Monroe County
Comprehensive Plan
Technical Document Update
May 2011

Elements

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Note: After the substantial completion of this document, House Bill 7207 was passed by the Florida Legislature. HB 7207 became law on July 1, 2011. While HB 7207 substantially modified the legal framework for growth management in Florida, the affect on this Technical Document was not significant. The utility and accuracy of the information and data remain valid and unchanged. As such, references to HB 7207 and associated statutory changes are not included in this document.

As part of HB 7207, Rule 9J-5 of the Florida Administrative Code was completely repealed. However, many sections of this rule were incorporated into Chapter 163 of the Florida Statutes. Due to the timing of the completion of the final draft of the Technical Document and the enactment of HB 7207, references to 9J-5 remain throughout the document.

For reference and informational purposes, a summary of changes to Chapter 163 as they relate to the repealed 9J-5 is provided. Specifically, Section 163.3177 F.S. includes complete, significant portions or variations of the following 9J-5 rule language:

- Purpose:
  - 1092-1095: 9J-5.001(5)
- General Format and Data and Analyses Requirements:
  - 1063-1078: 9J-5.005(6)
  - 1081-1085: 9J-5.005(2)(g)
  - 1102-1105: 9J-5.005(2)(a)
  - 1111-1112: 9J-5.005(1)(c)
  - 1118-1119: 9J-5.005(2)(c)
  - 1126-1130: 9J-5.005(2)(e)

- Internal Consistency:
  - 1140-1142: 9J-5.005(5)(a)
  - 1143-1146: 9J-5.005(5)(b)
- Future Land Use Element:
  - 1311-1314: 9J-5.006(1)(c)
  - 1314-1316: 9J-5.006(3)(a)
  - 1368-1370: 9J-5.006(3)(b)1
  - 1371-1372: 9J-5.006(3)(b)4
  - 1373: 9J-5.006(3)(c)2
  - 1374-1377: 9J-5.006(4)(b)
  - 1439-1440: 9J-5.006(2)(a)
  - 1441-1444: 9J-5.006(2)(b)
  - 1445-1446: 9J-5.006(2)(c)
  - 1448-1449: 9J-5.006(3)(b)8
  - 1450-1493: 9J-5.006(5)(g)
  - 1494-1522: 9J-5.006(5)(j)3
  - 1523-1543: 9J-5.006(1)(a) and (4)(a)
  - 1544-1552: 9J-5.006(1)(b)
- Transportation Element:
  - 1567-1581: 9J-5.019(1)
  - 1591-1596: 9J-5.019(5)
  - 1597-1610: 9J-5.019(3)
  - 1611-1640: 9J-5.019(3) and (4)
- General Sanitary Sewer, Solid Waste, Drainage, Potable Water and Natural Groundwater Aquifer Recharge Element:
  - 1691-1699: 9J-5.011(1)(b)
  - 1700-1701: 9J-5.011(1)(c)
  - 1704-1705: 9J-5.011(2)(c)1
  - 1705-1710: 9J-5.011(2)(b)1-5
- Conservation Element:
  - 1756-1773: 9J-5.013(1)(a)1-5
  - 1774-1776: 9J-5.013(2)(a) and (b)
  - 1777: 9J-5.013(2)(b)1
  - 1778-1784: 9J-5.013(2)(b)2
  - 1785-1787: 9J-5.013(2)(c)4
  - 1788-1790: 9J-5.013(2)(b)3
  - 1791-1794: 9J-5.013(2)(b)4
  - 1795-1803: 9J-5.013(2)(c)7-10
  - 1804-1805: 9J-5.013(3)(a)
  - 1806-1820: 9J-5.013(3)(b)
  - 1823-1828:9J-5.013(1)(c)
- Housing Element:
  - 1893-1906: 9J-5.010(1)(a)
  - 1910-1914: 9J-5.010(3)(b)1-3
  - 1915-1921: 9J-5.010(3)(c)1-3
- Coastal Management Element:
  - 1970: 9J-5.012(3)(b)10 and (c)11

- Intergovernmental Coordination Element:
  - 2060-2064: 9J-5.015(3)(b)2
  - 2064-2068: 9J-5.015(1)
  - 2069-2072: 9J-5.015(3)(b)3

Additional Notes:

The "Florida Department of Community Affairs" and "the State Land Planning Agency" are used interchangeably throughout this document.

This document was printed in its entirety in May 2011 and presented to the Monroe County Planning Commission on May 25, 2011 and the Board of County Commissioners on June 20, 2011. The document contains a May 2011 footer throughout. Comments that were received from the date of these meetings, up to June 27, 2011 have been reviewed and, where appropriate, pages have been updated accordingly. Only those pages that have been updated are dated July 2011 in the footer for reference.

INTRODUCTION AND EXECUTIVE SUMMARY
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1.0 INTRODUCTION AND EXECUTIVE SUMMARY

1.1 Introduction

1.1.1 Purpose

The purpose of the *Monroe County 2030 Comprehensive Plan Technical Document* (the "Technical Document"*)* is intended to address the data, inventory, and analyses requirements of Chapter 163, Florida Statutes (F.S.). The data, inventory and analyses contained within this document supports the development of goals, objectives, policies, and implementation programs established in the *Policy Document* component of the *Monroe County 2030 Monroe County Comprehensive Plan* (the "Plan").

1.1.2 Federal and State Influence Upon Land Use Planning in Monroe County

Federal and State government involvement in Monroe County (the "County") land use planning and decision-making is extensive due to the presence of aquatic and terrestrial resources that are of regional and national significance. This involvement has heavily influenced the County's comprehensive planning process. Many of the County's goals, objectives, and policies have been mandated by the State pursuant to the Area of Critical State Concern designation or by the Federal government as conditions for the County's continued participation in the National Flood Insurance Program. As part of the Plan, the County is compelled to include an Intergovernmental Coordination Element that seeks in part to increase the effectiveness, efficiency, and responsiveness of government, and provide for consistency in decisions and actions between various agencies, including the Florida Department of Environmental Protection, Army Corps of Engineers, and the United States Fish & Wildlife Service. By incorporating the Intergovernmental Coordination Element, however, the County does not assume liability for takings of private property attributed to the adoption or application of regulations by Federal and State agencies, or to the County's goals, objectives, and policies imposed by the Federal and State government to implement their statutes, including the Clean Water Act and the Endangered Species Act.

1.1.3 Government Structure

The County, created in 1824, is a political subdivision of the State of Florida. The powers and authority of the County government emanate from the Florida State Legislature. The County is a non-chartered county and the government functions in accordance with the Florida Constitution.

The Board of County Commissioners (BOCC), which performs the legislative and executive functions of the county government, consists of five members elected at large by the citizens. Each commissioner represents one of the five county districts and is elected for a term of four years.

1.1.4 Format of the Comprehensive Plan

The Plan is divided into three volumes: a Technical Document, Policy Document, and Map Atlas. The Technical Document contains background information including the technical support data analyses for the various elements of the Plan. The Policy Document contains the goals, objectives and policies for each element, the capital improvements implementation program, and the Comprehensive Plan monitoring and evaluation procedures. The Map Atlas contains maps depicting background information for the various elements (Existing Land Use, Habitat, Existing Transportation, etc.) as well as the Future Land Use and Future Transportation Map series.

Pursuant to Chapters 163 and 380, Florida Statutes, the Technical Document does not require adoption by the Board of County Commissioners (BOCC). The unadopted status of the Technical Document allows for continual updating and refinement of the data contained herein without requiring amendments to the Plan.

The following sections of the Plan require adoption by the BOCC:

- The Goals, Objectives and Policies contained in the Policy Document;
- The requirements for capital improvements implementation including the Five-Year Schedule of Capital Improvements, contained in the Policy Document;
- The procedures for monitoring and evaluation of the Plan, contained in the Policy Document;
- The Future Land Use and Transportation Map series, contained in the Map Atlas; and
- The Plan Adoption Ordinance, included as an appendix to the Policy Document.

This Technical Document contains chapters for each element of the Plan. Each chapter addresses a topic or group of topics involved with the physical development of land within the County and its adjacent planning areas. The elements address the appropriateness of various kinds of land use, the impacts of those land uses on natural resources, the services needed for existing and future development, the fiscal capability of the County to provide those services, and a capital improvement service delivery schedule.

The format of each chapter of this Technical Document provides a purpose for the Plan elements; the level-of-service standards (where applicable); an inventory and analysis of existing conditions and deficiencies; a description of future needs and a listing of planned improvements for inclusion in the Capital Improvements Element.

1.1.5 Planning Time Frame

The Plan was prepared to cover a twenty-year planning horizon (2010-2030) and includes population projections for this twenty-year period.

1.1.6 Data Sources and Limitations

Available data, as provided by various local, regional, and state agencies, has been utilized and sources have been identified throughout this Technical Document.

There are limitations to the data and these limitations have been noted where relevant throughout this document. The 2010 U.S. Census is not scheduled to be released until early 2011; therefore, unless otherwise noted, the local population and housing data is based on the 2000 U.S. Census.

1.2 Executive Summary

1.2.1 Geographic Setting

The County includes the Mainland area and over 1,700 islands which lie along the Florida Straits, dividing the Atlantic Ocean to the east from the Gulf of Mexico to the west, and defining one edge of the Florida Bay. The mainland part of the County is made up of the Everglades National Park and the southern portion of Big Cypress National Preserve. The Florida Keys extend 233 miles southwestward in a gradual arc from Biscayne Bay to the Dry Tortugas in the Gulf of Mexico.

1.2.2 Socio-Economic Characteristics

To effectively create a comprehensive plan that reflects the needs of the County, the social characteristics that define the community must be considered. Using information obtained from the *2009 American Community Survey, 1-Year Estimate*, the following items list several socio-economic facts regarding the County as a whole:

- HOUSEHOLDS AND FAMILIES: In 2009 there were 28,335 households in the County. The average household size was 2.52 people. Households include all the persons who occupy a housing unit.

  Families made up 57.5 percent of the households in the County. This figure includes married-couple families (46.3%). Non-family households made up 42.5 percent of all households in the County. Most of the non-family households were people living alone, but some were composed of people living in households in which no one was related to the householder.

- GEOGRAPHIC MOBILITY: In 2009, 89 percent of the people at least one year old living in the County were living in the same residence one year earlier; 5 percent had moved

during the past year from another residence in the same county, 2 percent from another county in the same state, 3.5 percent from another state, and 0.6 percent from abroad.

- EDUCATION: In 2009, 31.5 percent of people 25 years and over had at least graduated from high school and 24.4 percent had a bachelor's degree or higher. Eleven percent were dropouts; they were not enrolled in school and had not graduated from high school.

  The total school enrollment in the County was 13,201 in 2009. Nursery school and kindergarten enrollment was 1,500 and elementary or high school enrollment was 8,027 children. College or graduate school enrollment was 3,670.

- DISABILITY: In the County, among people at least five years old and older in 2009, 13 percent reported a disability. The likelihood of having a disability varied by age - from 3 percent of people under 18 years old, to 12 percent of people 18 to 64 years old, and to 30.5 percent of those 65 and older.

- INDUSTRIES: In 2009, for the employed population 16 years and older, the leading industries in the County were Arts, entertainment, and recreation, and accommodation and food services, 20 percent, and Educational services, and health care, and social assistance, 14.7 percent.

- OCCUPATIONS AND TYPE OF EMPLOYER: Among the most common occupations were: Service occupations, 28.8 percent; Management, professional and related occupations, 28.4 percent; Sales and office occupations, 27 percent; Construction, extraction, maintenance, and repair occupations, 9 percent; and Production, transportation, and material moving occupations, 4 percent. Seventy percent of the people employed were Private wage and salary workers; 20 percent were Federal, State, or local government workers; and 10 percent were Self-employed in own not incorporated business workers.

- TRAVEL TO WORK: Sixty-one percent of the County workers drove to work alone in 2009, 11 percent carpooled, 1 percent took public transportation, and 20.7 percent used other means. The remaining 6 percent worked at home. Among those who commuted to work, it took them on average 16.9 minutes to get to work.

- INCOME: The median income of households in the County was $49,721. Seventy-six percent of the households received earnings and 21 percent received retirement income other than Social Security. Thirty-one percent of the households received Social Security. The average income from Social Security was $15,589. These income sources are not mutually exclusive; that is, some households received income from more than one source.

- POVERTY AND PARTICIPATION IN GOVERNMENT PROGRAMS: In 2009, 12 percent of people were in poverty. 14.3 percent of related children under 18 were below the

poverty level, compared with 10.7 percent of people 65 years old and over. Seven percent of all families and 28 percent of families with a female householder and no husband present had incomes below the poverty level.

- HOUSING CHARACTERISTICS: In 2009, the County had a total of 54,243 housing units, 48 percent of which were vacant. Of the total housing units, 61 percent was in single-unit structures, 24 percent was in multi-unit structures, and 15 percent was mobile homes. Twenty-six percent of the housing units were built since 1990.

- OCCUPIED HOUSING UNIT CHARACTERISTICS: In 2009, the County had 28,335 occupied housing units - 17,901 (63%) owner occupied and 10,434 (37%) renter occupied. Four percent (1.193 units) of the households did not have telephone service and six percent (1.696 units) of the households did not have access to a car, truck, or van for private use. Thirty-nine percent had two vehicles and another 9 percent had three or more vehicles.

- HOUSING COSTS: The median monthly housing costs for mortgaged owners was $2,323, non-mortgaged (housing units without a mortgage) owners $592, and renters $1,206. 62.2 percent of owners with mortgages, 22.1 percent of owners without mortgages, and 65.8 percent of renters in the County spent 30 percent or more of household income on housing.

- POPULATION: Annual population estimates for municipalities and unincorporated areas indicate permanent population fell in the Keys from 2006-2008, with some return to growth evidenced in 2009. The effect of the short term decline is to drive the long term population projections down. Thus, both recent history and future projections from the Bureau of Economic and Business Research (BEBR) suggest a downward trend in permanent population.

  There is ongoing ROGO based residential growth and there is a substantial inventory of non-conforming, substandard, live-aboard and RV camp housing. Substandard, non-conforming units are being gradually removed from inventory, however, not at a rate fast enough to net out all residential growth. A portion of the permanent population losses have occurred as a result of the recession, a rise in foreclosures, depletion of affordable housing and increased unemployment; nearly 3,500 units have been foreclosed throughout the Keys since 2005. The rise in home prices and threat of hurricanes has also contributed to some permanent population loss. Losses associated with some of these conditions may be temporary, resulting in renewed growth after the recession. The BEBR annual permanent population estimate for 2009 indicated a net positive permanent population growth in 2009 and small losses in 2010.

  On the other hand, of all the new single family housing growth in the County since 1999, nearly 70 percent has been in non-homesteaded units. It is likely this is a function of both growth in seasonal population as well as permanent population loss, which may cause once permanently occupied existing units to become non-homesteaded. This

latter aspect represents a shift from existing permanent population to seasonal population and is why the non-homesteaded mix is so high.

Table 1.1 shows the permanent and seasonal population projections for unincorporated Monroe County through the year 2030.

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Table 1.1– Unincorporated Functional Population Distribution by Sub-Area

Year	Upper	Middle	Lower	Total
2000	29,183	2,138	37,957	69,277
2001	29,205	2,145	38,163	69,512
2002	29,222	2,151	38,364	69,737
2003	29,192	2,155	38,504	69,850
2004	29,150	2,157	38,628	69,935
2005	29,313	2,175	39,027	70,515
2006	29,222	2,174	39,089	70,485
2007	29,075	2,169	39,073	70,317
2008	28,928	2,169	39,240	70,338
2009	29,185	2,199	39,927	71,311
2010	28,980	2,183	39,645	70,808
2011	29,126	2,194	39,846	71,166
2012	29,187	2,199	39,929	71,315
2013	29,248	2,203	40,013	71,464
2014	29,309	2,208	40,097	71,613
2015	29,370	2,212	40,181	71,763
2016	29,429	2,217	40,263	71,909
2017	29,489	2,221	40,345	72,055
2018	29,549	2,225	40,427	72,201
2019	29,608	2,230	40,510	72,348
2020	29,668	2,234	40,592	72,494
2021	29,728	2,238	40,674	72,640
2022	29,787	2,243	40,756	72,786
2023	29,847	2,247	40,838	72,933
2024	29,907	2,252	40,921	73,079
2025	29,966	2,256	41,003	73,225
2026	30,026	2,260	41,085	73,371
2027	30,086	2,265	41,167	73,518
2028	30,145	2,269	41,249	73,664
2029	30,205	2,274	41,332	73,810
2030	30,265	2,278	41,414	73,956

Source: Fishkind & Associates, Inc.

NOTE: Slight differences in totals due to rounding

1.2.3 Land Use

Due to the differences in how the Geographic Information System (GIS) mapping data structures for the existing, future and tier maps were developed, there will be slight variations in the acreages reported. (See **Section 2.3.1** of *Chapter 2.0 Future Land Use* for a detailed discussion related to the limitations of these data structures.)

Table 1.2 shows the existing acreage and **Table 1.3** shows the amount of vacant land available by Land Use and Tier categories within the unincorporated areas of the County. **Table 1.4** shows the amount of land in each land use category and **Table 1.6** provides and estimate of the theoretical density and intensity based upon the corresponding density or intensity allowances for the various land uses identified in **Table 1.5**.

Table 1.2 - Existing Land Use Acreages, Unincorporated, By Planning Area

Existing Land Use	Lower Keys	Middle Keys	Upper Keys	Total	Percent of Total
Commercial	337.0	67.7	495.3	900.0	1.2%
Conservation	36,201.6	1,458.7	17,859.2	55,519.5	75.9%
Educational	49.2	0.0	30.8	80.0	0.1%
Industrial	414.8	0.2	40.6	455.6	0.6%
Institutional	99.6	0.4	60.8	160.8	0.2%
Military	4,025.7	0.0	0.0	4,025.7	5.5%
Other Public Utilities and Right-of-Way(ROW)	1,665.6	141.8	1,429.3	3,236.6	4.4%
Public Buildings and Grounds	17.1	33.0	61.2	111.3	0.2%
Recreational	640.8	132.1	548.3	1,321.2	1.8%
Residential	2,599.9	201.9	2,186.4	4,988.2	6.8%
Vacant or Undeveloped	1,376.2	108.3	854.4	2,338.9	3.2%
Total	47,427.6	2,144.1	23,566.2	73,137.9	100.0%
Percent Total by Planning Area	64.8%	2.9%	32.2%	100.0%	--

Source: Monroe County Growth Management, 2010, "MC_ELU_510"
Monroe County Property Appraiser, 2010, "Public_Parcel"
Note: Slight differences due to rounding.

As seen in **Table 1.2**, the land mass of the unincorporated Keys portion of the County is approximately 73,138 acres. Sixty-five percent of land area is found in the Lower Keys PA, 3 percent in the Middle Keys Planning Area (MKPA), and 32 percent in the Upper Keys Planning Area (UKPA). Since the Lower Keys Planning Area (LKPA) is the largest in land mass, it is not surprising that it has a number of existing land use designations, when compared to the other Planning Areas (PA). The exception applies to Commercial and Public Buildings and Grounds where percent ratios are larger in the UKPA.

More than 75 percent of land in the unincorporated Keys is used for conservation purposes. Other land uses, in descending order, include: Residential (6.8%), Military (5.5%), Other

Public (4.4%), Vacant or Undeveloped (3.2%), Recreational (1.8%), and Commercial (1.2%). All other land uses are less than 1 percent.

Table 1.3 – Vacant Land by Tier and Planning Area

	I	II	III	III A	0[1]	U	Vacant acres in Tier	Net Parcels and Acres
Lower Keys								
Vacant Parcels	1,301	418	1,360	27	NA	218	NA	3,324
Acres	753.5	75.3	289.8	9.4	15.7	202.4	1,346.0	1,330.3
Percent Vacant Acres	56.6%	5.7%	21.8%	0.7%	NA	15.2%	NA	NA
Middle Keys								
Vacant Parcels	3	0	414	0	NA	0	NA	417
Acres	28.2	0.0	77.5	0.0	0.1	0.0	105.8	105.7
Percent Vacant Acres	26.6%	0.0%	73.4%	0.0%	NA	0.0%	NA	NA
Upper Keys								
Vacant Parcels	608	0	1,333	227	NA	774	NA	2,942
Acres	352.5	0.0	227.9	63.9	2.2	126.2	772.7	770.5
Percent Vacant Acres	45.7%	0.0%	29.6%	8.3%	NA	16.4%	NA	NA
Total Parcels	**1,912**	**418**	**3,107**	**254**	**NA**	**992**	**NA**	**6,683**
Total Acres	**1,134.2**	**75.3**	**595.2**	**73.2**	**18.1**	**328.6**	**2,224.5**	**2,206.4**

Source: Monroe County Growth Management, 2010, "MC_ELU_510"; Monroe County Growth Management, 2010, "MC_FLUM_510"; Monroe County Growth Management, 2010, "Tier_0110"

Tiers are:

I = Tier I – Natural Areas

II = Tier II (Big Pine Key and No Name Keys in the Lower Keys Planning Area only)

III = Tier III – Infill Areas

III-A = Special Protection Area (SPA)

0 = Property does not have a Tier designation. Most of these occur in the Upper Keys and some are right-of-way parcels. Some lots were not originally designated because of mapping errors; the majority of which are currently being reviewed by the Tier Designation Review Committee and will be designated at a later date.

U = Undesignated Tier - Properties that originally had a Tier designation but became undesignated by a court order. This court order was in response to the Everglades Law Center's analysis of the Tier System. As a result of the court order, it was determined that a number of parcels should be re-designated. The Tier Designation Review Committee is currently addressing the issues

Note: Slight differences due to rounding.

Tier 0 is used for illustration purposes only and is not part of the analysis.

Vacant acres in all tiers after subtracting Tier 0.

As seen in **Table 1.3,** the LKPA contains 1,330.3 acres (3,324 parcels), which are vacant and are located within a tier designation. Most of the vacant land, (56.6%) is located in Tier I, comprising 1,301 parcels; and 21.8 percent (1,360 parcels) are designated Tier III. The UNDES Tier accounts for 15.2 percent or 218 parcels of vacant land. This PA is the only

planning area with 418 vacant parcels (5.7%) designated Tier II, which only applies to Big Pine Key and No Name Key. Less than one percent of vacant land (27 parcels) is located in Tier III-A. Until the UNDES land is designated under the Tier System, development potential will remain unclear. The County's ROGO system supports development on parcels designated Tier II, III and III-A. These tiers constitute 28.1 percent of vacant land in the LKPA.

The MKPA has 105.7 vacant acres or 417 vacant parcels, which are located in one of the tiers. Most of the vacant land, 73.4 percent or 414 parcels, are located within Tier III-Infill Area. The remaining three parcels or 26.6 percent is located within Tier I. This analysis is meant for illustrative purposes only and is not a true picture of development potential since a closer review of the individual parcel characteristics is needed in order to capture the Tier System true applicability.

The UKPA includes 770.5 acres or 2,942 parcels of vacant land within the Tier System. Most vacant acres (45.7%) are located in Tier I and constitute 608 parcels. Another 1,333 parcels (29.6%) are located in Tier III, these parcels constitute 227.9 acres. Vacant land located in the UNDES Tier constitutes 774 vacant parcels, 126.2 acres or 16.4 percent of vacant acres. Lastly, 8.3 percent of vacant acres or 227 parcels are located in Tier III-A. Tiers III and III-A include 37.9 percent of the vacant acres. This analysis is meant for illustrative purposes only and is not a true picture of development potential since a closer review of the individual parcel characteristics is needed in order to capture the Tier System true applicability.

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Table 1.4 - Future Land Use Acreages Distribution, Unincorporated, By Planning Area

Future Land Use	Lower Keys	Middle Keys	Upper Keys	Total	Percent of Total
Agriculture (A)	18.8	0.0	1.9	20.7	0.0%
Airport District (AD)	22.6	0.0	19.7	42.2	0.1%
Conservation (C)	19,591.5	489.1	11,553.9	31,634.6	43.2%
Education (E)	28.5	0.0	32.2	60.6	0.1%
Industrial (I)	415.8	0.0	0.0	415.8	0.6%
Institutional (INS)	87.6	0.0	43.5	131.0	0.2%
Military (M)	4,381.2	0.0	0.0	4,381.2	6.0%
Mixed Use / Commercial (MC)	885.4	138.6	1,009.1	2,033.2	2.8%
Mixed Use/Commercial Fishing (MCF)	113.2	25.3	12.6	151.1	0.2%
Public Buildings/Grounds (PB)	20.2	0.0	26.8	47.1	0.1%
Public Facilities (PF)	55.7	27.2	57.4	140.3	0.2%
Recreation (R)	526.8	848.3	638.5	2,013.5	2.8%
Residential Conservation (RC)	12,133.9	266.3	6,189.9	18,590.1	25.40%
Residential Low (RL)	2,846.5	23.9	941.0	3,811.4	5.2%
Residential Medium (RM)	2,922.1	231.3	2,137.3	5,290.7	7.2%
Residential High (RH)	422.3	41.8	903.0	1,367.0	1.9%
Undesignated (UNDS)	2,966.7	52.4	0.1	3,019.2	4.1%
Total	**47,438.7**	**2,144.1**	**23,566.8**	**73,149.6**	**100.0%**
Percentage of Total	64.9%	2.9%	32.2%	100.0%	--

Source: Monroe County Growth Management, 2010, "MC_FLUM_510"; Future Land Use Densities and Intensities Table in Goals Objectives and Policies, Pg 3.1-21
Note: Slight differences due to rounding.

As seen in **Table 1.4**, approximately 43 percent of land in the unincorporated Keys has a Conservation Land Use Designation. Other land uses, in descending order, include: Residential Conservation (25.4%), Residential Medium (7.2%), Military (6.0%), Residential Low (5.2%), Undesignated (4.1%), Mixed Use Commercial (2.8%), Recreational (2.8%), and Residential High (1.9%). All other land uses are less than 1 percent.

Allocated density is calculated in dwelling units per gross acre, while maximum net density is calculated in dwelling units per net buildable acre. The net buildable area is that area which is developable and not in open space or required as a minimum buffer yard or setback as provided for in the Land Development Code (LDC). The maximum floor area ratio is the maximum total floor area of the building on a lot divided by the gross area of the lot or site. (MCLDC Sec. 101-1). This system allows for a site-by site determination of the appropriate density and intensity each site proposed for development.

Table 1.5 –Allocated Density and Maximum Floor Area Ratio

Future Land Use	Allocated Density (per acre)	Maximum Allowed Floor Area
Agriculture (A)	0 du	.020-0.25
Airport District (AD)	0 du	0.10
Conservation (C)	0 du	0.05
Education (E)	0 du	0.30
Industrial (I)	1 du	0.25-0.60
Institutional (INS)	0 du	0.25-0.40
Mainland Native (MN)	0.01 du	0.10
Military (M)	6 du	0.30-0.50
Mixed Use / Commercial (MC)	1-6 du	0.10-0.45
Mixed Use/Commercial Fishing (MCF)	3-8 du	0.25-0.40
Public Buildings/Grounds (PB)	0 du	0.10-0.30
Public Facilities (PF)	0 du	0.10-0.30
Recreation (R)	0.25 du	0.20
Residential Conservation (RC)	0-0.25 du	0-0.10
Residential Low (RL)	0.25-0.50 du	0.20-0.25
Residential Medium (RM)	0.5-8 du	0.00
Residential High (RH)	3-16 du	0.00
Undesignated (UNDS)	NA	NA

Source: *Policy Document of the 2010 Monroe County Comprehensive Plan, Policy 101.4.21.*
Policy 101.4.21: Maximum net density is the maximum density allowed with the use of TDRs

Table 1.5 illustrates the density and density allowances for the various land uses within the County. The County's current policy determines both allocated and maximum net densities for residential as well as hotel-motel, recreational vehicle and institutional residential uses. For the purposes of the analyses of residential density below, and those within *Chapter 2.0 Future Land Use* and *Chapter 7.0 Housing*, allocated density was used.

Table 1.6 - Vacant Land Theoretical Density and Intensity by Land Use Category and Tier

Future Land Use	I	II	III	III A	U	Max. Allowed Density	Max. Allowed Intensity
Airport District	0	0	9.2	0	0	0	39,988.1
Conservation	80.1	0.4	0	0	0	0	175,198.3
Industrial	0.2	0	15.2	0	88	103.4	2,701,678.3
Institutional	1.2	0	0.7	0	0	0	32,234.4
Military	94.4	0	0	0	0	566.4	2,056,032.0
Mixed Use/Commercial	51.2	4.1	100.6	34.9	28.1	1,313.10	4,289,897.7
Mixed Use/Commercial Fishing	10.5	9.7	7.1	0	14.2	332.0	723,096.0
Recreation	18.3	0	3.1	0	0.1	5.4	186,523.9
Residential Conservation	360.7	0	2.1	0.5	57.4	105.1	1,832,046.5
Residential Low	373.9	0.9	33.8	13.1	10	215.8	4,700,015.1
Residential Medium	131.8	59.1	341.8	22.9	111.0	5,331.9	0
Residential High	13.7	1.2	39.8	2.0	19.9	1,225.9	0
Total	**1135.7**	**75.3**	**553.2**	**73.3**	**328.7**	9,199.0	**16,769,710.3**

Note: Slight differences due to rounding.

As illustrated in **Table 1.6**, the majority of vacant land is located within Tier I; although development would concentrate in the 702 acres within Tier II, III, and III-A. The maximum allowed density within all tiers are 10,258 dwelling units and intensity of 17,420,733 square feet.

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Table 1.7 provides an analysis of the all the land within the unincorporated areas of the County based upon future land use designation. The theoretical maximum density is based upon the County's projected population. For unincorporated Monroe County, most of the land is designated as Conservation (43.2%) and Residential Conservation (25.4%). Less than one percent is noted for Agriculture, Airport District, Education, Industrial, Institutional, Mixed Use Commercial Fishing, Public Buildings/Grounds and Public Facilities.

Table 1.7 - Maximum Theoretical Density and Intensity by Land Use

Future Land Use	Acres	Max. Allowed Dwelling Units	Max. Allowed Floor Area (sq/ft)
Agriculture (A)	20.7	0	225,648.08
Airport District (AD)	42.2	0	183,953.9
Conservation (C)	31634.6	0	68,900,049.9
Education (E)	60.6	0	792,312.8
Industrial (I)	415.8	415.8	10,867,087.4
Institutional (INS)	131.0	0	2,283241
Military (M)	4381.2	26287.2	95,422,536.00
Mixed Use/ Commercial (MC)	2033.2	12198.9	39,853,806.3
Mixed Use/ Commercial Fishing (MCF)	151.1	1208.7	2,632,417.9
Public Buildings/ Grounds (PB)	47.1	0	614,980.1
Public Facilities (PF)	140.3	0	1,833,048.3
Recreation (R)	2013.5	503.4	17,541,699.1
Residential Conservation (RC)	18590.1	4647.6	80,978,388.5
Residential Low (RL)	3811.4	1905.7	41,505,710.4
Residential Medium (RM)	5290.7	42325.7	0.00
Residential High (RH)	1367.0	21872.3	0.00
Undesignated (UNDS)	3019.2	0	0.00
Total	**73,149.6**	**67,643.00**	**363,634,872.5**

Source: Monroe County Growth Management, 2010 "MC_FLUM_510"; Future Land Use Densities and Intensities Table in Goals Objectives and Policies, pg 3.1-21.
Note: Slight difference due to rounding.

1.2.4 Traffic Circulation

The roadway network in the County, particularly the Florida Keys, is unique. The Harry S. Truman Blue Star Memorial Overseas Highway (U.S. 1 and S.R. 5), functions as an arterial, collector, and "Main Street" all rolled into one. Nowhere else is there a 112 miles-plus long archipelago connected by over 40 bridges along a single roadway.

Roadway access to and from the County is provided by only two roads: U.S. 1 and Card Sound Road (CR 905A). These two facilities serve the Florida Keys as economic and public safety lifelines. It cannot be overstated the need to assess the operation of U.S. 1 within a regional context to ensure the Florida Keys' only continuous roadway link will continue to function properly.

While U.S. 1 is the principal highway in the County, it is by no means the only road. Branching off from U.S. 1 are numerous local and collector roads serving the many subdivisions and the five incorporated cities throughout the Keys. As of the end of 2009, the county has a total of 801.445 centerline miles of roadways. Of this total, 583.453 miles are in designated small urban areas and 217.992 miles are in designated rural areas. The daily vehicle miles traveled averaged 3,193,243 DVMT.

A key traffic capacity limitation in the County is the ability of various segments of U.S. 1 to accommodate traffic volume increases at LOS C. The ability of the County to accommodate traffic volume growth varies by segment of U.S. 1 and by collector roadway. Thus, the distribution of potential residential growth by segment of U.S. 1 (and by Planning Area) is a critical factor in determining the future roadway segments which are over capacity. **Table 1.8** presents the estimated 2015-2030 forecasts of reserve volumes and residential capacities for each of the U.S. 1 segments.

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Table 1.8 - 2010-2030 Reserve Volume and Residential Unit Capacity Forecasts per Segment of U.S. 1

U.S. 1 Segment		2010		2015		2020		2025		2030	
		Reserve Volume [1]	Residential Unit Capacity	Reserve Volume [1]	Residential Unit Capacity	Reserve Volume [1]	Residential Unit Capacity	Reserve Volume [1]	Residential Unit Capacity	Reserve Volume [1]	Residential Unit Capacity
1	Stock Island	2,186	342	1,991	311	1,864	291	1,737	271	1,609	251
2	Boca Chica	4,973	777	4,156	649	3,566	557	2,968	464	2,358	368
3	Big Coppitt	549[2]	86	Note 3	Note 3	Note 3	Note 3	Note 3	Note 3	Note 3	Note 3
4	Saddlebunch	2,593	405	1,419	222	584	91	Note 3	Note 3	Note 3	Note 3
5	Sugarloaf	265	41	Note 3	Note 3	Note 3	Note 3	Note 3	Note 3	Note 3	Note 3
6	Cudjoe	2,525	395	2,024	316	1,670	261	1,310	205	942	147
7	Summerland	1,967	307	1,531	239	1,223	191	911	142	593	93
8	Ramrod	1,866	292	1,409	220	1,086	170	758	119	424	66
9	Torch	2,087	326	1,668	261	1,372	214	1,072	167	765	120
10	Big Pine	1,520	238	846	132	371	58	Note 3	Note 3	Note 3	Note 3
11	Bahia Honda	7,187	1,123	5,806	907	4,836	756	3,851	602	2,845	445
12	7-Mile Bridge	3,716	581	2,366	370	1,299	203	248	39	Note 3	Note 3
13	Marathon	17,771	2,777	16,094	2,515	14,792	2,311	13,537	2,115	12,269	1,917
14	Grassy	0[2]	0	Note 3	Note 3	Note 3	Note 3	Note 3	Note 3	Note 3	Note 3
15	Duck	1,565	245	1,023	160	542	85	77	12	Note 3	Note 3
16	Long	6,722	1,050	4,784	748	3,018	472	1,315	206	Note 3	Note 3
17	Lower Matecumbe	940[2]	147	Note 3	Note 3	Note 3	Note 3	Note 3	Note 3	Note 3	Note 3
18	Tea Table	727[2]	114	Note 3	Note 3	Note 3	Note 3	Note 3	Note 3	Note 3	Note 3
19	Upper Matecumbe	611	95	Note 3	Note 3	Note 3	Note 3	Note 3	Note 3	Note 3	Note 3
20	Windley	4,468	698	4,086	638	3,699	578	3,306	517	2,907	454
21	Plantation	2,881	450	952	149	Note 3	Note 3	Note 3	Note 3	Note 3	Note 3
22	Tavernier	9,539	1,490	7,778	1,215	5,991	936	4,178	653	2,337	365
23	Key Largo	9,121	1,425	7,897	1,234	6,065	948	4,501	703	2,915	455
24	Cross	7,187	1,123	5,906	923	4,605	719	3,285	513	1,945	304

NOTES: These individual reserve volumes may be unobtainable, due to the constraint imposed by the overall reserve volume.

1. Value shown is 5% Allocation for 2010. County regulations and FDOT policy allow segments that fail to meet LOS C standards to receive an allocation not to exceed five percent below the LOS C standard. The resulting flexibility allows a limited amount of additional land development (number of residential units as shown) to continue until traffic speeds are measured the following year or until remedial actions are implemented.
2. Residential capacity not determined for future years where forecast reserve capacity is negative.

Based upon the measured and forecasted speeds, reserve volumes and residential capacities for all of the U.S. 1 segments, the following segments are projected to operate below the acceptable LOS C:

Year 2010 (Current):
- U.S. 1 on Big Coppitt Key from MM 9.0 to MM 10.5 (segment 3), LOS D;
- U.S. 1 on Grassy Key from MM 54.0 to 60.5 (Segment 14), LOS D;
- U.S. 1 on Lower Matecumbe Key from MM 73.0 to 77.5 (Segment 17), LOS D; and
- U.S. 1 on Tea Table Key from MM 77.5 to MM 79.5 (segment 18), LOS D.

Year 2015:
- U.S. 1 on Big Coppitt Key from MM 9.0 to MM 10.5 (segment 3), LOS D;
- U.S. 1 on Sugarloaf Key from MM 16.5 to 20.5 (segment 5), LOS D;
- U.S. 1 on Grassy Key from MM 54.0 to 60.5 (Segment 14), LOS E;
- U.S. 1 on Lower Matecumbe Key from MM 73.0 to 77.5 (Segment 17), LOS D;
- U.S. 1 on Tea Table Key from MM 77.5 to MM 79.5 (segment 18), LOS D; and
- U.S. 1 on Upper Matecumbe Key from MM 79.5 to 84.0 (Segment 19), LOS D.

Year 2020:
- U.S. 1 on Big Coppitt Key from MM 9.0 to MM 10.5 (segment 3), LOS D;
- U.S. 1 on Sugarloaf Key from MM 16.5 to 20.5 (segment 5), LOS D;
- U.S. 1 on Grassy Key from MM 54.0 to 60.5 (Segment 14), LOS E;
- U.S. 1 on Lower Matecumbe Key from MM 73.0 to 77.5 (Segment 17), LOS D;
- U.S. 1 on Tea Table Key from MM 77.5 to MM 79.5 (segment 18), LOS D;
- U.S. 1 on Upper Matecumbe Key from MM 79.5 to 84.0 (Segment 19), LOS D; and
- U.S. 1 on Plantation Key from MM 86.0 to 91.5 (Segment 21), LOS D.

Year 2025:
- U.S. 1 on Big Coppitt Key from MM 9.0 to MM 10.5 (segment 3), LOS E;
- U.S. 1 on Saddlebunch Key from MM 10.5 to 16.5 (segment 4), LOS D;
- U.S. 1 on Sugarloaf Key from MM 16.5 to 20.5 (segment 5), LOS D;
- U.S. 1 on Big Pine Key from MM 29.5 to 33.0 (segment 10), LOS E;
- U.S. 1 on Grassy Key from MM 54.0 to 60.5 (Segment 14), LOS E;
- U.S. 1 on Lower Matecumbe Key from MM 73.0 to 77.5 (Segment 17), LOS E;
- U.S. 1 on Tea Table Key from MM 77.5 to MM 79.5 (segment 18), LOS E;
- U.S. 1 on Upper Matecumbe Key from MM 79.5 to 84.0 (Segment 19), LOS D; and
- U.S. 1 on Plantation Key from MM 86.0 to 91.5 (Segment 21), LOS D.

Year 2030:

- U.S. 1 on Big Coppitt Key from MM 9.0 to MM 10.5 (segment 3), LOS E;
- U.S. 1 on Saddlebunch Key from MM 10.5 to 16.5 (segment 4), LOS D;
- U.S. 1 on Sugarloaf Key from MM 16.5 to 20.5 (segment 5), LOS E;
- U.S. 1 on Big Pine Key from MM 29.5 to 33.0 (segment 10), LOS E;
- U.S. 1 on 7-Mile Bridge from MM 40.0 to 47.0 (segment 11), LOS D;
- U.S. 1 on Grassy Key from MM 54.0 to 60.5 (Segment 14), LOS E;
- U.S. 1 on Duck Key from MM 60.5 to 63.0 (segment 15), LOS D;
- U.S. 1 on Long Key from MM 63.0 to 73.0 (segment 16), LOS D;
- U.S. 1 on Lower Matecumbe Key from MM 73.0 to 77.5 (Segment 17), LOS E;
- U.S. 1 on Tea Table Key from MM 77.5 to MM 79.5 (segment 18), LOS E;
- U.S. 1 on Upper Matecumbe Key from MM 79.5 to 84.0 (Segment 19), LOS E; and
- U.S. 1 on Plantation Key from MM 86.0 to 91.5 (Segment 21), LOS E.

The County maintains over 600 miles of secondary roads, in addition to 25 bridges totaling less than one mile in length. The County is therefore responsible for a roadway system roughly five times the length of U.S. 1. Approximately 85 percent of the County's roadways are paved.

For County roadways, the maximum service volume threshold standard is established as LOS D.

Almost all county roadways currently operate at or better than LOS D. The one exception is Palm Avenue between White Street and U.S. 1 (N. Roosevelt Boulevard) which has a peak hour LOS of F based on 2009 traffic data.

1.2.5 Mass Transit

The County is currently served by two main public transit systems:

- Miami-Dade Transit in the northern region of the County with two routes (Dade-Monroe Express and Card Sound Express) serving the County from Key Largo to the City of Marathon; and

- The City of Key West Department of Transportation which operates:

  - Key West Transit with four fixed-route bus routes serving the City of Key West and Stock Island;
  - The Lower Keys Shuttle providing service in the southern portion of the County from the City of Marathon to the City of Key West; and
  - The Key West Park-N-Ride at The Old Town Garage.

Other transit related services providing limited service in the County include:

- Monroe County Transit's Paratransit Service;

- Guidance Clinic of the Middle Keys; and
- Greyhound Bus Line.

1.2.6 Ports, Aviation and Related Facilities

Within the County, there are eight airport facilities. One of these, Key West International Airport (KWIA) is the only commercial airport currently serving the community. The Florida Keys Marathon Airport (FKMA) provides only general aviation services, although non-scheduled air taxi service is provided. There are also four private airports or airstrips, one seaplane facility, and one military aviation facility: the U.S. Naval Air Station Key West. The KWIA and the Naval Air Station are situated in the Lower Keys. The FKMA is located in the Middle Keys. The seaplane facility is located on Stock Island. The four private airstrips are located throughout the Florida Keys.

While there is an abundance of coastline in the County, only two areas are considered port facilities. The Port of Key West, which is owned by the City of Key West and consists of cruise berths and passenger ferries, is located within the northwest quadrant of the city; while the privately-owned Stock Island port is considered to be the only truly industrial, deep water port in the County.

1.2.7 Housing

While the bulk of the land uses in the County are for conservation purposes, residential uses comprise the next highest land use activity. The County is predominantly a residential area, with a great deal of focus on a single-family home environment. Its location has attracted residential development not only for permanent, but also for seasonal residents. The amount of vacant land available is more than sufficient to accommodate the low level of projected population growth. However, due to the limited population growth (157 persons a year), the increasing vacancy rate, and the high price of land in a coastal community, there is no significant demand for new residential development from developers.

The responsibility lies with the private sector to provide for both owner-occupied and rental housing; although, the County does provide incentives for the development of affordable housing, including land acquisition and permit fee waivers. By ordinance, the County has adopted the *Florida Building Code, 2007* along with a fire safety code and administers and oversees contractor licensing. **Table 1.9** is an inventory of the housing types based on the 1990 and 2000 Census.

Table 1.9 – 1990-2000 Housing Types

	1990		2000		Change 1990-2000	
Unit Type	Number of Units	% Dist.	Number of Units	% Dist.	Number of Units	% Dist.
Single-Family (Detached)	14,711	45.0%	12,847	52.2%	-1,864	-12.7%
Single-Family (Attached)	992	3.0%	920	3.7%	-72	-7.3%
Duplex (2-units)	1,749	5.3%	669	2.7%	-1,080	-61.8%
Multi-Family (3+ units)	4,398	13.5%	2,561	10.4%	-1,837	-41.8%
Mobile Home/Trailer/Other	10,847	33.2%	7,598	30.9%	-3,249	-30.0%
Total Year-Round Units	**32,697**	**100.0%**	**24,595***	**100.0%**	**-8,102**	**-14.6%**

Source: Florida Housing Data Clearinghouse, April 2010
*41 units located in the Mainland PA
Note: To be updated on upon 2010 U.S. Census release May, 2011.

Table 1.10 -– Housing Inventory by Occupancy Status and Tenure, 2000

	Lower Keys		Middle Keys		Upper Keys		Total	
	Number Units	Percent	Number Units	Percent	Number Units	Percent	Number Units	Percent
Owner	6,159	71.9	328	81.6	4,847	71.5	11,334	70.4
Renter	2,413	28.1	74	18.4	1,934	28.5	4,421	29.6
Vacant	3,033	26.2	1,029	71.9	4,734	41.1	8,799	36.0
Occupancy	8,572	73.8	402	28.1	6,781	58.9	15,755	64.0
Total	**11,605**	**47.3**	**1,431**	**5.8**	**11,515**	**46.9**	**24,554***	**100.0**

Source: Florida Housing Data Clearinghouse, April 2010
*41 dwelling units located in the Mainland according to Census Block GIS analysis.
Note: To be updated on upon 2010 U.S. Census release May 2011.

Based upon the incorporated County population projections shown previously in **Table 1.1**, **Table 1.11** below illustrates the total housing need through the year 2030. For additional details related to the population projections, see *Chapter 2.0 Future Land Use Section 2.6 Population Projections.*

Table 1.11 - Projected Housing Need by Type, 2010-2030

	Seasonal*		Permanent**		Functional		Housing Need (functional only)
	# of households	Dwelling Units*	# of households	Dwelling Units*	# of households	Dwelling Units+	
2010	13,126	18,751	16,076	17,922	29,202	36,674	--
2015	13,358	19,083	16,225	18,089	29,584	37,172	498
2020	13,748	19,640	16,079	17,925	29,827	37,566	394
2025	14,138	20,197	15,933	17,762	30,071	37,960	394
2030	14,529	20,755	15,786	17,599	30,315	38,354	394
Total Need	**--**	**2,004**	**--**	**-323**	**--**	**1,680**	**1,680**

Fishkind & Associates, Inc., 2010, *Unincorporated Monroe County Population Projections;* Smith Travel Research; American Community Survey 2008

*Seasonal Dwelling units are # of households multiplied the occupancy rate of 70 percent

**Permanent dwelling units are # of households multiplied by the occupancy rate of 89.7 percent.

+ Functional dwelling units are the sum of seasonal and permanent dwelling units.

1.2.8 Potable Water

The Florida Keys Aqueduct Authority (FKAA) provides potable water to County residents and maintains the water distribution system up to individual property lines. Thereafter, property owners are responsible for those lines located on their land.

The residential Level of Service (LOS) is based on the permanent population plus the portion of the seasonal population living in residences. The seasonal number is defined as the average daily seasonal population living in residences on an annual basis. The existing LOS is 66.5gallons/capita/day.

The nonresidential LOS is based upon building square footages of commercial space in the unincorporated County including hotels and motels. This existing LOS is 0.35 gallons/square foot/day.

The overall consumption goal for the system is 86.00 gallons/capita/day. Based upon the projected population illustrated previously in **Table 1.1**, potable water will adequately meet the projected needs of the service area through 2030.

Table 1.12 - Existing Potable Water Level of Service Standards

Residential LOS	66.5 gallons/capita/day
Non-Residential LOS	0.35 gallons/square foot/day

Source: FKAA

Note: Equivalent Residential Unit: 149 gallons per day (2.24 average persons per household X 66.5 gal/capita/day

Table 1.13 - Goal Potable Water Consumption

Residential	57 gallons/capita/day
Non-residential	.29 gallons/square foot/day
Overall	86 gallons/capita/day

1.2.9 Sanitary Sewer

Treatment of sewage and the disposal of wastewater within the County historically have been accomplished through septic tanks, on-site treatment and disposal systems (OSTDS), and small to intermediate sized privately-owned wastewater treatment package plants. With expansion and growth, regional systems consisting of treatment plants and centralized sewer have been built providing a greater level of collection and treatment. Several sewer districts, both private and municipal, have been formed to service more densely populated areas.

Over the last 20 years, aerobic treatment units (ATU) for more advanced onsite treatment and secondary treatment plants have been introduced. Although they provide better treatment than septic tanks, including effluent disinfection, ATUs are not an efficient means of removal of phosphorus and nitrogen.

With the adoption of the *Monroe County Sanitary Wastewater Master Plan* (the "Master Plan") in June of 2000, the County has implemented a program to address these issues. The Master Plan identified 23,000 private onsite systems within unincorporated Monroe County, made up of septic tanks, ATUs, and unknown connections servicing a total of 4.88 million gallons per day (MGD). In addition, 246 small wastewater treatment plants (WWTP) were identified servicing another 2.40 MGD. The Master Plan focuses on utilizing regional systems for treatment in hot spots (areas of high density) and alternative Best Available Technology (BAT) in cold spots (areas of low density), and calls for several measures including the following:

- Replacement or upgrade of onsite systems to Onsite Wastewater Nutrient Reduction Systems (OWNRS);
- Creation of 12 community collection systems, five of which are to be phased into regional systems;
- Address hot spots with community systems by 2010; and
- Upgrade 17 facilities to BAT/Advanced Wastewater Treatment (AWT) by 2010.

In April 2010, the Florida Senate and House approved SB 2018 extending the deadline for compliance to the end of 2015, and postponing fines and potential liens against property owners. In addition, the bill authorized $200 million of State funding for improvements; however, the source of funding remains unresolved. Meeting the 2015 extension requires a detailed financial plan to implement necessary plant and infrastructure improvements. The funding gap of $330 million, which has already stretched the County's capacity for debt service, continues to broaden due to a delayed revenue stream resulting from delays in design and construction of new systems.

1.2.10 Solid Waste

The collection of solid waste is undertaken by private contractors under franchise agreements with the County. Although the original solid waste disposal site stipulated in the haul out contract was the WMI owned and operated Central Disposal Sanitary Landfill (CDSL) located at 3000 Northwest 48th Street, Pompano Beach (Unincorporated Broward County), Florida, all trash, unseparated recyclables and hazardous waste is currently hauled to the Wheelabrator facility in Broward County, Florida, for incineration and disposal.

As illustrated in **Table 1.13**, the historical solid waste generation (excluding Islamorada) shows a steady growth between the years 1998-2001. During the period 2002–2006, the County's solid waste generation was significantly higher. These higher values do not correspond to normal solid waste generation trends within the County and in actuality result from a cluster of outliers. The outliers are functions of favorable economic conditions (greater consumption of goods and services) and storm events that cause a significant amount of over generation due to debris. Furthermore, during the period of 2007-2008, an economic recession affected solid waste generation, significantly reducing standard trends for generation growth.

Table 1.14 - Solid Waste Generation Trends

	Solid Waste Generation	Population			LOS
Year	(Tons/Yr)	Permanent	Seasonal	Functional	(LBS/CAP/DAY)
2000	161,903	72,756	73,491	146,247	6.22
2001	198,314	73,218	73,540	146,758	7.59
2002	254,464	73,651	73,589	147,240	9.71
2003	213,186	74,051	73,639	147,690	8.11
2004	246,890	74,514	73,688	148,202	9.36
2005	285,553	75,857	73,737	149,594	10.72
2006	295,132	74,114	74,828	148,942	11.13
2007	187,177	72,632	75,734	148,366	7.09
2008	143,988	69,758	77,318	147,076	5.50

Source: Monroe County Recommended Functional Population Series, Fishkind & Associates 2010

The LOS Standard utilized in **Table 1.15** for projecting solid waste demands during the planning periods will be 6.97 pounds/capita/day (lbs/cap/day).

Table 1.15 – Solid Waste Projected Demands

	Population			LOS	Projected Solid Waste Generation
Year	Permanent	Seasonal	Functional	(LBS/CAP/DAY)	(Tons/Year)
2010	78,200	79,437	157,637	6.97	190,737
2015	77,600	81,580	159,180	6.97	192,604
2020	76,900	83,794	160,694	6.97	194,436
2025	76,200	86,008	162,208	6.97	196,268
2030	75,500	88,222	163,722	6.63	198,100

Source: Monroe County Population Projections, Fishkind & Associates 2010
Notes: FEDP data uses only permanent population for their evaluations.
Notes: Islamorada population is excluded from the County's population.

1.2.11 Drainage

Objective 101.9 directs Monroe County to provide for drainage and stormwater management so as to protect real and personal property and to protect and improve water quality. In 2001, Monroe County adopted a Stormwater Management Plan.

Section 114-3 of the Monroe County Land Development Code (MCLDC) requires stormwater controls for flood protection and floodplain encroachment, but also includes water quality controls for existing and proposed residential development and addresses retrofitting of existing facilities and redevelopment activities.

Additionally, the County has prepared a *Manual of Stormwater Management Practices* which provides information on acceptable forms of Best Management Practices. This document was prepared with the assistance of the South Florida Regional Planning Council (SFRPC) and the SFWMD and includes BMPs consisting of rate control structures, catch basins with skimmers and baffles, and wet and dry detention/retention facilities.

Furthermore, all new development and select redevelopment must adhere to the following level of service standards:

- Residential and commercial building floors - 100 year, 3 day;
- Emergency shelters/service building floors - 100 year, 3 day;
- Evacuation routes and emergency service road - 100 year, 3 day;
- Arterial roads - 100 year, 3 day;
- Collector roads - 25 year, 3 day;
- Neighborhood roads - 5 year, 1 day;

- Urban sites - 5 year, 1 day;
- Rural sites - 3 year, 1 day; and
- Off-site discharge rates are limited to historic, predevelopment conditions or as previously determined by the SFWMD or the County.

1.2.12 Coastal Management and Conservation

The southern tip of Florida and the Florida Keys contains one of the Country's most diverse assemblages of terrestrial, estuarine, and marine flora and fauna. The region includes the vast freshwater wetlands of the Florida Everglades and Big Cypress, the transitional areas where the waters of the Everglades discharge into the estuarine environment of Florida Bay, one of the world's largest coral reef tracts (the only one in the continental United States), the largest contiguous seagrass community in the world, and the subtropical habitats of the island chain. The environmental setting of the Keys is exceptional and unique, making the region a major travel destination. The County supports local, State, and federal programs aimed at preserving these vital resources and consistently apply regulations that protect them from further destruction.

Portions of the County are located within the Coastal Resource Barriers Resources System (CBRS). Today, the CBRS is comprised of undeveloped coastal barriers along the Atlantic and Gulf of Mexico coasts, including the coasts of the Florida Keys. The CBRS includes a number of units located in the Florida Keys and as such, is most susceptible to the threat of strong storms and hurricanes.

Within the Conservation and Coastal Management element, the County addresses natural disaster planning and hazard mitigation. The County's specific emergency response procedures are detailed in the Monroe County Comprehensive Emergency Management Plan (CEMP) (November 2007). As a low-lying chain of islands with a single main roadway, hurricane evacuation is a major concern.

In 2006, the Florida Department of Community Affairs (DCA) funded the South Florida Regional Planning Council (SFRPC) to carry out an update of the regional hurricane evacuation traffic study component of the South Florida Regional Hurricane Evacuation Study (HES) (includes Miami-Dade, Broward, and Monroe Counties). Additionally, the County funded the University of Utah to update its evacuation model for the County (the "Miller Model"). The 2010 update to the Miller Model (Ewing, 2010) also provided a summary of results from previous hurricane evacuation models. Depending on the assumptions used in the models (e.g., participation rates of evacuees, and traffic flow rates), the clearance times ranged from 16 hours 16 minutes to 23 hours 20 minutes.

1.2.13 Natural Groundwater Aquifer Recharge

The potable water supply resources used by the County, including both the aquifer system and treatment facilities, are geographically located in Miami-Dade County - entirely outside of the County's jurisdiction (see Chapter 8.0, Potable Water Element). In the County, the

surficial aquifer is brackish to saline and contains an inadequate quantity of water for use as a potable water supply. The FKAA is the agency that obtains and distributes potable water in the Keys.

As a result of the potable water source for the County being located entirely within Miami-Dade County, aquifer protection related to the FKAA's Florida City Wellfield is accomplished through the provisions of the Miami-Dade County Wellfield Ordinance. In the County, groundwater resource protection and management takes place in the context of the regulation of public and private interests in relation to wetlands, wildlife, aquifer discharges to surface waters, and other components of the natural system.

1.2.14 Recreation and Open Space

The County is well-served by its recreational opportunities, many of which are focused on the waters surrounding the Florida Keys. There are over 4.07 million acres of publicly-owned (Federal) conservation and recreation lands and waters provided in the County. The mainland portion of the County accounts for 1.62 million acres of this total. The vast majority of these areas are conservation lands which provide, activity-based, water-dependent and water-related recreation opportunities. In addition to these publicly provided lands and waters, many County businesses provide recreational activity-based facilities which are available to the functional population (which includes both the permanent and seasonal populations) of the County.

Using the 2010 functional population of 157,637, this translates into approximately 25,824 acres of conservation and recreation lands and waters/1,000 functional population. Based upon this simple calculation of the demand for recreational land, there seems to be more than enough for the permanent residents and visitors to the County. Adequate access to these facilities is provided for residents, tourists, and visitors of varying ages and physical ability levels.

The majority of the 4.07 million acres are conservation lands and a calculation for recreation lands and facilities is extremely important to the recreation/tourism industry of the County. Equally as important is the provision for a variety of recreational opportunities to the County functional population. In general, residents have indicated that there is a shortage of activity-based recreation areas in the County. Recreational facilities frequently citied as being in short supply included baseball/softball fields, football/soccer fields, equipped play areas, boat ramps, and physical exercise courses.

The LOS for the new planning period (2010-2030) is as follows:

- 1.5 acres of resource-based recreation areas/1,000 functional population; and
- 1.5 acres of activity-based recreation areas/1,000 functional population.

1.2.15 Intergovernmental Coordination

The County maintains intergovernmental relations with a variety of local, regional, and state entities. With the exception of the relatively new agreements with FKAA relating to the development of wastewater treatment systems, and the agreements with the newly incorporated cities of Marathon and Islamorada, those relationships are essentially the same as they were when the original comprehensive plan was adopted in 1995.

1.2.16 Energy Conservation and Climate

The County has adopted a greenhouse gas (GHG) target for county operations (Resolution 067-2010), including a reduction of countywide GHGs of 20 percent by 2020 as measured from a 2005 baseline inventory. The County has also adopted green building standards for County Facilities with Resolution 147-2010; building upon the energy requirements in the Florida Building Code by incorporating the Florida Green Building Coalition's green commercial building standard for county buildings, as the standard to be used for construction of all public buildings.

For a detailed discussion on this topic, see *Chapter 16.0 Energy Conservation and Climate*.

1.2.17 Capital Improvements

The County complies with all budget preparation and financial reporting requirements. The capital improvements program, together with the operating budget, provides the citizenry with a wealth of information about the community. Needed capital improvements have been identified and incorporated into the adopted Schedule of Capital Improvements and made part of the comprehensive plan goals, objectives, and policies. The County's financial position is good and with the exception of the planned wastewater treatment facilities, all projected needs can be financed from current or anticipated revenue sources.

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CHAPTER 1.0 - INTRODUCTION AND EXECUTIVE SUMMARY – COMMENT RESPONSES

Commenter: Kathy Grasser, Comprehensive Planner, Monroe County Planning and Env. Resources
Date Received: Email, March 30, 2011, 5:11 PM

Location	County Comment	K&S Action
1.2.2	Adjust percentages and figures to exactly match the 2009 American Community Survey, 1-Year Estimate source.	Agree, revised as requested and clarified in the text that source is from the "1-Year Estimate".
1.2.3	Add reference to Policy 1101.4.2	Agree, added.
1.2.11	Add a new paragraph at beginning "Objective 101.9 directs Monroe County to provide for drainage and Stormwater management. . ." Add a new 2nd paragraph "In 2001 Monroe County adopted a Stormwater Management Master Plan. . ."	Agree, added.

Commenter: Mayte Santamaria, Assistant Planning Director, Monroe County Planning and Env. Resources
Date Received: 6/22/11

Location	County Comment	K&S Action
Table 1.8	Add notes as reflected in Traffic Circulation Element for this table.	Agree. Have revised as suggested.
Table 1.11	Add asterisks.	Agree. Have revised as suggested.
Section 1.2.8	Revise to correct LOS numbers as reflected in Table 1.12	Agree. Have revised as suggested.
Section 1.2.12	Revise to reflect Monroe County funded the update to the Miller Model.	Agree. Have revised as suggested.

FUTURE LAND USE
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2.0 FUTURE LAND USE ELEMENT

[Rule 9J-5.006 F.A.C.]

The Future Land Use Element of the Monroe County (County) Comprehensive Plan addresses the data inventory requirements of 9J-5.005(2) of the Florida Administrative Code (F.A.C.). The data inventory requirement will support the development of goals, objectives, policies, and implementation programs for the Future Land Use Element.

The Future Land Use Element is a required comprehensive plan element under Florida's Local Government Comprehensive Planning and Land Development Regulation Act (Chapter 163, Florida Statutes). The purpose of the element is the designation of future land use patterns as reflected in the goals, objectives and policies of the local government comprehensive plan elements. Future land use patterns are depicted on the future land use map or map series. The purpose is also to evaluate existing development patterns; designate the proposed future general distribution, location, and extent of the uses of land for residential uses, commercial uses, industry, recreation, conservation, education, public buildings and ground, other public facilities and other categories of public and private uses of land.

2.1 Introduction

The Future Land Use Element serves as a guide for the development and use of land within the County. There are several regulatory requirements that exist in State laws and rules that guide the development approval process in the County, which includes related intergovernmental coordination requirements. Additionally, the County has a rich history of public interest and involvement in growth management issues that has shaped the approach to development and use of land within the County.

2.1.1 Existing Rules and Laws Governing Development

The Florida Keys ("the Keys") were designated as an Area of Critical State Concern by the State in 1974 pursuant to Section 380.05(2), F.S. Therefore, any local comprehensive plan enacted, amended or rescinded by the County which impacts the Keys is effective only after review of the proposed plan, amendment or recession by the State land planning agency, the Department of Community Affairs (DCA), to determine whether the proposed plan, amendment or recession is in compliance with the "Principles for Guiding Development" (see **Section 2.2.6** of this element for a detailed discussion).

In 1985, the legislature enacted a State Comprehensive Plan, effective July 1, 1985. In 1986, the County adopted the State Comprehensive Plan as an interim land use control. The County then adopted the *Monroe County 2010 Comprehensive Plan* (the "Plan"), pursuant to Chapter 163, Part II, F.S., on April 15, 1993. However, subsequent legal proceedings prompted a Final Order and Recommendations by the Administration Commission. The effect of the Final Order was that 90 percent of the Plan became effective but the disputed provisions required further action. Because of this Final Order, it was

necessary to amend the Plan in order to bring it into compliance and to make it consistent with the "Principles for Guiding Development" as required by Chapter 380, F.S. The Plan was amended pursuant to Rule 9J-14.022, F.A.C. January 4, 1996; and adopted by Rule 28-20.100, Part I, January 2, 1996 and Part II, July 14, 1997, resulting in the "Work Program"; Rule 28.20.100 F.A.C, outlines actions and strategies to be accomplished by the County (See **Section 2.2.7** for a detailed discussion of the "Work Program").

Because of these actions, development and growth in the Keys are governed by a unique set of rules, laws and principles for planning.

2.1.2 Public Involvement

Largely drawing from Chapter 163, F.S., the public participation process in developing the Comprehensive Plan is designed to actively engage and maximize participation by the County residents, business owners, interest groups, and community groups in shaping the comprehensive plan.

2.1.3 Intergovernmental Coordination

Effective intergovernmental coordination seeks to identify and respond to the need for enhancing existing coordination mechanisms or processes for such subjects as: land use planning; hurricane evacuation; voluntary dispute resolution; coordination with the Monroe County School Board; and coordination with special districts.

This topic is discussed in detail within the Intergovernmental Coordination Element.

2.1.4 Data Limitations

There are limitations to the data and these limitations have been noted where relevant throughout this document. The 2010 U.S. Census full data set is not scheduled to be released until May 2011; therefore, unless otherwise noted, the local population and housing data is based on the 2000 U.S. Census, the 2009 American Community Survey and the County's building permit construction data. This chapter will be further refined, as may be required, subsequent to the release of the remaining 2010 U.S. Census data sets.

2.2 The Planning Framework

In addition to the planning direction established in **Section 2.1**, the Plan is framed by several important components including, its geographic location; the County's designation as an Area of Critical State Concern; the guidelines for future development; the Florida Keys Carrying Capacity Study (FKCCS); efficient hurricane evacuation; federal laws relating to the Coastal Barrier Resource System (CBRS) and the Endangered Species Act; and the goals established within the *Livable CommuniKeys Plans*. In addition, Big Pine Key and No Name Key are guided by the Habitat Conservation Plan (HCP).

2.2.1 Geographic Location/ Planning Areas [Rule 9J-5.006.1(a) F.A.C]

The County includes the Mainland area and over 1,700 islands which lie along the Florida Straits, dividing the Atlantic Ocean to the east from the Gulf of Mexico to the west, and defining one edge of the Florida Bay. The Mainland Planning Area (PA) encompasses two national landmarks: The Everglades National Park and The Big Cypress National Preserve and accounts for approximately 85 percent or 562,149 acres of the overall County land mass. Since 99.8 percent of the Mainland PA consists of federal lands designated as Conservation use; the existing conditions of this element will focus primarily on lands within the unincorporated Lower, Middle, and Upper PAs. The four PAs geographic locations are identified below, and illustrated on the Existing Land Use Map (**Map Series 2-1**).

- Lower Keys Planning Area (LKPA): West boundary of Stock Island to the eastern limit of the Seven Mile Bridge. The Marquesas Keys, located 30 miles west of Key West and the Dry Tortuga Keys, located 70 miles west of Key West are also included within this PA;

- Middle Keys Planning Area (MKPA): Eastern limit of the City of Marathon to the western limit of the Village of Islamorada, including Lignumvitae Key and Shell Key. It excludes the incorporated City of Layton, the City of Marathon, the City of Key Colony Beach and the Village of Islamorada;

- Upper Keys Planning Area (UKPA): Western limit of the Village of Islamorada to the northern County line; and

- Mainland Planning Area (MPA): Bounded to the north by Collier County, to the east by Miami-Dade County, to the west by the Gulf of Mexico and to the south by Florida Bay. This PA also includes the offshore islands within the Everglades National Park.

2.2.2 Rate of Growth Ordinance (ROGO)

In the years after adoption of the County's first Plan in 1986, the growth rate was significant. Due to the State of Florida limitations on the amount of growth the County could absorb, based upon the carrying capacity and hurricane evacuation standards, in 1992, Monroe County adopted the Rate of Growth Ordinance (ROGO), which limits the amount of residential development based upon the ability to safely evacuate the Keys within 24 hours; it has been utilized in the County with only minor modifications since its adoption.

The ROGO system is a method of prioritizing where growth should be directed based on the fact that the State only allocates 197 housing units annually to the County for building permit issuance; it is part of the development process for all new residential units. Receiving a ROGO allocation is only one of three steps toward receiving a building permit in Monroe County. In addition, an applicant must receive an approved building permit

application. Through the years, ROGO has been amended based on changing conditions related to infrastructure.

The process of receiving a building permit in the County is competitive. Development approval is a point based system that allows applications for a new residential or commercial building permit to compete for the limited number of allocations issued each year. Points are based upon the parcel(s) Tier designation, density reduction, affordable housing, wastewater, land dedication and fund donation processes. A penalty is assigned if the project is within a V flood zone.

The number of allocations available is determined through the adoption of an administrative rule under the Florida Administrative Code at the State level. The number of allocations is based on the progress the County has made toward achieving State set goals such as a centralized wastewater system and hurricane evacuation clearance times. The total number of available allocations is split among the three allocation subareas of the County including the Upper Keys, Lower Keys and the Big Pine/No Name Key subareas, which varies slightly from the Planning Areas identified in **Section 2.2.1** above. Each applicant competes against the other applicants located within the same subarea. There is one exception to this process, applicants for affordable housing. These applicants compete against all applicants for affordable housing permits keys-wide. Allocations are awarded each quarter in each subarea.

ROGO allocations and awards by year and subarea are provided in **Section 7.1.1** of *Chapter 7.0 Housing Elemen*t

2.2.3 Non-Residential Rate of Growth (NROGO)

2.2.3.1 Background

Monroe County adopted the Non-Residential Rate of Growth (NROGO) in 2001 in order to, "…ensure a reasonable balance between the amount of future non-residential (primarily commercial) development and the needs of a slower growing residential population…"[2]

The purposes and intent of NROGO are:[3]

- To facilitate implementation of goals, objectives and policies set forth in the comprehensive plan relating to maintaining a balance between residential and nonresidential growth;

- To maintain a ratio of approximately 239 square feet of nonresidential floor area for each new residential permit issued through the residential rate of growth ordinance (ROGO);

[2] "Permit Allocation System for Non-Residential Development", Monroe County 2010 Comprehensive Plan.
[3] Section 138-47, MC LDC.

- To promote the upgrading and expansion of existing small-size businesses and to retain the predominately small scale character of nonresidential development in the Florida Keys;

- To regulate the rate and location of nonresidential development in order to eliminate potential land use conflicts; and

- To allocate the nonresidential floor area annually hereunder, based on the goals, objectives and policies of the comprehensive plan and the Livable CommuniKeys master plans.

The County utilized the following methodology to create an initial baseline square footage allocation to develop the system:

> *To calculate this ratio, total permit activity for non-residential development was compared to total permit activity for all residential development (including hotel and motel units) in unincorporated Monroe County during the five year period from 1986 to 1990.*
>
> *During this period 1,296,116 square feet of non-residential development was permitted, compared to 4,856 residential permits (including single-family, multi-family and mobile homes) and 573 hotel/motel units, for a total of 5,429 permits (Monroe County Planning Department, March 1991). Dividing the total square footage of non-residential development permitted by the total number of residential units permitted results in a ratio of 239 square feet of non-residential development per residential permit.*[4]

The "maximum annual allocations" and the distribution between the first and second allocation dates are determined by the Board of County Commissioners (BOCC) and as recommended by Growth Management and the Planning Commission. This provides flexibility and assures that goals are being met. The floor area that is not made available, or that remains unused in the current year, is carried forward to the next year. The Lower/Upper Keys subarea and the Big Pine/No Name Key subarea have a separate banking system, as illustrated in **Table 2.2**.

A summary of square footage of non-residential floor area previously made available and allocated in the unincorporated Keys from 2002 to 2010 is depicted in **Table 2.1** and **Table 2.2** below:

[4] Ibid.

Table 2.1 – Non-Residential Rate of Growth Allocations Lower/Upper Keys, 2002-2010

Year	Amount Available	Total Allocations Awarded
Year 10 (2002)	22,150 sq/ft	18,222 sq/ft
Year 11 (2003)	16,000 sq/ft	5,300 sq/ft
Year 12 (2004)	16,000 sq/ft	15,689 sq/ft
Year 13 (2005)	16,000 sq/ft	10,925 sq/ft
Year 14 (2006)	16,000 sq/ft	12,594 sq/ft
Year 15 (2007)	18,000 sq/ft	12,500 sq/ft
Year 16 (2008)	35,000 sq/ft	17,938 sq/ft
Year 17 (2009)	30,000 sq/ft	13,056 sq/ft
Year 18 (2010)	22,500 sq/ft	6,355 sq/ft

Source: Growth Management Memorandum to BOCC October 21, 2010

NROGO for the Big Pine/No Name Key subarea is treated differently given the Habitat Conservation Plan (HCP) for the Key Deer and other protected species. The maximum amount of nonresidential floor area to be allocated is limited to a maximum of 2,500 square feet for any one site. A summary of allocations in these environmentally sensitive keys is shown in **Table 2.2.**

Table 2.2 - Non-Residential Rate of Growth Allocations for Big Pine/No Name Key 2005-2010

Year	Number of Applicants	Total Allocations Awarded
Year 13 (2005)	1	2,181 sq/ft
Year 15 (2007)	2	5,000 sq/ft
Year 16 (2008)	2	3,809 sq/ft
Year 17 (2009)	0	0 sq/ft
Year 18 (2010)	0	0 sq/ft

Source: Growth Management Memorandum to BOCC October 21, 2010

2.2.3.2 Trends

In the past nine years there has been minimal competition for the available non-residential floor area. The average square footage made available in the nine year period was 21,294 square feet and the average square footage allocated each NROGO year was 12,294 square feet. In year 12, the demand for square footage exceeded the amount of available square footage.

2.2.3.3 Availability of Non-Residential Floor Area for YR 19 (2011)

On October 19, 2010 the Monroe County Planning Commission recommended that 22,500 square feet be made available in NROGO year 19 and to be distributed as noted below. On November 17, 2010, the BOCC adopted, via Resolution, the Planning Commission recommendation.

2.2.4 The Tier System

As a companion to ROGO, and a method to direct growth to the least sensitive environmentally sensitive areas, in 2006 a Tier System was adopted. A Tier Overlay District was created as a land use district map amendment to designate geographical areas outside of the mainland of the County, excluding the Ocean Reef planned development, into Tiers:

Tier	Description
I	Tier I boundaries were delineated to include one or more of the following criteria: • Vacant lands which can be restored to connect upland native habitat patches and reduce further fragmentation of upland native habitat. • Lands required to provide an undeveloped buffer, up to 500 feet in depth, if indicated as appropriate by special species studies, between natural areas and development to reduce secondary impacts. Canals or roadways, depending on width, may form a boundary that removes the need for the buffer or reduces its depth. • Lands designated for acquisition by public agencies for conservation and natural resource protection. • Known locations of threatened and endangered species, as defined in LDR Section 101-1, identified on the threatened and endangered plant and animal maps or the Florida Keys Carrying Capacity Study maps, or identified in on-site surveys. • Conservation, Native Area, Sparsely Settled, and Offshore Island land use districts. • Areas with minimal existing development and infrastructure.
II	Pertains only to Big Pine Key / No Name Key. Scattered lots and fragments of environmentally sensitive lands that may be found in platted subdivisions. A large number of these lots are located on canals and are of minimal value to the key deer and other protected species because the canal presents a barrier to dispersal.
III	Tier III are lands located outside of Big Pine Key and No Name Key that are not designated Tier I or Tier III-A. Tier III represents the majority of developable acreage in the County.
III-A	Tier III-A is designated as a Special Protection Area. It is defined as lands that have one acre or more of native upland habitat.
Undesignated	Some properties do not have a tier designation. These undesignated properties are found throughout the Keys but most occur in Ocean Reef, which is exempt from the Tier Overlay Ordinance. Others are rights-of-way, military installations, or properties that were not designated due to mapping discrepancies and, at the time of the preparation of this document, are being evaluated for tier designation.

The tier designations are used as criteria in ROGO for awarding points and to determine the amount of clearing of upland native vegetation that may be permitted, and prioritize lands for public acquisition. The tier boundaries are depicted on the Tier Overlay District Map.

More specific information on the ROGO point system can be found in *Chapter 3.0 Conservation and Coastal Management Elemen*t.

2.2.5 Area of Critical State Concern

Pursuant to Section 380.0552(2), F.S., the intent of the Florida Keys Area of Critical State Concern designation is to:

- Establish a land use management system that protects the natural environment of the Keys;
- Establish a land use management system that conserves and promotes the community character of the Keys;
- Establish a land use management system that promotes orderly and balanced growth in accordance with the capacity of available and planned public facilities and services;
- Provide affordable housing in close proximity to places of employment in the Keys;
- Establish a land use management system that promotes and supports a diverse and sound economic base;
- Protect the constitutional rights of property owners to own, use, and dispose of their real property;
- Promote coordination and efficiency among governmental agencies that have permitting jurisdiction over land use activities in the Keys;
- Promote an appropriate land acquisition and protection strategy for environmentally sensitive lands within the Keys;
- Protect and improve the nearshore water quality of the Keys through the construction and operation of wastewater management facilities that meet the requirements of Section 381.0065(4)(l) and 403.086(10), F.S., as applicable; and
- Ensure that the population of the Keys can be safely evacuated.

Because of this designation, the State Land Planning Agency, the Department of Community Affairs (DCA), oversees all final development review and approval rights. Pursuant to Section 380.0552(4), F.S., the designation may be recommended for removal upon fulfilling the aforementioned legislative intent and completion of all work program tasks. Annually, DCA must submit a written report to the Administration Commission to describe the progress toward achieving the tasks in the work program. DCA shall recommend removal of the designation if it determines that:

- All of the work program tasks have been completed, including construction of, operation of, and connection to central wastewater management facilities pursuant to Section 403.086(10), F.S. and upgrade of onsite sewage treatment and disposal systems pursuant to Section 381.0065(4)(l), F.S.;

- All local comprehensive plans and land development regulations and the administration of such plans and regulations are adequate to protect the Keys Area, fulfill the legislative intent specified in subsection (2), and are consistent with and further the principles guiding development; and

- A local government has adopted a resolution at a public hearing recommending the removal of the designation.

The Areas of Critical State Concern are depicted in the Areas of Critical Concern (**Map Series 2-2**) of the Map Atlas.

2.2.6 Principles for Guiding Development

Originally, state, regional and local agencies and units of government in the Keys Area of Critical State Concern had to coordinate all plans and conduct all regulatory activities consistent with "Principles for Guiding Development" as amended in 1984. Now, pursuant to Section 380.0552(7), F.S., DCA shall approve any land development regulation or element of a local comprehensive plan and it becomes effective after DCA determines it is in compliance with the "Principles for Guiding Development" specified and as set forth in Chapter 27F-8, F.A.C., as amended effective August 23, 1984. Those principles are:

- Strengthening local government capabilities for managing land use and development so that local government is able to achieve these objectives without continuing the continuation of the area of critical state concern designation;

- Protecting shoreline and marine resources, including mangroves, coral reef formations, seagrass beds, wetlands, fish and wildlife, and their habitat;

- Protecting upland resources, tropical biological communities, freshwater wetlands, native tropical vegetation (for example, hardwood hammocks and pinelands), dune ridges and beaches, wildlife, and their habitat;

- Ensuring the maximum well-being of the Keys and its citizens through sound economic development;

- Limiting the adverse impacts of development on the quality of water throughout the Keys;

- Enhancing natural scenic resources, promoting the aesthetic benefits of the natural environment, and ensuring ensure that development is compatible with the unique historic character of the Keys;

- Protecting the historical heritage of the Keys; and
- Protecting the value, efficiency, cost effectiveness, and amortized life of existing and proposed major public investments, including:
  - The Florida Keys Aqueduct and water supply facilities;
  - Sewage collection, treatment, and disposal facilities;
  - Solid waste treatment, collection, and disposal facilities;
  - Key West Naval Air Station and other military facilities;
  - Transportation facilities;
  - Federal parks, wildlife refuges, and marine sanctuaries;
  - State parks, recreation facilities, aquatic preserves, and other publicly owned properties;
  - City Electric Service and the Florida Keys Electric Co; and
  - Other utilities, as appropriate.
- Protecting and improving water quality by providing for the construction, operation, maintenance, and replacement of stormwater management facilities; central sewage collection; treatment and disposal facilities; and the installation and proper operation and maintenance of onsite sewage treatment and disposal systems.
- Ensuring the improvement of nearshore water quality by requiring the construction and operation of wastewater management facilities that meet the requirements of Sections 381.0065(4)(l) and 403.086(10), F.S., as applicable, and by directing growth to areas served by central wastewater treatment facilities through permit allocation systems.
- Limiting the adverse impacts of public investments on the environmental resources of the Keys.
- Making available adequate affordable housing for all sectors of the population of the Keys.
- Providing adequate alternatives for the protection of public safety and welfare in the event of a natural or manmade disaster and for a post disaster reconstruction plan.
- Protecting the public health, safety, and welfare of the citizens of the Keys and maintain the Keys as a unique Florida resource.

Amendments to local comprehensive plans in the Florida Keys Area of Critical State Concern must also be reviewed for compliance with the following:

- Construction schedules and detailed capital financing plans for wastewater management improvements in the annually adopted capital improvements element, and standards for the construction of wastewater treatment and disposal facilities or collection systems that meet or exceed the criteria in Section 403.086(10), F.S. for wastewater treatment and disposal facilities or Section 381.0065(4)(l), F.S. for onsite sewage treatment and disposal systems.

- Goals, objectives, and policies to protect public safety and welfare in the event of a natural disaster by maintaining a hurricane evacuation clearance time for permanent residents of no more than 24 hours. The hurricane evacuation clearance time shall be determined by a hurricane evacuation study conducted in accordance with a professionally accepted methodology and approved by the State land planning agency.

2.2.7 Work Program

In December 12, 1995 when the Administration Commission found the Plan not in compliance, it noticed a proposed rule (Rule 28-20.100, F.A.C.) and ordered facilitated rulemaking/mediation to address outstanding issues. The disputed provisions of the Rule required further action. Mediation was conducted resulting in subsequent rule changes. This amended rule introduced the concept of the Five Year Work Program ("Work Program"). The Work Program required, among other things, the implementation of the Florida Keys Carrying Capacity Study.

Rule changes were again challenged. An administrative hearing was held in August of 1996 to December 1996 and the proposed rule was upheld by Final Order with the Administration Commission adopting Rule 28-20.100, F.A.C. in July, 1997. Annual reports related to the implementation of the Work Program are required to be submitted to the Governor and Cabinet. Lack of substantial progress would result in a 20 percent loss of annual allocation of permits for ROGO in a given year. In November 1997, this Final Order was appealed, oral arguments were heard, and the First District Court of Appeal affirmed the Final Order in December, 1997.

In March 1998, the first report to the Governor and Cabinet was issued. In January 1999, the second report to the Governor and Cabinet was issued stating a lack of substantial compliance. It also identified lack of progress in cesspit identification and removal and recommended that the Work Program be revised to incorporate changes.

Subsequent rule amendments extended the program's deadline to accommodate the tasks that had not been completed and today tasks remain incomplete (although the tasks have been substantially retired) beyond the extended horizon of the Work Program. There is no Work Program task that has been ignored or not acted upon, and all tasks may be considered either complete or in progress. While the number of remaining tasks is limited, these tasks are costly and time consuming to complete. Many of the remaining tasks consist of costly capital improvement projects, several of which have yet to go beyond planning/preliminary design.

Because the tasks have been refined, the DCA, Governor and Cabinet (acting as the Administration Commission) proposed a new Rule 28-20.130 and Rule 28-20.140. This Rule was finalized during 2011; the tasks necessitates FLUE and CIE amendments.

2.2.8 Florida Keys Carrying Capacity Study

The Final Order in 1995 also initiated the Florida Keys Carrying Capacity Study (FKCCS). In 1996 the Work Program required the development of a carrying capacity analysis study completed by July 2002. The US Army Corps of Engineers and DCA formed a partnership to jointly fund and complete the study and work began on the Carrying Capacity Impact Analysis Model (CCIAM) and the study. The goal of the FKCCS, excerpted from Rule 28-20.100, F.A.C. was as follows:

> *"The carrying capacity analysis shall be designed to determine the ability of the Florida Keys ecosystem and the various segments thereof, to withstand all impacts of additional land development activities."*

The draft final report was issued in 2001 and it was peer reviewed by the National Research Council determining that the CCIAM was not ready to determine the ability of the Keys ecosystem to withstand all impacts of additional development activities as required by Rule 28-20.100 F.A.C. The Carrying Capacity Study and model were revised and it was determined that the CCIAM may be a useful tool in some circumstances but it had limitations. In particular, the CCIAM is unable to determine the impact on nearshore water quality. This peer review committee agreed on the following four recommendations of the study:

- Prevent encroachment into native habitat because of severe depletion by historic development activities;

- Continue restoration and land acquisition programs, implement the wastewater and storm water master plans, and continue ongoing research and management activities in the Florida Keys National Marine Sanctuary (FKNMS);

- Concentrate on redevelopment and infill for future development; and

- Increase efforts to manage remaining habitats and resources.

In November 2002, DCA initiated a Florida Keys Carrying Capacity/Rule 28.20, F.A.C. Work Group to assist in the implementation of these recommendations. Year Six of the Work Program (July 13, 2002 – July 12, 2003), enacted in Rule 28-20.100, F.A.C., directed the County to implement the FKCCS by adopting amendments to ROGO, the Monroe County Land Development Code (MCLDC), the Future Land Use Map (FLUM) series and the maximum permitted densities.

2.2.9 Hurricane Evacuation

One of the most hurricane vulnerable areas of the United States is the lower southeast coast of Florida.[5] This area is comprised of the County and the mainland counties of Miami-Dade, Broward, and Palm Beach (the other three counties). U.S. 1 and Card Sound Road/CR-905 are designated as the evacuation routes for the Keys. Historically, there has been a high frequency of hurricanes which have affected the region. Some of the recent hurricanes are Andrew (1992; Upper Keys); Georges (1998); Irene (1999; Middle and Lower Keys); and Rita and Wilma (2005; throughout the keys including the Sand Keys), which are further detailed in *Chapter 3.0 Conservation and Coastal Management Element*.

The DCA and the County are currently undertaking the process of updating the evacuation model for the County *Florida Keys Hurricane Evacuation Study (Miller 2001*, commonly known as "The Miller Model". Additionally, in response to the impacts noted during the 2004 and 2005 hurricane seasons, State legislation was passed (HB 1359 amending portions of Chapter 163, F.S.) that identified new hurricane evacuation planning requirements and a new definition of the Coastal High Hazard Area (CHHA). The new definition of the CHHA is "the area below the elevation of the Category 1 storm surge line as established by a Sea, Lake and Overland Surges from Hurricanes (SLOSH) computerized storm surge model" (Section 163.3178(2)(h), F.S.). The State of Florida Division of Emergency Management (DEM) obtained grant money through the Federal Emergency Management Agency's (FEMA) Hazard Mitigation Grant Program and charged the Regional Planning Councils to conduct, regional evacuation modeling and studies across the State, including modeling and boundary mapping for the CHHA.

Hurricane evacuation clearance time in the County, as determined by modeling efforts, is one of the key factors used to control growth within the County, as required by Chapter 28-20.140 F.A.C. Clearance time is defined as, "…the time required to clear the roadways of all vehicles evacuating in response to a hurricane situation. Clearance time begins when the first evacuating vehicle enters the road network and ends when the last evacuating vehicle reaches its destination."[6] The ability to safely evacuate residents and visitors in advance of an approaching hurricane is paramount. Thus, growth as managed through the Rate of Growth Ordinance allocations of housing units, should not exceed the point where the ability to safely evacuate the Keys is compromised. This would mean that once a certain population/housing unit count is reached, it would not be safe to allow additional population/housing units.

Based upon the current policies established in the *2010 Comprehensive Plan* (listed below), the County must achieve evacuation clearance within 24 hours. Since development of the initial Miller Model in 2000 (further explained in **Section 2.2.9.1**), the County amended the comprehensive plan, adding Policy 216.1.8 (see below), which requires phased evacuation with visitors leaving 48 hours, mobile home residents leaving 36 hours, and permanent residents leaving 30 hours in advance of tropical storm winds in a Category 3-5 storm.

[5] *Lower SE Florida Hurricane Evacuation Study*, Corps of Engineers, June 1991.
[6] Ewing, R. *Monroe County Hurricane Evacuation Clearance Time – Final Report*, September 17, 2010.

Current 2010 Comprehensive Plan policies:

- ***Future Land Use Element***

Objective 101.2

Monroe County shall reduce hurricane evacuation clearance times to 24 hours by the year 2010.

- ***Conservation and Coastal Management Element***

Objective 216.1

Monroe County shall reduce hurricane evacuation clearance time to 24 hours by the year 2010.

Policy 216.1.1

Within one year of the effective date of this plan, Monroe County shall adopt Land Development Regulations which establish a Permit Allocation System for new residential development. The Permit Allocation System shall limit the number of permits issued for new residential development to be consistent with the Future Land Use Element in order to maintain hurricane evacuation clearance times at a maximum of 24 hours.

Policy 216.1.8

In the event of a pending major hurricane (category 3-5) Monroe County shall implement the following staged/phased evacuation procedures to achieve and maintain an overall 24-hour hurricane evacuation clearance time for the resident population.

1. Approximately 48 hours in advance of tropical storm winds, a mandatory evacuation of non-residents, visitors, recreational vehicles (RV's), travel trailers, live-aboards (transient and non-transient), and military personnel from the Keys shall be initiated. State parks and campgrounds should be closed at this time or sooner and entry into the Florida Keys by non-residents should be strictly limited.

2. Approximately 36 hours in advance of tropical storm winds, a mandatory evacuation of mobile home residents, special needs residents, and hospital and nursing home patients from the Keys shall be initiated.

3. Approximately 30 hours in advance of tropical storm winds, a mandatory phased evacuation of permanent residents by evacuation zone (described below) shall be initiated. Existing evacuation zones are as follows:

a) Zone 1 – Key West, Stock Island and Key Haven to Boca Chica Bridge (MM 1-6)
b) Zone 2 – Boca Chica Bridge to West end of 7-mile Bridge (MM 6-40)
c) Zone 3 – West end of 7-Mile Bridge to West end of Long Boat Key Bridge (MM 40-63)
d) Zone 4 – West end of Long Boat Key Bridge to CR 905 and CR 905A intersection
e) (MM 63-106.5)
f) Zone 5 – 905A to, and including Ocean Reef (MM 106.5–126.5)

The actual sequence of the evacuation by zones will vary depending on the individual storm.. The concepts embodied in this staged evacuation procedures should be embodied in the appropriate County operational Emergency Management Plans.

The evacuation plan shall be monitored and updated on an annual basis to reflect increases, decreases and or shifts in population; particularly the resident and non-resident populations

For the purpose of implementing Policy 216.1.8, this Policy shall not increase the number of allocations to more than 197 residential units a year, except for workforce housing. Any increase in the number of allocations shall be for workforce housing only.

Policy 216.1.16

Monroe County shall coordinate with the Florida Department of Transportation (FDOT) to ensure that U.S. 1 roadway capacity improvements necessary to maintain hurricane evacuation clearance time at 24 hours, including but not limited to improvements to U.S. 1 between MM 80 and MM 90, are completed.

Policy 216.1.18

Reduced evacuation clearance times which may result from adjustments to evacuation model variables, programs to reduce the number of evacuating vehicles or increased roadway facility capacity, shall not be used to increase development expectations beyond the growth allocations provided herein, except to the extent that a hurricane evacuation clearance time of 24 hours can be maintained. Any necessary reduction in hurricane clearance times shall be accomplished by a plan amendment within 180 days of the re-assessment.

- ***Intergovernmental Coordination Element***

Policy 1301.4.9

Monroe County shall coordinate with the Florida Department of Transportation (FDOT) to ensure that U.S. 1 roadway capacity improvements are placed on FDOT's five year plan to reduce hurricane evacuation clearance times to 24 hours by the year 2010

- ***Transportation Element***

Objective 101.2

Monroe County shall reduce hurricane evacuation clearance times to 24 hours by the year 2010.

2.2.9.1 Hurricane Modeling

Clearance time modeling, through various iterations of the *Lower Southeast Florida Hurricane Evacuation Study*, prepared by Post, Buckley, Schuh & Jernigan, Inc. (PBS&J), has been conducted for the County since the early 1990's. In 2000, pursuant to the requirements of the County's Work Program (see **Section 2.2.7** above), Miller Consulting developed *The Florida Keys Hurricane Evacuation Model* (the "Miller Model") to, "…measure and analyze the unique characteristics of the Florida Keys and to determine the clearance time required to evacuate the Florida Keys up to Florida City, based upon existing US1 conditions."[7] This model is based on the number of dwelling units and capacity of roadway links.

In November of 2009, County staff, municipal representatives, DCA and other State of Florida agencies attended a Hurricane Modeling Work Group meeting to develop various assumptions to be used in the hurricane evacuation modeling. Two assumptions used previously in the modeling effort have been substantially changed since the initial model was developed, including the original participation rates and flow rates, which are: 1) 70 percent participation (meaning 70 percent of the people would evacuate) and 2) maximum FDOT capacity of roadways.

During 2010, two substantial modeling efforts were completed:

- *The Florida Keys Hurricane Evacuation Model*

The County, with the DCA participation, commissioned an update to the original *Florida Keys Hurricane Evacuation Study* commonly known as "The Miller Model". In 2008, the DCA retained Professor Earl Baker at Florida State University to conduct a survey of residents in unincorporated Monroe County regarding whether or not they would evacuate their homes if mandatory evacuation notices were issued for Category 3-5 hurricanes. The results indicate that close to 90 percent of those surveyed would evacuate. In June 2010, Dr. Brian Wolshon, P.E. of Louisiana State University and Joaquin Vargas, P.E., of Traf Tech Engineering, Inc, (for FDOT) provided revised traffic flow rates. Dr. Reid Ewing, Ph.D., Professor of City and Metropolitan Planning at the University of Utah, conducted a modeling effort, using the Miller Model, to accommodate phased evacuation, the FDOT 5-Year Work Program roadway projects, as well as updated participation rate and traffic flow rate assumptions to determine projected clearance time results.

[7] Ibid. pg. 4

Pursuant to Rule 28-20.140 F.A.C., this model will serve as the tool DCA uses to evaluate comprehensive plan amendments that propose increases in density and intensity; the County's annual ROGO allocations that affect build-out; and the mandatory 24-hour evacuation requirement under Chapter 380.0552(9)(a)(2), F.S.

- *The South Florida Regional Hurricane Evacuation Study*

In response to the impacts noted during the 2004 and 2005 hurricane seasons, State legislation was passed (HB 1359 amending portions of Chapter 163, F.S.) that identified new hurricane evacuation planning requirements and a new definition of the Coastal High Hazard Area (CHHA). The new definition of the CHHA is "the area below the elevation of the Category 1 storm surge line as established by a Sea, Lake and Overland Surges from Hurricanes (SLOSH) computerized storm surge model" (Section 163.3178(2)(h), F.S.). The State of Florida Division of Emergency Management (DEM) obtained grant money through the Federal Emergency Management Agency's (FEMA) Hazard Mitigation Grant Program and charged the Regional Planning Councils to conduct regional evacuation modeling and studies across the State, including modeling and boundary mapping for the CHHA.

The South Florida Regional Planning Council (SFRPC), with the assistance of the FDOT, PBS&J and Miller Consulting, Inc., finalized a regional evacuation study that includes Miami-Dade, Broward, and Monroe Counties to model hurricane evacuation from a regional perspective, assuming multi-county evacuation at the same time. Although hurricanes are a prominent concern in the study, the study includes an "all hazards" analysis to prepare for other types of evacuations as well, such as inland flooding or wildfires.

As it pertains to Monroe County, according to the SFRPC, *The South Florida Regional Hurricane Evacuation Study* is to be considered an operational tool that highlights weaknesses which need to be addressed in the regional evacuation system. Over 13,000 scenarios were run, identifying needs, such as traffic bottle necks, that could be incorporated into the FDOT District *Long Range Transportation Plan*. It is also an emergency management tool as it relates to planning for the placement and distribution of equipment and personnel to address an evacuation event. In addition, there is associated software available that would enable emergency managers to run their own scenarios for emergency management planning purposes.

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The summary results of these two models are provided in **Table 2.3 and 2.4**, below:

Table 2.3 - The Florida Keys Hurricane Evacuation Model (The Miller Model), Summary Results

	Low Occupancies (2001) Occupancy by Zone 1=67%; 2=54%; 3=47%; 4=35%; 5=46%; 6=52%; 7=27%		**High Occupancies (2008)** Occupancy by Zone 1=84%; 2=67%; 3=59%; 4=44%; 5=58%; 6=65%; 7=34%	
	Low Participation Approx. 70%	High Participation Approx. 90-95%	Low Participation Approx. 70%	High Participation Approx. 90-95%
2001 Lanes/2001 Miller Flow Rates	16 hours 16 minutes	18 hours 50 minutes	18 hours 32 minutes	22 hours 6 minutes
2001 Lanes/2010 FDOT Flow Rates	18 hours 58 minutes	22 hours 28 minutes	22 hours 8 minutes	27 hours 2 minutes
2015 Lanes/2010 FDOT Flow Rates	16 hours 16 minutes	16 hours 16 minutes	16 hours 16 minutes	18 hours 40 minutes
2015 Lanes/2010 FDOT Flow Rates (without outbound shoulder from mm 90 to mm 106)	16 hours 16 minutes	17 hours 16 minutes	17 hours 4 minutes	20 hours 16 minutes

Source: Ewing, R. *Monroe County Hurricane Evacuation Clearance Time – Final Report*, September 17, 2010.

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Table 2.4 - The 2006 South Florida Regional Hurricane Evacuation Study, Summary Results

Evacuation Scenario	Assumptions	Clearance Time (Hours)
2005 Baseline	• Simultaneous evacuation of tourist, mobile home residents and permanent residents • 100% evacuation participation rate for all units types	37.5 hours
2005 Baseline incorporating Phased Evacuation of Tourists and Mobile Home Residents (Test Scenario 1)	• Only the effect of permanent resident evacuation on clearance time is measured. Tourists and mobile home residents are taken out of the evacuation in accordance with Monroe County's adopted phased evacuation plan. • 100% evacuation participation rate for permanent residents	23.6 hours
Monroe County Phase Evacuation with miller Model Participation Rates (Test Scenario 8)	• Only permanent resident evacuation is measured • 75% evacuation participation rate for permanent residents	18.2 hours

Source: 2006 South Florida Regional Hurricane Evacuation Traffic Study

As illustrated in **Table 2.3**, the evacuation clearance times in the updated Miller Model range from 16 hours, 16 minutes to 27 hours, two minutes. Evacuation clearance times in the Regional Study (**Table 2.4**) ranges from 18 hours, two minutes to 37 hours, five minutes. The distinctions between the models are explained in the *Monroe County 30-Day Report 2010,* (Page 3) and the draft Rule 28-20.140 F.A.C. (explained below). The DCA notes that for regulatory purposes, Monroe County, as an Area of Critical State Concern, is to follow the requirements specified within the adopted Rule 28-20.140 F.A.C., which was adopted April 11, 2011 and is effective as of July 1, 2011.

The Rule outlines various tasks to be achieved relative to hurricane evacuation. They are:

- *By July 1, 2012, Monroe County shall enter into a memorandum of understanding with the Department of Community Affairs, Division of Emergency Management, Marathon, Islamorada, Key West, Key Colony Beach, and Layton after a notice and comment period of at least 30 days for interested parties. The memorandum of understanding shall stipulate, based on professionally acceptable data and analysis, the input variables and assumptions, including regional considerations, for utilizing the Florida Keys Hurricane Evacuation Model or other models acceptable to the Department to accurately depict evacuation clearance times for the population of the Florida Keys.*

- *By July 1, 2012, the Florida Keys Hurricane Evacuation Model shall be run with the agreed upon variables from the memorandum of understanding to complete an analysis of maximum build-out capacity for the Florida Keys Area of Critical State Concern, consistent with the requirement to maintain a 24-hour evacuation clearance time and the Florida Keys Carrying Capacity Study constraints. This analysis shall be prepared in coordination with the Department of Community Affairs and each municipality in the Keys.*

- *By July 1, 2012, the County and the Department of Community Affairs shall update the data for the Florida Keys Hurricane Evacuation Model as professionally acceptable sources of information are released (such as the Census, American Communities Survey, Bureau of Economic and Business Research, and other studies). The County shall also evaluate and address appropriate adjustments to the hurricane evacuation model within each Evaluation and Appraisal Report.*

- *By July 1, 2012, the Department of Community Affairs shall apply the derived clearance time to assess and determine the remaining allocations for the Florida Keys Areas of Critical State Concern. The Department will recommend appropriate revisions to the Administration Commission regarding the allocation rates and distribution of allocations to Monroe County, Marathon, Islamorada, Key West, Layton and Key Colony Beach or identify alternative evacuation strategies that support the 24-hour evacuation clearance time. If necessary, the Department of Community Affairs shall work with each local government to amend the Comprehensive Plans to reflect revised allocation rates and distributions or propose rule making to the Administration Commission.*

Additional discussion of this topic is located in *Chapter 3.0 Conservation and Coastal Management Element*; and *Chapter 4.0 Traffic Circulation Element.*

2.2.10 Livable CommuniKeys Plans

In the late 1990s, the County Planning Department began to develop a comprehensive planning approach to address the individual needs of Keys communities while increasing

community participation in the local planning process. The Livable CommuniKeys Program (LCP) was developed and, shortly thereafter, endorsed by the Board of County Commissioners. The LCP recognizes the distinctive nature of each island's resources and community needs and desires; addresses quality of life issues; and provides a future vision for the community. The LCPs are implemented through the Plan. They include:

- Big Pine Key and No Name Key. (Adopted by the Board of County Commissioners, on December 27, 2004);
- Tavernier Master Plan. (Adopted by the Board of County Commissioners on February 16, 2005);
- The Key Largo Master Plan. (Adopted by the Board of County Commissioners on May 21, 2007); and
- Stock Island/Key Haven Livable CommuniKeys Master Plan. (Volume I was incorporated by reference into the 2010 Comprehensive Plan and Volume Two (2) titled *Harbor Preservation/Redevelopment and Corridor Enhancement Plan*, dated November 2005, and was also incorporated by reference into the 2010 Comprehensive Plan.)
- The Lower Keys Master Plan is underway and expected to be adopted in 2012.

The LCPs are further complemented by the Corridor Enhancement Plans. Their designs and themes are based on the distinctive flavors of each LCP; thus improving the community character along the U.S. 1 corridor. They include:

- Big Pine Key / U.S. 1 Corridor Area Enhancement Plan from MM 33 to MM 29.5;
- Tavernier Commercial Corridor Enhancement Master Plan, which extends from MM 91 to Tavernier Creek Bridge about 2.5 miles in length; and
- Key Largo US1 Corridor Enhancement Plan, which extends from MM 97 to MM 107.

This topic is discussed in more detail in **Section 2.7** *"Future Land Use Needs and Opportunities"* of this element.

2.2.11 Federal Coastal Barrier Resource System

The Coastal Barrier Resources Act (CBRA) of 1982 established the Coastal Barrier Resources System (CBRS). The CBRA legislation is specifically designed to restrict Federal expenditures and financial assistance which have the effect of encouraging development of coastal barriers to minimize the loss of human life, reduce the wasteful expenditure of Federal revenue, and reduce damage to habitat and other valuable natural resources of coastal barriers. Today, the CBRS is comprised of undeveloped coastal barriers along the

Atlantic and Gulf of Mexico coasts, including the coasts of the Keys, Puerto Rico and the Virgin Islands. The CBRS includes 25 units listed in the County. The Federal policy against subsidizing development of designated coastal barriers has impacted the amount and rate of development of those units.

Since the intent and effect of the CBRS has been to discourage development (prohibiting flood insurance and other federal program funds) in the County's designated coastal barriers, the County should consider whether to maintain the existing comprehensive plan policies related to the CBRS, or to focus on the development impacts on endangered species and habitat should unsubsidized development still occur.

This topic and a list of coastal barriers in Monroe County are discussed in more detail in *Chapter 3.0, Conservation and Coastal Management Element*.

2.2.12 Federal Consistency and Coastal Zone Management

The Coastal Zone Management Act (CZMA) seeks preserve, protect, develop and, where possible, to restore and enhance the resources of the nation's coastal zone. It encouraged coastal states to develop and implement comprehensive management programs that would balance the need for coastal resource protection with the need for economic growth and development in the coastal zone. If a management program developed by a coastal state is approved by the U.S. Department of Commerce National Oceanic and Atmospheric Administration (NOAA), the state is authorized to review certain federal activities affecting the land or water uses or natural resources of its coastal zone for consistency with its program. This authority is referred to as "*federal consistency*" and allows states to review:

- Activities conducted by or on behalf of a federal government agency;
- Activities requiring federal licenses or permits;
- Permits issued under the Outer Continental Shelf Lands Act for offshore minerals exploration or development; and
- Federally funded activities (Federal assistance to state and local governments).

The Florida Coastal Management Program (FCMP) is a series of state regulations designed to preserve, protect, develop and, where possible, to restore and enhance the resources of the coastal zone and was approved by NOAA in 1981 and is codified in Chapter 380, Part II, F.S. The FCMP consists of a network of 24 Florida Statutes (i.e. enforceable policies) administered by nine state agencies and five water management districts. In order to accomplish these tasks, the FCMP regulations authorize the Florida DCA to review permits issued by state licensing agencies for federal actions. DCA permit review consists of ensuring that permits for federal activities are consistent with state statutes and rules. During the DCA review, it coordinates with the state licensing agencies by providing its comments and a determination regarding its findings.

Federal consistency reviews are integrated into other review processes (for example:

Florida State Clearinghouse, environmental resource permits and joint coastal permits) conducted by the state depending on the type of federal action being proposed. Regardless of the process used, the review of federal activities is coordinated with the applicable FCMP member agencies, which includes the Department of Community Affairs. Agencies authorized to review and comment on the consistency of federal activities subject to state review under the FCMP are those agencies charged with the implementation of the statutes and rules included in the federally approved program.

Each agency is given an opportunity to provide comments on the merits of the proposed action, address concerns, make recommendations, and state whether the project is consistent with its statutory authorities in the FCMP. The Department of Environmental Protection, as the designated lead coastal agency for the state, communicates the agencies' comments and the State's final consistency decision to federal agencies and applicants through the approval or denial of a permit.

This framework allows the State to make integrated, balanced decisions that ensure the wise use and protection of the State's water, property, cultural, historic, and biological resources; protect public health; minimize the State's vulnerability to coastal hazards; ensure orderly, managed growth; protect the State's transportation system; and sustain a vital economy.

2.2.13 Habitat Conservation Plan (HCP)

To address habitat loss and indirect effects associated with development on Big Pine and No Name Keys, the U.S. Fish and Wildlife Service (USFWS) issued an Incidental Take Permit to the County, FDOT, and DCA. The take of these species is incidental to land clearing for development and recreational improvements. The HCP for Big Pine Key and No Name Key was implemented to protect the Florida Key deer as well as other protected species under the plan, including the Lower Keys marsh rabbit. The HCP outlines the planned growth patterns and rate as well as the anticipated impact that growth will have on the species. This topic is discussed in more detail in *Chapter 3.0 Conservation and Coastal Management Element*.

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2.3 Existing Land Use

[Rule 9J-5.006.1(a),(c) & (2)(b) F.A.C]

2.3.1 Existing Patterns and Trends

The pattern and mix of existing land uses is indicative of the market forces and natural resource constraints which have shaped existing development and are likely to influence future growth.

Since 99.8 percent of the Mainland PA primary land use is designated Conservation, this section will focus upon the unincorporated Lower, Middle and Upper PAs existing land use conditions. For the purpose of this Element, these areas are collectively referred to as the unincorporated Keys.

The Existing Land Use Maps (**Map Series 2-1**) have been developed by the County Growth Management Division as representative of the existing pattern of development in the unincorporated Keys. **Map Series 2-1** and the supporting GIS data were created in May 2010. For the creation of the Existing Land Use Map series, the County Growth Management Division utilized the Property Appraisers Geographic Information System (GIS) data, in particular the Property Classification (PC) codes, to assign a generalized land use designation. The existing land use data for the unincorporated Keys is summarized in **Table 2.5. Appendix 2-1** illustrates how the Property Appraiser's PC codes were converted into a generalized existing land use.

As seen in **Appendix 2-1**, a few of the PC codes that were grouped into the Commercial land use are PC 11 - stores, PC 17 and 18 - office buildings, PC 36 - camps, PC 38 - golf courses, and hotel/motel (PC 39). The Conservation designation includes PC 82 – US Mainland forest, parks, PC 88 – Federal, PC 99 owned by the Nature Conservancy and the Florida Keys Land Trust. The Education land use category constitutes PC codes 72: private school or college, and PC 83 - Public Schools. Included in the Institutional land uses were churches (PC 41), public college (PC 84) and public hospitals (PC 85). Residential land uses include PC codes 01 -single family, PC 02 - Mobile Home and other residential uses detailed in **Appendix 2-1**.

SPECIAL NOTES:

- PC code 87 - State was assigned to a Conservation land use if aerial photography revealed mangrove and assigned to Utilities and Right-of-Way if aerial photography revealed a developed parcel. Likewise, PC code 86 - County was assigned to a Conservation land use if aerial photography revealed mangrove and assigned to the Public Buildings and Ground land use, if aerial photography revealed a developed parcel. For more detail on PC code classification into a generalized land use, see **Appendix 2-1**.

- The existing land use inventory excludes water bodies and submerged lands and includes offshore islands, which are discussed in detail in **Section 2.3.4** *"Offshore Islands"* of this element.

- The measurement of land areas in the County is not exact. The unique environmental character of the area, especially the large areas of mangrove-fringed shoreline and numerous small islands, many of which are below the mean high water line, makes an exact land area with acreages inventory difficult, simply because defining "land" in the County is difficult. The calculation of acreages of land use types provides an approximation of the land area of each of the land use categories, and is useful in determining the conditions as they presently exist.

Table 2.5 - Existing Land Use by Planning Area (Acres)

Existing Land Use	Lower Keys	Middle Keys	Upper Keys	Total	Percent of Total
Commercial	337.0	67.7	495.3	900.0	1.2%
Conservation	36,201.6	1,458.7	17,859.2	55,519.5	75.9%
Educational	49.2	0.0	30.8	80.0	0.1%
Industrial	414.8	0.2	40.6	455.6	0.6%
Institutional	99.6	0.4	60.8	160.8	0.2%
Military	4,025.7	0.0	0.0	4,025.7	5.5%
Other Public Utilities and Right-of-Way(ROW)	1,665.6	141.8	1,429.3	3,236.6	4.4%
Public Buildings and Grounds	17.1	33.0	61.2	111.3	0.2%
Recreational	640.8	132.1	548.3	1,321.2	1.8%
Residential	2,599.9	201.9	2,186.4	4,988.2	6.8%
Vacant or Undeveloped	1,376.2	108.3	854.4	2,338.9	3.2%
Total	47,427.6	2,144.1	23,566.2	73,137.9	100.0%
Percent Total by Planning Area	64.9%	2.9%	32.2%	100.0%	--

Source: Monroe County Growth Management, 2010, "MC_ELU_510"
Monroe County Property Appraiser, 2010, "Public Parcel"
NOTE: Slight difference in totals due to rounding.

As indicated in **Table 2.5**, the land mass of the unincorporated Keys portion of the County is approximately 73,138 acres. Sixty-five percent of land area is found in the Lower Keys PA, three percent in the Middle Keys PA, and 32 percent in the Upper Keys PA. Since the Lower Keys PA is the largest in land mass, it is not surprising that it has the highest ratio of existing land use designations, when compared to the other PAs. The exception applies to Commercial and Public Buildings and Grounds where percent ratios are larger in the Upper Keys PA.

More than 75 percent of land in the unincorporated Keys is set aside for conservation purposes. Of the developed land uses, Residential is the largest land use category, representing approximately 6.8 percent of the land uses in the County, followed by Military at 5.5 percent, Utilities and Rights-of-Way at 4.4 percent, Vacant at 3.2 percent, Recreation at 1.8 percent, and Commercial at 1.2 percent.

The following sections provide a detailed discussion of the existing development patterns in the unincorporated Keys:

2.3.1.1 Commercial Lands

Commercial land uses can broadly be defined as those uses associated with the buying and selling of goods and/or services. Commercial uses account for 900 acres, or 1.2 percent of the total area of the unincorporated Keys. Commercial land uses include general commercial, commercial fishing, and tourist commercial land uses. General commercial uses include retail and office uses, which are oriented toward the resident population and represent the majority of commercial uses. General commercial uses are generally concentrated in a strip along U.S. 1. This is primarily evident in the more heavily developed keys, including Key Largo, Tavernier, and Sugarloaf, and consists of retail, service, and auto-related uses as well as office buildings, which are generally small, single story structures. The UKPA contains the highest ratio (55%) of commercial land use.

2.3.1.2 Conservation Lands

Conservation land includes land acquired by public agencies and private organizations for conservation purposes. This is the single largest land use category and accounts for 55,519.5 acres, or 75.9 percent of the total land area of the unincorporated Keys. These conservation lands are primarily located in the Upper and Lower Keys. Federal, State and County governments have been actively acquiring environmentally sensitive lands and habitats of rare, threatened and endangered species. This land use category includes such conservation lands as Crocodile Lake National Wildlife Refuge, the National Key Deer Refuge, and the John Pennekamp Coral Reef State Park.

It should be noted that the vast amount of conservation land in the County, and the continued preservation and management of it, is a strategy to reduce greenhouse gas emissions because these areas, including both vegetation and soils, are widely recognized as carbon storage sinks according to the Department of Energy (DOE). DOE defines terrestrial carbon sequestration as either the net removal of CO_2 from the atmosphere or the prevention of CO_2 net emissions from the terrestrial ecosystems into the atmosphere.

2.3.1.3 Educational Lands

Educational land uses account for approximately 80 acres in the County; sixty-two percent of the acreage is located in the LKPA. There are a total of 13 public schools including three high schools, one middle school, two middle/elementary schools, six elementary schools, and one school for exceptional students in Monroe County as a whole. Four schools are located in the unincorporated Keys.

2.3.1.4 Industrial Lands

Industrial land uses account for approximately 455.6 acres or less than one percent in the unincorporated Keys. Industrial uses include cement, rock and gravel operations, light manufacturing and storage areas, and heavy industrial uses. Industrial uses are heavily concentrated in the Lower Keys, with 91 percent distribution.

2.3.1.5 Institutional Lands

Institutional uses, including hospitals, churches, cemeteries, and service clubs account for 160.8 acres in the unincorporated Keys, representing less than one percent of the total land area. About 62 percent of institutional lands are located in the Lower Keys.

2.3.1.6 Military Lands

The Keys have long been recognized as strategically significant by the U.S. military forces, and military operations still play an important role in the economy of the Keys. As shown in **Table 2.5**, military lands account for 4,025.7 acres, or approximately 5.5 percent of the unincorporated Keys. Military lands in the unincorporated areas of the County are entirely located in the Lower Keys, including the Boca Chica Naval Air Station on Boca Chica, Rockland and Geiger Keys; and additional facilities on Saddlebunch Key and Cudjoe Key. Fleming Key and Dredgers Keys in the City of Key West make up an additional 536.4 acres of military land and are not part of this analysis given their location within a municipality.

2.3.1.7 Other Public – Utilities and ROW

This land use category includes land owned by public utilities, including existing electric power generation and transmission systems; service providers; and right-of-way and accounts for 4.4 percent of the land use. A majority (51%) of this land use is located in the LKPA.

2.3.1.8 Public Buildings/Grounds

Public buildings/grounds account for approximately 111.3 acres or 0.2 percent of the land uses in the unincorporated Keys. This land use category includes all government offices, such as County, State and federal offices, post offices, sheriff and jail facilities, Coast Guard stations, fire stations, cemeteries/crematories and community clubs and lodges. This land use category does not include publicly-owned lands held for conservation purposes (see 2.3.1.2 Conservation Lands, above). Most of this land use (55 percent) is located in the Upper Keys.

2.3.1.9 Recreation Lands

Recreation lands include public recreation lands and facilities as well as some private recreation lands, such as golf courses. These uses account for approximately 1,321 acres, or less than two percent of the total land area. Three of the larger recreation areas in this category are Bahia Honda and Long Key State Recreation Areas and Ocean Reef golf course. Forty-nine percent of this land use type is located in the Lower Keys.

2.3.1.10 Residential Land

Residential land uses, including single-family detached homes, mobile homes, multi-family apartments, and mixed-use residential areas are found on almost every one of the 38 Keys along U.S. 1. As indicated in **Table 2.5**, residential uses account for 4,988 acres, or 6.8 percent of the unincorporated Keys; approximately 52 percent is located in the LKPA.

2.3.1.11 Vacant or Undeveloped Lands

The vacant land area is 2,339 acres or 3.2 percent of the unincorporated portion of the Keys and is contained within roughly 6,750 parcels. Approximately 58.8 percent of vacant land in the unincorporated Keys is heavily concentrated in the LKPA; 35.5 percent in the UKPA; and 5.7 percent in the MKPA. Vacant land analysis is further explained based on its relationship to the Tier System and underlying future land uses in **Section 2.7.4** "*Vacant Land Analysis*"

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2.3.1.12 Existing Patterns and Trends by Planning Area (PA)

Lower Keys

As seen in **Table 2.6**, Conservation land use (76.3%) in this PA is consistent with that observed in the unincorporated Keys as a whole. Military constitutes 8.5 percent of land use; 5.5 percent Residential, 3.5 percent, Other Public – Utilities and ROW; 2.9 percent Vacant or Undeveloped; and 1.4 percent Recreational. Less than one percent of land is distributed in the Commercial, Education, Industrial, and Public Buildings and Grounds land uses.

Table 2.6 - Existing Land Use – Lower Keys Planning Area (LKPA)

Existing Land Use	Acres	Percent of Total
Commercial	337.0	0.7%
Conservation	36,201.6	76.3%
Educational	49.2	0.1%
Industrial	414.8	0.9%
Institutional	99.6	0.2%
Military	4,025.7	8.5%
Other Public - Utilities and ROW	1,665.6	3.5%
Public Buildings and Grounds	17.1	0.0%
Recreational	640.8	1.4%
Residential	2,599.9	5.5%
Vacant or Undeveloped	1,376.2	2.9%
Total	47,427.6	100.0%

Source: Monroe County Growth Management, 2010, "MC_ELU_510"
Monroe County Property Appraiser, 2010, "Public Parcel"
NOTE: Slight difference in totals due to rounding.

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Middle Keys

As seen in **Table 2.7** below, Conservation constitutes 68.0 percent of land use in this PA. In descending order Residential land use comprises 9.4 percent, Other Public 6.6 percent, Recreational 6.2 percent, Vacant or Undeveloped 5.1 percent, Commercial 3.2 percent, and 1.5 percent for Public Buildings and Grounds. The remaining land uses (Military and Educational) are non-existent.

Table 2.7 - Existing Land Use - Middle Keys Planning Area (MKPA)

Existing Land Use	Acres	Percent of Total
Commercial	67.7	3.2%
Conservation	1,458.7	68.0%
Educational	0.0	0.0%
Industrial	0.2	0.0%
Institutional	0.4	0.0%
Military	0.0	0.0%
Other Public - Utilities and ROW	141.8	6.6%
Public Buildings and Grounds	33.0	1.5%
Recreational	132.1	6.2%
Residential	201.9	9.4%
Vacant or Undeveloped	108.3	5.1%
Total	2,144.1	100.0%

Source: Monroe County Growth Management, 2010, "MC_ELU_510"
Monroe County Property Appraiser, 2010, "Public Parcel"
NOTE: Slight difference in totals due to rounding.

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Upper Keys

As seen in **Table 2.8** below, Conservation constitutes 75.8 percent of land use in this PA. Other land uses, in descending order, include: Residential (9.3%), Other Public (6.1%), Vacant or Undeveloped (3.6%), Recreational (2.3%), and Commercial (2.1%). All other land uses are less than one percent.

Table 2.8 - Existing Land Use - Upper Keys Planning Area (UKPA)

Existing Land Use	Acres	Percent
Commercial	495.3	2.1%
Conservation	17,859.2	75.8%
Educational	30.8	0.1%
Industrial	40.6	0.2%
Institutional	60.8	0.3%
Military	0.0	0.0%
Other Public - Utilities and ROW	1,429.3	6.1%
Public Buildings and Grounds	61.2	0.3%
Recreational	548.3	2.3%
Residential	2,186.4	9.3%
Vacant or Undeveloped	854.4	3.6%
Total	23,566.2	100.0%

Source: Monroe County Growth Management, 2010, "MC_ELU_510"
Monroe County Property Appraiser, 2010, "Public Parcel"
NOTE: Slight difference in totals due to rounding.

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2.3.2 Existing Density and Intensity

GIS data to analyze the range of density or intensity of land use for the County was obtained from the Monroe County Property Appraisers Office in January 2010 and is provided on **Appendix 2-2,** in detailed form. This data provides parcel and floor area for land uses which are grouped into PC Codes. The Property Appraiser's PC land use acreage does not necessarily match the newly created Existing Land Use Map or the existing land use analysis in **Section 2.3.1 "**Existing Patterns and Trends". This is due to the method in which the existing land use data was created. As seen in **Appendix 2-1,** PC codes were converted into a generalized existing land use category, and form the basis for the existing land use analysis. Property appraiser data is used to determine existing density and intensity as of January 2010.

The PC code and existing land use discrepancies are due to:

- The Property Appraiser's Office only maps platted land whereas existing and future land use maps comprise offshore islands, which may not be platted in their entirety;
- The Property Appraiser's data includes submerged lands whereas the existing and future land use maps do not; and
- The method for creating the existing land use map was a two part exercise 1) to convert the Property Appraiser's PC code into a generalized land use category and map **(Appendix 2-1)**, and 2) match the land mass depicted in the future land use map series.

Property Appraiser data should only be used for assessing density and intensity and not for acreage calculations. The density and intensity calculation provides an approximation of each PC land use category and is useful in determining the conditions as they presently exist (January 2010).

Some of the densities and intensities are worth highlighting. According to the Property Appraiser's data, the average single family density is at 2.2 units per acre. Multi-family of less than 10 units averages 5.2 units per acre. Multi-family "Compounds" use have the highest density at 18.2 units per acre. The average density for all multi-family units is 6.7 units per acre. **(Appendix 2-2)**

The residential portion of mixed uses has a density of 1.65 dwelling units per acre. Likewise the Floor Area Ratio (FAR) for the commercial portion of mixed-uses averages 0.10. **(Appendix 2-2)**

At the time of data collection there were 5,667,248 square feet of non residential space with an average FAR of 0.0055as seen in **Table 2.9.** Of the general commercial PC codes, the highest FAR is in the "Drive-in Theatre or Open Stadium" (PC 31) category at 0.26098. The average FAR in the general commercial category is .013. In the tourist commercial category, the average FAR is 0.08535. Commercial fishing has the lowest average FAR at .05826. **(Appendix 2-2)**

For the Industrial uses, "Lumberyard" (PC 43) has the highest FAR at .12854; however, the average of all industrial uses is .04492. Overall, no PC code category exceeds a 0.3 FAR **(Appendix 2-2).**

Table 2.9 below depicts the floor area ratio calculations by summarized PC code and derive from **Appendix 2-2**. It is not intended to summarize floor area ratios by the existing land use category classifications as seen in **Appendix 2-1,** but rather by PC code**.**

Table 2.9 – Average Floor Area Ratio (FAR)

PC Code Summary	Area (SF)	Existing Building Square Feet	Average FAR
Mixed Use	5,177,622	518,972	0.1002
General Commercial	192,259,737	2,535,865	0.0132
Tourist Commercial	1,245,364	106,288	0.0853
Commercial Fishing	1,032,510	60,152	0.0583
Industrial	18,474,226	829,812	0.0449
Education	4,110,004	371,068	0.0903
Institutional	21,851,714	671,600	0.0307
Public Buildings/ Grounds	698,418,605	313,691	0.0004
Public Facilities	6,891,176	188,552	0.0274
Military	66,245,929	2,674	0.0000
Recreation	18,082,089	68,574	0.0038
TOTAL	**1,033,788,976**	**5,667,248**	**0.0055**

Source: Monroe County Property Appraiser's Office, January 2010, "Parcel Public"
NOTE: Slight difference in totals due to rounding.

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Table 2.10 illustrates the acreage of generalized PC codes and are explained in more detail on **Appendix 2-2.** These acreage calculations are not to be confused by those in **Section 2.3.1** "*Existing Patterns and Trends".*

Table 2.10: Acreage by Property Appraiser Code (PC)

PC Code Summary	Area (Acreage)
Single Family	6,176
Mobile Homes	6,981
Multi-Family	955
Mixed Use	119
General Commercial	4,414
Tourist Commercial	29
Commercial Fishing	24
Industrial	424
Education	94
Institutional	502
Public Buildings/ Grounds	16,033
Public Facilities	158
Military	1,521
Recreation	415
TOTAL	**37,845**

Source: Monroe County Property Appraiser's Office, January 2010, "Parcel Public"
NOTE: Slight difference in totals due to rounding.

Table 2.11 illustrates the acreage of generalized PC codes and are explained in more detail on **Appendix 2-2.** These acreage calculations are not to be confused by those in **Section 2.3.1** "*Existing Patterns and Trends"* in which vacant land is approximately 2,339 acres.

Table 2.11: Vacant Land by Property Appraiser Code

PC Code	PC Code Description	Area (Acreage)
00	Vacant Residential	19,152.6
10	Vacant Commercial	675.9
40	Vacant Industrial	0.0
70	Vacant Institutional	1,505.6
Total		**21,334.2**

Source: Monroe County Property Appraiser's Office, January 2010, "Parcel Public"
NOTE: Slight difference in totals due to rounding.

2.3.3 Platted Lots

2.3.3.1 Platted Lots Existing Conditions

An important component of the land use analysis for the County is the number of platted lots and platted subdivisions. For this analysis, GIS data was utilized to determine lots that are currently zoned in one of three categories that assign development potential per parcel, rather than acreage basis. For these three zoning categories, density is presently assigned at one unit per lot, regardless of the lot size.

The three zoning categories that provide for one unit per lot include Improved Subdivision (IS), Urban Residential Mobile Home (URM), and Commercial Fishing Village (CFV). It should also be noted that parcels with one of these zoning designations do not always fall within a platted subdivision. However, the inventory does list all IS, URM and CFV lots, including those outside platted subdivisions.

While not all development occurs on platted lots in platted subdivisions, the majority of single-family home development does occur in areas zoned for one of the three one unit/parcel zoning districts. It can be expected that this trend will continue, as by definition, these IS, URM, and CFV parcels occur in areas of existing infrastructure (potable water and roads), and are generally located in environmentally disturbed areas.

Table 2.12 – Inventory of IS, URM and CFV Zoned Lots

	Lower Keys	Middle Keys	Upper Keys	Total	% of Total
Vacant	2,212	4	1,859	**4,075**	17.1
Conservation	2,342	0	819	**3,161**	13.3
Developed	8,527	418	7,634	**16,579**	69.6
Total	**13,081**	**422**	**10,312**	**23,815**	100.0

Source: Monroe County Growth Management, 2010, Geographic Information System file "MC_ELU_510"; Monroe County Growth Management, 2010, "Zoning"
NOTE: Slight difference in totals due to rounding.

As seen in **Table 2.12**, there are 23,815 lots zoned for one dwelling unit per lot regardless of lot size. Of these lots, 69.6 percent are developed; 13.3 percent are currently under the Conservation existing land use category; and 17.1 percent are vacant. Of the 23,815 lots that allow one dwelling unit, 55.0 percent are located in the LKPA, 43.3 percent are located in the UKPA and less than 2.0 percent are located in the MKPA. Further evaluation of the individual characteristics of the vacant lots is warranted to understand their true development potential. An analysis of vacant lots that allow one dwelling unit comparing its relationship to the Tier System is provided in **Section 2.7.4** "*Vacant Land Analysis".*

2.3.4 Offshore Islands

In addition to the 38 islands connected by US1, Monroe County also contains over 200 offshore islands which are not connected to US1 or other roads by bridges. For the most part, these islands are composed of sediment, as opposed to rock; are periodically inundated (Enos, 1989); and characterized by environmentally sensitive lands containing mangrove forests, salt marsh, buttonwood wetlands, salt ponds, and freshwater wetlands. They are also known for their endangered or threatened species habitat; many of the islands in the Keys are zoned for protection of the nesting birds by both the National Park Service and the National Wildlife Refuges.

Smaller islands tend to consist entirely of mangrove swamp, whereas the larger islands tend to contain open areas and may support freshwater forests or hammocks (Enos, 1989). Most of these islands are surrounded by shallow water, and the submerged lands support seagrass beds which are important in stabilizing sediments that would otherwise exist as shifting sand and mud. These islands are largely undeveloped due to the large number in public ownership and their relative inaccessibility. Federal, state and local regulations have combined to limit development to extremely low levels.

Potential adverse impacts associated with human activities include the scouring of seagrass beds due to boating and jet ski activities in shallow water; the disturbance of migratory and wading waterfowl and turtle habitat and nesting sites; and destruction of habitat and disposal of garbage by visitors to these islands.

Data was obtained from the *2010 Monroe County Comprehensive* as adopted in 1995. A detailed discussion of their environmental significance is provided in *Chapter 3.0, Conservation and Coastal Management Element*.

2.3.4.1 Inventory of Offshore Islands

Publicly-Owned Offshore Islands

Most of the offshore islands in the County are in public ownership for conservation purposes (**Table 2.13**). In the Upper and Middle Keys, all of the offshore islands in Florida Bay to the north of the Intracoastal Waterway between Cross Key on the east and approximately Long Key on the west are within Everglades National Park (these are shown with dashed coastlines on the **Map Series 2-1**). In addition to those islands within the Everglades National Park, several offshore islands in the Upper and Middle Keys are part of publicly-owned conservation lands, including the Crocodile Lake National Wildlife Refuge, the John Pennekamp Coral Reef State Park, the Dagney Johnson Key Largo Hammock State Park, Lignumvitae Key State Botanical Site, the Indian Key State Historic Site, and Long Key State Recreation Area.

In the Lower Keys, the majority of offshore islands in Florida Bay are in public ownership as part of the Great White Heron National Wildlife Refuge and the National Key Deer

Refuge. To the west of Key West, the Key West National Wildlife Refuge includes a series of approximately 17 offshore islands, including the grouping of islands known as the Marquesas (the only offshore island in this grouping not in public ownership is Ballast Key). Further to the west of the Marquesas, the Dry Tortugas National Park includes approximately 62,000 acres of submerged lands and 40 acres of uplands, including those islands commonly known as the Dry Tortugas.

All of these publicly-owned offshore islands are managed for conservation purposes by the USFWS, the National Park Service, and the Florida Department of Environmental Protection (FDEP). These offshore islands serve as habitat for a variety of wildlife, including many threatened and endangered species.

Table 2.13 - Publicly-Owned Offshore Islands

Key Name	Acres	Comment
Annette Key	382.3	
Antonio Key	NA	
Barracuda Key	NA	
Bay Key	NA	Portion in Public Ownership
Big Harper Key	NA	
Big Spanish Key	57.0	
Budd Keys	42.3	
Buttonwood Keys	73.8	
Cavo Agua Key	51.0	
Channel Key	25.3	
Cocoanut Key	NA	
Content Key	339.8	Portion in Public Ownership
Coon Key	NA	
Crane Key	NA	
Crane Keys	NA	
Crawl Key	19.8	
Cutoe Key	NA	
Duck Key	NA	
East Bahia Honda Key	NA	
Fish Hawk Key	16.8	Also known as Eagle Nest Key
Friend Key	NA	
Galdin Key	NA	
Grassy Key	NA	
Happy Jack Key	NA	
Hardup Key	NA	
Harper Key	NA	
Horseshoe Key	NA	
Howe Key Mangrove	NA	
Howe Key	721.7	
Hurricane Key	NA	
Johnson Keys	256.9	

Table 2.13 - Publicly-Owned Offshore Islands (continued)

Key Name	Acres	Comment
Johnstons Keys	485.0	
Johnstons Keys Mangroves	NA	
Knockemdown Keys	1134.1	Portion not in public ownership
Little Pine Key	564.5	
Little Pine Key Mangroves	NA	
Little Spanish Key	52.0	
Little Spanish Key Mangrove	NA	
Little Swash Keys	NA	
Lower Harbor Keys	NA	
Mayo Keys	58.3	
Mud Keys	138.5	
Old Dan Mangrove	NA	
Pidgeon Key	NA	
Porpoise Key	NA	
Pye Key	NA	
Rattlesnake Lumps	NA	
Refuge Key	NA	
Round Key	NA	
Sandfly Key	NA	
Sawyer Key	90.8	
Snipe Key	720.3	
Squirrel Key	NA	
Teakettle Key	NA	
Toptree Hammock Key	NA	
Torch Key Mangroves	NA	
Unnamed	NA	West of Rattlesnake Lumps
Unnamed	NA	East of Knockemdown Key
Unnamed	NA	East of big Pine Key (near Doctors Point)

Source: Monroe County Growth Management 1992

Privately-Owned Offshore Islands

There are approximately 60 offshore islands in private ownership and subject to regulation by the County (**Table 2.14**). These include islands ranging in size from one acre to over several hundred acres (although there are some offshore islands of less than one acre, these are largely unnamed sovereignty lands owned by the State of Florida and are not listed on **Tables 2.13** or **2.15**).

Many privately-owned offshore islands are "mangrove islands" which are periodically inundated and characterized by mangroves with very little upland vegetation.

Table 2.14 - Privately Owned Offshore Islands

Key Name	Acres	Comment
Angelfish Keys	60.0	
Anne Key	28.8	
Ballast Key	24.0	
Bamboo Key*	9.0	
Bay Keys	35.0	
Big Raccoons	202.3	
Bird Key	14.5	
Black Swan*	4.5	
Broad Key	63.0	
Budd Keys	25.0	
Burnt Keys	134.3	
Channel Key	11.5	
Content Key	50.0	
Cook's Island	40.6	Developed
Cotton Key	36.4	
Crab Key	12.5	
Don Quixote Key	20.4	
Dove Key*	4.5	
East Sister Rock*	1.0	Developed
Fanny Keys*	2.2	Developed
Gopher Key*	2.3	
Half Moon Key	81.2	
Howell Key*	8.5	Also known as Drummond Key
Key Who	10.0	West of northern tip of Summerland Key
Knockemdown Keys	500.0	Portion located in public ownership
Little Card Point	122.1	
Little Duck Key	25.5	
Little Grassy Key	73.8	Near Big Pine Key
Little Palm Island	5.5	
Little Raccoon Key	64.1	
Linderman Key*	10.0	
Loggerhead Key	87.0	Also known as Key Lois
Main Key	145.6	
Mallory Keys	20.0	
Molasses Keys	40.5	
Money Key*	4.6	Developed
Mud Keys	10.0	
Newfound Harbor Keys	118.6	Developed
O'Hara Key	38.0	
Palo Alto Key	373.9	Developed
Pelican Key	20.0	

Table 2.14 Privately Owned Offshore Islands (continued)

Key Name	Acres	Comment
Pumpkin Key	10.0	
Russell Key	12.8	Developed
Saddlehill Key	107.3	
Seven Mangroves Islands	17.3	
Tarpon Belly Keys	13.0	Developed
Tavernier Key	20.8	
Toms Harbor Keys	41.5	
Unnamed*	1.0	
Unnamed*	8.8	
Unnamed*	27.3	
Unnamed*	1.4	
Wells Key	39.0	
West Harbor Key	69.3	
West Sister Rock*	1.0	
Wilson Key	15.4	
Wisteria Island	21.5	

Source: *Monroe County 2010 Comprehensive Plan, 1995*
* Offshore islands with less than 10 acres.

A number of privately-owned offshore islands are included in the Federal Coastal Barrier Resources System (CBRS) as established by the Coastal Barrier Resources Act (CBRA) of 1982. This legislation prohibits federally subsidized development of undeveloped coastal barrier islands in order to minimize the loss of human life, reduce expenditures of federal revenue, and reduce damage to fish and wildlife habitat and other valuable natural resources of coastal barriers (United State Department of Interior, 1988).

Several of these islands contain hardwood hammock vegetation, which supports numerous plant and animal species that have very limited distributions and are considered rare and endangered.

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Other Offshore Islands

In addition to those islands included on **Tables 2.13** and **2.14,** there are a number of offshore islands for which ownership is unclear (**Table 2.15**). These islands are not listed by the Monroe County Tax Appraiser's Office as being in private ownership, and they have not been explicitly identified by any State or federal agencies as being in public ownership.

Table 2.15 - Other Offshore Islands

Key Name	Acres	Comment
Big Mangrove Key	25.0	
Bill Finds Key*	2.0	
Cormorant Rookeries	20.0	
Little Crane Key*	2.0	
Marjoe Key*	1.0	
Pelican Key*	2.0	
Porpoise Key	15.0	
Refuge Key*	8.0	
Riding Key	15.0	
Rodríguez Key	120.0	

Source: Monroe County Growth Management 1992
* Offshore islands with less than 10 acres.

Included in this category are a number of unnamed islands throughout the Keys, which are not listed on **Tables 2.13 and 2.15**. Most of these islands are likely to be sovereignty lands, which lie below the mean high water line and are owned by the State of Florida. The County is currently further exploring the ownership issues related to these islands. Monroe County Growth Management Department and the Property Appraisers Office should coordinate in this effort.

For the most part, in the Existing Land Use Map offshore islands have a Conservation land use designation and for the Future Land Use Map they have an undesignated land use designation since many of them have yet to receive a designation approved by the County Commission. The County should explore placing offshore island names on the future and existing land use GIS data, in order to better quantify the acreage for each island.

2.3.4.2 Current Monroe County Regulations

The Offshore Islands (OS) zoning designation (Section 130-157 of the MCLDC) allows 0.1 dwelling unit per acre or 1 dwelling unit per ten acres. The parcel size used to calculate potential density is exclusive of mangroves. Therefore, all offshore islands that contain less than ten acres are shown on the previous set tables with an asterisk.

2.3.4.3 Public Facilities

Development on offshore islands is unique with regard to the provision of public facilities. The County does not encourage the development of these islands and does not spend any public funds to extend public services or facilities (i.e., water, electricity, etc.) to offshore islands or to construct any infrastructure (i.e., roads and bridges) to offshore islands. The following are a few of the County's existing Comprehensive Plan policies relating to offshore island development:

Policy 102.7.3

Monroe County shall discourage developments proposed on offshore islands by methods including, but not limited to, designated offshore islands as Tier I Lands.

GOAL 209

Monroe County shall discourage private land uses on its mainland, offshore islands and undeveloped coastal barriers, and shall protect existing conservation lands from adverse impacts associated with private land uses on adjoining lands.

Policy 215.2.3

No public expenditures shall be made for new or expanded facilities in areas designated as units of the Coastal Barrier Resources System, saltmarsh and buttonwood wetlands, or offshore islands not currently accessible by road, with the exception of expenditures for conservation and parklands consistent with natural resource protection, and expenditures necessary for public health and safety.

The County currently permits these activities for applicants who pay for these improvements and who receive the approvals and permits required by the appropriate federal, State, and local agencies. Most of the existing residential development on offshore islands is self-contained in terms of sewerage, water, electricity, and communications. However, this development requires onshore services; therefore, it is treated as equivalent to development on one of the 38 main Keys in terms of demand for public facilities and services and hurricane evacuation planning.

2.3.5 Adjacent Jurisdiction Land Use [Rule 9J-5.006(1)(f)1., F.A.C

The generalized land uses of counties and municipalities adjacent to the County are indicated on the **Map Series 2-1**. Miami-Dade County and Collier County border the Mainland portion of the County to the north and east. There are no adjacent municipalities located in either of these two counties. The County includes five incorporated cities: Layton, Key Colony Beach and Marathon located in the Middle Keys; and Islamorada located in the Middle and Upper Keys. Key West, the County seat, is located at the southwestern end of the Keys, and comprises the entire island of Key West, the north half of Stock Island; Sunset Key, a small island across from the Mallory Docks; and Key West Harbor (south of Wisteria Island). The

Village of Islamorada is located in the Upper Keys and comprises Lower Matecumbe Key, Upper Matecumbe Key, Windley Key and Plantation Key.

2.3.5.1 Miami-Dade County

Miami-Dade County lies to the east of the mainland portion of the County and includes the southern mainland coast to the north of the Keys. To the west of U.S. 1, the portions of Miami-Dade County adjacent to the County are located within the Everglades National Park. This park is managed by the National Park Service and ranges from vast sawgrass prairies to tropical hammocks and mangrove swamps. Development is limited to park-related facilities including visitor centers; hiking trails, and overlooks along Route 27; and tourist-oriented facilities at Flamingo.

The portion of Miami-Dade County to the east of U.S. 1 along the southern mainland coast is designated as Environmental Protection Subarea F (Coastal Wetlands and Hammocks), by the *Miami-Dade Comprehensive Development Master Plan, October 2006 Edition As Amended through May 6, 2009.* These areas, which are not within the authorized boundaries of Biscayne or Everglades National Parks, are low-lying, flood prone, and characterized predominantly by coastal wetland communities. Accordingly, all land use or site alteration proposals are evaluated on a case-by-case basis by federal, State, regional, and County agencies.

Land uses that could be considered for approval by Miami-Dade County include low-coverage residential use at a density not to exceed 1 dwelling unit per 5 acres, water-dependent uses or necessary public, water related facilities. These land uses are generally consistent with the adjacent County areas on North Key Largo, which are indicated as Conservation areas on the **Map Series 2-1**. Conservation areas indicate lands that have been acquired by federal, State, or local agencies or private entities for conservation purposes.

In addition, necessary electrical generation and transmission facilities are also permitted in this area. The approval of any new use, and the replacement or expansion of any existing use will be conditioned upon its demonstrated consistency with the adopted goals, objectives and policies of this plan, conformity with all prevailing environmental regulations and compatibility with objectives of the Comprehensive Everglades Restoration Plan.

2.3.5.2 Collier County

Collier County lies to the northwest of the mainland portion of the County. The portions of Collier County adjacent to the County are designated as Conservation Lands by the *Collier County Growth Management Plan* and are located within either the Everglades National Park or Big Cypress National Preserve. Big Cypress National Preserve occupies much of the eastern half of Collier County, and is primarily cypress swamp, with pine woodlands, prairies, and marshes. This is consistent with the Conservation designation given to the County portion of the mainland immediately adjacent to Collier County.

2.3.5.3 City of Key Colony Beach

In 2010, according to the US Census, the population of the City of Key Colony Beach was estimated to be 797 persons. The City encompasses 219 acres and is located within the Middle Keys, according to the Existing Land Use data provided by Monroe County Growth Management. Sixty-six percent of the land falls under the residential land use category. Fifteen percent of land is categorized as public buildings and grounds; 10 percent of the land is vacant; 4 percent is conservation; and 3 percent is commercial. The remaining land is categorized institutional and recreational.

2.3.5.4 City of Layton

The City of Layton is the smallest municipality in land mass in the County with an estimated population of 184 (2010 US Census). Based on the Existing Land Use data from Monroe County Growth Management, the City of Layton is an approximately 25 acre municipality located in Long Key within the Middle Keys PA. Seventy percent of the land is designated residential. Sixteen percent of land is designated commercial and eight percent is vacant. Approximately six acres are for institutional and public building and grounds.

2.3.5.5 City of Key West

The City of Key West is a municipality located at the southwestern end of the Keys chain connected by U.S. 1. With an estimated population of 23,291, according to American Community Survey (2006-2008), the City has the greatest concentration of residents and tourists in the County, and accounts for over 32 percent of the County's 73,078[8] residents.

According to the *City of Key West Comprehensive Plan*, the City includes 4,437.7 acres. Approximately 652.8 acres, or 17.5 percent, of the City land uses consists of residential development; 301 acres, or eight percent of commercial development; 1,622.7 acres, or 44 percent of Institutional (largely military) development; 431 acres, or 12 percent are Rights-of-Way; and 548 acres, or 15 percent of undeveloped lands. The acreage noted above includes approximately 225 acres of open water and Fleming and Dredgers Keys, which are both military lands owned by the U.S. Navy.

The southern half of Stock Island, which is located in the unincorporated Keys, is intensively developed with general commercial uses along U.S. 1, with a mix of residential, tourist-oriented commercial and commercial fishing uses south of the highway. Commercial fishing areas, Keys Electric and Florida Key Aqueduct Authority installations, and Cow Key, which is vacant, are located along the southern coastline. The north half of the island, which lies in the City of Key West, is less intensively developed than the southern half, and includes the Key West Golf and Country Club, and such institutional and public uses as the Florida Keys Memorial Hospital, the Florida Keys Community College and the County Government buildings.

[8] US Census, American Community Survey, 2006-2008

The land use of the City of Key West to the west of Stock Island includes residential and tourist-oriented uses as well as the Key West International Airport. Along the northern coast, land uses consist of general commercial, residential, and military uses.

2.3.5.6 City of Marathon

The City of Marathon is a 4,912 acre municipality in the County; the 2010 US Census estimated the population to be 8,297. According to the *City of Marathon Comprehensive Plan*, residential land use accounts for 51.91 percent of all land in the City. Single-family detached homes are the predominant residential type within the City, accounting for 72 percent of the residential land use category, followed by multi-family with 15.6 percent, and mobile homes with six percent. Commercial uses utilize 14.4 percent of land in the City and are found primarily along U.S. 1. The Public/Semi-Public classification accounts for 27.3 percent. Industrial lands uses account for 1.3 percent of land uses in the City. Other land use designations include the airstrip, off shore islands, submerged lands and private park/conservancy subcategories, which account for five percent of all land. Vacant parcels are scattered throughout the City and comprise 37.8 percent of the total land area within the City. Vacant residential lands account for the largest portion at 33.9 percent.

2.3.5.7 Village is Islamorada

The Village of Islamorada, with an estimated population of 6,119 (2010 US Census), is a municipality of 3,796 acres located within the County. According to *The Village of Islamorada Future Land Use Data and Analysis Report*, residential land use accounts for 31.3 percent of all land in the Village. Single family detached homes are the predominant residential type within the Village, and account for 26.5 percent of the residential land use category followed by multi-family with 3.7 percent, and mobile homes with 1.1 percent. Commercial uses utilize 9.7 percent of land in the Village and are found primarily along U.S. 1 on Plantation Key and Upper Matecumbe Key, with concentrated Village Activity Centers on both keys. The Public/Semi-Public classification accounts for 9.5 percent. Other lands that entail industrial, airstrip and roads consist of 3.5 percent of land. Conservation lands are the second largest land use category in the Village, comprising almost 30 percent of all lands. Vacant parcels of land are scattered throughout the Village, and comprise approximately 14 percent of total land area within the Village.

2.3.5.8 Airport Land Use Regulatory Authority

Within the County, there are eight airport facilities. One of these, Key West International Airport (KWIA), is the only commercial airport currently serving the community. The Florida Keys Marathon Airport (FKMA) provides only general aviation services, although non-scheduled air taxi service is provided. Land use activities adjacent to these airports must be coordinated with the runway objection free zone.

There are also four private airports or airstrips, and one seaplane facility. For a detailed discussion regarding aviation facilities see *Chapter 6.0 Ports, Aviation and Related Facilities*.

KWIA includes approximately 258 acres of land and is located within the limits of the City of Key West, in the southeast quadrant of the city. KWIA is owned by the County. FKMA is located at MM 51.5 on Vaca Key within the City of Marathon and is owned by the County.

Section 332.02 F.S. vests the County with the authority to operate and regulate an airport which it owns, regardless of whether the facility is located within or outside of its jurisdictional limits. Furthermore, under F.S. 332.02(1), a municipality "may not acquire or take over any airport . . . owned or controlled by another municipality of the State without the consent of such municipality" so any transfer of the airport property or *control* over the property would require Commission approval.

Additionally, F.S. 332.08(2) authorizes the County "to adopt and amend all needful rules, regulations, and ordinances for the management, government, and use of any property under its control, whether within or without the territorial limits of the" County.

2.3.6 Areas of Critical County Concern

The Areas of Critical County Concern (ACCC) are not to be confused with the Area of Critical State Concern (previous **Section 2.2.5** *"Area of Critical State Concern").* Pursuant to Chapter 106 of the MCLDC, the BOCC designated areas within the County as Areas of Critical County Concern if it is determined that the area is one of special environmental sensitivity, contains important historical or archaeological resources, is characterized by substantial capital improvement deficiencies, or provides significant redevelopment opportunities. The ACCCs are illustrated in **Map Series 2-2.** The BOCC has identified three ACCCs within unincorporated Monroe County:

- Big Pine Key ACCC;
- North Key Largo ACCC; and
- Ohio Key ACCC.

Big Pine Key, North Key Largo, and Ohio Key have been designated as ACCCs due to environmental sensitivity. Big Pine Key is the subject of an environmentally-based Livable CommuniKeys Master Plan and development is governed by a Habitat Conservation Plan. The reasons for the establishment of each of the ACCCs and their associated planning issues are described below:

2.3.6.1 Big Pine Key ACCC

The Big Pine Key ACCC includes the central and northern portions of Big Pine Key. The ACCC was established to initiate a focal point planning effort directed at reconciling the conflict between reasonable investment-backed expectations of landowners and the habitat needs of the endangered Key deer (Odocoileus virginianus clavium). The focal point plan was to consider:

- The reasonable investment backed expectations of the owners of land within the Big Pine Key ACCC;
- The habitat needs of the Key deer;
- The role and importance of freshwater wetlands to the survival of the Key deer;
- The conflicts between human habitation and the survival of the Key deer;
- Management approaches to reconciling the conflict between development and the survival of the Key deer; and
- Specific implementation programs for the Big Pine Key ACCC.

2.3.6.1.1 Development Potential and Capacity Constraints

Big Pine Key and No Name Key contain particularly sensitive habitat for threatened and endangered species. Since the mid-1990s, the County, the Florida DCA, the FDOT, and the USFWS have recognized that continued growth and development on Big Pine and No Name Keys without proper protective measures would be harmful to Key deer (*Odocoileus virginianus clavium*), Lower Keys Marsh Rabbit (*Sylvilagus palustris hefneri*), and eastern indigo snake (*Drymarchon corais couperi*). Big Pine Key and No Name Key were under a development moratorium for over 10 years due to the level of service of U.S. 1 through the Big Pine area. The moratorium placed an undue burden on the community, so the County met with various stakeholders to seek a solution to the problem. A solution to the level of service was realized through the additional lane on the north bound side of U.S. 1 and through the deer crossing tunnels on Big Pine Key. However, additional constraints on growth in Big Pine remained due to the many endangered species located on Big Pine Key and No Name Key.

The County, along with its partners, began a process to continue the growth on Big Pine in an environmentally compatible nature through a permitting process with USFWS. This process included the development of the Habitat Conservation Plan (HCP) in 2006 which outlined the planned growth patterns and rate as well as the anticipated impact that growth will have on the species. In conjunction with this process, the County prepared a Livable CommuniKeys Plan for Big Pine and No Name Key to serve as a master plan for the area.

Covering an area of approximately 7,000 acres, the Big Pine Key/No Name Key HCP is a conservation strategy that protects the habitat of the Key deer, Lower Keys marsh rabbit, and eastern indigo snake while allowing limited residential, commercial, recreational, and municipal development on Big Pine Key and No Name Key. In addition to protecting high quality habitat for these species, the HCP directs development toward areas that have already been already impacted and away from endangered species habitat.

The goal of the HCP is to hold impact on the species to a minimum based on Key Deer "quasi-extinction", which was defined as the probability that the number of female deer would fall below 50 at least once over 50 years. The drafters used an assignment of "H" for each parcel as a tool to regulate development. "H" represents impact, both primary and secondary. Factors such as distance from U.S. 1, existing housing density, existing habitat quality, proximity to deer movement corridors, existing deer density, and water barriers were considered in the "H" model for each parcel. The assigned "H" values range from 0 (no impact), to 2. A Population Viability Analysis was conducted for the Key Deer in association with the HCP and details the likelihood of persistence of a species.

The Population Viability Analysis study indicated that, under current conditions, the Key Deer have a 2.2 percent chance of reaching quasi-extinction. Based on this Population Viability Analysis, the drafters decided to strive for increasing this likelihood to no more than 4.2 percent. This equates to the loss of 4.2 deer a year to human-related mortality. With the above goal, an acceptable "H" limit or impact limit for development in Big Pine Key and No Name key is "H" = 1.1 over 20 years. The drafters then agreed to mitigate all "H" (impact) at a ratio of 3:1. This means that each parcel developed under this plan will add to the total "H" allowed over the next 20 years and the County must mitigate that "H" by three times this amount. If this ratio is not maintained, development activity will be stopped until the ratio is achieved or exceeded.

In an effort to not exceed this "H" = 1.1 limit, basic development limitations were set. These limitations are outlined in general in the HCP and more defined in the Livable CommuniKeys Plan (LCP) for Big Pine and No Name Keys. These limitations cover everything from residential to light industrial to road widening. The following 20-year limitations are defined in the LCP:

- Residential units limited to 200;
- Commercial limited to 47,800 square feet;
- One major recreation and community center at the county-owned "Mariner's Resort";
- Non-public institutional limited to 2,500 square feet per year, with restrictions;
- Seven new pocket parks within certain subdivisions; and
- Three new public parks, with restrictions.
- Allow expansion of existing religious institutions, civic clubs and community organizations on scarified land, with certain conditions;
- Projects identified in the County's Sanitary Sewer and Stormwater Master Plans, restricted to disturbed or scarified lands;
- Public office space located in the US1 Corridor Area;
- Expansion of county emergency response facilities at the current location;
- Three-laning of U.S. 1 only.

ROGO/NROGO applications for Big Pine and No Name Key compete against each other based on the overall score and date the applicant applied. Applicants are competing for eight market rate and two affordable allocations annually. Prior to allocation issuance, the applicant must mitigate the "H" value associated with the development of the parcel. This

is accomplished through land donation or fund donation to allow the County to purchase property to maintain a 3:1 ratio for impact. If at any time during the 20 year period "H" = 1.1 is met or exceeded, development activity will halt.

While these restrictions on new development help meet the goal, additional restrictions were also required. Most of these restrictions were based on tier, which reflects the increased impact based on location and development pattern for the area. These 20-year restrictions are:

- 10 new residential permits in Tier 1 areas;
- No new fences in Tier 1 areas; and
- Only residential development is allowed in Tier 1.

A complete listing of restrictions is available in the HCP and the Master Plan. All applications for new residential and commercial development will be required to apply for a ROGO/NROGO allocation.

Based on the HCP finalized in 2006, USFWS issued an Incidental Take Permit (No. TE083411-0, issued June 9, 2006 and expires June 30, 2023) that allows the County to continue to adversely impact endangered species on Big Pine and No Name Key through the issuance of building permits. The development of 200 homes or no more than 168 acres of development over a 20-year period is anticipated on Big Pine Key and No Name Key. The HCP does not specify which properties will be permitted or when. Because the County now has the approved HCP and Incidental Take Permit necessary to protect listed species and their habitats, landowners obtaining a building permit generally do not need any other permits or reviews from the USFWS. Improvements to properties are generally allowed as long as they are consistent with County regulations. However, projects that remove native vegetation or reduce Key deer access to habitat such as fences may undergo additional review by the County and the USFWS.

The HCP aides in the recovery of listed species on Big Pine and No Name Keys because it directs development toward areas that have already been impacted and away from listed species habitat. Development is limited to 168 acres (with no more than 7 acres being native habitat) of impact over a 20-year period and mitigation is conducted at a 3:1 ratio. In total, 504 acres will be acquired, restored, and managed for Key deer, Lower Keys marsh rabbit, and eastern indigo snake conservation. In addition, no development will occur in Lower Keys marsh rabbit habitat and a 1,640-foot buffer from future development will be implemented to reduce the indirect effects of development (except for about 40 acres that have already been fragmented). All unprotected suitable marsh rabbit habitat on Big Pine and No Name Key will be targeted for acquisition and conservation. The County also implements a free-roaming pet education program to reduce mortality (predation) on marsh rabbits.

Under the MCLDC [Section 118-7 (General Environmental Design Criteria)], clustering of development is required to reduce habitat fragmentation and to preserve the largest

possible area of contiguous undisturbed habitat (for all natural habitat types). The MCLDC also contains restrictions on the amount of land clearing, depending on the tier designation. The County currently requires a coordination letter from the USFWS when development is proposed in known or potential habitat for endangered and threatened species. Under the Tier Overlay Ordinance, lands that serve as habitat for protected species have top priority for land acquisition. Under the current ROGO/NROGO system, development within known habitat of threatened or endangered species receive minus 10 points.

2.3.6.2 North Key Largo ACCC

The North Key Largo ACCC includes the portion of Key Largo which lies between the junction of U.S. 1/State Road 905 and the Monroe/Miami-Dade County boundary at Angelfish Creek. The North Key Largo Area of Critical County Concern was established for the purpose of reconciling the reasonable investment-backed development expectations of North Key Largo landowners with the need to preserve the habitat of four species of animals that are listed as endangered under the Endangered Species Act, 16 USC 1531—1543; the American Crocodile (Crododylus acutus), the Key Largo Woodrat (Neotoma floridana smalli), the Key Largo Cotton Mouse (Peromyscus gossypinus allapaticola), and the Schaus Swallowtail Butterfly (Heraclides aristidemus ponceanus).

The North Key Largo ACCC was established in part because it was recognized that the potential impacts of several large proposed developments, in addition to already existing developments, would threaten the survival of the four endangered species. These proposed developments were largely to be located on land which had been subdivided prior to the designation of the four species as endangered. As these developments began to move forward, Monroe County recognized the need to evaluate the potential impacts of these developments, which included:

- Reduction and fragmentation of critical habitat;
- Increased mosquito spraying, to which the Schaus' swallowtail butterfly is highly susceptible;
- Degradation of nearshore water quality associated with increased runoff, septic leachate, and boat operations and maintenance; and
- Increased mortalities of crocodiles due to road kills as well as the potential for increased harassment or killing of crocodiles due to the incompatibility between humans and crocodiles.

2.3.6.3 Ohio Key ACCC

Piping plovers in the Florida Keys congregate on wintering grounds on Ohio Key. The County has designated this wintering ground as an Area of Critical County Concern (ACCC) for purposes of protecting the piping plover habitat. The MCLDC (Section 106-9) states that,

"The Ohio Key ACCC was established for the purpose of reconciling the reasonable investment-backed expectations of the owners of Ohio Key with the habitat value and environmental sensitivity of the wetlands system on the Key that serves as a habitat for a variety of wading birds, including the piping plover, a species listed as threatened under the Federal Endangered Species Act."

The ACCC includes the southern half of Ohio Key, which encompasses approximately 22 acres, while the northern half of Ohio Key, also known as Sunshine Key, after a recreational vehicle campground located there. The MCLDC explicitly limits future uses on Ohio Key to 20 recreational vehicle parking spaces or campsites. While the land within the ACCC is now under public ownership, the County should retain the existing MCLDC restrictions, which limit land uses and establish wildlife habitat protection measures for the piping plover on the Atlantic-side portion of Ohio Key.

Section 106-9 of the MCLDC describes the conditions under which the 20 recreational vehicle spaces or campsites could be developed while also protecting the piping plover habitat. These conditions include:

- All development other than picnic tables, boardwalks and bird-watching blinds is restricted to the lands identified on the existing conditions map as 740.3;

- The recreational vehicle parking spaces or campsites are set back at least 100 feet from the dwarf mangrove area shown on the existing conditions map;

- The area that is developed for recreational vehicle parking spaces or campsites and a bathhouse is fenced so as to control access to the dwarf mangrove, disturbed beach and berm water areas within the Ohio Key area of critical county concern;

- No motorized vehicles of any kind or any bicycle, except for maintenance vehicles, shall have access to or shall be used in the Ohio Key area of critical county concern except for that portion of the area designated as 740.3 on the existing conditions map;

- Picnic tables are restricted to the areas designated as 740.3 or 740.4 on the existing conditions map;

- No pets shall be allowed in the Ohio Key area of critical county concern;

- The concrete refuse previously dumped on the land designated as 740.3 on the existing conditions map shall be removed or buried;

- No dumping or filling shall be allowed in the Ohio Key area of critical county concern except for filling necessary to carry out the development of the campsites and bathhouse permitted by this subsection and to bury the concrete refuse previously dumped on the land designated as 740.3 on the existing conditions map;

- All exotic invasive species of plant are removed from the land designated as 740.3 on the existing conditions map in the Ohio Key area of critical county concern;

- No insecticide is sprayed or fogged in the Ohio Key area of critical county concern;

- All boardwalks or bird-watching blinds to be constructed in the land area designated as 620, 500 or 740.4 on the existing conditions map shall be reviewed and approved as a minor conditional use subject to the following standards:
  - The boardwalk or bird-watching blind shall be located so that the flow of water within the Ohio Key area of critical county concern is not altered; and
  - The boardwalk or bird-watching blind shall be located so as to not interrupt wading bird use of the lands designated as 612 and 500 on the existing conditions map.

- Except as expressly provided for and modified by the Ohio Key area of critical county concern, all development in the area shall be subject to each and every provision of the MCLDC; and

- In addition to the Monroe County criteria, any proposed development will be required to meet all federal, state and local regulations.

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2.3.7 Historic Resources [Rule 9J-5.006(2)(b), F.A.C.]

2.3.7.1 National Register of Historic Places

This Historic Preservation Act of 1966 created the National Register of Historic Places (the "Register") and the corresponding State Historic Preservation Offices (SHPO).[9] The passage of the act, which was amended in 1980 and 1992, established a broad-based historic preservation policy. The Register is administered by the National Park Service (NPS), an agency within the United States Department of the Interior. Its mission is, *"…* to coordinate and support public and private efforts to identify, evaluate, and protect America's historic and archeological resources."[10]

The Register reviews nominations submitted by states, tribes, and other federal agencies and lists eligible properties; offers guidance on evaluating, documenting, and listing different types of historic places; assists qualified historic properties to obtain preservation benefits and incentives; manages the National Historic Lighthouse Preservation; and sponsors the Cultural Resources Diversity Program to diversify historic preservation and cultural resource management.

Within the County as a whole, there are currently 59 sites and structures listed on the Register. The sites and structures, located within the unincorporated areas of the County, are inventoried on **Table 2.16**, below.

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[9] National Historic Preservation Act of 1966, Public Law 102–575.
[10] "About Us" (n.d., para.1). *National Register of Historic Places*. Retrieved from http://www.nps.gov/nr/about.htm.

Table 2.16 – National Register of Historic Places, Unincorporated Keys

Ref Num	Resource Name	Address	City	Listed Date
06000979	Mud Lake Canal	Cape Sable, Everglades National Park	Flamingo	20060920
02000494	USCG Cutter DUANE	1 mi. S of Molasses Reef	Key Largo	20020516
01000228	Dry Tortugas National Park	70 mi. West of Key West	Key West	19921026
04000788	Overseas Highway and Railway Bridges (Boundary Increase)	Parallel to U.S. 1 (Approx. MM 9.8-72.8)	Key Largo	20040803
84000199	Carysfort Lighthouse	Key Largo National Marine Sanctuary	Key Largo	19841031
91001771	African Queen	99701 Overseas Hwy.	Key Largo	91001771
79000684	Overseas Highway and Railway Bridges	Bridges on U.S. 1 between Long and Conch Key, Knight and Little Duck Key, and Bahia Honda and Spanish Key	Florida Keys	79000684
96001183	Rookery Mound	Address Restricted	Everglades City	96001183
96001182	Bear Lake Mounds Archeological District	Address Restricted	Flamingo	96001182
70000069	Fort Jefferson National Monument	68 mi. W of Key West, in Gulf of Mexico	Dry Tortugas Islands	19701110
96001180	Ten Thousand Islands Archeological District	Address Restricted	Everglades City	19961105
96001179	Cane Patch	Address Restricted	Everglades City	19961105
82002377	Bat Tower-Sugarloaf Key	1 mi. NW of U.S. 1 on Perky Key	Sugarloaf Key	19820513
75000562	Rock Mound Archeological Site	Address Restricted	Key Largo	19750701
72000340	John Pennekamp Coral Reef State Park and Reserve	U.S. 1	Key Largo	19720414

Source: National Register of Historic Places, September 2010

2.3.7.2 Florida Master Site File of Historic Resources in Monroe County

The State Historic Preservation Office (SHPO) is the entity that maintains the Florida Master Site File (FMSF) inventory for the County, and for coordinating the review of historic resource nominations to the National Register of Historic Places. The FMSF includes

structures and archeological sites. In total, the FMSF currently contains 391 listings of historic structures in the unincorporated Keys, 222 of which are housing.

Sites are added to the FMSF when completed site file forms describing the characteristics and history of the site are submitted to the Florida Department of State, Division of Historic Resources. Although the FMSF provides an extensive inventory of historic resources, the process does not evaluate the significance of listed sites. However, any sites which are listed or have been determined to be eligible for listing on the National Register are noted as such in their FMSF record.

Some structures and sites listed in the FMSF have undergone further evaluation to determine the degree of their significance as part of the nomination process for the National Register of Historic Places; these are inventoried on **Table 2.17** and **Table 2.19** (Tavernier)**.** Other structures and sites (excluding those eligible or listed on the Register, and those in the Tavernier Historic District) listed on the FMSF, are shown on **Table 2.18.** Structures on the FMSF which are located in the Tavernier Historic District are shown separately on **Table 2.20.**

Historic Structures and the Tavernier Historic District are illustrated on the **Map Series 2.1** and **Map Series 2-3.**

Table 2.17– Florida Master Site File, Historic Structures Potentially Eligible for Listing on the National Register of Historic Places

Site ID	Name	Address	Use
MO01485	Water Metering Station	Overseas Hwy	Other
MO01896	Sugarloaf Fishing Cabin (1)	15410-15470 Old South 4a Rd	Other
MO01897	Sugarloaf Cabin (2)	15410-15470 Old South 4a Rd	Other
MO01898	Sugarloaf Fishing Cabin (3)	15410-15470 Old South 4a Rd	Other
MO01947	Squires Homestead	No File	
MO03732	Spanish Harbor Rest Area	Overseas Hwy	Restaurant
MO03447	Matheson, William John House		Museum/art gallery/planetarium
MO03711	81 South Conch Avenue, Conch Key	81 S Conch Ave	Private residence
MO01934	Key Largo Limestone Seawall	98650 Overseas Hwy	Boat ramp
MO03682	Key Largo Anglers Club	50 Clubhouse Rd	Lodge (club) building
MO03692	Key Largo Lodge	55 Oceana Dr	Private residence

Source: Florida Master Site File, January 2010

Table 2.18 - Florida Master Site File Structures

Site ID	Name	Address	Use
Lower Keys Planning Area			
MO01265	Big Pine Key #12	Oleander St	Other
MO01295	American Shoals Lighthouse		Lighthouse
MO01487	Nut House Gift Shop	717 Overseas Hwy	
MO01488	Purple Porpoise Pub	301 Overseas Hwy	
MO01871	Key West Boca Chica Bldg 132	Unsp Saratoga Ave	Hangar
MO01872	Key West Geiger Key Hawk Missile Site	Highway 941 Boca Chica Rd.	Other
MO01899	Sugarloaf Fishing Cabin (4)	15410-15470 Old South 4a Rd	Other
MO01960	Dynamite Bunkers	U.S. 1	Military
MO02708	Veteran's Memorial Park	Mm40 Overseas Hwy	Park
MO03500	Key West Boca Chica Building 102	Yorktown Ave	Other
MO03501	Key West Boca Chica Building 108	Midway Ave	Warehouse
MO03502	Key West Boca Chica Building 109	Midway Ave	Warehouse
MO03503	Key West Boca Chica Building 126	Yorktown Ave	Other
MO03504	Key West Boca Chica Building 127	Yorktown Ave	Office building
MO03505	Key West Boca Chica Building 129	Yorktown Ave	Retail establishment
MO03506	Key West Boca Chica Building 131	Saratoga Ave	Hangar
MO03507	Key West Boca Chica Building 133	Yorktown Ave	Warehouse
MO03508	Key West Boca Chica Building 134	Military Ave	Warehouse
MO03509	Key West Boca Chica Building 143	Yorktown Ave	Warehouse
MO03510	Key West Boca Chica Building 149	Saratoga Ave	Warehouse
MO03511	Key West Boca Chica Building 153	Saratoga Ave	Warehouse
MO03512	Key West Boca Chica Building 156	Yorktown Ave	Warehouse
MO03513	Key West Boca Chica Building 222	Midway Ave	Warehouse
MO03514	Key West Boca Chica Building 225	Midway Ave	Other

Source: Florida Master Site File, January 2010

Table 2.18 - Florida Master Site File Structures (continued)

Site ID	Name	Address	Use
MO03515	Key West Boca Chica Building 227	Midway Ave	Fitness center or spa
MO03516	Key West Boca Chica Building 229	Midway Ave	Other
MO03517	Key West Boca Chica Building 230	Saratoga Ave	Transmission structure (electrical)
MO03518	Key West Boca Chica Building 314	Saratoga Ave	Office building
MO03519	Key West Boca Chica Building 405	Midway Ave	Bank
MO03520	Key West Boca Chica Building 409	Langley Ave	Military
MO03521	Key West Boca Chica Building 414	Midway Ave	Warehouse
Mo03522	Key West Boca Chica Building 418	Saratoga Ave	Office building
Mo03523	Key West Boca Chica Building 419	Midway Ave	Warehouse
Mo03524	Key West Boca Chica Building 423	Saratoga Ave	Office building
Mo03525	Key West Boca Chica Building 508	Langley Ave	Library
Mo03526	Key West Boca Chica Building 514		Military
Mo03527	Key West Boca Chica Building 515	Langley Ave	Migrant housing
Mo03528	Key West Boca Chica Building 516	Hornet Ave	Warehouse
Mo03529	Key West Boca Chica Tennis Court #524	Dekalb Ave	Other
Mo03530	Key West Boca Chica Building 618	Hornet Ave	Dining hall
Mo03531	Key West Boca Chica Building 624	Saratoga Ave	Other
Mo03532	Key West Boca Chica Building 625	Randolph Ave	Other
Mo03533	Key West Boca Chica Building 626	Randolph Ave	Office building
Mo03534	Key West Boca Chica Building 627	Randolph Ave	Office building
Mo03535	Key West Boca Chica Building 628	Lexington Ave	Office building
Mo03536	Key West Boca Chica Building 629	Lexington Ave	Office building
Mo03537	Key West Boca Chica Building 630	Langley Ave	Office building

Table 2.18 - Florida Master Site File Structures (continued)

Site ID	Name	Address	Use
MO03538	Key West Boca Chica Building 631	Ticonderoga Ave	Other
MO03539	Key West Boca Chica Building 632	Ticonderoga Ave	Other
MO03540	Key West Boca Chica Building 634	Ticonderoga Ave	Lodge (club) building
MO03541	Key West Boca Chica Building 635	Langley Ave	Office building
MO03542	Key West Boca Chica Baseball Field #652	Forrestal Ave	Other
MO03543	Key West Boca Chica Basketball Court 655	Randolph Ave	Other
MO03544	Key West Boca Chica Building 711	Essex Circ	Office building
MO03545	Key West Boca Chica Building 718	Essex Circ	Education related
MO03546	Key West Boca Chica Building 803		Warehouse
MO03547	Key West Boca Chica Buildings 805-807		Warehouse
MO03548	Key West Boca Chica Buildings 808		Warehouse
MO03549	Key West Boca Chica Buildings 902	Shangri La Ave	Office building
MO03550	Key West Boca Chica Field Building 1004		Communications-related
MO03606	Key West Truman Annex Building A-146	Yorktown Ave	Warehouse
MO03610	Key West Boca Chica Hawk Missile Site	Boca Chica Key	Military
MO03622	Arenson	50 Palmetto Dr	Private residence
MO03623	No Name Pub		Restaurant
MO03726	Honeymoon Cottage		Museum/art gallery/planetarium
MO03733	31131 Avenue D, Big Pine Key	31131 Avenue D	Private residence
MO03734	31336 Avenue E, Big Pine Key	31336 Avenue E	Private residence
MO03735	Tackle And Bait Shop	1791 Bogie Dr	Private residence
MO03736	30371 Poinciana Road, Big Pine Key	30371 Poinciana Dr	Private residence
MO03737	30457 Palm Drive, Big Pine Key	30457 Palm Dr	Private residence
MO03738	30423 Oleander Boulevard, Big Pine Key	30423 Oleander Blvd	Private residence
MO03739	30434 Oleander Boulevard, Big Pine Key	30434 Oleander Blvd	Private residence

Table 2.18 - Florida Master Site File Structures (continued)

Site ID	Name	Address	Use
MO03740	30458 Oleander Boulevard, Big Pine Key	30458 Oleander Blvd	Private residence
MO03741	423 Barry Avenue, Little Torch Key	423 Barry Ave	Private residence
MO03742	433 Barry Avenue, Little Torch Key	433 Barry Ave	Private residence
MO03743	580 Barry Avenue, Little Torch Key	580 Barry Avenue	Private residence
MO03744	1257 Warner Road, Little Torch Key	1257 Warner Rd	Private residence
MO03745	1269 Mills Road, Little Torch Key	1269 Mills Rd	Private residence
MO03746	1263 Mills Road, Little Torch Key	1263 Mills Rd	Private residence
MO03747	26936 Shanahan Road, Ramrod Key	26936 Shanahan Rd	Private residence
MO03748	24915 Horace Street, Summerland Key	24915 Horace St	Private residence
MO03749	24945 Center Street, Summerland Key	24945 Center St	Private residence
MO03750	25063 Center Street, Summerland Key	25063 Center St	Private residence
MO03751	13 Center Street, Summerland Key	13 Center St	Private residence
MO03752	Horace And Center Streets, Summmerland	Horace And Center St	Private residence
MO03753	Restaurant And Fish Market	Mm25 Overseas Hwy	Restaurant
MO03754	637 2nd Street, Summerland Key	637 2nd St	Private residence
MO03755	25044 45th Street, Summerland Key	25044 45th St	Private residence
MO03756	Galley Grill Restaurant	Mm25 Overseas Hwy	Restaurant
MO03757	60 Dobie Street, Summerland Key	60 Dobie St	Private residence
MO03758	21074 Overseas Highway, Cudjoe Key	21074 Overseas Hwy	Private residence
MO03759	Mangrove Mamas	Mm20 Overseas Hwy	Restaurant
MO03760	81 Johnson Road, Sugarloaf Key	81 Johnson Rd	Private residence
MO03761	71 Johnson Road, Sugarloaf Key	71 Johnson Rd	Private residence

Table 2.18 - Florida Master Site File Structures (continued)

Site ID	Name	Address	Use
MO03762	19556 Navajo Street, Sugarloaf Key	19556 Navajo St	Private residence
MO03763	19580 Mayan Street, Sugarlaof Key	19580 Mayan St	Private residence
MO03764	19674 Indian Mound Drive, Sugarloaf Key	19674 Indian Mound Dr	Private residence
MO03765	19591 Aztec Drive, Sugarloaf Key	19591 Aztec Dr	Private residence
MO03766	19616 Aztec Drive, Sugarloaf Key	19616 Aztec Dr	Private residence
MO03767	19582 Aztec Drive, Sugarloaf Key	19582 Aztec Dr	Private residence
MO03768	19572 Aztec Drive, Sugarloaf Key	19572 Aztec Dr	Private residence
MO03769	19583 Seminole Street, Sugarloaf Key	19583 Seminole St	Private residence
MO03770	19658 Seminole Street, Sugarloaf Key	19658 Seminole St	Private residence
MO03771	19520 Tequesta Street, Sugarloaf Key	19520 Tequesta St	Private residence
MO03772	19525 Date Palm Drive, Sugarloaf Key	19525 Date Palm Dr	Private residence
MO03773	19545 Date Palm Drive, Sugarloaf Key	19545 Date Palm Dr	Private residence
MO03774	Chase House	Airport Rd	Private residence
MO03775	Sugarloaf Lodge	17001 Overseas Hwy	Hotel, Motel, Inn
MO03776	Babys Coffee	3784 Overseas Hwy	Shop
MO03777	31 Bay Drive, Saddlebunch Keys	31 Bay Dr	Private residence
MO03778	30 Bay Drive, Saddlebunch Keys	30 Bay Dr	Private residence
MO03779	6 West Circle Drive, Saddlebunch Keys	6 W Circle Dr	Apartment
MO03780	5570 Laurel Avenue, Stock Island	5570 Laurel Ave	Commercial
MO03781	5675 5th Avenue, Stock Island	5675 5th Ave	Commercial
MO03782	Daewoo Dealership	5200 Overseas Hwy	Automobile dealership
MO03783	5158 Overseas Highway, Stock Island	5158 Overseas Hwy	Private residence
MO03784	5135 Suncrest Avenue, Stock Island	5135 Suncrest Ave	Private residence
MO03785	La Jen Hair Fashions	5635 Macdonald Ave	Commercial and residence

Table 2.18 - Florida Master Site File Structures (continued)

Site ID	Name	Address	Use
MO03786	40 Palmetto Drive, Big Coppitt Key	40 Palmetto Dr	Private residence
MO03787	41 Palmetto Drive, Big Coppitt Key	41 Palmetto Dr	Private residence
MO03788	48 Palmetto Drive, Big Coppitt Key	48 Palmetto Dr	Private residence
MO03789	47 Palmetto Drive, Big Coppitt Key	47 Palmetto Dr	Private residence
MO03790	13 Cactus Drive, Big Coppitt Key	13 Cactus Dr	Private residence
MO03791	15 Cactus Drive, Big Coppitt Key	15 Cactus Dr	Private residence
MO03792	25 Cactus Drive, Big Coppitt Key	25 Cactus Dr	Private residence
MO03793	24 Cactus Drive, Big Coppitt Key	24 Cactus Dr	Private residence
MO03794	Prado Circle, Big Coppitt	Prado Circ	Meetinghouse (religious)
MO03795	381 Avenue F, Big Coppitt Key	381 Avenue F	Private residence
MO03796	Corner Of 2nd St & Ave F, Big Coppitt		Private residence
MO03797	401 Avenue E, Big Coppitt Key	401 Avenue E	Private residence
MO03798	521 Avenue D, Big Coppitt Key	521 Avenue D	Private residence
MO03799	540 Avenue D, Big Coppitt Key	540 Avenue D	Private residence
MO03800	531 Avenue D, Big Coppitt Key	531 Avenue D	Apartment
MO03801	530 Avenue C, Big Coppitt Key	530 Avenue C	Apartment
MO03802	310 Avenue B, Big Coppitt Key	310 Avenue B	Private residence
MO03803	21 1st Street, Big Coppitt Key	21 1st St	Private residence
MO03804	46 1st Street, Big Coppitt Key	46 1st St	Private residence
MO03805	44 1st Street, Big Coppitt Key	44 1st St	Private residence
MO03806	45 1st Street, Big Coppitt Key	45 1st St	Private residence

Table 2.18 - Florida Master Site File Structures (continued)

Site ID	Name	Address	Use
MO03807	47 1st Street, Big Coppitt Key	47 1st St	Private residence
MO03808	410 Avenue A, Big Coppitt Key	410 Avenue A	Private residence
MO03809	Southern Keys Cemetery Office	258 4th St	Office
MO03810	Big Coppitt First Baptist Church	200 Avenue F	Meetinghouse (religious)
MO03811	Avenue F, Beside Big Coppitt Park	Avenue F	Garage
MO03812	20 4th Street, Big Coppitt Key	20 4th St	Private residence
MO03813	217 Avenue G, Big Coppitt Key	217 Avenue G	Private residence
MO03814	200 Avenue G, Big Coppitt Key	200 Avenue G	Private residence
MO03815	101 Avenue G, Big Coppitt Key	101 Avenue G	Private residence
MO03816	718 4th Avenue, Big Coppitt Key	718 4th Ave	Duplex
MO03817	716 4th Avenue, Big Coppitt Key	716 4th Ave	Duplex
MO03818	218 Shore Avenue, Big Coppitt Key	218 Shore Ave	Private residence
MO03819	204 Shore Avenue, Big Coppitt Key	204 Shore Ave	Private residence
MO03820	Bobalus Southern Cafe	Mm 10 Overseas Hwy	Restaurant
MO03821	231 Coppitt Road, Big Coppitt Key	231 Coppitt Rd	Private residence
MO03822	Purple Porpoise	Mm 9.7 Overseas Hwy	Commercial and apartments
MO03823	519 Palm Drive, East Rockland Key	519 Palm Dr	Private residence
MO03824	557 Park Drive, East Rockland Key	557 Park Dr	Private residence
MO03825	578 Hammock Drive, East Rockland Key	578 Hammock Dr	Private residence
MO03826	Raybro Electrical Supplies	5648 Maloney St	Shop
MO03827	Burrin Animal Hospital	2nd St	Office
MO03828	Boyds Campground	Maloney St	Office
MO03829	6400 2nd Street, Stock Island	6400 2nd St	Private residence
MO03830	6408 2nd Street, Stock Island	6408 2nd St	Apartment
MO03831	Mckillup Rentals	5530 3rd Ave	Apartment

Table 2.18 - Florida Master Site File Structures (continued)

Site ID	Name	Address	Use
MO03832	Lopez Apartments	5691 3rd Ave	Apartment
MO03833	Key West Kennel Club Race Track	5th Ave	Raceway
MO03834	5339 5th Avenue, Stock Island	5339 5th Ave	Apartment
MO03835	5331 5th Avenue, Stock Island	5331 5th Ave	Private residence
MO03836	5 6th Avenue, Stock Island	5 6th Ave	Private residence
MO03837	19 6th Avenue, Stock Island	19 6th Ave	Private residence
MO03838	315 Cross Street, Stock Island	315 Cross St	Private residence
MO03839	311 Cross Street, Stock Island	311 Cross St	Private residence
MO03840	309 Cross Street, Stock Island	309 Cross St	Private residence
MO03841	303 Cross Street, Stock Island	303 Cross St	Private residence
MO03842	408 Balido Street, Stock Island	408 Balido St	Private residence
MO03843	404 Balido Street, Stock Island	404 Balido St	Private residence
MO03844	400 Balido Street, Stock Island	400 Balido St	Private residence
MO03845	397 Balido Street, Stock Island	397 Balido St	Private residence
MO03846	399 Balido Street, Stock Island	399 Balido St	Private residence
MO03847	403 Balido Street, Stock Island	403 Balido St	Private residence
MO03848	405 Balido Street, Stock Island	405 Balido St	Private residence
MO03849	407 Balido Street, Stock Island	407 Balido St	Private residence
MO03850	409 Balido Street, Stock Island	409 Balido St	Private residence
MO03851	411 Balido Street, Stock Island	411 Balido St	Private residence
MO03852	410 Balido Terrace, Stock Island	410 Balido Terr	Private residence
MO03853	404 Balido Street, Stock Island	404 Balido St	Private residence
MO03854	402 Balido Terrace, Stock Island	402 Balido Terr	Private residence
MO03855	400 Balido Terrace, Stock Island	400 Balido Terr	Private residence

Table 2.18 - Florida Master Site File Structures (continued)

Site ID	Name	Address	Use
MO03856	424 County Road, Stock Island	424 County Rd	Private residence
MO03857	420 County Road, Stock Island	420 County Rd	Private residence
MO03858	410 County Road, Stock Island	410 County Rd	Private residence
MO03859	400 County Road, Stock Island	400 County Rd	Private residence
MO03856	424 County Road, Stock Island	424 County Rd	Private residence
Middle Keys Planning Area			
MO03701	35 Seaview Avenue, Conch Key	35 Seaview Ave	Private residence
MO03702	44 Seaview Avenue, Conch Key	44 Seaview Ave	Private residence
MO03703	55 Seaview Avenue, Conch Key	55 Seaview Ave	Private residence
MO03704	85 Seaview Avenue, Conch Key	85 Seaview Ave	Private residence
MO03705	42 North Conch Avenue, Conch Key	42 N Conch Ave	Private residence
MO03706	52 North Conch Avenue, Conch Key	52 N Conch Ave	Private residence
MO03707	63 North Conch Avenue, Conch Key	63 N Conch Ave	Private residence
MO03708	73 North Conch Avenue, Conch Key	73 N Conch Ave	Private residence
MO03709	97 North Conch Avenue, Conch Key	97 N Conch Ave	Private residence
MO03710	120 West Conch Avenue, Conch Key	120 W Conch Ave	Private residence
MO03712	61 South Conch Avenue, Conch Key	61 S Conch Ave	Private residence
MO03713	30 South Conch Avenue, Conch Key	30 S Conch Ave	Private residence
MO03714	20 South Conch Avenue, Conch Key	20 S Conch Ave	Private residence
Upper Keys Planning Area			
MO01302	African Queen	99701 Overseas Hwy	Vessel - water going
MO01932	Reefcomber Motel	98650 Overseas Hwy	Hotel, Motel, Inn
MO01982	Parsonage	148 Atlantic Circle Dr	Private residence
MO02076	Rock Garden Lodge-Chinese Restaurant	U.S. 1, Mile Marker 98	Restaurant
MO02077	Tracy, Francis Garden Center	U.S. 1, Mile Marker 94	Commercial

Table 2.18 - Florida Master Site File Structures (continued)

Site ID	Name	Address	Use
MO02078	U.S. Hwy 1, Mile Marker 97.6 (A)	U.S. 1, Mile Marker 97.6	Commercial and residence
MO02079	U.S. Hwy 1, Mile Marker 97.6 (B)	U.S. 1, Mile Marker 97.6	Private residence
MO02083	U.S. Hwy 1, Mile Marker 98.3	Mm 98.3 Overseas Hwy	Commercial
MO02084	Old Post Office	Mm 99 Overseas Hwy	Meetinghouse (religious)
MO02085	Allen Chapel, A M E Church	Mm101 Burlington St	House of worship
MO02086	NW Turn Of Loquat Drive	Loquat Drive	Abandoned or vacant
MO02087	Se Turn Of Loquat Drive	Loquat Drive	Private residence
MO03649	162 Jo Jean Drive, Tavernier	162 Jo Jean Dr	Private residence
MO03650	192 Harborview Drive, Tavernier	192 Harbor View Dr	Private residence
MO03651	140 Sterling Street, Tavernier	140 Sterling St	Private residence
MO03653	130 Sterling Street, Tavernier	130 Sterling St	Private residence
MO03654	149 Sterling Street, Tavernier	149 Sterling St	Private residence
MO03657	94400 Overseas Highway, Tavernier	94400 Overseas Hwy	Private residence
MO03658	97260 Overseas Highway, Key Largo	97260 Overseas Hwy	Private residence
MO03659	Mm97.8 Overseas Highway, Key Largo	Mm97.8 Overseas Hwy	Private residence
MO03660	Sea Trail Motel	98620 Overseas Hwy	Hotel, Motel, Inn
MO03661	Key Largo Ranger Station	Mm 98.9 Overseas Hwy	Governmental Offices
MO03662	99330 Overseas Highway, Key Largo	99330 Overseas Hwy	Commercial
MO03663	99314 Overseas Highway, Key Largo	99314 Overseas Hwy	Private residence
MO03665	104 Palmetto Street, Tavernier	104 Palmetto St	Private residence
MO03666	15 Seaside Avenue, Tavernier	15 Seaside Ave	Private residence
MO03667	113 North Bay Harbor Road, Key Largo	113 N Bay Harbor Rd	Private residence
MO03668	150 South Bayview Drive, Key Largo	150 S Bayview Rd	Private residence
MO03669	239 South Bay Harbor Drive, Key Largo	239 S Bay Harbor Rd	Private residence
MO03670	116 South Coco Plum Drive, Key Largo	116 S Coco Plum Dr	Private residence

Table 2.18 - Florida Master Site File Structures (continued)

Site ID	Name	Address	Use
MO03671	126 Harbor Drive, Key Largo	126 Harbor Dr	Private residence
MO03672	145 Harbor Drive, Key Largo	145 Harbor Dr	Private residence
MO03673	16 Seagate Road, Key Largo	16 Seagate Rd	Private residence
MO03674	4 Coral Drive, Key Largo	4 Coral Dr	Private residence
MO03675	139 Bayview Drive, Key Largo	139 Bayview Dr	Private residence
MO03676	Dorothy Lester House	138 Bayview Dr	Private residence
MO03678	462 Sunset Drive, Key Largo	462 Sunset Dr	Private residence
MO03679	99550 Overseas Highway, Key Largo	99550 Overseas Hwy	Commercial
MO03680	107 Jasmine Drive, Key Largo	107 Jasmine Dr	Private residence
MO03681	88 Coconut Drive, Key Largo	88 Coconut Dr	Private residence
MO03683	6 Coral Way, Key Largo	6 Coral Way	Private residence
MO03684	2 Paradise Drive, Key Largo	2 Paradise Dr	Private residence
MO03685	19 Coral Way, Key Largo	19 Coral Way	Private residence
MO03686	17 Tarpon Avenue, Key Largo	17 Tarpon Ave	Private residence
MO03687	28 Tarpon Avenue, Key Largo	28 Tarpon Dr	Private residence
MO03688	40 Marlin Avenue, Key Largo	40 Marlin Ave	Private residence
MO03689	16 Marlin Avenue, Key Largo	16 Marlin Ave	Private residence
MO03690	12 Marlin Avenue, Key Largo	12 Marlin Ave	Private residence
MO03691	Caribbean Club	104504 Overseas Hwy	Commercial
MO03693	815 Oceana Road, Key Largo	815 Oceana Rd	Private residence
MO03694	811 Oceana Road, Key Largo	811 Oceana Rd	Private residence
MO03695	808 Oceana Road, Key Largo	808 Oceana Rd	Private residence
MO03696	804 Oceana Road, Key Largo	804 Oceana Rd	Private residence
MO03697	24 Oceana Road, Key Largo	24 Oceana Rd	Private residence
MO03698	17 Transylvania Avenue, Key Largo	17 Transylvania Ave	Private residence
MO03699	35 Transylvania Avenue, Key Largo	35 Transylvania Ave	Private residence
MO03700	39 Transylvania Avenue, Key Largo	39 Transylvania Ave	Private residence

Source: Florida Master Site File, January 2010

2.3.7.3 Historic Landmark Area District Studies

Monroe County Code of Ordinance Article III (Sections 134-55 and 134-56) contains a procedure for designating local historic landmarks. To date, only the three longest Overseas Railroad Bridges: Long Key, Bahia Honda and Seven Mile railroad bridges, have been designated as local historical landmarks.

The Tavernier Historic District, as recommended by Tavernier Livable CommuniKeys Plan (LCP), is bounded on the north by the U.S. 1, on the west by the Tavernier Creek, on the south by the Atlantic Ocean, and on the east by Mile Marker (MM) 92. The general location of Tavernier's local historic district is shown on **Map Series 2-1** and **Map Series 2-3** of the Map Atlas. Of the 344 listings of historic structures in the unincorporated Keys, 62 are located in Tavernier Historic District as shown in **Table 2.24 and Table 2.25**. Of the 62 structures in Tavernier, 53 are residences.

On February 5, 2010, the Florida Department of State Division of Historic Resources determined that the Tavernier Historic District is potentially eligible for listing on the National Register of Historic Places.

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Table 2.19 – Tavernier Historic Structures Potentially Eligible for Listing on the National Register of Historic Places

SITEID	NAME	ADDRESS	USE
MO01889	200 Beach Road	200 Beach Rd	Private residence
MO01984	Woods, O M House	189 Beach Rd	Private residence
MO01985	Station Masters House	198 Beach Rd.	Private residence
MO01990	180 Lowe St	180 Lowe St	Private residence
MO01992	Red Cross House	184 Lowe St	Private residence
MO01993	Lowe, Alice House	224 Ocean Tral	Private residence
MO01994	131 Ocean View Drive	131 Ocean View Dr	Private residence
MO01995	Tavernier Methodist Church	91701 Overseas Hwy	Community center (e.g., recreation hall)
MO01996	Tavernier Hotel	91865 Overseas Hwy	Hotel, Motel, Inn
MO01997	Albury, Merlin House	91731 Overseas Hwy	Private residence
MO01998	Old Tavernier Post Office	91951 Overseas Hwy	Commercial
MO01999	Albury, Willard House	91991 Overseas Hwy	Private residence
MO02000	Albury, J V House	92001 Overseas Hwy	Medical
MO02004	Carpenter, Cliff House	114 Sunrise Dr	Private residence
MO02009	Albury, Charles House	132 Tavern Dr	Private residence
MO02010	Wilkinson House	159 Tavernier Trail	Private residence
MO02013	Albury, Rodney House	200 Albury Ln	Private residence
MO03625	Copper Kettle Restaurant	91875 Overseas Hwy	Pharmacy
MO03626	Old Tavern Tea Room	91861 Overseas Hwy	Restaurant
MO03630	190 Atlantic Circle Drive, Tavernier	190 Atlantic Circle Dr	Private residence
MO03633	Roberts House	140 S Sunrise Dr	Private residence
MO03715	165 Tavernier Trail, Tavernier	165 Tavernier Trail	Private residence

Source: Florida Master Site File, January 2010

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Table 2.20 – Tavernier Historic Structures

Siteid	Name	Address	Use
Other			
MO01891	163 Coconut Row	163 Coconut Row Na	Private residence
MO01892	240 Lincoln Ave	240 Lincoln Avenue Ave	Private residence
MO01893	204 Ocean Blvd.	204 Ocean Blvd	Private residence
MO01894	137 Sunrise Dr.	137 Sunrise Dr	Private residence
MO01983	166 Atlantic Circle	166 Atlantic Circle Dr	Private residence
MO01986	Geiger Packing House	91495 Overseas Hwy	Commercial and residence
MO01987	129 Coconut Row	129 Coconut Row	Private residence
MO01988	110 Lowe St	110 Lowe St	Private residence
MO01989	114 Lowe St	114 Lowe St	Private residence
MO01991	181 Lowe St	181 Lowe St	Private residence
MO02001	118 Sunrise Drive	118 Sunrise Dr	Private residence
MO02002	120 Sunrise Drive	120 Sunrise Dr	Private residence
MO02003	Allen, Robert Porter House	133 Sunrise Dr	Private residence
MO02005	Carpenter, Cliff Shed	114 Sunrise Dr	Outbuilding
MO02006	256 Tarpon Drive	256 Tarpon St	Private residence
MO02007	114 Tavernier Drive	114 Tavernier Drive	Private residence
MO02008	120 Tavernier Drive	120 Tavernier Dr	Private residence
MO02011	136 Tavernier Dr	136 Tavernier Dr	Private residence
MO02012	140 Tavernier Dr	140 Tavernier Dr	Private residence
MO03627	Old Standard Oil Gas Station	19871 Overseas Hwy	Service station
MO03628	143 Atlantic Circle Drive, Tavernier	143 Atlantic Circle Dr	Private residence
MO03629	186 Atlantic Circle Drive, Tavernier	186 Atlantic Circle Dr	Private residence
MO03631	128 Tavernier Drive, Tavernier	128 Tavernier Dr	Private residence
MO03632	126 Tavernier Drive, Tavernier	126 Tavernier Dr	Private residence
MO03634	162 South Sunrise Drive, Tavernier	162 S Sunrise Dr	Private residence
MO03635	149 South Sunrise Drive, Tavernier	149 S Sunrise Dr	Private residence
MO03636	114 Tavernier Drive, Tavernier	114 Tavernier Dr	Private residence

Table 2.20 - Tavernier Historic Structures (continued)

Siteid	Name	Address	Use
MO03637	122 Lowe Street, Tavernier	122 Lowe St	Private residence
MO03638	124 Lowe Street, Tavernier	124 Lowe St	Private residence
MO03639	130 Lowe Street, Tavernier	130 Lowe St	Private residence
MO03640	157 Lowe Street, Tavernier	157 Lowe St	Private residence
MO03641	185 Lowe Street, Tavernier	185 Lowe St	Private residence
MO03642	195 Lowe Street, Tavernier	195 Lowe St	Private residence
MO03643	178 Beach Road, Tavernier	178 Beach Rd	Private residence
MO03644	181 Coconut Row, Tavernier	181 Coconut Row	Private residence
MO03645	115 Coconut Row, Tavernier	115 Coconut Row	Private residence
MO03716	153 Tavernier Trail, Tavernier	153 Tavernier Tral	Private residence
MO03717	137-141 South Sunrise Drive, Tavernier	137-141 S Sunrise Dr	Apartment
MO03718	139 Coconut Row, Tavernier	139 Coconut Row	Private residence

Source: Florida Master Site File, January 2010
Diane E. Silvia, Ph.D. Email to Mitch Harvey. June 29,2010.

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2.3.7.4 Archaeological Sites

Archeological files are also a curate by the State Historic Preservation Officer (SHPO). In the County as a whole there are 649 archeological sites. Due to the sensitive nature of archeological sites and their vulnerability to vandalism, the locations are not illustrated on the Existing Land Use Map series and are only listed by general location as shown on **Table 2.21,** below.

Table 2.21 - Archeological Sites

Site ID	Form No	Site Name	Own Type
MO00001	194904	Key West Beach	
MO00001	197606	Key West Beach	
MO00001	MELD	Key West Beach	
MO00002	195110	Stock Island Midden/Stock Island 1	
MO00002	199010	Stock Island Midden/Stock Island 1	
MO00002	MELD	Stock Island Midden/Stock Island 1	COUN
MO00003	194306	Boca Chica Key #1	
MO00003	199006	Boca Chica Key #1	
MO00003	199605	Boca Chica Key #1	FEDE
MO00003	MELD	Boca Chica Key #1	FEDE
MO00004	194709	Sugarloaf Key 1	
MO00004	195110	Sugarloaf Key 1	
MO00004	199006	Sugarloaf Key 1	
MO00004	MELD	Sugarloaf Key 1	PRIV
MO00005	194904	Cudjoe Key 1	
MO00005	198712	Cudjoe Key 1	
MO00005	MELD	Cudjoe Key 1	PRIV
MO00006	195110	Ramrod Key 6	
MO00006	888801	Ramrod Key 6	
MO00006	MELD	Ramrod Key 6	PRIV
MO00007	194406	Watson's Hammock (Big Pine Key)	
MO00007	194906	Watson's Hammock (Big Pine Key)	
MO00007	197904	Watson's Hammock (Big Pine Key)	
MO00007	999999	Watson's Hammock (Big Pine Key)	
MO00007	MELD	Watson's Hammock (Big Pine Key)	
MO00008	MELD	Big Pine Key 2	UNSP
MO00009	194912	Key Vaca 1	
MO00010	194606	Key Vaca 2	
MO00011	195110	Coon Key	
MO00012	194606	Lower Matecumbe Key 1	
MO00012	200810	Lower Matecumbe Key 1	CORP
MO00012	999999	Lower Matecumbe Key 1	
MO00012	MELD	Lower Matecumbe Key 1	
MO00013	195110	Lignumvitae Key Mound	
MO00014	195110	Lignumvitae Key Stone Structure	
MO00015	195110	Indian Key	

Table 2.21 - Archeological Sites (continued)

Site ID	Form No	Site Name	Own Type
MO00015	197204	Indian Key	
MO00015	197207	Indian Key	
MO00015	200510	Indian Key	STAT
MO00015	MELD	Indian Key	
MO00016	195110	Tea Table Key	
MO00016	200810	Tea Table Key	CORP
MO00017	195110	Upper Matecumbe Key	
MO00017	200504	Upper Matecumbe Key	STAT
MO00017	200810	Upper Matecumbe Key	PRIV
MO00017	999999	Upper Matecumbe Key	
MO00017	MELD	Upper Matecumbe Key	STAT
MO00018	200810	Whale Harbor	UNKN
MO00018	MELD	Whale Harbor	STAT
MO00019	200810	Windley Key	UNKN
MO00019	MELD	Windley Key	STAT
MO00020	195110	Plantation Key 1	STAT
MO00020	200810	Plantation Key 1	UNKN
MO00021	195110	Plantation Key 2	
MO00021	200810	Plantation Key 2	UNKN
MO00022	195110	Plantation Key 3	
MO00022	199609	Plantation Key 3	PRIV
MO00022	200810	Plantation Key 3	PRIV
MO00023	195106	Plantation Key 4	
MO00023	195110	Plantation Key 4	
MO00023	200810	Plantation Key 4	UNKN
MO00023	999999	Plantation Key 4	
MO00023	MELD	Plantation Key 4	
MO00024	195110	Plantation Key 5	STAT
MO00024	200810	Plantation Key 5	UNKN
MO00025	MELD	Key Largo 1	
MO00026	195110	Rock Mound 1 (Midden) Key Largo	
MO00026	197408	Rock Mound 1 (Midden) Key Largo	
MO00026	198500	Rock Mound 1 (Midden) Key Largo	
MO00027	195110	Rock Mound 2 (Rock Mound) (Key Largo 3)	
MO00027	197407	Rock Mound 2 (Rock Mound) (Key Largo 3)	
MO00027	198500	Rock Mound 2 (Rock Mound) (Key Largo 3)	
MO00027	MELD	Rock Mound 2 (Rock Mound) (Key Largo 3)	
MO00028	195110	Key Largo 4	
MO00029	195003	Snake Bight Canal	
MO00029	999999	Snake Bight Canal	
MO00029	MELD	Snake Bight Canal	
MO00030	MELD	Bear Lake 4	
MO00031	MELD	Bear Lake 5	
MO00033	193806	Bear Lake Mounds	FEDE

Table 2.21 - Archeological Sites (continued)

Site ID	Form No	Site Name	Own Type
MO00034	MELD	Bear Lake 2	
MO00035	MELD	Bear Lake 3	
MO00036	195102	East Cape Sable	
MO00037	195202	Cape Sable Beach	
MO00038	195202	Cape Sable 2	
MO00039	194406	Cape Sable 1	
MO00040	194905	Little Ingraham West	
MO00041	194905	Big Sable Creek	
MO00042	194901	Cane Patch	FEDE
MO00043	194901	Banana Patch	
MO00044	195204	Indian Camp Creek Mound	FEDE
MO00045	195102	Harney River	
MO00046	195104	Camp Lonesome	FEDE
MO00047	195110	Rodgers River 1	
MO00048	195110	Rodgers River 2	
MO00049	195110	Onion Key	FEDE
MO00050	195102	Willie Willie Mound	
MO00050	196401	Willie Willie Mound	
MO00050	MELD	Willie Willie Mound	FEDE
MO00051	195110	Highland Point	
MO00052	195110	Site Back Of Highland Point	FEDE
MO00053	195110	Johnson Hammock	FEDE
MO00054	195001	Lostmans Key	FEDE
MO00055	195102	First Bay	
MO00055	196401	First Bay	
MO00055	MELD	First Bay	FEDE
MO00056	195102	Hamilton Garden Patch	
MO00056	196401	Hamilton Garden Patch	
MO00056	MELD	Hamilton Garden Patch	FEDE
MO00057	195110	Walter Hamilton Place	
MO00057	196701	Walter Hamilton Place	
MO00057	MELD	Walter Hamilton Place	
MO00058	195110	NN	
MO00058	196602	NN	
MO00058	MELD	NN	
MO00059	195110	Hamilton Mound	
MO00059	196401	Hamilton Mound	
MO00059	MELD	Hamilton Mound	FEDE
MO00060	195110	Gopher Key 1	
MO00060	196401	Gopher Key 1	
MO00060	MELD	Gopher Key 1	FEDE
MO00061	194906	Gopher Key 2	
MO00061	196401	Gopher Key 2	
MO00061	MELD	Gopher Key 2	FEDE

Table 2.21 - Archeological Sites (continued)

Site ID	Form No	Site Name	Own Type
MO00062	194906	Chevalier Place	
MO00062	196406	Chevalier Place	
MO00062	999999	Chevalier Place	
MO00062	MELD	Chevalier Place	FEDE
MO00063	190006	Watsons Place	
MO00063	194906	Watsons Place	
MO00063	196401	Watsons Place	
MO00063	MELD	Watsons Place	FEDE
MO00064	194906	Miller Point	
MO00064	196506	Miller Point	
MO00064	888801	Miller Point	
MO00064	MELD	Miller Point	FEDE
MO00065	195110	Howard Wood Creek	
MO00065	999999	Howard Wood Creek	
MO00065	MELD	Howard Wood Creek	
MO00066	196007	Huston River	
MO00066	196406	Huston River	
MO00066	MELD	Huston River	FEDE
MO00067	196401	Tigertail Mound	
MO00067	888801	Tigertail Mound	
MO00067	MELD	Tigertail Mound	
MO00068	195111	Barneys Mound	
MO00068	196401	Barneys Mound	
MO00068	MELD	Barneys Mound	
MO00069	MELD	Roberts Creek	
MO00070	194811	Coconut Camp	
MO00070	197704	Coconut Camp	
MO00070	MELD	Coconut Camp	FEDE
MO00071	195111	Houses Hammock	FEDE
MO00072	195111	Lopez Place	
MO00072	196401	Lopez Place	
MO00072	MELD	Lopez Place	FEDE
MO00073	195110	Pinecrest Hammock 1	
MO00074	195110	Pinecrest Hammock 3	
MO00075	195201	Lundsford	
MO00076	195110	Lower Matecumbe 2	
MO00076	200810	Lower Matecumbe 2	PRIV
MO00077	195301	Knights Key	
MO00078	194906	Doctor Tiger's Hammock	
MO00078	197704	Doctor Tiger's Hammock	
MO00078	MELD	Doctor Tiger's Hammock	FEDE
MO00079	195110	Ground Rattler Hammock	
MO00080	195110	Near Ground Rattler Hammock	
MO00081	198508	Charley Jumper	FEDE

Table 2.21 - Archeological Sites (continued)

Site ID	Form No	Site Name	Own Type
MO00082	195110	Turkey Hammock 1	
MO00083	194806	Turkey Hammock 2	
MO00084	194906	Lone Pine Midden	
MO00085	194811	Coffee Pot Camp	FEDE
MO00086	194806	Otter Camp	
MO00088	200810	Lower Matecumbe Key 3	UNKN
MO00088	MELD	Lower Matecumbe Key 3	
MO00089	195406	Rabbit Key	
MO00089	196406	Rabbit Key	
MO00089	MELD	Rabbit Key	FEDE
MO00090	196109	Herrera Wreck	STAT
MO00090	197708	Herrera Wreck	UNSP
MO00090	199109	Herrera Wreck	STAT
MO00090	200408	Herrera Wreck	UNSP
MO00090	MELD	Herrera Wreck	
MO00091	196509	San Francisco Wreck	
MO00091	196511	San Francisco Wreck	
MO00091	200408	San Francisco Wreck	UNKN
MO00092	199109	El Infante Wreck	FEDE
MO00092	200410	El Infante Wreck	UNSP
MO00092	200709	El Infante Wreck	STAT
MO00093	196008	NN	
MO00093	999999	NN	
MO00093	MELD	NN	FEDE
MO00095	196008	New Turkey Key	FEDE
MO00096	196008	Old Turkey Key	
MO00096	196401	Old Turkey Key	
MO00096	MELD	Old Turkey Key	FEDE
MO00097	196406	Plover Key	FEDE
MO00099	196008	Mormon Key	
MO00099	196401	Mormon Key	
MO00099	MELD	Mormon Key	FEDE
MO00100	196008	NN	
MO00100	196506	NN	
MO00100	MELD	NN	FEDE
MO00101	199109	San Jose Wreck	UNSP
MO00101	200410	San Jose Wreck	UNSP
MO00102	199109	Chavez Wreck	STAT
MO00102	200408	Chavez Wreck	UNSP
MO00102	200509	Chavez Wreck	
MO00104	200103	San Pedro	STAT
MO00104	200410	San Pedro	
MO00104	MELD	San Pedro	
MO00105	196401	Buzzard Key	FEDE
MO00106	196401	Wood Key	

Table 2.21 - Archeological Sites (continued)

Site ID	Form No	Site Name	Own Type
MO00106	197703	Wood Key	FEDE
MO00107	196401	Pavilion Key	FEDE
MO00108	196401	Lopez Key	FEDE
MO00109	196505	Little House Hammock	FEDE
MO00110	196505	Huston River 2	FEDE
MO00111	196401	Comer Key	FEDE
MO00112	196401	Stokes Mound	FEDE
MO00113	196508	Clam Point	FEDE
MO00114	196508	Sig Walker Camp	FEDE
MO00117	196603	Little Fat Deer Key	
MO00118	194706	Rookery Mound	
MO00118	194901	Rookery Mound	
MO00118	196504	Rookery Mound	
MO00118	MELD	Rookery Mound	FEDE
MO00120	MELD	Duck Rock Cove	FEDE
MO00121	196010	Rough Lemon Hammock	FEDE
MO00122	MELD	Bradley Key	
MO00123	MELD	Curry Key	
MO00124	197502	West Summerland Key	
MO00124	199010	West Summerland Key	
MO00124	MELD	West Summerland Key	CONP
MO00125	194811	Gas Can Midden	FEDE
MO00127	197505	Dynamite Rock	
MO00127	198212	Dynamite Rock	
MO00127	198501	Dynamite Rock	
MO00127	199301	Dynamite Rock	
MO00127	MELD	Dynamite Rock	
MO00128	197504	Atlantic	
MO00129	MELD	Niles Channel	
MO00130	199706	Henrietta Marie Wreck	UNSP
MO00130	MELD	Henrietta Marie Wreck	
MO00131	197210	San Rafael Wreck	
MO00131	200408	San Rafael Wreck	UNSP
MO00132	196509	Walker Key Wreck Or El Sueco De Arizon	
MO00132	200409	Walker Key Wreck Or El Sueco De Arizon	
MO00133	196507	San Felipe Shipwreck	
MO00133	197709	San Felipe Shipwreck	STAT
MO00133	199205	San Felipe Shipwreck	
MO00133	200409	San Felipe Shipwreck	
MO00134	MELD	Wreck 12	
MO00135	196506	Shot Wreck	
MO00136	196506	Ivory Wreck	
MO00137	196506	San Fernando Wreck	
MO00138	196506	Nn Wreck	

Table 2.21 - Archeological Sites (continued)

Site ID	Form No	Site Name	Own Type
MO00139	196509	Bronze Wreck	
MO00140	MELD	Knight Key Pier (Flagler Railroad Pier)	
MO00141	197108	Quicksand Wreck	
MO00142	197108	West Turtle Shoal Wreck	
MO00143	197202	Shipwreck	
MO00143	200410	Shipwreck	
MO00144	196805	NN Wreck	
MO00145	196810	NN Wreck	
MO00146	197106	Capitana Wreck	
MO00146	199109	Capitana Wreck	FEDE
MO00146	200408	Capitana Wreck	
MO00148	197008	Granite Wreck	
MO00149	197010	NN Wreck	
MO00150	197010	NN Wreck	
MO00151	199109	Iron Ballast Wreck 1	FEDE
MO00152	197105	Swivel Gun Wreck	
MO00153	197105	Steel Wreck	
MO00154	197105	Schooner Wreck	
MO00155	197105	Iron Ballast Wreck 2	
MO00156	197106	Brick Wreck	
MO00157	197008	Ships Mast Wreck	
MO00158	197105	Sounding Lead Wreck	
MO00159	197106	Ship Wreckage	
MO00160	197106	NN Wreck	
MO00161	197106	Nine Cannon Wreck	
MO00162	197106	NN Wreck	
MO00163	197106	NN Wreck	
MO00164	197106	Construction Wreck	
MO00165	197106	Shipwreck Debris	
MO00166	197106	Sack Wreck	
MO00167	197106	NN Wreck	
MO00168	197106	NN Wreck	
MO00169	197105	Fischer-Robinson-Clausen Wreck	
MO00170	197106	Dead Eye Wreck	
MO00171	197106	NN Wreck	
MO00172	197106	Shrimp Boat Wreck	
MO00173	199109	USS Alligator	FEDE
MO00174	197205	NN Wreck	
MO00177	199109	Los Tres Puentes Wreck	STAT
MO00177	200408	Los Tres Puentes Wreck	UNSP
MO00178	197106	Gallo Indiana Wreck ?	
MO00178	200408	Gallo Indiana Wreck ?	
MO00181	197106	NN Wreck	
MO00182	197106	NN Wreck	

Table 2.21 - Archeological Sites (continued)

Site ID	Form No	Site Name	Own Type
MO00183	197206	NN Wreck	
MO00199	195106	H M S Loo Wreck	
MO00200	195106	Tallman	
MO00232B	MELD	Marine Hospital	CORP
MO00246	197308	Water Key	
MO00248	197405	Shipwreck 1	FEDE
MO00249	197405	Shipwreck 3	FEDE
MO00250	197405	Shipwreck 4	FEDE
MO00251	197405	Shipwreck 2	FEDE
MO00252	197405	Shipwreck 5	FEDE
MO00253	197311	Coin Wreck	
MO00253	200810	Coin Wreck	PRIV
MO00256	197411	NN Wreck	
MO01104	198302	Sig Walker Mound	FEDE
MO01105	198302	Castaway Mound	FEDE
MO01106	198303	Alligator Bay 7	FEDE
MO01107	198303	Alligator Bay 8	FEDE
MO01108	198401	Alligator Bay 9	FEDE
MO01109	198303	Big Boy Lake 2	FEDE
MO01110	198303	Big Lostmans Bay	FEDE
MO01111	198403	Oyster Key	FEDE
MO01112	198403	Clive Key	FEDE
MO01113	198403	Murray Key	FEDE
MO01114	198302	Gator Hook Swamp 1	FEDE
MO01115	198302	Gator Hook 2	FEDE
MO01116	198206	Mosquito Island (Boat Lamp Camp)	FEDE
MO01117	198301	Indian Camp Creek 4	FEDE
MO01118	198301	Indian Camp Creek 5	FEDE
MO01119	198302	Indian Camp Creek 6	FEDE
MO01120	MELD	Indian Camp Creek 7	FEDE
MO01121	198303	Indian Camp Creek 8	FEDE
MO01122	198303	Indian Camp Creek 9	FEDE
MO01123	198302	Lostmans River 6	FEDE
MO01124	198302	Lostmans River 7	FEDE
MO01125	198401	Hamilton, Leon Place	FEDE
MO01126	198404	Hamilton, Eugene Place	FEDE
MO01127	198404	Lostman's River Ranger Station 13	FEDE
MO01128	198302	Panther Mound 23	FEDE
MO01129	MELD	Pavilion Key 4	FEDE
MO01130	198403	Pavilion Key 12	FEDE
MO01132	198901	American Shoal Schooner Wreck	FEDE
MO01132	200807	American Shoal Schooner Wreck	UNKN
MO01133	198403	Pavilion Key 13	FEDE
MO01136	198402	Pavilion Key 14	FEDE

Table 2.21 - Archeological Sites (continued)

Site ID	Form No	Site Name	Own Type
MO01142	198404	Pavilion Key 15	FEDE
MO01143	198403	Fort Poinsett	FEDE
MO01144	198402	Shark Point 1	FEDE
MO01145	198205	Tarpon Bay 1	FEDE
MO01150	198206	Tarpon Bay 3	FEDE
MO01159	198303	Tarpon Bay 4	FEDE
MO01194	MELD	Spanish Harbor Bridge	
MO01195	MELD	Pigeon Key Railroad Wreck	
MO01196	200605	Bahia Honda Wreck	STAT
MO01196	MELD	Bahia Honda Wreck	
MO01197	197703	Loop Hammock Island 13	FEDE
MO01198	197703	Rock Mound (Loop Hammock Island 12)	FEDE
MO01199	197703	Taylor Hammock 1	FEDE
MO01200	197704	NN	FEDE
MO01201	197704	NN	FEDE
MO01202	197704	Taylor Hammock 2	FEDE
MO01203	197704	Taylor Hammock 3	FEDE
MO01204	197704	NN	FEDE
MO01205	197703	NN	FEDE
MO01206	197704	Gator Hook Lake	FEDE
MO01207	197704	36th Street	FEDE
MO01208	197704	Lime Tree Hammock	FEDE
MO01209	197704	Lime Camp	FEDE
MO01210	197704	NN	FEDE
MO01211	197704	Sandy Mound	FEDE
MO01212	197704	Brittlecane Hammock	FEDE
MO01213	197705	Tiger Burial	FEDE
MO01214	197705	Citrus	FEDE
MO01215	197705	Hess	FEDE
MO01216	197705	Slough	FEDE
MO01217	197705	Dietz	FEDE
MO01253	MELD	Bow	
MO01254	MELD	Railroad Section Camp 1	
MO01255	MELD	Railroad Section Camp 2	
MO01256A	199005	Adderley Town	CONP
MO01258	195110	Rock Mound Archaeological Site	
MO01258	197407	Rock Mound Archaeological Site	
MO01258	199509	Rock Mound Archaeological Site	CORP
MO01258	MELD	Rock Mound Archaeological Site	PRIV
MO01261	199009	Big Coppitt 1	PREH
MO01262	199009	Big Pine Key 9	PUUN
MO01263	199006	Big Pine Key 10	PRUN
MO01264	199009	Big Pine Key 11	COUN
MO01266	199009	Big Pine 13	FEDE

Table 2.21 - Archeological Sites (continued)

Site ID	Form No	Site Name	Own Type
MO01267	190108	Boca Chica #2	FEDE
MO01267	199605	Boca Chica #2	FEDE
MO01268	199009	Boca Chica #3	FEDE
MO01268	199605	Boca Chica #3	FEDE
MO01269	199008	Cudjoe Key 4	PRIV
MO01271	199008	Holiday Key	UNKN
MO01272	199006	Little Pine 1	FEDE
MO01273	199109	Little Pine Key 2	FEDE
MO01274	199009	Little Pine 3	FEDE
MO01275	199009	Little Pine 4	FEDE
MO01277	199008	Middle Torch Key 1	UNKN
MO01278	199008	No Name Key 1	FEDE
MO01279	199008	No Name Key 2	FEDE
MO01280	199008	No Name Key 3	FEDE
MO01281	199008	No Name Key 4	FEDE
MO01282	199008	No Name Key 5	FEDE
MO01284	199008	No Name 7	FEDE
MO01285	199006	No Name Key 8	FEDE
MO01286	199006	Ramrod Key 4	PRIV
MO01287	199008	Ramrod Key 5	FEDE
MO01288	198804	Sawyer Key Homestead	UNKN
MO01288	198899	Sawyer Key Homestead	
MO01289	199006	Stock Island 2	CITY
MO01290	199006	Stock Island 3	CITY
MO01291	199006	Sugarloaf Key 3	STAT
MO01292	199006	Sugarloaf Key 4	PRUN
MO01293	199006	Sugarloaf Key 5	STAT
MO01294	199006	West Summerland Key 2	CONP
MO01296	199008	Cudjoe Key 3	PRIV
MO01297	199004	Grass Key Rock Pit	CORP
MO01298	198912	Pent	CORP
MO01299	199004	Rachel Carson Key	CORP
MO01300	199005	Crane Hammock 3	PRIV
MO01301	196807	Angela Street 600 Block	PRIV
MO01303	199109	Cannabis Trawler	FEDE
MO01304	199109	Eagle	FEDE
MO01305	199109	Alexander Barge	FEDE
MO01306	199109	D & B Barge Wreck	FEDE
MO01307	199109	Spiney Oyster Barge	FEDE
MO01308	199109	Brick Barge	STAT
MO01309	199109	Fishing Camp Foundation	STAT
MO01310	199109	Duane	FEDE
MO01310	200209	Duane	FEDE
MO01311	199109	Bibb	FEDE

Table 2.21 - Archeological Sites (continued)

Site ID	Form No	Site Name	Own Type
MO01312	199109	Rosalee	STAT
MO01313	199109	Unidentified Shipwreck A	FEDE
MO01314	199109	Unidentified Shipwreck B	FEDE
MO01315	199109	Unidentified Shipwreck C	FEDE
MO01316	199109	Unidentified Shipwreck D	FEDE
MO01316	199110	Unidentified Shipwreck D	FEDE
MO01316	200802	Unidentified Shipwreck D	UNSP
MO01317	199109	Unidentified Shipwreck E	FEDE
MO01318	199109	Unidentified Shipwreck F	STAT
MO01319	199109	Unidentified Shipwreck G	STAT
MO01320	199109	Hawk Channel Schooner Wreck	STAT
MO01321	199109	Disgusting Wreck	STAT
MO01322	199109	Rum Runner Wreck	STAT
MO01323	199109	Brick Wreck	STAT
MO01324	199109	Iron Masted Schooner	FEDE
MO01325	199109	Welberry Wreck	STAT
MO01326	199109	Hms Fly	FEDE
MO01327	199109	Indian Key Wreck	STAT
MO01328	199109	Bronze Pin Wreck	FEDE
MO01329	199109	Schooner Wreck	FEDE
MO01330	199109	Windlass Wreck	FEDE
MO01331	199109	Brass Wreck	FEDE
MO01332	199109	Ore Ballast Schooner Wreck	FEDE
MO01334	199109	Kearns Wreck	FEDE
MO01335	199109	Indian Key Anchorage	STAT
MO01336	199109	Tea Table Anchorage	STAT
MO01337	199109	Tavernier Key/Planter Anchorage	STAT
MO01338	199109	Rodrigues Key/Rock Harbor Anchorage	STAT
MO01339	199109	Alligator Lighthouse	UNSP
MO01340	199109	Bridge Rubble	FEDE
MO01341	199206	Round Container	STAT
MO01342	199206	Stacked Rock	STAT
MO01446	MELD	Stone Wall - Lignum Vitae Key	UNSP
MO01448	199201	Muir Wreck	STAT
MO01467A	200004	Thompson Turtle Kraals	CITY
MO01472	199502	Long Key Dock Piers	UNKN
MO01473	199502	Long Key Side Track	STAT
MO01474	199502	Long Key Railroad Residence	STAT
MO01475	199502	Islamorada Railroad Residence	STAT
MO01475	200810	Islamorada Railroad Residence	STAT
MO01477	199605	Nn	FEDE
MO01478	199605	Nn	FEDE
MO01480	199611	Crane Road Cisterns	UNSP
MO01491	200308	Vestige Of Flagler Railroad	CORP

Table 2.21 - Archeological Sites (continued)

Site ID	Form No	Site Name	Own Type
MO01866	200401	Naval Branch Medical Clinic	FEDE
MO01867	200401	Peary Court	FEDE
MO01868	200401	Truman Annex	FEDE
MO01869	200401	Trumbo Point	FEDE
MO01870	200401	Trumbo Point 2	FEDE
MO01879	200410	Bronze Pin Wreck Off Grassy Key	UNSP
MO01879	200807	Bronze Pin Wreck Off Grassy Key	UNKN
MO01880	200410	Rib Wreck	UNSP
MO01880	200706	Rib Wreck	UNSP
MO01881	200410	Brick Wreck Off Key Colony Beach	UNSP
MO01881	200605	Brick Wreck Off Key Colony Beach	STAT
MO01882	200401	Trumbo Point 3	FEDE
MO01883	200510	Lower Matecumbe Wells	CORP
MO01883	200810	Lower Matecumbe Wells	CORP
MO01885	200504	Choate Construction Basin	STAT
MO01885	200810	Choate Construction Basin	STAT
MO01886	200504	Hurricane Debris	STAT
MO01886	200810	Hurricane Debris	STAT
MO01887	200605	Bahia Honda Ballast Stone Pile	STAT
MO01901	200803	Upper Matecumbe Key	PRIV
MO01901	200810	Upper Matecumbe Key	PRIV
MO01902	200710	Snake Creek Anchor	STAT
MO01902	200810	Snake Creek Anchor	STAT
MO01904	200803	Jewell Key	FEDE
MO01923	200807	Sister Creek Channel Site	UNKN
MO01924	200811	Key West WWI Naval Air Station	FEDE
MO01959	MELD	Duck Pond Dump	
MO01961	199502	Windley Key Quarry	STAT
MO01961	200810	Windley Key Quarry	STAT
MO01961	MELD	Windley Key Quarry	
MO01962	198204	Village Of Planter	
MO01965	198209	Port Bougainville 1	
MO01965	198212	Port Bougainville 1	
MO01966	198209	Port Bougainville 2	
MO01966	198212	Port Bougainville 2	
MO01967	198212	Heart Hammock	
MO01968	198212	Sherd	
MO01969	198212	Adze	UNKN
MO01970	198212	Garden Cove	CORP
MO01971	198212	Celt	CORP
MO01972	198212	Laura	CORP
MO01973	198212	Frag	CORP
MO01974	198212	Busycon Adze	CORP
MO01975	198212	Columella	CORP

Table 2.21- Archeological Sites (continued)

Site ID	Form No	Site Name	Own Type
MO01978	MELD	Pumpkin Key	
MO01981	199006	Big Munson Key	CONP
MO02014	198006	Mcgee	FEDE
MO02015	198006	Nn (Bicy 206)	FEDE
MO02016	198006	Nn (Bicy 211)	FEDE
MO02017	198006	Nn (Bicy 212)	FEDE
MO02018	198006	Nn (Bicy 237)	FEDE
MO02019	198006	Nn (Bicy 238)	FEDE
MO02020	198006	Nn (Bicy 239)	FEDE
MO02021	198006	Nn (Bicy 240)	FEDE
MO02022	198006	Dead Tree	FEDE
MO02023	198006	Nn (Bicy 241)	FEDE
MO02024	198006	Nn (Bicy 242)	FEDE
MO02025	198006	Nn (Bicy 244)	FEDE
MO02026	198006	Nn (Bicy 245)	FEDE
MO02027	198006	Dixon's Slough	FEDE
MO02028	198006	Gum Slough	FEDE
MO02029	198006	Slough Interchange	FEDE
MO02030	198006	Gator Croak	FEDE
MO02031	198006	Gimp	FEDE
MO02032	198006	Bicy 261	FEDE
MO02033	198006	Bicy 279	FEDE
MO02034	198006	Bicy 280	FEDE
MO02035	198006	Bicy 281	FEDE
MO02036	198006	Fred Dayhoff	FEDE
MO02037	198006	Bicy 283	FEDE
MO02038	198306	Bicy 288	FEDE
MO02039	198306	Sweetwater Island	FEDE
MO02040	198306	Alligator Camp	FEDE
MO02041	198306	Bicy 313	FEDE
MO02042	198306	Bicy 314	FEDE
MO02043	198306	Bicy 325	FEDE
MO02044	198306	Bicy 326	FEDE
MO02045	198306	Bicy 338	FEDE
MO02046	198812	Bicy 339	FEDE
MO02047	198306	Bicy 340	FEDE
MO02048	198306	Bicy 385	FEDE
MO02049	198006	Bicy 194	FEDE
MO02050	MELD	Barbara	
MO02051	198507	Card Sound Road	
MO02051	199301	Card Sound Road	
MO02051	MELD	Card Sound Road	
MO02052	MELD	Litman	
MO02053	MELD	Carys Fort	

Table 2.21 - Archeological Sites (continued)

Site ID	Form No	Site Name	Own Type
MO02054	198507	Jeffreys	
MO02054	199301	Jeffreys	
MO02054	MELD	Jeffreys	
MO02055	198507	Goodie	
MO02055	199301	Goodie	
MO02055	MELD	Goodie	
MO02056	198507	Norman	
MO02056	199301	Norman	
MO02056	MELD	Norman	
MO02057	MELD	Rose Marie	
MO02058	MELD	Gun Range Cistern	
MO02060	MELD	Newport Plantation	
MO02061	MELD	Thorn	
MO02062	MELD	Ocean Reef	
MO02063	MELD	Harry Harris	
MO02064	200601	North Largo	STAT
MO02064	MELD	North Largo	
MO02065	MELD	Ocean Side	
MO02066	MELD	Newport	
MO02067	MELD	Swine	
MO02068	MELD	Black Lowe	
MO02069	198507	Camp Key Largo	
MO02069	200904	Camp Key Largo	STAT
MO02070	MELD	North Tavernier	
MO02071	MELD	Mcclellan	
MO02072	MELD	Sunland South	
MO02073	MELD	Gulfstream	
MO02074	MELD	Tavernier	
MO02075	MELD	Lake Surprise	
MO02088	198711	Long Key 1	
MO02089	198711	Old Rachel Key	
MO02089	199106	Old Rachel Key	
MO02089	MELD	Old Rachel Key	CONP
MO02090	198711	Key Vaca 4	
MO02091	198711	Crawl Key 1	
MO02092	198711	Boot Key	
MO02093	198711	Fat Deer 1	
MO02094	198711	Twin Cisterns Homestead	
MO02094	200810	Twin Cisterns Homestead	PRIV
MO02095	198711	Tower	
MO02095	200810	Tower	PRIV
MO02096	198711	East Matecumbe	
MO02096	200810	East Matecumbe	UNKN
MO02098	198711	Windley Key Shell Scatter	

Table 2.21 - Archeological Sites (continued)

Site ID	Form No	Site Name	Own Type
MO02098	200810	Windley Key Shell Scatter	PRIV
MO02099	MELD	La Africana	UNKN
MO02100	198408	Singleton Homestead	UNKN
MO02101	198712	Big Pine Key 3	UNKN
MO02101	198799	Big Pine Key 3	
MO02101	200210	Big Pine Key 3	STAT
MO02102	198712	Big Pine Key 4	UNKN
MO02103	198712	Big Pine Key 5	UNKN
MO02104	198712	Big Pine Key 6	UNKN
MO02105	198712	Big Pine 7	UNKN
MO02106	198712	Big Pine Key 8	UNKN
MO02107	198712	Big Torch Key 1	UNKN
MO02108	198712	Big Torch Key 2	UNKN
MO02109	MELD	Little Torch Key 1	
MO02110	198712	Little Torch Key 2	
MO02110	199006	Little Torch Key 2	CORP
MO02111	198712	Ramrod Key 1	PRIV
MO02111	198799	Ramrod Key 1	
MO02112	198712	Ramrod Key 2	
MO02112	199006	Ramrod Key 2	PRIV
MO02113	198712	Ramrod Key 3	
MO02113	199006	Ramrod Key 3	CORP
MO02114	198806	Cudjoe Key 2	PRUN
MO02115	198712	Sugarloaf Key 2	
MO02115	199006	Sugarloaf Key 2	FEDE
MO02117	198712	Bahia Honda 1	UNKN
MO03226	199509	8mo3226	FEDE
MO03431	199605	Fort Zachary Taylor Coverface	FEDE
MO03431	200312	Fort Zachary Taylor Coverface	FEDE
MO03431	200512	Fort Zachary Taylor Coverface	STAT
MO03446	200004	Key West Bight Dump	CITY
MO03448	196009	Grassy Key Canoe	UNKN
MO03449	197804	Key West Canoe	UNKN
MO03450	196907	Big Pine Key Canoe	UNKN
MO03497	200108	Drainage Ditch	UNKN
MO03615	200203	Faec Railroad Camp, Crescent, Fl	COUN
MO03615	200211	Faec Railroad Camp, Crescent, Fl	COUN
MO03616	200204	Weather Station	FEDE
MO03620	200203	Islamorada Shipwreck	UNSP
MO04504	200810	Islamorada Post Office	CORP

Source: State Historic Preservation Office

2.3.7.5 Ship Wrecks

The Florida Master Site Files also include recorded shipwrecks. In the County as a whole there are 369 ship wreck sites; these are listed on **Table 2.22**. Due to the sensitive nature of archeological sites and their vulnerability to vandalism, the locations are not illustrated on the Existing Land Use Map series and are only listed by general location.

Table 2.22 - Ship Wrecks

Site ID	Form No	Site Name	Own Type
MO00090	MELD	HERRERA WRECK	
MO00091	196509	San Francisco Wreck	
MO00091	196511	San Francisco Wreck	
MO00091	200408	San Francisco Wreck	UNKN
MO00092	199109	El Infante Wreck	FEDE
MO00101	200410	San Jose Wreck	UNSP
MO00102	200509	Chavez Wreck	
MO00104	MELD	San Pedro	
MO00130	MELD	Henrietta Marie Wreck	
MO00131	197210	San Rafael Wreck	
MO00132	200409	Walker Key Wreck Or El Sueco De Arizon	
MO00133	197709	San Felipe Shipwreck	STAT
MO00134	MELD	Wreck 12	
MO00135	196506	Shot Wreck	
MO00136	196506	Ivory Wreck	
MO00137	196506	San Fernando Wreck	
MO00138	196506	NN Wreck	
MO00139	196509	Bronze Wreck	
MO00141	197108	Quicksand Wreck	
MO00142	197108	West Turtle Shoal Wreck	
MO00143	200410	Shipwreck	
MO00144	196805	NN Wreck	
MO00145	196810	NN Wreck	
MO00146	200408	Capitana Wreck	
MO00148	197008	Granite Wreck	
MO00149	197010	NN Wreck	
MO00150	197010	NN Wreck	
MO00151	199109	Iron Ballast Wreck 1	FEDE
MO00152	197105	Swivel Gun Wreck	
MO00153	197105	Steel Wreck	
MO00154	197105	Schooner Wreck	
MO00155	197105	Iron Ballast Wreck 2	
MO00156	197106	Brick Wreck	
MO00157	197008	Ships Mast Wreck	
MO00158	197105	Sounding Lead Wreck	

Table 2.22 - Ship Wrecks (continued)

Site ID	Form No	Site Name	Own Type
MO00159	197106	Ship Wreckage	
MO00160	197106	NN Wreck	
MO00161	197106	Nine Cannon Wreck	
MO00162	197106	NN Wreck	
MO00163	197106	NN Wreck	
MO00164	197106	Construction Wreck	
MO00165	197106	Shipwreck Debris	
MO00166	197106	Sack Wreck	
MO00167	197106	NN Wreck	
MO00168	197106	NN Wreck	
MO00169	197105	Fischer-Robinson-Clausen Wreck	
MO00170	197106	Dead Eye Wreck	
MO00171	197106	NN Wreck	
MO00172	197106	Shrimp Boat Wreck	
MO00173	199109	USS Alligator	FEDE
MO00174	197205	NN Wreck	
MO00177	199109	Los Tres Puentes Wreck	STAT
MO00178	200408	Gallo Indiana Wreck ?	
MO00181	197106	NN Wreck	
MO00182	197106	NN Wreck	
MO00183	197206	NN Wreck	
MO00199	195106	H M S Loo Wreck	
MO00248	197405	Shipwreck 1	FEDE
MO00249	197405	Shipwreck 3	FEDE
MO00250	197405	Shipwreck 4	FEDE
MO00251	197405	Shipwreck 2	FEDE
MO00252	197405	Shipwreck 5	FEDE
MO00253	200810	Coin Wreck	PRIV
MO00256	197411	NN Wreck	
MO01132	198901	American Shoal Schooner Wreck	FEDE
MO01196	MELD	Bahia Honda Wreck	
MO01303	199109	Cannabis Trawler	FEDE
MO01304	199109	Eagle	FEDE
MO01305	199109	Alexander Barge	FEDE
MO01306	199109	D & B Barge Wreck	FEDE
MO01307	199109	Spiney Oyster Barge	FEDE
MO01308	199109	Brick Barge	STAT
MO01310	199109	Duane	FEDE
MO01311	199109	Bibb	FEDE
MO01312	199109	Rosalee	STAT
MO01313	199109	Unidentified Shipwreck A	FEDE
MO01314	199109	Unidentified Shipwreck B	FEDE
MO01315	199109	Unidentified Shipwreck C	FEDE
MO01316	199109	Unidentified Shipwreck D	FEDE

Table 2.22 - Ship Wrecks (continued)

Site ID	Form No	Site Name	Own Type
MO01316	199110	Unidentified Shipwreck D	FEDE
MO01316	200802	Unidentified Shipwreck D	UNSP
MO01317	199109	Unidentified Shipwreck E	FEDE
MO01318	199109	Unidentified Shipwreck F	STAT
MO01319	199109	Unidentified Shipwreck G	STAT
MO01320	199109	Hawk Channel Schooner Wreck	STAT
MO01321	199109	Disgusting Wreck	STAT
MO01322	199109	Rum Runner Wreck	STAT
MO01323	199109	Brick Wreck	STAT
MO01324	199109	Iron Masted Schooner	FEDE
MO01325	199109	Welberry Wreck	STAT
MO01326	199109	Hms Fly	FEDE
MO01327	199109	Indian Key Wreck	STAT
MO01328	199109	Bronze Pin Wreck	FEDE
MO01329	199109	Schooner Wreck	FEDE
MO01330	199109	Windlass Wreck	FEDE
MO01331	199109	Brass Wreck	FEDE
MO01332	199109	Ore Ballast Schooner Wreck	FEDE
MO01334	199109	Kearns Wreck	FEDE
MO01448	199201	Muir Wreck	STAT
MO01879	200410	Bronze Pin Wreck Off Grassy Key	UNSP
MO01880	200706	Rib Wreck	UNSP
MO01881	200410	Brick Wreck Off Key Colony Beach	UNSP
MO01887	200605	Bahia Honda Ballast Stone Pile	STAT
MO03620	200203	Islamorada Shipwreck	UNSP

Source: State Historic Preservation Office

2.3.7.6 Pigeon Key

Pigeon Key, once a work camp for the Overseas Railroad, is now used primarily as an educational retreat and is managed and maintained under the auspices of the Pigeon Key Foundation.

The Pigeon Key Foundation is a non-profit organization dedicated to preserving the history and environment of the Keys through education and research. Pigeon Key Marine Science Camp is a 501(c)(3) not-for-profit organization whose mission is to provide educational experiences in a history rich environment located on a five acre island.

2.3.7.7 Historic Preservation Groups

The following groups are increasingly important resources for the preservation of historic resources in the County. The organizations include professionally staffed non-profits, citizen membership groups, scholarly and professional associations, government agencies, and grass-roots advocates. These groups can contribute a variety of services and skills to the historic preservation effort including financial support, technical assistance, increasing public awareness, and scholarly research.

Because the County does not have staff or budget to support a full historic preservation program, the County must rely on the resources of these groups for funding and initiating and performing much of the actual historic preservation work.

2.3.7.8 National Organizations

2.3.7.8.1 National Trust for Historic Preservation

The National Trust for Historic Preservation is a private, non-profit national organization established by U.S. Congress in 1949. The mission of this organization is to encourage public participation in preservation activities, own and maintain historically significant properties, and provide technical assistance and funding for preservation projects. The Trust publishes a *Preservation News*, *Historic Preservation Magazine*, and *Preservation Law Reporter*. The County is under the jurisdiction of the Southern Regional Office located in Charleston, South Carolina.

2.3.7.8.2 U.S. Department of the Interior

The U.S. Department of the Interior is the primary federal agency with responsibility for historic preservation. This department expands and maintains the National Register of Historic Places and oversees the development of State Historic Preservation Programs.

2.3.7.8.3 Society of Professional Archaeologists

The Society of Professional Archaeologists is a national organization that establishes standards used by State and federal governments to determine qualifications and experience necessary for professional archaeologists. The Society also publishes a monthly newsletter providing the latest development in the field of archaeology.

2.3.7.9 State and Regional Groups

2.3.7.9.1 The Archaeological and Historical Conservancy, Inc.

The Archaeological and Historical Conservancy (AHC) is a private non-profit organization dedicated to the preservation of archaeological and historic sites. The AHC conducts archaeological and historic surveys on properties for private landowners, developers, and

government agencies. The AHC has been involved in the previously discussed, on-going survey of historic and archaeological sites in the Keys since 1985. This primary emphasis of this survey has been archaeological sites. It is a source of information on the location, degree of disturbance, and potential significance of archaeological sites in the County. The Florida Anthropological Society, founded in 1948, is a private, not-for-profit membership organization. The organization publishes a quarterly scholarly journal, *The Florida Anthropologist*, which contains articles written by professional and amateur members on Florida archaeology.

2.3.7.9.2 The Florida Archaeological Council

The Council is a professional organization for practicing archaeologists in Florida. Membership is limited to qualified archaeologists. The Council can provide lists of professional archaeologists as well as suggest archaeologists for particular areas and expertise.

2.3.7.9.3 The Florida Department of the State, Division of Historic Resources

The Division of Historic Resources has statewide responsibility for the National Register program in Florida, as well as awarding and administering grants for historic preservation purposes. The State Historic Preservation Office (SHPO), the Bureau of Archaeological Research, and the Bureau of Survey and Registration are contained within the division. This office maintains the Florida Master Site File (FMSF) inventory and serves as a clearinghouse for information on archaeological sites and historic structures. The FMSF is a repository for information submitted to the Division of Historic Resources on sites considered to be historically or archaeologically significant. The FMSF collects, organizes, and disseminates information. However, the FMSF does not determine the significance of a site or its eligibility for local, state or federal designations.

2.3.7.9.4 The Florida Folklore Society

The Florida Folklore Society is a private, non-profit organization dedicated to the study and appreciation of folklore and folklife of the State of Florida. The Society collects and distributes information on Florida folklore and folklife to members and the public.

2.3.7.9.5 The Florida Trust for Historic Preservation

The Florida Trust for Historic Preservation is a statewide, non-profit preservation organization which began in 1978. The mission of this organization is to educate the public about the State's historic resources, promote, advocate, to provide information regarding the preservation of historic resources, and to support local preservation activities. The Trust administers a revolving fund for the purchase of options on endangered historic properties until a buyer sensitive to preservation issues can be found. The Trust also administers a facade easement program which enables the Trust to protect the facades of historic buildings.

The Trust actively educates the Florida legislature about historic preservation issues and encourages all levels of government to support preservation of historic resources. Other activities of the Trust include an annual meeting, an annual awards program to recognize significant contributions to historic preservation, and the restoration and management of several historic properties in Florida.

2.3.7.9.6 Florida Historical Society

The Florida Historical Society is a statewide organization that focuses on the promotion of and publications about the history of Florida. In addition to publishing the *Florida Historical Quarterly*, a professional level journal, the Society holds annual meeting and workshops.

2.3.7.9.7 Historical Association of Southern Florida

The Historical Association of Southern Florida (HASF) was founded in 1940 by a group of citizens interested in preserving the history of Southern Florida and the Caribbean. The HASF's Historical Museum of Southern Florida represents the full range of history from prehistoric to contemporary societies. The museum library is the largest repository of materials devoted to the history of the region. Many publications are produced by the HASF: a scholarly journal (*Tequesta*), a popular history quarterly (*South Florida History Magazine*), a quarterly membership newsletter (*Currents*), and a series of guidebooks on the neighborhoods and waterways of the region.

2.3.7.9.8 South Florida Regional Planning Council

The SFRPC, in conjunction with the County, commissioned the Archaeological and Historical Conservancy's cultural resource survey of the Keys.

2.3.7.10 Local Groups

2.3.7.10.1 Friends of Islamorada State Parks

The Friends of Islamorada State Parks is a citizens' group interested in the protection of archaeological resources in nearby state parks (Robert Carr, AHC, personal communication).

2.3.7.10.2 Historic Florida Keys Preservation Board

The Historic Florida Keys Preservation Board (HFKPB) was created by state law in November 1972. It was formed to research, acquire, preserve, restore, maintain, reconstruct and operate historic sites, buildings and property throughout the County. The seven member Board is appointed by the Governor, and directs the small, professional staff. Past projects have included the restorations of the Bat Tower on Sugarloaf Key, Old City Hall, the Oldest House, the Armory and the San Carlos Institute, a historic survey of Tavernier, the

Signalization Technical Advisory Panel, the Cemetery Restoration Project, and a Historic Architectural Review Commission Guidelines Grant.

2.3.7.10.3 Historical Preservation Society of the Upper Keys

The Historic Preservation Society of the Upper Keys (HPSUK) is a non-profit citizens' organization dedicated to the identification and preservation of historic resources in the Upper Keys.

2.3.7.10.4 Historic Preservation Advisory Council

The HPSUK Council was established through the Florida Historical Resources Act to be responsible for enhancing public participation in the preservation and protection of the state's archaeological and historic resources. The members are appointed by the Secretary of State and are provided with staff assistance from the Division of Historic Resources. The Council's main objective is to establish priorities for identifying, acquiring and protecting historic resources; evaluating applications for state historic markers; evaluating applications for historic preservation grants-in-aid; formulating public goals for preservation and promoting public awareness and participation; and preparing historic preservation rules at the State level.

2.3.7.10.5 The Key West Maritime Heritage Society, Inc.

The Key West Maritime Heritage Society was founded in 1982 as a non-profit educational institution to accumulate and disseminate information on Spanish Maritime and Colonial activity in the New World. The Society is particularly interested in the preservation and conservation of maritime archaeological sites. The Society's activities involve conservation and exhibition of artifacts raised from two Spanish Galleons and an English slave ship.

2.3.7.10.6 Monroe County Tourist Development Council

The Tourist Development Council can be a funding source for historic preservation projects which aid or enhance tourism opportunities.

2.3.8 Availability of Facilities and Services to Serve Existing Land Uses

2.3.8.1 Roads

For County roadways, the maximum service volume threshold standard is established as LOS D. According to the *2008 Monroe County Public Facilities Capacity Assessment Report*, almost all county roadways currently operate at or better than LOS D. The one exception is Palm Avenue between White Street and U.S. 1 (N. Roosevelt Boulevard) which has a peak hour LOS of F based on 2009 traffic data.

As reported in the DRAFT 2010 *U.S. 1 Arterial Travel Time and Delay Study* by the County, four segments of U.S. 1 currently fail to operate at an acceptable LOS (i.e. below LOS C). They are:

- U.S. 1 on Big Coppitt Key from MM 9.0 to MM 10.5 (Segment 3);
- U.S. 1 on Grassy Key from MM 54.0 to 60.5 (Segment 14);
- U.S. 1 on Lower Matecumbe Key from MM 73.0 to 77.5 (Segment 17); and
- U.S. 1 on Tea Table Key from MM 77.5 to MM 79.5 (Segment 18).

Segments 3 and 18 may need capacity improvements to maintain the adopted LOS C standard. Segment 3 is at LOS D for the two most recent consecutive years, 2009 and 2010. Segment 18 is at LOS D for four consecutive years, 2007 through 2010.

A more detailed discussion of the County's road system is contained in *Chapter 4.0 Traffic Circulation Element.* The County's transportation facilities are illustrated in **Map Series 4-1, 4-3, 4-4, 4-5, 4-6 and 4-7** of the Map Atlas.

2.3.8.2 Potable Water

The Florida Keys Aqueduct Authority (FKAA) is the sole supplier of potable water to the County. The FKAA's source of water for withdrawal is the Biscayne and Floridan Aquifers. The South Florida Water Management District (SFWMD) regulates water withdrawal from the aquifers through the issuance of Consumptive Use Permits. The Consumptive Use Permit currently in effect (SFWMD Water Use Permit No. 13-00005-W) was issued on March 13, 2008, and is valid for a twenty year period ending March 13, 2028. This permit is actually a re-issuance of a permit granted by SFWMD on November 14, 2002. The current permit contains an annual withdrawal of 8.751 billion gallons per year, an average monthly allocation of 809 million gallons, or 17.79 MGD and an average dry season (December 1 – April 30) of 17 MGD.

A more detailed discussion of potable water facilities and service in the County is contained in *Chapter 8.0 Potable Water Element.* Potable water facilities and service areas are illustrated in **Map Series 8-1** of the Map Atlas.

2.3.8.3 Solid Waste

As of 2010, the County provides solid waste service to accommodate 70,808 residents. The current facilities and operations are sufficient to meet the projected LOS for through the 2010-2030 planning horizon.

A more detailed discussion of solid waste facilities and service in the County is contained in *Chapter 9.0 Solid Waste Element.* Solid Waste facilities and service areas are illustrated in **Map Series 9-1** of the Map Atlas.

2.3.8.4 Sanitary Sewer

Treatment of sewage and the disposal of wastewater within the County historically have been accomplished through septic tanks, on-site treatment and disposal systems (OSTDS), and small to intermediate sized privately-owned wastewater treatment package plants. With expansion and growth, regional systems consisting of treatment plants and centralized sewer have been built providing a greater level of collection and treatment. Several sewer districts, both private and municipal, have been formed to service more densely populated areas.

A more detailed discussion of existing wastewater disposal facilities is contained in Chapter *10.0 Sanitary Sewer Element.* Sanitary Sewer facilities and service areas are illustrated in **Map Series 10-1** of the Map Atlas.

2.3.8.5 Drainage

At the present time, only project specific surface water management systems exist in the County that are capable of servicing existing land use or mitigating associated impacts.

In the past, the only controls on stormwater imposed by the County were those involving flood protection and floodplain encroachment in Section 122 of the MCLDC. Subsequently, the MCLDC has been revised, based on recommendations provided in the County's Stormwater Management Master Plan (SMMP), to not only provide stormwater controls for flood protection and floodplain encroachment, but also to include water quality controls in Section 114-3 of the MCLDC. This new MCLDC also includes water quality controls for existing and proposed residential development and addresses retrofitting of existing facilities and redevelopment activities. This meets the intent of Section 114-3(a) of the MCLDC, to protect the vital water resources of the County.

In conjunction with Section 114-3 of the MCLDC, the County has prepared a Manual of Stormwater Management Practices which provides information on acceptable forms of BMPs. This document was prepared with the assistance of the South Florida Regional Planning Council (SFRPC) and the SFWMD and includes BMPs consisting of rate control structures, catch basins with skimmers and baffles, and wet and dry detention/retention facilities.

A more detailed discussion of existing stormwater management facilities is contained in *Chapter 11.0 Drainage Element.* Natural drainage features are illustrated in **Map Series 11-1** of the Map Atlas.

2.3.8.6 Natural Groundwater Aquifer Recharge

The potable water supply resources used by the County, including both the aquifer system and treatment facilities, are geographically located in Miami-Dade County - entirely outside of the County's jurisdiction (see *Chapter 8.0, Potable Water Element*). In the County, groundwater resource protection and management takes place in the context of the

regulation of public and private interests in relation to wetlands, wildlife, aquifer discharges to surface waters, and other components of the natural system.

A more detailed discussion of natural aquifer groundwater recharge is contained in Chapter *12.0 Natural Groundwater Aquifer Recharge Element.*

2.3.8.7 Parks and Recreation

The County boasts of over 4.17 million acres of Conservation lands and waters under the ownership and maintenance of the Federal Government, the State of Florida, private Conservation organizations and the Monroe County Land Authority. Arguably, the Conservation lands in and around the County serve a population more regional and statewide than the County itself, however, for comparison, the Level of Service (LOS) based on the County's 2010 functional population equates to over 26,434 acres per 1,000 population. The distribution of these lands, due to the unique linear geography of the Keys allows for the population to be within a short drive or walk of numerous and varied conservation lands.

A more complete discussion of recreational facilities in the County is contained in Chapter *13.0 Recreation and Open Space Element.*

2.3.8.8 Educational Facilities [Rule 9J-5.006(1)(c) & (2)(a), F.A.C.]

This section describes existing education facilities in the County, the service areas of these facilities, and plans for future expansion.

The Monroe County District School Board oversees the operation of 13 public schools including three high schools, one middle school, two middle/elementary schools, six elementary schools, and one school for exceptional students. The names, locations, and service areas of these schools are presented in **Table 2.23**.

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Table 2.23 – Educational Facilities

Facility Name/Type	Location	Service Area
Subdistrict 1 (Upper Keys)		
Key Largo (Elementary/Middle)	Key Largo	Dade County Line to MM 93
Plantation Key (Elementary/Middle)	Plantation Key	MM 93 to Long Key
Treasure Village Montessori* (Elementary/Middle)	Islamorada	Dade County Line to Marathon
Coral Shores (High)	Plantation Key	Dade County Line to Long Key
Subdistrict 2 (Middle Keys)		
Switlick (Elementary)	Marathon Key	Conch Key to 7 Mile Bridge
Marathon (Middle/High)	Marathon Key	Conch Key to Big Pine Key
Subdistrict 3 (Lower Keys)		
Sands (Exceptional)	Key West	Sugarloaf Key to Key West
Adams (Elementary)	Stock Island	Rockland Key to Stock Island
Archer/Reynolds (Elementary)	Key West	Key West
Big Pine Academy* (Elementary)	Big Pine	Grassy Key to Big Coppitt Key
Poinciana (Elementary)	Key West	Key West
Sigsbee (Elementary)	Key West	Key West
Sugarloaf (Elementary/Middle)	Sugarloaf Key	Ohio Key to Boca Chica
O'Bryant (Middle)	Key West	Key Haven to Key West
Key West (High)	Key West	Lower Torch Key to Key West
Monroe County		
Montessori Charter (Elementary) *	Key West	Entire County
Keys Center (Middle/High)	Key West, Marathon, Islamorada	Entire County
Monroe County DJJ	Key West	Entire County
Post-Secondary Facilities		
FKCC (main campus)	Stock Island	Primarily Lower Keys
FKCC (branch campus)	Marathon	Primarily Middle Keys
FKCC (branch campus)	Plantation Key	Primarily Upper Keys

* Charter Schools
Source: Monroe County School District

The schools are distributed among three subdistricts. Subdistrict 1 serves the Upper Keys from Key Largo to Matecumbe Key. Subdistrict 2 serves the Middle Keys from Long Key to the Seven Mile Bridge and Subdistrict 3 serves the Lower Keys from Bahia Honda to Key West. There is one charter school that does not provide bussing and serves the entire county. The Keys Center is an alternative program provided within the high schools in the county and the juvenile detention facility provides education to the detained youth. There are no public schools located in mainland Monroe County.

The School Board plans to renovate the Plantation Key and Horace Bryant Schools by 2011. A new gym is planned for the Plantation Key School and the Trumbo Administrative Complex is planned to be relocated or renovated by 2011. **Table 2.24** illustrates that the Florida Inventory of School Houses (FISH) Capacity for the County is 11,208 and utilization averaged to 69 percent for 2008-2009 according to the Monroe County 2008 Facilities Plan. No new schools are planned for the County.

Table 2.24 - Public School Capacity

School	FISH Capacity	Utilization
Coral Shore Senior High	961	81%
Key West Senior High	1,433	93%
Horace O'Bryant Middle	1,091	74%
Marathon Senior High	1,371	41%
May Sands School	30	70%
Glynn Archer Elementary	580	42%
Poinciana Elementary	641	92%
Sigbee Elementary	522	43%
Sugarloaf School	1,199	64%
Sanley Switik Elementary	907	62%
Key Largo School	1,245	71%
Gerald Adams Elementary	649	70%
Plantation Key School	651	84%
Total	**11,208**	**68.9%**

Source: 2008 Monroe County Public Facilities Capacity Assessment Report

2.4 Existing Population

[Rule 9J-5.006(1)(g) & (2)(c), F.A.C.]

2.4.1 Historic Population

The analyses presented in this section distinguish the unincorporated Keys from the incorporated areas within the County where possible, based on available source data. In accordance with the statutory guidelines for local comprehensive planning in Florida, the best available data has been identified and used in all analyses.

The County's uneven historic growth rate is reflective of the national and State trends and the effect of the local military installation activity in the County. Resident population trends over the last 40 years are presented in **Table 2.25**.

Table 2.25 – Historic Population

Year	Population	Population Change	Average Annual Change
Unincorporated Keys			
1970	24,552		
1980	37,741	13,189	1,319
1990	52,032	14,291	1,429
2000	36,036	(15,996)	(1,599)
2010[11]	36,268	232	23
Municipalities			
1970*	28,034		
1980*	25,447	(2,587)	(259)
1990*	25,992	545	(55)
2000^	43,553	17,561	1,756
2010[12]^	40,043	(3,510)	(351)
Monroe County			
1970	52,586		
1980	63,188	10,602	1,060
1990	78,024	14,836	1,484
2000	79,589	1,565	156
2010[13]	76,311	(3,278)	(328)

[11] Unincorporated County population number derives from *Unincorporated Monroe County Population Projections* report published May 15, 2011.
[12] Municipalities' population number derives from US Census 2010.
[13] Monroe County population number derives from a sum of US Census 2010 municipality number and unincorporated county numbers from the *Unincorporated Monroe County Population Projections* report published May 15, 2011.
*Key Colony Beach, Key West, Layton

^ Islamorada, Key Colony Beach, Key West, Layton, Marathon
Source: U.S. Census 2010. Fishkind & Associates, Inc., (2011), *Unincorporated Monroe County Population Projections.*

Table 2.25 illustrates the historic resident population trends in the incorporated and unincorporated areas of the County. Since 1970, the County added 27,003 residents to the population. The resident population for 1970 was 52,586. For the 10 year period between 1970 and 1980, the County's population experienced a rapid period of growth, adding approximately 1,060 residents per year and boosting the County population to 63,188 by 1980. From 1980 to 1990 the County population grew at approximately 1,484 residents per year to a total of 78,024 residents as of the 1990 Census. From 1990 to 2000, the countywide population grew by 1,565 to 79,589, with 36,036 located in the unincorporated area. In 1997, the Village of Islamorada was incorporated and in 1999 the City of Marathon was incorporated; this resulted in a decline in the population with the unincorporated areas of the County as shown in **Table 2.25**. In 2010, 36,268 residents lived in the unincorporated County.

2.4.2 Household Size

The estimated average household size for 2010 is a combination of seasonal and permanent household size calculations as described in the *Unincorporated Monroe County Population Projections*. For 2009, the University of Florida Bureau of Economic and Business Research (BEBR) estimated that there are 2.2 persons per household in Monroe County. This estimate is used to project the number of permanent households for 2010 and the planning horizon. Generally, seasonal households have a higher person per household due to the increasing size of newly built units. Therefore, the figure of 2.7 persons per household is used to calculate the number of households for seasonal population and is supported by the Florida Keys Aqueduct Authority (FKAA) methodology, as approved by DCA. Household size methodologies are different given the nature of seasonal and permanent populations. For a more detailed explanation of household size and numbers see **Section 7.3.1** *"Projected Number of Households".*

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2.4.3 Demographic Profile

2.4.3.1 Sex

As illustrated in **Table 2.26**, the male population outnumbers the female population in the County. The 2009 Census estimates are the best available data for these estimates. Totals are based on **Table 2.25.**

Table 2.26 - Distribution of Population by Sex [Monroe County Unincorporated and Incorporated Areas (2009)]

	Unincorporated Area		Incorporated Area		Total	
	Number	Percent	Number	Percent	Number	Percent
Male	37,811	53.4%	21,383	53.4%	59,194	53.4%
Female	32,997	46.6%	18,660	46.6%	51,657	46.6%
Total	**70,808**	**100.0%**	40,043	**100.0%**	**110,851**	**100.0%**

U.S. Census 2010. Fishkind & Associates, Inc., (2011), *Unincorporated Monroe County Population Projections.*

2.4.3.2 Race and Ethnicity

The composition of the County's population by race is shown in **Table 2.27**. For this data, Census 2010 apportionments of race are used in conjunction with population 2010 from Table **2.25**. Over 70 percent of the population is white. Hispanic, regardless of race, account for 20.5 percent.

Table 2.27 - Distribution of Population by Race [Monroe County Unincorporated and Incorporated Areas (2010)]

	Unincorporated Area		Incorporated Area		Total	
	Number	Percent	Number	Percent	Number	Percent
White (non-Hispanic)	50,486	71.3%	28,551	71.3%	79,037	71.3%
Black (non-Hispanic)	3,753	5.3%	2,122	5.3%	5,875	5.3%
Hispanic	14,516	20.5%	8,209	20.5%	22,724	20.5%
Other	2,053	2.9%	1,161	2.9%	3,215	2.9%
Total	**70,808**	**100.0%**	**40,043**	**100.0%**	**110,851**	**100.0%**

Source: U.S. Census 2010. Fishkind & Associates, Inc., (2011), *Unincorporated Monroe County Population Projections.*

2.4.3.3 Age

The working age population (25 to 64 years of age) accounts for approximately 59 percent of total population in the County as illustrated in **Table 2.28**. Statewide, this age group represents about 50 percent of the total. The percentages of younger and older persons in the County are below statewide averages.

The unincorporated Keys have a significantly higher percentage of retirement aged population (17.6 percent age 65 and over) than that indicated for the incorporated areas. It is noted that the incorporated area statistics are dominated by Key West and that Key Colony Beach and Layton both contain substantially higher percentages of retirement age population than the County as a whole.

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Table 2.28 - Age Distribution by Monroe County Unincorporated and Incorporated Areas (1990, 2000)

	1990						2000					
	Unincorporated Area		Incorporated Area		Total / Percent		Unincorporated Area		Incorporated Area		Total / Percent	
	Total	%	Total	%	Total	%	Total	%	Total	%	Total	%
<5	2,656	5.1	1,816	7.0	4,472	5.7	1,562	4.3	1,900	4.4	3,462	4.3
5- 17	5,870	11.3	3,213	12.4	9,083	11.6	5,058	14.0	5,085	11.7	10,143	12.7
18-20	1,412	2.7	819	3.2	2,231	2.9	822	2.3	1,181	2.7	2,003	2.5
21-24	2,149	4.1	1,688	3.5	3,837	4.9	1,056	2.9	1,940	4.5	2,996	3.8
25-44	16,854	32.4	10,.508	40.4	27, 362	35.1	10,316	28.6	14,437	33.1	24,753	31.1
45-54	6,887	13.3	2,515	9.7	9,402	12.1	6,847	19.0	7,800	17.9	14,647	18.4
55-59	3,267	6.3	1,010	3.9	4,277	5.5	2,722	7.6	2,874	6.6	5,596	7.0
60-64	3,760	7.2	1,144	4.4	4,904	6.3	2,123	5.9	2,218	5.1	4,341	5.5
65-74	6,258	12.0	1,960	7.5	8,218	10.5	3,327	9.2	3,452	7.9	6,779	8.5
75-84	2,492	4.8	1,052	4.0	3,544	4.5	1,798	5.0	2,095	4.8	3,893	4.9
85 >	427	0.8	267	1.0	694	0.9	405	1.1	571	1.3	976	1.2
Total	**52,032**	**100.0**	**25,992**	**100.0**	**78,024**	**100.0**	**36,036**	**100.0**	**43,553**	**100.0**	**79,589**	**100.0**

Source: U.S. Census 1990 and 2000

Note: To be updated on upon 2010 U.S. Census release May 1st 2011.

2.5 Environmental Characteristics
[Rule 9J-5.006(2)(b), F.A.C.]

2.5.1 Soils

Soils in the Keys are "very limited" for developed uses, including shallow excavations, dwellings without basements, local roads and streets, and septic tank absorption fields. They are sparsely distributed and are generally confined to hammocks at the higher elevations and mangrove stands in the lower lying areas of the islands. Soil thickness is generally less than 10 inches. The Natural Resource Conservation Service (NRCS) of the U.S. Department of Agriculture (USDA) has mapped 16 soil units in the Florida Keys (exclusive of the mainland) (USDA 2010). The USDA defines very limited as follows:

> "the soil has one or more features that are unfavorable for the specified use. The limitations generally cannot be overcome without major soil reclamation, special design, or expensive installation procedures. Poor performance and high maintenance can be expected" (USDA, 2010).

In the Keys, the soils are most commonly limited due to shallow depth to bedrock, flooding, and wetness. Localized limiting characteristics include flood potential, inadequate depth to bedrock or saturated zone, tendency to cave, low strength, poor filtration capability, subsidence potential, and presence of large stones. Soils characterized as "urban land" are potentially better development sites when compared to natural soils in the Keys. These soils have "variable" limitations for developed uses, reflecting their history of disturbance. Most of these areas are already fully developed.

Soils are depicted per the NRCS on **Map Series 3-1** of the Map Atlas.

2.5.2 Topography

The Florida Keys belong to the Southern Zone of the Coastal Lowlands physiographic province. This area lies south and southeast of Lake Okeechobee, is primarily underlain by Pleistocene limestone, and is characterized by low relief, poor drainage, and extensive areas of coastal mangrove swamps. Elevations on the Keys are low, generally less than 5 feet above sea level. Most of the land area is only 2 to 3 feet above high tide. The highest point lies on Windley Key, where the maximum elevation is 18 feet above sea level.

The islands generally slope gradually up from the sea to flattened, gently rounded tops (Lane, 1986). Irregularities of the rock surfaces are a result of the heterogeneous topography of the coral reefs that created the islands, and also as a result of erosion and solution of the limestone rocks (Lane, 1986). Solution features, such as pitted and pinnacled surfaces, occur throughout the Keys. There are also many sinkholes, filled

with peat or carbonate sediments, up to several feet in diameter and several feet deep (Lane, 1986).

2.5.3 Vegetation

There are two native upland biological communities in the Florida Keys. These are:

- tropical hardwood hammocks, the climax terrestrial community, and
- pinelands, a fire-climax system.

Tropical hardwood hammock communities occur as isolated stands of hardwoods or "tree islands". These distinct tree islands consist of broadleaved evergreen hardwood species mainly of a West Indian distribution and are typically surrounded by pineland or wetland vegetative communities which occur in wetter soils (Tomlinson, 1980; Snyder et al., 1990; Taylor, 1998; USFWS, 1999). They are closely associated with tropical pinelands on the larger keys, most notably on Big Pine Key. The island-like character is most evident on mainland Monroe County, where raised areas among the pinelands and freshwater wetlands harbor hammock forests. In the Keys, the natural topographic configuration of the islands, especially in the Upper Keys, has favored development of large stands of hardwoods.

Pinelands are fire-climax systems dominated by pine trees. Although pinelands formerly existed in the Upper Keys (Alexander, 1953), their occurrence in the County is presently limited to the Lower Keys, primarily on Little Pine Key, Big Pine Key, No Name Key, Cudjoe Key, Sugarloaf Key and on neighboring keys. Because slash pines (*Pinus elliottii* var. densa) do not tolerate high salinities, Ross et al. (1994) found that sea level rise over the last 70 years has caused a reduction in the areal extent of pinelands. More than 50 percent of the ground surface in pinelands is exposed rock. All pinelands are found in the Lower Keys and comprise an area of 1,668.1 acres. Most of the pine lands (72.2 percent) are owned by the federal government in the National Key Deer Refuge. Of the total pinelands, 9.2 percent are privately owned.

Upland vegetation such as tropical hardwood and pinelands are depicted in **Map Series 3-3.**

2.5.4 Units of the Coastal Barrier Resources System

The Coastal Barrier Resources Act (CBRA) of 1982 established the Coastal Barrier Resources System (CBRS). The CBRA legislation is specifically designed to restrict federally subsidized Federal expenditures and financial assistance which have the effect of encouraging development of undeveloped coastal barriers to minimize the loss of human life, reduce the wasteful expenditure of Federal revenue, and reduce damage to habitat and other valuable natural resources of coastal barriers. Today, the CBRS is comprised of undeveloped coastal barriers along the Atlantic and Gulf of Mexico coasts, including the coasts of the Keys, Puerto Rico and the Virgin Islands.

The CBRS includes 25 units listed in the County. The Federal policy against subsidizing development of designated coastal barriers has impacted the amount and rate of development of those units.

Since the intent and effect of the CBRS has been to discourage development (prohibiting flood insurance and other federal program funds) in the County's designated coastal barriers, the County should consider whether to maintain the existing comprehensive plan policies related to the CBRS, or to focus on the development impacts on endangered species and habitat should unsubsidized development still occur.

2.5.5 Habitats of Threatened and Endangered Species

The Florida Keys encompass a variety of ecologically unique biological communities providing habitat to diverse wildlife populations, including many species endemic to the Keys; several are globally rare and endangered. For an illustration of species see **Map Series 3-5.** The biological communities of the Keys include:

Living Marine Resources

- Mangrove forests along the shorelines of the Keys;
- Scrub Mangrove;
- Seagrass beds on both sides of the Keys and extending offshore to the Florida Reef Tract; and
- Coral and hard bottom communities of nearshore and offshore waters, including the Florida Reef Tract

Wetlands

- Transitional wetlands landward of the mangrove fringe and seaward of upland communities;
- Beaches (as part of the Beach/Berm Community);
- Salt ponds occupying shallow enclosed basins having restricted tidal influence;
- Small freshwater wetlands in freshwater lenses in the Lower Keys

Uplands

- Tropical hardwood hammocks, the climax terrestrial community; and
- Pinelands, a fire-climax system

2.5.6 Natural Groundwater Aquifer Recharge

In Miami-Dade County, the Biscayne Aquifer (the upper part of the Surficial Aquifer System) is a major source of potable water and essentially all potable water in the Keys is piped via aqueduct to the Florida Keys from wellfields in the Biscayne Aquifer in Miami-Dade County.

In the County, the surficial aquifer is brackish to saline and contains an inadequate quantity of water for use as a potable water supply. Some County residents provide their own water supply using home reverse osmosis plants to desalinate Biscayne Aquifer water, or by collecting rain water in cisterns. On some of the larger islands of the Lower Keys, small lenses of freshwater to slightly brackish water float on the top of the Biscayne Aquifer near the ground surface. Chloride levels in these lenses are generally too high for human consumption, but the lens water is suitable for some irrigation purposes and provides an important source of freshwater for wildlife and vegetation.

As a result of the potable water source for the County being located entirely within Miami-Dade County, aquifer protection related to the FKAA's Florida City Wellfield is accomplished through the provisions of the Miami-Dade County Wellfield Ordinance.

2.5.7 Military Installation Compatibility

Background

Naval Air Station Key West (NAS Key West) consists of approximately 5,800 acres with facilities located in 13 different areas of the Lower Keys. Boca Chica Field, NAS Key West's primary site and airfield, is located on Boca Chica Key. Boca Chica Field is approximately three miles east of the City of Key West and consists of approximately 4,700 acres encompassing nearly the entire key.

In the 1970s and 1980s, the Navy implemented an Air Installations Compatible Use Zones (AICUZ) program at NAS Key West (Boca Chica Field) to encourage, through local cooperation, compatible development in and around the Navy airfield in the County. The purpose of the AICUZ program is to:

- Protect public health, safety, and welfare;
- Ensure the continued viability of the Air Station; and
- Promote development of compatible land use in high noise and accident potential zones.

The AICUZ program's objective is to balance the requirement for adequate aircraft training capabilities at airfields with community concerns over aircraft noise and accident potential generated by training. The Navy's AICUZ program is focused on

promoting land use compatibility between air installations and surrounding communities. The program recognizes the local government's responsibility to protect the public health, safety, and welfare through land use control tools like zoning ordinances, building codes, subdivision regulations, building permits, and fair disclosure statements.

The AICUZ footprint is the area where land use controls are needed to protect the health, safety, and welfare of those living near a military airfield. Through the AICUZ, the Navy has sought easements restricting use in critical areas and has purchased hundreds of individual lots located within the AICUZ.

In 1986 the County codified in their Land Development Code (LDC) the 1977 NAS Key West 1977 AICUZ Map, taken from the 1977 AICUZ study (see Figure 6-5(A) in *Chapter 6.0 Ports, Aviation and Related Facilities Element*), and is currently utilizing this data when considering development applications.

In 2004, the Florida Legislature enacted SB 1604 that amended Florida's Growth Management Act to require more active communication between local governments and military bases to avoid potential conflicts between future developments and military base installations. The act requires that each county in which a military base is located and each affected municipality notify a military base's commanding officer of a proposed change to the government's comprehensive plan and land development regulations that would affect the land use adjacent to the military base. Additionally, the amendment requires that the County add a representative of the military installation as an ex officio, nonvoting member of the County's Planning Commission.

In 2010, HB 7129 was enacted by the Florida Legislature, which further amended Section 163.3175 F. S., to add the following provisions:

1. A requirement that the County transmit to the Commanding Officer of NAS Key West any: a) change to its Comprehensive Plan (Plan); b) proposed Plan amendments; or c) change to the MCLDC which would affect intensity, density or use of land adjacent to or in close proximity to NAS Key West.

2. Upon request of the Commanding Officer of NAS Key West, require the County to transmit and allow comments on any Development Order requesting a variance or waiver from height or lighting restrictions or noise attenuation reduction requirements within a zone of influence.

3. Any comments received from the Commanding officer of NAS Key West shall be transmitted to the State Land Planning Agency (DCA).

4. The County shall include a representative of NAS Key West acting on behalf of the installation as an ex officio nonvoting member of the County's land planning agency (Planning Commission).

5. By June 30, 2012 the County shall adopt criteria and address compatibility of lands adjacent to or closely proximate to NAS Key West within the Future Land Use Element of its Plan or go to mediation with County, NAS, DCA, RPC, private land owner reps.

County Position

In April of 2003 the Navy published the *Environmental Assessment for Fleet Support and Infrastructure Improvements – Naval Air Station Key West* (EA). In 2004, the Navy prepared an updated CY 2007 AICUZ map for NAS Key West. The 2007 AICUZ map encompassed a substantially larger area compared to the 1977 AICUZ map.

The environmental impacts of all of the planned and current aircraft were not evaluated by the Navy's EA in accordance with the National Environmental Policy Act (NEPA). For example, the EA purported to evaluate the impacts of the Super Hornet aircraft, however, evidence of this is not found in the report. Specifically, the Super Hornet aircraft was mentioned in only three pages of the 232-page EA and those three pages did not discuss the noise or other environmental impacts. Further, the Draft EA was distributed to the public and reporting agencies for input and this input was the basis for the final comments published in the April 2003 EA. None of the public or agency comments mention the Super Hornet aircraft, thereby creating the assumption neither the public nor the 11 reporting agencies have evaluated the impacts of the Super Hornet aircraft at NAS Key West.

The impacts of introducing this type of aircraft at NAS Key West are clearly significant. It is important to point out that the Navy also published in 2003 the *Final Environmental Impact Statement for the Introduction of the F/A-18E/F Super Hornet Airport to the East Coast of the United States*. The impacts of the Super Hornet aircraft on the east coast of the United States are recognized in this publication. However, the environmental impacts resulting from F/A-18E/F Super Hornet operations at NAS Key West were not discussed.

Because of the deficiencies and discrepancies noted above, the 2007 AICUZ map has not been codified into the MCLDC and is not utilized by the County when considering development applications.

The Navy is currently undertaking an Environmental Impact Statement (EIS) to evaluate alternatives for future airfield operations at NAS Key West. The Draft EIS is scheduled to be released by the Navy during the summer of 2012. If properly undertaken, the EIS will consider current airfield operations and changes in the type and number of aircraft operations at NAS Key West. In addition, to evaluate impacts fully the Navy must ensure that all analysis is undertaken utilizing the most currently accepted peer reviewed methods. This includes, but is not limited to the evaluation of military aircraft noise.

In their May 12, 2010 Notice of Intent to Prepare an EIS (*Federal Register* Vol. 75, No 91) the Navy listed, among others, "consistency with existing land use control plans, polices and actions" as factors to be evaluated in the EIS. In this regard, the Final EIS will potentially inform and lead to the creation of a revised AICUZ map. The Final EIS and Record of Decision are scheduled for spring and fall 2012 respectively. Therefore, it is the position of the County that adoption of an AICUZ map in the Comprehensive Plan should be deferred until a full evaluation of the environmental impacts is completed in the EIS, including an evaluation of the impacts from NAS Key West Super Hornet operations. Adoption of the 2007 AICUZ map without the benefit of a full evaluation of impacts through the Navy's EIS process would be premature.

The County will continue to work closely with the Navy throughout the process. This includes the establishment by the Board of County Commission of a NAS Key West EIS Oversight Committee. Upon completion of the EIS, the County will review any updated AICUZ map and adopt appropriate changes to its Comprehensive Plan.

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2.6 Population Projections *[Rule 9J-5.005(2)(e), F.A.C.]*

2.6.1 Background - Forecast Approach

The population forecast was prepared[13] for unincorporated Monroe County through year 2030 for the update of the County's Comprehensive Plan. Population is identified according to upper/middle/lower (UML) keys. It is based on the countywide functional population control total forecast through 2030; functional population is the sum of permanent plus seasonal population.

The Keith and Schnars team (K&S) begins with a permanent population forecast and a seasonal population forecast at the county level. The seasonal population series is based on the Florida Keys Aqueduct Authority (FKAA) data series. This series includes estimates of seasonal residences, RV's, hotel/motel, camps, boat liveaboards, mobile home, and other. The Department of Community Affairs (DCA) has recommended using the FKAA series for the purposes of estimating the seasonal population component, with appropriate updates to the methodology.

The permanent population series is the latest published by the University of Florida, Bureau of Economic and Business Research (BEBR). In as much as ROGO has been in place since 1993, BEBR population projections reflect a ROGO constrained growth trend. This means permanent population growth projections implicitly assume the continuation of the ROGO constraint and the effects of the ROGO constraint are implicitly embedded in the history.

2.6.2 Analysis of Permanent Population Data

University of Florida annual population estimates for municipalities and unincorporated areas indicates permanent population fell in the Keys from 2006-2008, with some a return to growth evidenced in 2009. The effect of the short term decline is to drive the long term population projections down. Thus, both recent history and future projections from BEBR suggest a downward trend in permanent population. This is reflected in the resulting Functional Population series shown in **Figure 1**. This series represents the sum of the most recent BEBR permanent projection and the FKAA seasonal projection.

[13] The population forecast was prepared by Fishkind and Associates with support from Keith and Schnars, P.A.

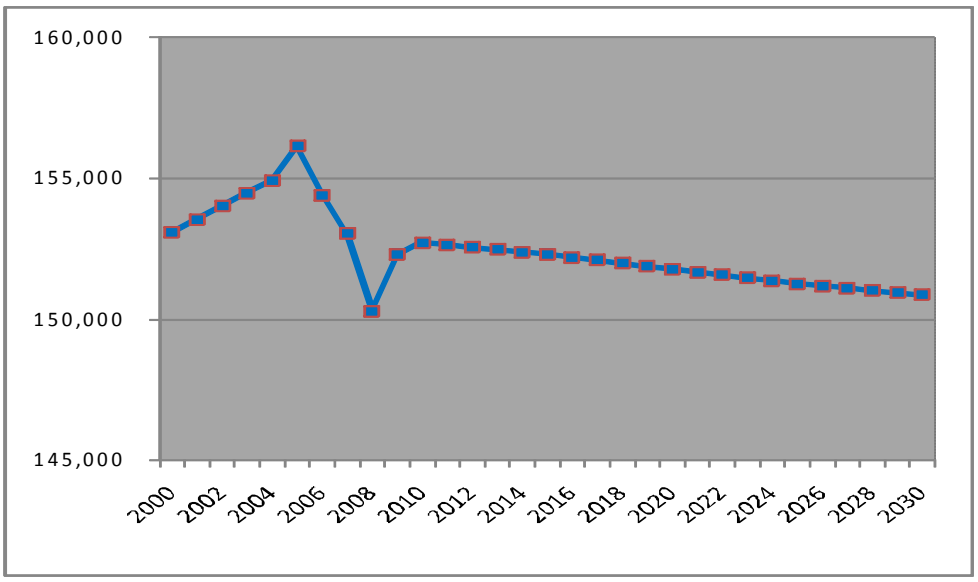


Figure 1 – Preliminary Functional Population Projection

2.6.3 Analysis of Seasonal Population Data

There is ongoing ROGO based residential growth and there is a substantial inventory of non-conforming, substandard, live-aboard and RV camp housing. Substandard, non-conforming units are being gradually removed from inventory, however, not at a rate fast enough to net out all residential growth. It is our view a portion of the permanent population losses have occurred as a result of the recession, a rise in foreclosures, depletion of affordable housing and increased unemployment. Nearly 3,500 units have been foreclosed throughout the Keys since 2005. The rise in home prices and threat of hurricanes has also contributed in our view to some permanent population loss. Losses associated with some of these conditions may be temporary, resulting in renewed growth after the recession. The BEBR annual permanent population estimate for 2009 indicated, net positive permanent population growth in 2009 and small losses in 2010.

On the other hand, of all the new single family housing growth in the County since 1999, nearly 70 percent has been in non-homesteaded units. It is likely this is a function of both growth in seasonal population as well as permanent population loss, which may cause once permanently occupied existing units to become non-homesteaded. This latter aspect represents a shift from existing permanent population to seasonal population and is why the non-homesteaded mix is so high.

2.6.4 Seasonality

Seasonal population is one component of Functional population. K&S has researched three functional population series. The three functional series in this analysis include permanent populations based on Census, BEBR and FKAA. In each of these scenarios the same Seasonal Series, from FKAA, is used. The FKAA seasonal series is the Seasonal Series

developed by Monroe County Planning Department (MCPD). The detailed methodology for the Seasonal Series is found in the MCPD report included as **Appendix 2-3**. The FKAA Seasonal Series methodology generated from the MCPD is also found in **Appendix 2-3.** As permanent population has fallen we must examine whether or not, and the degree to which, it is replaced by seasonal population. The American Communities Survey from 2005, 2008 and the Census 2000 data indicate a substantial increase in housing units held for seasonal use. These data indicate the number of seasonal units has risen from 12,628 in 2000 to 15,738 in 2005 to 19,195 in 2008 (**Table 2.30**). This is an increase of 6,567 seasonal units. This would represent a shift into seasonal population by as much as 16,418 persons. During the same period permanently occupied units have fallen from 35,086 to 29,084, some 6,002 units or a decline of 15,005 persons (**Table 2.29**). Based on the ACS and Census data, the loss in permanent population is approximately equivalent to the gain in seasonal population since year 2000.

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Table 2.29 – Vacant and Occupied Unit Counts, 2000 - 2008

Table H1. Housing Units by Vacancy Status and Tenure by Units in Structure, 2000 - Monroe County

Monroe County Units in Structure	Occupied Units			Vacant Units	Total Units	Vacant %
	Owner	Renter	Total			
1, detached	13,866	3,496	17,362	6,850	24,212	28.29%
1, attached	1,045	1,503	2,548	1,655	4,203	39.38%
2	480	1,598	2,078	453	2,531	17.90%
3 or 4	306	1,875	2,181	589	2,770	21.26%
5 to 9	215	1,042	1,257	897	2,154	41.64%
10 to 19	403	425	828	899	1,727	52.06%
20 to 49	375	180	555	1,039	1,594	65.18%
50 or more	346	1,043	1,389	444	1,833	24.22%
Mobile home	4,468	1,945	6,413	3,401	9,814	34.65%
Boat, RV, van, etc.	396	79	475	304	779	39.02%
Total	21,900	13,186	35,086	16,531	51,617	32.03%

Table H1. Housing Units by Vacancy Status and Tenure by Units in Structure, 2005 - Monroe County

Monroe County Units in Structure	Occupied Units			Vacant Units	Total Units	Vacant %
	Owner	Renter	Total			
1, detached	16,618	2,024	18,642	7,448	26,090	28.55%
1, attached	1,427	2,106	3,533	2,978	6,511	45.74%
2	621	973	1,594	636	2,230	28.52%
3 or 4	52	1,521	1,573	638	2,211	28.86%
5 to 9	458	482	940	1,440	2,380	60.50%
10 to 19	597	46	643	505	1,148	43.99%
20 to 49	132	1,125	1,257	1,198	2,455	48.80%
50 or more	435	532	967	203	1,170	17.35%
Mobile home	2,876	1,485	4,361	3,904	8,265	47.24%
Boat, RV, van, etc.	405	46	451	0	451	0.00%
Total	23,621	10,340	33,961	18,950	52,911	35.81%

Table H1. Housing Units by Vacancy Status and Tenure by Units in Structure, 2008 - Monroe County

Monroe County Units in Structure	Occupied Units			Vacant Units	Total Units	Vacant %
	Owner	Renter	Total			
1, detached	15,019	3,344	18,363	10,351	28,714	36.05%
1, attached	490	1,233	1,723	3,209	4,932	65.06%
2	371	803	1,174	764	1,938	39.42%
3 or 4	283	699	982	1,581	2,563	61.69%
5 to 9	272	845	1,117	2,158	3,275	65.89%
10 to 19	170	202	372	1,011	1,383	73.10%
20 to 49	161	56	217	828	1,045	79.23%
50 or more	463	504	967	816	1,783	45.77%
Mobile home	2,739	1,121	3,860	4,011	7,871	50.96%
Boat, RV, van, etc.	164	145	309	0	309	0.00%
Total	20,132	8,952	29,084	24,729	53,813	45.95%

Source: US Census and American Communities Survey;
Prepared by the South Florida Regional Planning Council

Table 2.30 – Vacant Units by Vacancy Status, 2000 - 2008

Table H3. Number of Vacant Units by Vacancy Status, 2000 - Monroe County

Monroe County Vacancy Status	Vacant Units	%
For rent	1,663	10.06%
For sale only	759	4.59%
Rented or sold, not occupied	304	1.84%
For seasonal, recreational, or occasional use	12,628	76.39%
For migrant workers	48	0.29%
Other vacant	1,129	6.83%
Total	**16,531**	**100.00%**

Table H3. Number of Vacant Units by Vacancy Status, 2005 - Monroe County

Monroe County Vacancy Status	Vacant Units	%
For rent	943	4.98%
Rented, not occupied	458	2.42%
For sale only	448	2.36%
Sold, not occupied	123	0.65%
For seasonal, recreational, or occasional use	15,738	83.05%
For migrant workers	0	0.00%
Other vacant	1,240	6.54%
Total	**18,950**	**100.00%**

Table H3. Number of Vacant Units by Vacancy Status, 2008 - Monroe County

Monroe County Vacancy Status	Vacant Units	%
For rent	1,581	6.43%
Rented, not occupied	53	0.22%
For sale only	1,545	6.28%
Sold, not occupied	441	1.79%
For seasonal, recreational, or occasional use	19,195	78.03%
For migrant workers	0	0.00%
Other vacant	1,914	7.78%
Total	**24,729**	**100.53%**

Source: US Census and American Communities Survey;
Prepared by the South Florida Regional Planning Council

Contributing to the support of the seasonal increase phenomenon is the rate of foreclosures and the Monroe County Property Appraiser data regarding homestead exemptions. It is generally believed non-homesteaded properties represent seasonal vacant, second homes, or for-rent units. Population in these should be distinguished from short-term tourist visitors. However, in times of high foreclosure rates, a shift to non-homestead may represent a temporary loss in permanent population.

In fact, during the housing bubble from 2003-2008, non-homesteaded units did rise. This coincided with a rise in foreclosures, as well as speculative investing and reported permanent population losses. There were 3,431 foreclosures in the County from 2005-2009.

During the 2000-2009 period, total homesteaded units increased from 16,005 to 16,698 units, a net increase of 693 units. Non-homesteaded units moved from 20,784 to 22,197, a net increase of 1,413 units. This compares with the 3,431 foreclosures from 2005-2009, recognizing it is likely as much as half of the foreclosed units may have been resold since the initial foreclosures which began in 2005, and some tendency to for those units to return to a homesteaded status. By 2009, after speculative investing ceased, the share of non-homesteaded properties went back down, falling to 2003 levels. This is consistent with the expectation of resold foreclosures regaining homesteads (**Figure 2**). Also, as noted, permanent population increased during 2009 according to BEBR, supporting an increase in permanent population.

The non-homestead rate for all units is now 57.1 percent. This is essentially the same rate both pre and post bubble. Single family non-homestead rates began to move up more closely in concert with rising foreclosures (**Figure 2**). This supports our belief that a considerable portion of permanent population losses may be attributable to foreclosures arising from the speculative housing bubble, and thus temporary. The expectation is some permanent population may return to these units over the course of the planning horizon – thus permanent population may increase over this period in substantially greater numbers than the growth in new housing units. To the degree this condition occurs, the BEBR medium series permanent population projection will be in error and will under-project permanent population growth. Planning for this contingency in the face of an unknown resolution to thousands of foreclosures is necessary. Thus, reflecting the population associated with portions of these foreclosed units as non-homestead and seasonal population will also correct and compensate for this potential longer term problem with the BEBR projection.

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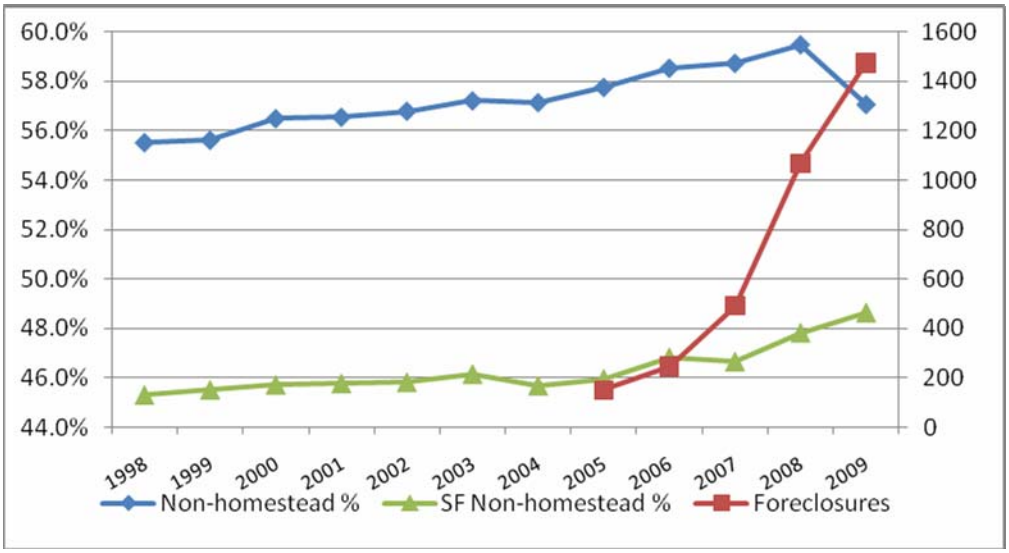


Figure 2- Monroe County – Foreclosures and The Percent of Non-Homestead Residential Units

There has been an increase in vacant units from 2005-2009. During this period both the Census and BEBR indicated permanent population loss. From 2005 to 2008 the ACS indicated an increase in seasonal vacancy of 3,457 units. During the 2005-2009 period, foreclosure data indicated there were 3,431 foreclosures, as noted earlier. Thus, the ACS data indicates, on net, the permanent population losses and associated housing vacancy is being shifted into seasonal units. Further, it is believed there is associated seasonal (non-permanent population) associated with these vacant units. With a reported permanent population growth in 2009 and increasing homestead exemptions in 2009 on one hand and coinciding numbers of foreclosures and seasonal increase through ACS, it is equally possible in our view, the permanent population loss is temporary and due as much to the end of the housing bubble, foreclosures and rising unemployment as it is due to a shift from permanent to seasonal residency. It is likely both conditions exist and are occurring.

2.6.5 Unincorporated Population Upper/Middle/Lower Keys

2.6.5.1 Permanent Population

Permanent population is based on the on-line service I-Site which provides updated block group information based on US Census data (**Table 2.31**). The distribution of permanent population based on these data is shown in **Table 2.32**.

Table 2.31 - Unincorporated Monroe County-Distribution of Permanent Population

	Upper Keys	Middle Keys	Lower Keys	Total
Population (1990)	44%	3%	52%	100%
Population (2000)	42%	3%	55%	100%
Population (2009)	41%	3%	56%	100%
Population (2014)	40%	3%	57%	100%

Source: Fishkind & Associates, Inc.; I-Site online demographic database.
NOTE: Slight difference in totals based on rounding.

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Table 2.32 – Unincorporated Permanent Population Distribution by Planning Area

Year	Upper Keys	Middle Key	Lower Keys
2000	15,135	1,081	19,820
2001	15,185	1,087	19,978
2002	15,229	1,094	20,130
2003	15,226	1,096	20,221
2004	15,212	1,098	20,296
2005	15,402	1,115	20,647
2006	15,073	1,094	20,299
2007	14,737	1,072	19,940
2008	14,263	1,044	19,481
2009	14,797	1,088	20,383
2010	14,430	1,061	19,877
2011	14,654	1,078	20,185
2012	14,632	1,076	20,154
2013	14,609	1,074	20,123
2014	14,586	1,073	20,092
2015	14,564	1,071	20,061
2016	14,538	1,069	20,025
2017	14,511	1,067	19,989
2018	14,485	1,065	19,953
2019	14,459	1,063	19,916
2020	14,433	1,061	19,880
2021	14,406	1,059	19,844
2022	14,380	1,057	19,808
2023	14,354	1,055	19,772
2024	14,327	1,053	19,735
2025	14,301	1,052	19,699
2026	14,275	1,050	19,663
2027	14,249	1,048	19,627
2028	14,222	1,046	19,591
2029	14,196	1,044	19,554
2030	14,170	1,042	19,518

Source: Fishkind & Associates, Inc.

2.6.5.2 Seasonal Population

Seasonal population within the upper/middle/lower unincorporated areas is estimated based on the ratio of unincorporated seasonal population to unincorporated permanent

population, multiplied by the permanent population distributions by planning area (**Table 2.33**).

Table 2.33- Unincorporated Seasonal Population Distribution by Planning Area

Year	Upper Keys	Middle Key	Lower Keys
2000	14,048	1,056	18,137
2001	14,020	1,057	18,185
2002	13,993	1,058	18,234
2003	13,966	1,058	18,283
2004	13,938	1,059	18,332
2005	13,910	1,060	18,381
2006	14,150	1,080	18,789
2007	14,339	1,096	19,133
2008	14,665	1,126	19,759
2009	14,388	1,111	19,545
2010	14,550	1,122	19,768
2011	14,472	1,117	19,660
2012	14,555	1,123	19,775
2013	14,639	1,129	19,890
2014	14,722	1,135	20,005
2015	14,806	1,141	20,120
2016	14,891	1,148	20,238
2017	14,977	1,154	20,357
2018	15,063	1,160	20,475
2019	15,149	1,167	20,593
2020	15,235	1,173	20,712
2021	15,321	1,179	20,830
2022	15,407	1,185	20,948
2023	15,493	1,192	21,067
2024	15,579	1,198	21,185
2025	15,665	1,204	21,304
2026	15,751	1,211	21,422
2027	15,837	1,217	21,540
2028	15,923	1,223	21,659
2029	16,009	1,230	21,777
2030	16,095	1,236	21,896

Source: Fishkind & Associates, Inc.

2.6.5.3 Functional Population

Table 2.34 presents the functional (permanent and seasonal) population for the unincorporated County.

Table 2.34 – Unincorporated Functional Population

Year	Permanent	Seasonal	Functional
2000	36,036	33,241	69,277
2001	36,250	33,263	69,513
2002	36,452	33,285	69,737
2003	36,543	33,307	69,850
2004	36,606	33,329	69,935
2005	37,164	33,351	70,515
2006	36,466	34,019	70,485
2007	35,749	34,568	70,317
2008	34,788	35,550	70,338
2009	36,268	35,043	71,311
2010	35,368	35,440	70,808
2011	35,917	35,249	71,166
2012	35,862	35,453	71,315
2013	35,806	35,658	71,464
2014	35,751	35,862	71,613
2015	35,696	36,067	71,763
2016	35,632	36,277	71,909
2017	35,567	36,488	72,055
2018	35,503	36,698	72,201
2019	35,438	36,909	72,347
2020	35,374	37,120	72,494
2021	35,310	37,330	72,640
2022	35,245	37,541	72,786
2023	35,181	37,752	72,933
2024	35,116	37,962	73,078
2025	35,052	38,173	73,225
2026	34,988	38,384	73,372
2027	34,923	38,594	73,517
2028	34,859	38,805	73,664
2029	34,794	39,016	73,810
2030	34,730	39,226	73,956

Source: Fishkind & Associates, Inc.

Based on these data we are able to determine the functional population for unincorporated Keys according to the upper/middle/lower planning area of the unincorporated portion of the County. **Table 2.35** assigns the functional population to the planning area.

Table 2.35 – Unincorporated Functional Population Distribution by Planning Area

Year	Upper Keys	Middle Key	Lower Keys	Total
2000	29,183	2,138	37,957	69,277
2001	29,205	2,145	38,163	69,512
2002	29,222	2,151	38,364	69,737
2003	29,192	2,155	38,504	69,850
2004	29,150	2,157	38,628	69,935
2005	29,313	2,175	39,027	70,515
2006	29,222	2,174	39,089	70,485
2007	29,075	2,169	39,073	70,317
2008	28,928	2,169	39,240	70,338
2009	29,185	2,199	39,927	71,311
2010	28,980	2,183	39,645	70,808
2011	29,126	2,194	39,846	71,166
2012	29,187	2,199	39,929	71,315
2013	29,248	2,203	40,013	71,464
2014	29,309	2,208	40,097	71,613
2015	29,370	2,212	40,181	71,763
2016	29,429	2,217	40,263	71,909
2017	29,489	2,221	40,345	72,055
2018	29,549	2,225	40,427	72,201
2019	29,608	2,230	40,510	72,348
2020	29,668	2,234	40,592	72,494
2021	29,728	2,238	40,674	72,640
2022	29,787	2,243	40,756	72,786
2023	29,847	2,247	40,838	72,933
2024	29,907	2,252	40,921	73,079
2025	29,966	2,256	41,003	73,225
2026	30,026	2,260	41,085	73,371
2027	30,086	2,265	41,167	73,518
2028	30,145	2,269	41,249	73,664
2029	30,205	2,274	41,332	73,810
2030	30,265	2,278	41,414	73,956

Source: Fishkind & Associates, Inc. NOTE: Slight differences in totals due to rounding.

2.7 Future Land Use Needs and Opportunities

[Rule 9J-5.006(2), F.A.C.]

This section highlights some of the discrepancies that exist between the Existing and Future Land Use Maps, by providing insight on where discrepancies may exist. This section also provides an analysis of the theoretical maximum density and intensity based on future land use element Policy 101.4.21, vacant land, zoning that allows one dwelling unit per lot, and the Tier System. Last, this section summarizes the County's growth span based on the 197 ROGO allocations per year and the 293 square feet of commercial space per ROGO awarded.

2.7.1 Future and Existing Land Use Discrepancies

It is important to note that future land GIS data layer dates of May 2010, were created by the County Growth Management Division. Since the existing land use data was created using the Property Appraisers files, some of the existing land use and future land use category distributions will not coincide (see **Section 2.3** *"Existing Land Use"* for further explanation on the creation of the Existing Land Use data). For instance, as seen in **Table 2.5** of the existing land use data, the Conservation land use category comprises 75.9 percent of the land versus only 43.2 percent of the future land use (**Table 2.36**).

Upon receipt of the existing land use GIS layer, the future land use layer needed to be fine-tuned, since acreage calculations did not match. With spatial analysis, it was determined that the future land use layer was missing some offshore islands. The offshore islands missing were primarily located in the Everglades National Park and the Lower Keys PA including but not limited to the Marquesas and the Dry Tortugas Keys. These new areas of the Future Land Use Map (**Map Series 2-3**) are shown as "Undesignated", given that they have not been assigned a land use.

In conducting comparative spatial analysis to understand the Conservation land use discrepancies between the future and existing land use maps, it appears that the following contribute to the dissimilarities:

- The future land use designation "Recreational Conservation" was classified as "Conservation" in the existing land use map.
- The "Undesignated" land in the future land use is "Conservation" in the existing land use.

Therefore, it appears that in addition to the Property Appraiser's PC code conversions into generalized land use codes to create the Existing Land Use Map, as explained in **Section 2.3.1** "*Existing Patterns and Trends"*, the "Residential Conservation" (in the future land use) was classified as "Conservation" (in the existing land use).

What may account for the disparity of Conservation lands between both future (43.2 percent of land) and existing (75.9 percent of land) maps is that "Residential Conservation" and "Undesignated" lands in the future are assigned "Conservation" in the existing. However, further analyses to identify discrepancies in land use should be conducted.

As seen in **Table 2.36**, Conservation (43.2 percent) and Residential Conservation (25.4 percent) account for the highest future land use percentages. Military accounts for 6 percent. Less than one percent is noted for Agriculture, Airport District, Education, Industrial, Institutional, Mixed Use Commercial Fishing, Public Buildings/Grounds and Public Facilities.

Although minimal, there is a slight difference of 11.7 acres between the future and exiting land use GIS layers, primarily located in the LKPA.

Table 2.36: Future Land Use Acreage Distribution

Future Land Use	Lower Keys	Middle Keys	Upper Keys	Total	Percent of Total
Agriculture (A)	18.8	0.0	1.9	20.7	0.0%
Airport District (AD)	22.6	0.0	19.7	42.2	0.1%
Conservation (C)	19,591.5	489.1	11,553.9	31,634.6	43.2%
Education (E)	28.5	0.0	32.2	60.6	0.1%
Industrial (I)	415.8	0.0	0.0	415.8	0.6%
Institutional (INS)	87.6	0.0	43.5	131.0	0.2%
Military (M)	4,381.2	0.0	0.0	4,381.2	6.0%
Mixed Use / Commercial (MC)	885.4	138.6	1,009.1	2,033.2	2.8%
Mixed Use/Commercial Fishing (MCF)	113.2	25.3	12.6	151.1	0.2%
Public Buildings/Grounds (PB)	20.2	0.0	26.8	47.1	0.1%
Public Facilities (PF)	55.7	27.2	57.4	140.3	0.2%
Recreation (R)	526.8	848.3	638.5	2,013.5	2.8%
Residential Conservation (RC)	12,133.9	266.3	6,189.9	18,590.1	25.4%
Residential Low (RL)	2,846.5	23.9	941.0	3,811.4	5.2%
Residential Medium (RM)	2,922.1	231.3	2,137.3	5,290.7	7.2%
Residential High (RH)	422.3	41.8	903.0	1,367.0	1.9%
Undesignated (UNDS) [15]	2,966.7	52.4	0.1	3,019.2	4.1%
Total	**47,438.7**	**2,144.1**	**23,566.8**	**73,149.6**	**100.0%**
Percentage of Total	64.9%	2.9%	32.2%	100.0%	--

Source: Monroe County Growth Management, 2010, "MC_FLUM_510.
NOTE: Slight differences in totals due to rounding.

2.7.2 Variable Densities and Intensities

[15] "Undesignated" was added to the Future Land Use Map in order to denote land that has been newly added in the GIS file and has not been designated.

The County's current LDC includes both allocated and maximum net densities for residential as well as hotel-motel, recreational vehicle and institutional residential uses. Allocated density is calculated in dwelling units per gross acre, while maximum net density is calculated in dwelling units per net buildable acre. The net buildable area is that area which is developable and not in open space or required as a minimum buffer yard or setback as provided for in the MCLDC. The maximum floor area ratio is the amount of commercial floor area to be developed per unit of land on the net buildable area of the site. This system allows for a site-by site determination of the appropriate density and intensity for each site proposed for development.

2.7.3 Future Land Use Needs Analysis Rule 9J-5.006(2)(c), F.A.C.]

This section provides an analysis of the future land use theoretical maximum density and intensity. For the purposes of this element, theoretical development potential is defined as the maximum allocated density and intensity based on Policy 101.4.21 and the land use designation in the absence of other controlling factors, such as tier designation. The following analyses are conducted for the purpose of identifying theoretical development potential and serve as the basis, along with population projections, for the needs analysis through the planning period. Spatial analysis is conducted through GIS.

Table 2.37 summarizes **Tables 2.41, 2.48, 2.57, 2.58, 2.59** and **2.60.** It provides a snapshot of the County's maximum theoretical density based on data analysis. Based on the current ROGO allocation of 197 and theoretical maximum density, growth span would take 565 years. On the conservative spectrum, vacant lots in which one dwelling unit per lot is allowed, it would take at least 12 years to accommodate 2,286 dwelling units. All of the development scenarios, as illustrated on **Table 2.37**, fulfill the Functional Housing Need (1,680 dwelling units) for 2015 through 2030, as shown on **Table 2.38.**

NOTE: The following theoretical density and intensity analyses are for illustrative purposes only; conditions specific to the individual parcel, including physical size, environmental sensitivity, zoning and tier designation and other regulatory constraints, such as ROGO and NROGO are the final determinant of development potential.

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Table 2.37 – Theoretical Maximum Density and Growth Span

	Total Theoretical Maximum Density	Theoretical Maximum Density of Vacant Lands	Theoretical Maximum Density of Vacant Lots with a Densit			
	73,149 total acres	2,339 vacant acres	Total Vacant Lots with a Density of 1du/lot*	Total Vacant Lots with a Density of 1du/lot in Tier I, II, III, III A, 0 and U **	Total Vacant Lots with a Density of 1du/lot in Tier I, II, III, and III A ***	T w 1
Total Max. Allowed Density (units)	111,365	10,258	4,075	3,927	3,121	
Current Annual ROGO allocation	197	197	197	197	197	
Years of Growth	565	52	21	20	16	

*Includes lots in Tier I, II, III, IIIA, Undesignated Tier, Tier 0 and 148 lots located in Ocean Reef (UKPA).

** Excludes the 148 lots located in Ocean Reef (UKPA).

*** Excludes 148 lots located in Ocean Reef (UKPA),Undesignated Tier and Tier 0.

****Excludes 148 lots located in Ocean Reef (UKPA), Tier I, Undesignated Tier, and Tier 0

Source: Monroe County Growth Management, 2010, "MC_ELU_510"; Monroe County Growth Management, 2010, "Zoning County Growth Management, 2010, "MC_FLUM_510"; Monroe County Growth Management, 2010, "Tier 0110"

I = Tier I – Natural Areas

II = Tier II (Big Pine Key and No Name Keys in the Lower Keys PA only)

III = Tier III – Infill Areas

III-A = Special Protection Area (SPA)

U = Undesignated Tier - Properties that originally had a Tier designation but became undesignated by a court order. This response to the Everglades Law Center's analysis of the Tier System. Therefore, it was determined that a number of pa designated. The Tier Designation Review Committee is currently addressing the issues.

0 = Property does not have a Tier designation. Most of these occur in the Upper Keys and some are right-of-way parcels. originally designated because of mapping errors; the majority of which are currently being reviewed by the Tier D Committee and will be designated at a later date.

NOTE: Slight differences in totals due to rounding.

NOTE: There is a Vested Rights Order for Ocean Reef for 2,663 vested dwelling units.

- 1,838 residential and transient units have been built.
- 200 transient units and 625 other residential units are vested for future development.
- December 23, 2010 letter from DCA.

The Functional Housing Need for 2015 through 2030 is shown on **Table 2.38**. This table is based upon the projected functional population. For an illustration of how functional households and functional dwelling units see **Section 7.3.1** *"Projected Number of Households"* and **Section 7.3.2 "***Projected Housing Need".*

Table 2.38 – Functional Population Housing Need (2015-2030)

Year	Lower Keys	Middle Keys	Upper Keys	Total Pop	Functional Households	Functional Dwelling	HH % Change	Housing Need
2010	39,645	2,183	28,980	70,808	29,202	36,674	n/a	n/a
2015	40,181	2,212	29,370	71,763	29,584	37,172	1.35%	498
2020	40,592	2,234	29,668	72,494	29,827	37,566	1.02%	394
2025	41,003	2,256	29,966	73,225	30,071	37,960	1.01%	394
2030	41,414	2,278	30,265	73,957	30,315	38,354	1.00%	394
Total								**1,680**

Source: Fishkind Population Projections

Based upon the housing need shown on **Table 2.38** above, assuming future residential development occurs in the pattern and intensities called for under the Comprehensive Plan and at the rate anticipated under the residential and non-residential permit allocation systems, there appears to be a sufficient amount of land designated to support both residential and non-residential development throughout the 2030 planning horizon.

The following sections focus on detailing the maximum theoretical density and intensity based on, future land use designation, vacant land, Tier designation, lots that allow one dwelling unit, by Planning Area and for the County as a whole.

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2.7.3.1 Theoretical Maximum Density

The theoretical maximum density in the unincorporated County is approximately 111,365 dwelling units as seen in **Table 2.39**. Numbers are obtained by calculating acreage of each of the future land use designations times the allowable density. The current future land use map theoretically allows 111,365 dwelling units; at the current annual ROGO allocation rate of 197 dwelling units per year, thus providing 565 years of growth.

Table 2.39 – Total Theoretical Maximum Density and Growth Span

	Total Acres	Total Theoretical Density (DU)	Allowed ROGO	Years of Growth
Lower	47,438.7	67,642.7	**197**	**565.3 yrs**
Middle	2,144.1	3,843.4		
Upper	23,566.8	39,878.8		
TOTAL	**73,149.6**	**111,364.9**		

Source: Source: Policy 101.4.21 and Monroe County Growth Management, 2010, "MC_FLUM_510 (future land use GIS file)
NOTE: Slight differences in totals due to rounding.

The theoretical maximum intensity in the unincorporated County is approximately 363,634,872.5 square feet as seen in **Table 2.40**. Numbers are obtained by calculating acreage for each of the future land use designations times the maximum allowable square foot. There are 239 square feet of NROGO currently allowed for each ROGO allocation. At 363,634,872.5 square feet of commercial space and 47,083 NROGO maximum allocation per year, there would be 7,723 years of growth.

Table 2.40 – Total Theoretical Intensity and Growth Span

	Total Acres	Total Theoretical Intensity (sq/ft)	Allowed NROGO	Years of Growth
Lower	47,438.7	259,924,306.0	**47,083**[16]	**7,723.3 yrs**
Middle	2,144.1	13,388,362.0		
Upper	23,566.7	90,322,204.5		
TOTAL	**73,149.6**	**363,634,872.5**		

Source: Policy 101.4.21 and Monroe County Growth Management, 2010, "MC_FLUM_510 (future land use GIS file)
NOTE: Slight differences in totals due to rounding.

[16] There are 239 square feet per each of the ROGO (197) allocations currently allowed. Therefore, a maximum total of 47,083 square feet.

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Based on spatial analysis and Policy 101.4.21, the total theoretical density by PA is presented on **Table 2.41.** An approximate of 67,643 theoretical dwelling units are allowed in the LKPA, approximately 3,843 in the MKPA, and approximately 39,879 in UKPA. Again, there appears to be a sufficient amount of land designated to support both residential development throughout the 2030 planning horizon for the 1,680 dwelling units needed (**Table 2.38**).

As seen in **Table 2.42,** the maximum theoretical intensity by future land use and planning area is calculated. It appears that there is ample amount of square foot area for the 1,680 dwelling units needed in the planning horizon, 2030. At 1,680 dwelling units needed by 2030, only 401,520 square feet would be needed.

NOTE: The following theoretical density and intensity analyses are for illustrative purposes only; conditions specific to the individual parcel, including physical size, environmental sensitivity, zoning and tier designation and other regulatory constraints, such as ROGO and NROGO are the final determinant of development potential.

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Table 2.41 – Theoretical Maximum Density (dwelling units)

Future Land Use	Policy 101.4.21 Maximum Dwelling Units / Acre	Max Density	Lower Keys		Middle Keys		Upper Keys	
			Acres	Theoretical Max. Density	Acres	Theoretical Max. Density	Acres	Theoretical Max. Density
Agriculture (A)	0 du	0.0	18.8	0.0	0.0	0.0	1.9	0.0
Airport District (AD)	0 du	0.0	22.6	0.0	0.0	0.0	19.7	0.0
Conservation (C)	0 du	0.0	19,591.5	0.0	489.1	0.0	11,553.9	0.0
Education (E)	0 du	0.0	28.5	0.0	0.0	0.0	32.2	0.0
Industrial (I)	1 du	1.0	415.8	415.8	0.0	0.0	0.0	0.0
Institutional (INS)	0 du	0.0	87.6	0.0	0.0	0.0	43.5	0.0
Military (M)	6 du	6.0	4,381.2	26,287.2	0.0	0.0	0.0	0.0
Mixed Use / Commercial (MC)	1-6 du	6.0	885.4	5,312.5	138.6	831.8	1,009.1	6,054.7
Mixed Use/Commercial Fishing (MCF)	3-8 du	8.0	113.2	905.5	25.3	202.1	12.6	101.0
Public Buildings/Grounds (PB)	0 du	0.0	20.2	0.0	0.0	0.0	26.8	0.0
Public Facilities (PF)	0 du	0.0	55.7	0.0	27.2	0.0	57.4	0.0
Recreation (R)	0.25 du	0.25	526.8	131.7	848.3	212.1	638.5	159.6
Residential Conservation (RC)	0-0.25 du	0.25	12,133.9	3,033.5	266.3	66.6	6,189.9	1,547.5
Residential Low (RL)	0.25-0.50du	0.5	2,846.5	1,423.3	23.9	11.9	941.0	470.5
Residential Medium (RM)	Approx 0.5-8 du	8.0	2,922.1	23,376.8	231.3	1,850.6	2,137.3	17,098.3
Residential High (RH)	Approx 3-16 du	16.0	422.3	6,756.5	41.8	668.3	903.0	14,447.2
Undesignated (UNDS)	NA	NA	2,966.7	0.0	52.4	0.0	0.1	0.0
Total	**NA**	**NA**	**47,438.7**	**67,642.7**	**2,144.1**	**3,843.4**	**23,566.8**	**39,878.8**
Total Maximum Theoretical Density	**111,364.9**							

Source: Policy 101.4.21 and Monroe County Growth Management, 2010, "MC_FLUM_510 (future land use GIS file)
NOTE: Slight differences in totals due to rounding.

Table 2.42 – Theoretical Maximum Intensity (square feet floor area)

Future Land Use	Policy 101.4.21 Maximum Allowed Floor Area	Max.	Lower Keys		Middle Keys		Upper Keys	
			Acres	Theoretical Max. Allowed Floor Area (sq/ft)	Acres	Theoretical Max. Allowed Floor Area (sq/ft)	Acres	Theoretical Max. Allowed Floor Area (sq/ft)
Agriculture (A)	.020-0.25	0.25	18.8	204,949.8	0.0	0.0	1.9	20,691.0
Airport District (AD)	0.1	0.1	22.6	98,271.4	0.0	0.0	19.7	85,682.5
Conservation (C)	0.05	0.05	19,591.5	42,670,330.6	489.1	1,065,259.8	11,553.9	25,164,459.5
Education (E)	0.3	0.3	28.5	372,176.6	0.0	0.0	32.2	420,136.2
Industrial (I)	0.25-0.60	0.6	415.8	10,867,087.4	0.0	0.0	0.0	0.0
Institutional (INS)	0.25-0.40	0.4	87.6	1,525,471.2	0.0	0.0	43.5	757,769.8
Military (M)	0.30-0.50	0.5	4,381.2	95,422,536.0	0.0	0.0	0.0	0.0
Mixed Use / Commercial (MC)	0.10-0.45	0.45	885.4	17,355,806.8	138.6	2,717,425.3	1,009.1	19,780,574.2
Mixed Use/Commercial Fishing (MCF)	0.25-0.40	0.4	113.2	1,972,222.6	25.3	440,130.2	12.6	220,065.1
Public Buildings/Grounds (PB)	0.10-0.30	0.3	20.2	264,496.3	0.0	0.0	26.8	350,483.8
Public Facilities (PF)	0.10-0.30	0.3	55.7	727,756.9	27.2	355,449.6	57.4	749,841.8
Recreation (R)	0.2	0.2	526.8	4,589,307.4	848.3	7,390,128.2	638.5	5,562,263.5
Residential Conservation (RC)	0-0.10	0.1	12,133.9	52,855,181.3	266.3	1,160,133.5	6,189.9	26,963,073.7
Residential Low (RL)	0.20-0.25	0.25	2,846.5	30,998,711.7	23.9	259,835.4	941.0	10,247,163.3
Residential Medium (RM)	0	0	2,922.1	0.0	231.3	0.0	2,137.3	0.0
Residential High (RH)	0	0	422.3	0.0	41.8	0.0	903.0	0.0
Undesignated (UNDS)	NA	NA	2,966.7	0.0	52.4	0.0	0.1	0.0
Total	**NA**	**NA**	**47,438.7**	**259,924,306.0**	**2,144.1**	**13,388,362.0**	**23,566.8**	**90,322,204.5**
Total Maximum Theoretical Density	**363,634,872.5**							

Source: Policy 101.4.21 and Monroe County Growth Management, 2010, "MC_FLUM_510 (future land use GIS file)
NOTE: Slight differences in totals due to rounding.

2.7.3.2 Theoretical Maximum Density and Intensity by Planning Area

Lower Keys

Table 2.43 provides the theoretical maximum density and intensity for the Lower Keys. The following summarizes some of the highlights of the table:

Residential:

The primary land uses that allow the most dwelling units given the acreage and intensity potential are Military (26,287 dwelling units) and Residential Medium (23,376 dwelling units). The maximum theoretical density for the LKPA is 67,643 dwelling units.

Non Residential:

The land uses that allow the most square footage commercial area, given the combination of acreage and intensity potential is Military with over 95 million commercial square feet of floor area. Overall, 259,924,306 square feet of commercial floor area is the maximum theoretical intensity in the LKPA.

NOTE: The following theoretical density and intensity analyses are for illustrative purposes only; conditions specific to the individual parcel, including physical size, environmental sensitivity, zoning and tier designation and other regulatory constraints, such as ROGO and NROGO are the final determinant of development potential.

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Table 2.43 –Theoretical Maximum Density and Intensity – Lower Keys Planning Area (LKPA)

Future Land Use	Acres	Max. Allowed Density (du)	Max. Allowed Floor Area (sf)
Agriculture (A)	18.8	0.0	204,949.8
Airport District (AD)	22.6	0.0	98,271.4
Conservation (C)	19,591.5	0.0	42,670,330.6
Education (E)	28.5	0.0	372,176.6
Industrial (I)	415.8	415.8	10,867,087.4
Institutional (INS)	87.6	0.0	1,525,471.2
Military (M)	4,381.2	26,287.2	95,422,536.0
Mixed Use / Commercial (MC)	885.4	5,312.5	17,355,806.8
Mixed Use/Commercial Fishing (MCF)	113.2	905.5	1,972,222.6
Public Buildings/Grounds (PB)	20.2	0.0	264,496.3
Public Facilities (PF)	55.7	0.0	727,756.9
Recreation (R)	526.8	131.7	4,589,307.4
Residential Conservation (RC)	12,133.9	3,033.5	52,855,181.3
Residential Low (RL)	2,846.5	1,423.3	30,998,711.7
Residential Medium (RM)	2,922.1	23,376.8	0.0
Residential High (RH)	422.3	6,756.5	0.0
Undesignated (UNDS)	2,966.7	0.0	0.0
Total	**47,438.7**	**67,642.7**	**259,924,306.0**

Source: Monroe County Growth Management, 2010, "MC_FLUM_510"; Policy 101.4.21
NOTE: Slight differences in totals due to rounding.

Middle Keys

Table 2.44, below, provides the Theoretical Maximum Density and Intensity for the Middle Keys.

Table 2.44 – Theoretical Maximum Density and Intensity – Middle Keys Planning Area (MKPA)

Future Land Use	Acres	Max. Allowed Density (du)	Max. Allowed Floor Area (sf)
Agriculture (A)	0.0	0.0	0.0
Airport District (AD)	0.0	0.0	0.0
Conservation (C)	489.1	0.0	1,065,259.8
Education (E)	0.0	0.0	0.0
Industrial (I)	0.0	0.0	0.0
Institutional (INS)	0.0	0.0	0.0
Military (M)	0.0	0.0	0.0
Mixed Use / Commercial (MC)	138.6	831.8	2,717,425.3
Mixed Use/Commercial Fishing (MCF)	25.3	202.1	440,130.2
Public Buildings/Grounds (PB)	0.0	0.0	0.0
Public Facilities (PF)	27.2	0.0	355,449.6
Recreation (R)	848.3	212.1	7,390,128.2
Residential Conservation (RC)	266.3	66.6	1,160,133.5
Residential Low (RL)	23.9	11.9	259,835.4
Residential Medium (RM)	231.3	1,850.6	0.0
Residential High (RH)	41.8	668.3	0.0
Undesignated (UNDS)	52.4	0.0	0.0
Total	**2,144.1**	**3,843.4**	**13,388,362.0**

Source: Monroe County Growth Management, 2010, "MC_FLUM_510"; Policy 101.4.21
NOTE: Slight differences in totals due to rounding.

The following summarizes some of the highlights of the table:

Residential:

The primary land uses that allow the most dwelling units given the acreage and intensity potential are Residential Medium (1,850.6 dwelling units) and Mixed Use/Commercial (831.8 dwelling units). The maximum theoretical density for the MKPA is 3,843 dwelling units.

Non Residential:

The land uses that allow the most square feet of commercial, given the combination of acreage and intensity potential are Recreation with 7,390,128.2 square feet and Mixed Use/Commercial with 2,717,425.3 square feet. Overall, 13,388,362.0 square feet of commercial floor area is the maximum theoretical intensity in the MKPA.

NOTE: The following theoretical density and intensity analyses are for illustrative purposes only; conditions specific to the individual parcel, including physical size, environmental sensitivity, zoning and tier designation and other regulatory constraints, such as ROGO and NROGO are the final determinant of development potential.

Upper Keys

Table 2.45 (provided below) provides the Theoretical Maximum Density and Intensity for the Upper Keys.

Table 2.45 – Theoretical Maximum Density and Intensity – Upper Keys Planning Area (UKPA)

Future Land Use	Acres	Max. Allowed Density (du)	Max. Allowed Floor Area (sf)
Agriculture (A)	1.9	0.0	20,691.0
Airport District (AD)	19.7	0.0	85,682.5
Conservation (C)	11,553.9	0.0	25,164,459.5
Education (E)	32.2	0.0	420,136.2
Industrial (I)	0.0	0.0	0.0
Institutional (INS)	43.5	0.0	757,769.8
Military (M)	0.0	0.0	0.0
Mixed Use / Commercial (MC)	1,009.1	6,054.7	19,780,574.2
Mixed Use/Commercial Fishing (MCF)	12.6	101.0	220,065.1
Public Buildings/Grounds (PB)	26.8	0.0	350,483.8
Public Facilities (PF)	57.4	0.0	749,841.8
Recreation (R)	638.5	159.6	5,562,263.5
Residential Conservation (RC)	6,189.9	1,547.5	26,963,073.7
Residential Low (RL)	941.0	470.5	10,247,163.3
Residential Medium (RM)	2,137.3	17,098.3	0.0
Residential High (RH)	903.0	14,447.2	0.0
Undesignated (UNDS)	0.1	0.0	0.0
Total	**23,566.8**	**39,878.8**	**90,322,204.5**

Source: Monroe County Growth Management, 2010, Geographic Information Systems file "MC_FLUM_510"; Policy 101.4.21
NOTE: Slight differences in totals due to rounding.

The following summarizes some of the highlights of the table:

Residential:

The primary land uses that allow the most dwelling units given the acreage and intensity potential are Residential Medium (17,098.3 dwelling units) and Residential High (14,447.2 dwelling units). The maximum theoretical density for the UKPA is 39,878.8 dwelling units.)

Non Residential:

The land uses that allow the most square foot of commercial given the combination of acreage and intensity potential are Conservation with 25,164,459.5 square feet; Mixed Use/Commercial with 19,780,574.2 square feet; and Residential Conservation with 26,963,073.7 square feet. Overall, 90,322,204.5 square feet of commercial floor area is the maximum theoretical intensity in the UKPA.

NOTE: The following theoretical density and intensity analyses are for illustrative purposes only; conditions specific to the individual parcel, including physical size, environmental sensitivity, zoning and tier designation and other regulatory constraints, such as ROGO and NROGO are the final determinant of development potential.

2.7.4 Vacant Land Analysis
[Rule 9J-5.006(2)(b), F.A.C.]

Vacant land analysis was performed through GIS. The vacant land (2,339 acres), on the Existing Land Use Map, was evaluated against the underlying future land use designations. Then density and intensity per Policy 101.4.21 were calculated.

2.7.4.1 Vacant Land Analysis Density and Intensity for Unincorporated County

Table 2.46 and **2.47,** below, summarizes the allocated density and intensity per acre of vacant land. **Table 2.48** evaluates density and intensity in more detail by looking at the underlying future land uses of vacant land for the unincorporated County as a whole.
As seen on **Table 2.46,** there are 2,339 acres of vacant land. Vacant land allows a total theoretical density of 10,258 dwelling units. At the current allowed ROGO, it would take the County 52 years of growth, to develop vacant land.

Table 2.46 - Vacant Land Theoretical Density and Growth Span

	Total Vacant Acres	Total Theoretical Density (DU)	Current ROGO Allocation	Years of Growth
Lower	1,376.6	5,289.7	**197**	**52.1 yrs**
Middle	108.3	511.2		
Upper	854.4	4,457.1		
TOTAL	**2,339.2**	**10,258.0**		

Source: Monroe County Growth Management, 2010, Geographic Information System file "MC_ELU_510"
Monroe County Growth Management, 2010, Geographic Information System file "MC_FLUM_510;
Policy 101.4.21
NOTE: Slight differences in totals due to rounding.

As previously mentioned, there are 2,339 acres of vacant land. Vacant land allows a total theoretical intensity of 17,420,733 square feet**.** At the current allowed NROGO, it would take the County 370 years of growth, to develop vacant land, as seen in **Table 2.47.**

Table 2.47 - Vacant Land Theoretical Intensity and Growth Span

	Total Vacant Acres	Total Theoretical Intensity (sq/ft)	Current ROGO Allocation	Years of Growth
Lower	1,376.6	12,083,413.3	**197**	**370.0 yrs**
Middle	108.3	444,007.1		
Upper	23,566.8	4,893,312.6		
TOTAL	**2,339.2**	**17,420,733.0**		

Source: Monroe County Growth Management, 2010, Geographic Information System file "MC_ELU_510";
Monroe County Growth Management, 2010, Geographic Information System file "MC_FLUM_510;
Policy 101.4.21
NOTE: Slight differences in totals due to rounding.

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Table 7.48 denotes maximum theoretical density and intensity allowable in vacant land. The following summarizes some of the highlights of the table:

Residential:

About 73 percent of vacant land has a residential future land use designation. The primary land uses that allow the most dwelling units given the acreage and intensity potential are Residential Medium (6,208.8 dwelling units) and Mixed Use/Commercial (1,347.1 dwelling units). Again, the maximum theoretical density allowed unincorporated vacant land is 10,258 dwelling units.

Non Residential:

The land uses that allow the most square foot of commercial given the combination of acreage and intensity potential are Recreational Low with 4,778,640.9 square feet; Mixed Use/Commercial with 4,401,041.04 square feet; and Industrial with 2,828,699.3 square feet. Overall, 17,278,945.2 square feet of commercial floor area is the maximum theoretical intensity in the unincorporated County.

Table 2.48 - Vacant Land Density and Intensity Unincorporated County

	Unincorporated County			
Future Land Use	Vacant Acres	% Vacant	Max. Allowed Density (du)	Max. Allowed Intensity (sf)
Airport District	9.2	0.4%	0	40,031.6
Conservation	81.0	3.5%	0	34,521.3
Industrial	108.2	4.6%	108.2	2,828,699.3
Institutional	3.5	0.1%	0	60,112.8
Military	97.0	4.1%	582.1	2,112,877.8
Mixed Use/Commercial	224.4	9.6%	1,347.1	4,401,041.0
Mixed Use/Commercial Fishing	50.2	2.1%	401.9	875,381.8
Recreation	21.8	0.9%	5.5	190,183.0
Residential Conservation	449.3	19.2%	112.3	1,957,455.7
Residential Low	438.8	18.8%	219.4	4,778,640.9
Residential Medium	776.1	33.2%	6,208.8	0.0
Residential High	79.5	3.4%	1,272.6	0.0
Total	**2,339.2**	**100.0**	**10,258.0**	**17,278,945.2**

Source: Monroe County Growth Management, 2010, Geographic Information System file "MC_ELU_510"
Monroe County Growth Management, 2010, Geographic Information System file "MC_FLUM_510"
Policy 101.4.21
NOTE: Slight differences in totals due to rounding.

2.7.4.2 Vacant Land Analysis Density and Intensity by Planning Area

As previously noted in **Section 2.3.1**, there are approximately 2,339 acres of vacant land in the unincorporated Keys. The largest amount of vacant land in the unincorporated areas of the County (1,376.6 acres) is located within the LKPA.

This section provides further analysis of the vacant land vis-à-vis the future land use designation to determine theoretical maximum development potential. Due to the differences in how the Geographic Information System (GIS) mapping data structures for the existing, future and tier maps were developed, there will be slight variations in the acreages reported. (See **Section 2.3.1** of this element for a detailed discussion related to the limitations of these data structures.)

The future land use category distribution of density and intensity of the vacant land in the unincorporated area is illustrated in the tables included in this section. The general trend for all planning areas signal that vacant land is primarily located under the residential future land use designations: Residential Conservation, Residential Low and Residential Medium.

NOTE: The following theoretical development potential analyses are for illustrative purposes only; conditions specific to the individual parcel, including physical size, environmental sensitivity, zoning and tier designation and other regulatory constraints, such as ROGO and NROGO are the final determinant of development potential.

Lower Keys

Residential:

As illustrated in **Table 2.49**, below, the largest concentration of vacant land (1,376.6 acres) is located within the LKPA. Approximately 73 percent of the vacant lands are designated for residential land use. Without considering Tier System designation and lot specifications, the majority (3,080) of the theoretical development potential for dwelling units is concentrated in the Residential Medium land use category.

Non Residential:

Mixed Use designations comprise 10.3 percent of vacant land, with a theoretical development potential of 2.7 million square feet of non-residential floor area; 1.9 million square feet (7.1%) Mixed Use/Commercial (MU-C); and 778,852 square feet (3.2%) Mixed Use/Commercial Fishing (MU-CF). Theoretically, 12 million square feet of commercial area are allowed in the LKPA.

Table 2.49 - Vacant Land Density and Intensity – Lower Keys Planning Area (LKPA)

	Lower Keys			
Future Land Use	Vacant Acres	% Vacant	Max. Allowed Density (du)	Max. Allowed Intensity (sf)
Airport District	9.2	0.7%	0.0	40,031.6
Conservation	15.9	1.2%	0.0	34,521.3
Industrial	108.2	7.9%	108.2	2,828,699.3
Institutional	1.9	0.1%	0.0	32,234.4
Military	97.0	7.0%	582.1	2,112,877.8
Mixed Use/Commercial	97.7	7.1%	586.2	1,915,115.4
Mixed Use/Commercial Fishing	44.7	3.2%	357.6	778,852.8
Recreation	3.8	0.3%	1.0	33,367.0
Residential Conservation	325.1	23.6%	81.3	1,416,309.8
Residential Low	265.5	19.3%	132.8	2,891,403.9
Residential Medium	385.0	28.0%	3,080.0	0.0
Residential High	22.5	1.6%	360.6	0.0
Total	**1,376.6**	**100.0%**	**5,289.7**	**12,083,413.3**

Source: Monroe County Growth Management, 2010, Geographic Information System file "MC_ELU_510"; Monroe County Growth Management, 2010, Geographic Information System file "MC_FLUM_510"
Policy 101.4.21
NOTE: Slight differences in totals due to rounding.

Middle Keys

Residential:

The geographical boundary of the MKPA changed with the incorporation of the Village of Islamorada (1997) and the City of Marathon (1999), and now contains the smallest vacant land area. As indicated in **Table 2.50**, below, the majority (94 %) of the vacant land in this PA is designated as residential land use. Theoretically 511 dwelling units could be developed in the MKPA without considering the vacant land location in the Tier System.

Non Residential:

The Mixed Use designation makes-up the remaining use within this PA with 4.6 percent as Mixed Use/ Commercial and 1.4 percent as Mixed Use/Commercial Fishing, resulting in a maximum theoretical development potential of 125,235.0 square feet of commercial floor area in these two land use designations. Additionally, in the residential land uses approximately 310,000 square feet of commercial floor area are allowed in theory.

Table 2.50- Vacant Land Density and Intensity – Middle Keys Planning Area (MKPA)

	Middle Keys			
Future Land Use	Vacant Acres	% Vacant	Max. Allowed Density (du)	Max. Allowed Intensity (sf)
Mixed Use/Commercial	5.0	4.6%	30.1	98,402.0
Mixed Use/Commercial Fishing	1.5	1.4%	12.3	26,833.0
Residential Conservation	26.4	24.4%	6.6	115,129.1
Residential Low	18.7	17.3%	9.4	203,643.0
Residential Medium	56.6	52.3%	452.8	0.0
Total	**108.3**	**100.0%**	**511.2**	**444,007.1**

Source: Monroe County Growth Management, 2010, Geographic Information System file "MC_ELU_510"
Monroe County Growth Management, 2010, Geographic Information System file "MC_FLUM_510"
Policy 101.4.21
NOTE: Slight differences in totals due to rounding.

Upper Keys

Residential:

Currently, as shown on **Table 2.51** below, there are 854.4 acres of vacant land within the UKPA; 75.4 percent is designated as residential. Most of the allowable density is concentrated in the Residential Medium land use designation, resulting in a theoretical maximum of 2,676 dwelling units. The maximum theoretical density in the UKPA is 4,457 dwelling units, without considering the Tier System

Non Residential:

The majority of the allowed intensity is under the Mixed Use/Commercial designation, resulting in a maximum theoretical development potential of 2,387,523.6 square feet of commercial floor area. An overall theoretical density of 4,893,312 square feet of commercial floor area are allowed in the UKPA.

The remaining vacant land is distributed in the following future land use designations: 7.6 percent Conservation; 2.1 percent Recreation; and 0.2 percent Institutional.

Table 2.51 - Vacant Land Density and Intensity – Upper Keys Planning Area (UKPA)

	Upper Keys			
Future Land Use	Vacant Acres	% Vacant	Max. Allowed Density (du)	Max. Allowed Intensity (sf)
Conservation	65.1	7.6%	0.0	141,787.8
Institutional	1.6	0.2%	0.0	27,878.4
Mixed Use/Commercial	121.8	14.2%	730.8	2,387,523.6
Mixed Use/Commercial Fishing	4.0	0.5%	32.0	69,696.0
Recreation	18.0	2.1%	4.5	156,816.0
Residential Conservation	97.8	11.4%	24.5	426,016.8
Residential Low	154.6	18.1%	77.3	1,683,594.0
Residential Medium	334.5	39.2%	2,676.0	0.0
Residential High	57	6.7%	912.0	0.0
Total	**854.4**	**100.0%**	**4,457.1**	**4,893,312.6**

Source: Monroe County Growth Management, 2010, Geographic Information System file "MC_ELU_510"; Monroe County Growth Management, 2010, Geographic Information System file "MC_FLUM_510" Policy 101.4.21 NOTE: Slight differences in totals due to rounding.

2.7.4.3 Vacant Land Analysis Density and Intensity by Tier

To further analyze vacant land, it is important to understand its relationship within the Tier System. The Tier System currently in place in the County designates geographical areas outside of the Mainland PA, excluding Ocean Reef, into "tiers" to rate the environmental sensitivity of a piece of lands and its potential for development. It is used to assign ROGO and NROGO points; determine the amount of clearing of upland native vegetation that may be permitted; and prioritize lands for public acquisition. The boundaries are depicted in the Tier Overlay District Map, adopted as part of the land use district map.

Parcels classified as either Undesignated (UNDES), Tier III-A (Special Protection Area) and Tier II, have an undetermined development probability at this time, while Tier III represents the majority of high quality, developable acreage in the County. Tier II only applies to Big Pine Key and No Name Key. Parcels under Tier I, have very low development potential given natural lands and environmental resource protection areas. UNDES parcels were previously designated, however, given a court ruling, they are currently being re-designated. Tier 0 land is assigned to right-of-ways, some submerged lands and mapping errors. Therefore, Tier 0 is not included as part of this analysis and is presented for illustrative purposes only. In addition, a Military Tier was identified in GIS data. However, it is not part of this analysis because no vacant land is located within this tier.

For these analyses, GIS data was utilized to overlay the Tier System layers with the vacant land layer. Given the method in which the vacant land data and the Tier System data were developed, the acres of vacant land within the Tier System will not match the 2,338.9 acres of vacant land depicted in **Table 2.48**. Vacant land in Ocean Reef is not designated under

the Tier System and therefore, is not included in the analyses. That is to say, that although there are 2,339 acres of vacant land, only 2,224 acres are located within a tier as seen in **Table 2.52.**

As illustrated in **Table 2.52**, below, the majority of vacant land is located within Tier I (51 %) with little development potential given the point system. Tier II, II, and IIIA make 33.4 percent of vacant land and this is where development is most likely to concentrate.

Table 2.52 - Vacant Land by Tier and Planning Area

	I	II	III	III A	0[17]	U	Vacant acres in Tier	Net Parcels and Acres[18]
Lower Keys								
Vacant Parcels	1,301	418	1,360	27	NA	218	NA	3,324
Acres	753.5	75.3	289.8	9.4	15.7	202.4	1,346.0	1,330.3
Percent Vacant Acres	56.6%	5.7%	21.8%	0.7%	NA	15.2%	NA	NA
Middle Keys								
Vacant Parcels	3	0	414	0	NA	0	NA	417
Acres	28.2	0.0	77.5	0.0	0.1	0.0	105.8	105.7
Percent Vacant Acres	26.6%	0.0%	73.4%	0.0%	NA	0.0%	NA	NA
Upper Keys								
Vacant Parcels	608	0	1,333	227	NA	774	NA	2,942
Acres	352.5	0.0	227.9	63.9	2.2	126.2	772.7	770.5
Percent Vacant Acres	45.7%	0.0%	29.6%	8.3%	NA	16.4%	NA	NA
Total Parcels	**1,912**	**418**	**3,107**	**254**	**NA**	**992**	**NA**	**6,683**
Total Acres	**1,134.2**	**75.3**	**595.2**	**73.2**	**18.1**	**328.6**	**2,224.5**	**2,206.4**
Percentage of Tier	**51.0%**	**3.4%**	**26.8%**	**3.3%**	**0.8%**	**14.8%**	**100.0%**	**NA**

Source: Monroe County Growth Management, 2010, Geographic Information System file "MC_ELU_510"; Monroe County Growth Management, 2010, Geographic Information System file "MC_FLUM_510"; Monroe County Growth Management, 2010, Geographic Information System file "Tier_0110"

Tiers are:

I = Tier I – Natural Areas

II = Tier II (Big Pine Key and No Name Keys in the Lower Keys Planning Area only)

III = Tier III – Infill Areas

III-A = Special Protection Area (SPA)

0 = Property does not have a Tier designation. Most of these occur in the Upper Keys and some are right-of-way parcels. Some lots were not originally designated because of mapping errors; the majority of which are currently being reviewed by the Tier Designation Review Committee and will be designated at a later date.

U = Undesignated Tier - Properties that originally had a Tier designation but became undesignated by a court order. This court order was in response to the Everglades Law Center's analysis of the Tier System. Therefore, it was determined that a number of parcels should be re-designated. The Tier

[17] Tier 0 is used for illustration purposes only and is not part of the analysis.

[18] Vacant acres in all tiers after subtracting Tier 0.

Designation Review Committee is currently addressing the issues. NOTE: Slight differences in totals due to rounding.

Lower Keys

As seen in **Table 2.52**, the LKPA contains 1,330.3 acres (3,324 parcels), which are vacant and are located within a tier designation. Most of the vacant land, (56.6 %) is located in Tier I, comprising 1,301 parcels; and 21.8 percent (1,360 parcels) are designated Tier III. The UNDES Tier accounts for 15.2 percent or 218 parcels of vacant land. This PA is the only planning area with 418 vacant parcels (5.7%) designated Tier II, which only applies to Big Pine Key and No Name Key. Less than one percent of vacant land (27 parcels) is located in Tier III-A. Until the UNDES land is designated under the Tier System, development potential will remain unclear. The County's ROGO system allows development on parcels designated Tier I, II, III and III-A. These tiers constitute 84.7 percent of vacant land in the LKPA. Of the 84.7 percent, 56.6 is located in Tier I, where the County encourages conservation. This analysis is meant for illustrative purposes only and is not a true picture of development potential since a closer review of the individual parcel characteristics is needed in order to capture the Tier System true applicability.

Middle Keys

The MKPA has 105.7 vacant acres or 417 vacant parcels, which are located in one of the tiers, as seen in **Table 2.52.** Most of the vacant land, 73.3 percent or 414 parcels, are located within Tier III-Infill Area. The remaining three parcels or 26.7 percent is located within Tier I. This analysis is meant for illustrative purposes only and is not a true picture of development potential since a closer review of the individual parcel characteristics is needed in order to capture the Tier System true applicability.

Upper Keys

As seen in **Table 2.52**, the UKPA includes 770.5 acres or 2,942 parcels of vacant land within the Tier System. Most vacant acres (45.7%) are located in Tier I and constitute 608 parcels. Another 1,333 parcels (29.6%) are located in Tier III, these parcels constitute 227.9 acres. Vacant land located in the UNDES Tier constitutes 774 vacant parcels, 126.2 acres or 16.4 percent of vacant acres. Lastly, 8.3 percent of vacant acres or 227 parcels are located in Tier III-A. Tiers III and III-A include 37.9 percent of the vacant acres. This analysis is meant for illustrative purposes only and is not a true picture of development potential since a closer review of the individual parcel characteristics is needed in order to capture the Tier System true applicability.

2.7.4.4 Vacant Land Analysis within a Tier, Density and Intensity

The following analysis studies the relationship between vacant land and its relationship the Future Land Use Map and the Tier System, to further understand development potential. The tables below report the vacant land that is located within a Tier and its corresponding future land use designation. The following analysis focuses on the maximum allowed density and maximum allowed intensity given the underlying future land uses.

NOTE: The following theoretical density and intensity analyses are for illustrative purposes only; conditions specific to the individual parcel, including physical size, environmental sensitivity, zoning and tier designation and other regulatory constraints, such as ROGO and NROGO are the final determinant of development potential.

As shown on **Table 2.53,** most of the vacant land is located in Tier I (1,135 acres). A maximum allowed density is 9,199 dwelling units are allowed on vacant land that has a tier designation including those that have been Undesignated. A total of 16,736,710 square feet are also allowed. However, this analysis is meant for illustrative purposes only and is not a true representation of development potential since a closer review of the individual parcel characteristics is required in order to capture the Tier System applicability.

Table 2.53 - Vacant Land Theoretical Density and Intensity by Land Use Category and Tier

Future Land Use	I	II	III	III-A	U	Max. Allowed Density (du)	Max. Allowed Intensity (sf)
Airport District	0	0	9.2	0	0	0.0	39,988.1
Conservation	80.1	0.4	0	0	0	0.0	175,198.3
Industrial	0.2	0	15.2	0	87.9	103.4	2,701,678.3
Institutional	1.2	0	0.7	0	0	0.0	32,234.4
Military	94.4	0	0	0	0	566.4	2,056,032.0
Mixed Use/Commercial	51.2	4.1	100.6	34.9	28.1	1,313.1	4,289,897.7
Mixed Use/Commercial Fishing	10.5	9.7	7	0	14.2	332.0	723,096.0
Recreation	18.2	0	3.1	0	0.1	5.4	186,523.9
Residential Conservation	360.6	0	2.1	0.5	57.4	105.1	1,832,046.5
Residential Low	373.9	0.9	33.7	13.1	10	215.8	4,700,015.1
Residential Medium	131.7	59.1	341.8	22.9	111.1	5,331.9	0.0
Residential High	13.7	1.2	39.8	2	19.9	1,225.9	0.0
Total	**1,135.7**	**75.4**	**553.2**	**73.4**	**328.7**	**9,199.0**	**16,736,710.3**

Source: Monroe County Growth Management, 2010, Geographic Information System file "MC_ELU_510"; Monroe County Growth Management, 2010, Geographic Information System file "MC_FLUM_510"; Policy 101.4.21; Monroe County Growth Management, 2010, Geographic Information System file "Tier_0110"

Tiers are:

I = Tier I – Natural Areas

II = Tier II (Big Pine Key and No Name Keys in the Lower Keys Planning Area only)

III = Tier III – Infill Areas

III-A = Special Protection Area (SPA)

0 = Property does not have a Tier designation. Most of these occur in the Upper Keys and some are right-of-way parcels. Some lots were not originally designated because of mapping errors; the majority of which are currently being reviewed by the Tier Designation Review Committee and will be designated at a later date.

NOTE: Slight differences in totals due to rounding.

Lower Keys

As illustrated in **Table 2.54**, the majority of vacant land in this PA is located within Tier I. Although development would concentrate in the 374.5 acres within Tier II, III, and III-A, the maximum allowed density within all tiers are 5,085 dwelling units and intensity of 11,580,382 square feet. However, this analysis is meant for illustrative purposes only and is not a true representation of development potential since a closer review of the individual parcel characteristics is required in order to capture the Tier System applicability.

Table 2.54 - Vacant Land within a Tier, Density and Intensity – Lower Keys Planning Area (LKPA)

Future Land Use	I	II	III	III A	U	Max. Allowed Density (du)	Max. Allowed Intensity (sf)
Airport District	0.0	0.0	9.2	0.0	0.0	0.0	39,988.1
Conservation	15.2	0.4	0.0	0.0	0.0	0.0	33,955.0
Industrial	0.2	0.0	15.2	0.0	86.3	101.7	2,658,815.3
Institutional	1.2	0.0	0.7	0.0	0.0	0.0	32,234.4
Military	94.4	0.0	0.0	0.0	0.0	566.4	2,056,032.0
Mixed Use/Commercial	35.1	4.1	45.8	4.3	6.7	576.2	1,882,576.1
Mixed Use/Commercial Fishing	9.6	9.7	2.5	0.0	14.2	288.6	628,483.7
Recreation	3.7	0.0	0.0	0.0	0.0	0.9	32,495.8
Residential Conservation	257.9	0.0	0.4	0.5	56.2	78.7	1,372,096.4
Residential Low	229.7	0.9	25.9	0.0	4.6	130.6	2,843,705.7
Residential Medium	100.8	59.1	176.9	4.6	33.9	3,002.2	0.0
Residential High	6.5	1.2	13.2	0.0	0.4	340.5	0.0
Total	**754.4**	**75.3**	**289.8**	**9.4**	**202.4**	**5,085.9**	**11,580,382.4**

Source: Monroe County Growth Management, 2010, Geographic Information System file "MC_ELU_510"; Monroe County Growth Management, 2010, Geographic Information System file "MC_FLUM_510"; Policy 101.4.2; Monroe County Growth Management, 2010, Geographic Information System file "Tier_0110"

Tiers are:

I = Tier I – Natural Areas

II = Tier II (Big Pine Key and No Name Keys in the Lower Keys Planning Area only)

III = Tier III – Infill Areas

III-A = Special Protection Area (SPA)

0 = Property does not have a Tier designation. Most of these occur in the Upper Keys and some are right-of-way parcels. Some lots were not originally designated because of mapping errors; the majority of which are currently being reviewed by the Tier Designation Review Committee and will be designated at a later date.

U = Undesignated Tier - Properties that originally had a Tier designation but became undesignated by a court order. This court order was in response to the Everglades Law Center's analysis of the Tier System. Therefore, it was determined that a number of parcels should be re-designated. The Tier Designation Review Committee is currently addressing the issues.

NOTE: Slight differences in totals due to rounding.

Middle Keys

As observed in **Table 2.55**, vacant land is located in Tier I (28.2 acres) and Tier III (63.8) only. Although development would be encouraged under Tier III given that Tier I encourages conservation, the maximum allowed density within all tiers is 498 dwelling units and the maximum allowed floor area is 347,412 square feet. This analysis is meant for illustrative purposes only and is not a true picture of development potential since a review of the individual parcel characteristics is needed in order to capture the Tier System true applicability.

Table 2.55 - Vacant Land within a Tier, Density and Intensity – Middle Keys Planning Area (MKPA)

Future Land Use	I	II	III	III A	U	Max. Allowed Density (du)	Max. Allowed Intensity (sf)
Mixed Use/Commercial	0.0	0.0	4.1	0.0	0.0	24.5	79,976.2
Mixed Use/Commercial Fishing	0.0	0.0	1.4	0.0	0.0	11.4	24,916.3
Residential Conservation	12.6	0.0	0.4	0.0	0.0	3.3	56,628.0
Residential Low	15.6	0.0	1.5	0.0	0.0	8.5	185,892.3
Residential Medium	0.0	0.0	56.4	0.0	0.0	451.0	0.0
Total	**28.2**	**0.0**	**63.8**	**0.0**	**0.0**	**498.7**	**347,412.8**

Source: Monroe County Growth Management, 2010, Geographic Information System file "MC_ELU_510"; Monroe County Growth Management, 2010, Geographic Information System file "MC_FLUM_510"; Future Policy 101.4.2; Monroe County Growth Management, 2010, Geographic Information System file "Tier_0110"

Tiers are:

I = Tier I – Natural Areas

II = Tier II (Big Pine Key and No Name Keys in the Lower Keys Planning Area only)

III = Tier III – Infill Areas

III-A = Special Protection Area (SPA)

0 = Property does not have a Tier designation. Most of these occur in the Upper Keys and some are right-of-way parcels. Some lots were not originally designated because of mapping errors; the majority of which are currently being reviewed by the Tier Designation Review Committee and will be designated at a later date.

U = Undesignated Tier - Properties that originally had a Tier designation but became undesignated by a court order. This court order was in response to the Everglades Law Center's analysis of the Tier System. Therefore, it was determined that a number of parcels should be re-designated. The Tier Designation Review Committee is currently addressing the issues.

NOTE: Slight differences in totals due to rounding.

Upper Keys

As observed in **Table 2.56**, close to half of the land is located within Tier I. Even though development would most likely be concentrated on the 263.6 acres within Tier III and III-A, the maximum allowed density within all tiers is 3,614 dwelling units and maximum intensity of 4,808,915 square feet. This analysis is meant for illustration purposes only and is not a true representation of development potential. A closer review of the individual parcel characteristics is required in order to capture the Tier System applicability.

Table 2.56 - Vacant Land within a Tier, Density and Intensity – Upper Keys Planning Area (UKPA)

Future Land Use	I	II	III	III A	U	Max. Allowed Density (du)	Max. Allowed Intensity (sf)
Conservation	64.9	0.0	0.0	0.0	0.0	0.0	141,243.3
Industrial	0.0	0.0	0.0	0.0	1.6	1.6	42,863.0
Mixed Use/Commercial	16.1	0.0	50.7	30.6	21.4	712.4	2,327,345.5
Mixed Use/Commercial Fishing	0.9	0.0	3.1	0.0	0.0	32.0	69,696.0
Recreation	14.5	0.0	3.1	0.0	0.1	4.4	154,028.2
Residential Conservation	90.1	0.0	1.3	0.0	1.2	23.1	403,322.0
Residential Low	128.6	0.0	6.3	13.1	5.4	76.7	1,670,417.1
Residential Medium	30.9	0.0	108.5	18.3	77.2	1,878.6	0.0
Residential High	7.2	0.0	26.6	2.0	19.5	885.4	0.0
Total	**353.1**	**0.0**	**199.6**	**64.0**	**126.4**	**3,614.4**	**4,808,915.1**

Source: Monroe County Growth Management, 2010, "MC_ELU_510"; Monroe County Growth Management, 2010, Geographic Information System file "MC_FLUM_510"; Policy 101.4.2; Monroe County Growth Management, 2010, Geographic Information System file "Tier_0110"

Tiers are:

I = Tier I – Natural Areas

II = Tier II (Big Pine Key and No Name Keys in the Lower Keys Planning Area only)

III = Tier III – Infill Areas

III-A = Special Protection Area (SPA)

0 = Property does not have a Tier designation. Most of these occur in the Upper Keys and some are right-of-way parcels. Some lots were not originally designated because of mapping errors; the majority of which are currently being reviewed by the Tier Designation Review Committee and will be designated at a later date.

U = Undesignated Tier - Properties that originally had a Tier designation but became undesignated by a court order. This court order was in response to the Everglades Law Center's analysis of the Tier System. Therefore, it was determined that a number of parcels should be re-designated. The Tier Designation Review Committee is currently addressing the issues.

NOTE: Slight differences in totals due to rounding.

2.7.4.5 Vacant Platted Lots Which Allow One Dwelling Unit by Tier and Land Use

The following evaluation of vacant platted lots allowing one dwelling unit is conducted to determine the development potential based upon the County's Tier System and future land use designations. As seen in **Table 2.57**, of the 4,075 vacant parcels located in a zoning district that allows one dwelling unit per lot, 54.3 percent or 2,212 lots are located within the LKPA; 45.6 percent or 1,859 lots are located in the UKPA; and four parcels are located within in the MKPA. This analysis includes lots in Tier I, II, III, IIIA, Undesignated Tier, Tier 0 and 148 lots located in Ocean Reef. (Ocean Reef is vested for 2,663 dwelling units – see pg. 125). This is a growth span around 20 years.

The analyses below are for illustrative purposes only and is not a true representation of development potential since a closer review of individual parcel characteristics is needed in order to capture the true Tier System applicability. In addition, conditions specific to the individual parcel, including physical size, environmental sensitivity, zoning designation and other regulatory constraints are the final determinant of development potential.

Table 2.57 – Total Vacant Lots with Density of One Dwelling Unit per Lot

	Total vacant Lots with a Density of 1du/lot	Current ROGO Allocation	Years of Growth
Lower Keys	2,212	**197**	**20.7 yrs**
Middle Keys	4		
Upper Keys	1,859		
TOTAL	**4,075**		

Source: Monroe County Growth Management, 2010, Geographic Information System file "MC_ELU_510"; Monroe County Growth Management, 2010, "Zoning"; Source: Monroe County Growth Management, 2010, Geographic Information System file "MC_FLUM_510"; Policy 101.4.2; Monroe County Growth Management, 2010, Geographic Information System file "Tier 0110" NOTE: Slight differences in totals due to rounding.

As seen in **Table 2.58** below, there is a total of 3,927 vacant parcels located in a zoning district that allows one dwelling unit per lot that are located on Tier I, II, III, IIIA, Undesignated Tier, Tier 0 and excludes 148 lots located in Ocean Reef (with no tier). (Ocean Reef is vested for 2,663 dwelling units – see page 125). This is a growth span of approximately 20 years.

Table 2.58 - Vacant Lots with Density of One Dwelling Unit per Lot in Tier I, II, III, IIIA, Undesignated Tier and Tier 0

	Total vacant Lots with a Density of 1du/lot	Current ROGO Allocation	Years of Growth
Lower Keys	2,212	**197**	**19.9**
Middle Keys	4		
Upper Keys	1,711		
TOTAL	**3,927**		

Source: Monroe County Growth Management, 2010, Geographic Information System file "MC_ELU_510"; Monroe County Growth Management, 2010, "Zoning"; Source: Monroe County Growth Management, 2010, Geographic Information System file "MC_FLUM_510"; Monroe County Growth Management, 2010, Geographic Information System file "Tier 0110"; Policy 101.4.2
NOTE: Slight differences in totals due to rounding.

As seen in **Table 2.59** below, there is a total of 3,121 vacant parcels located in a zoning district that allows one dwelling unit per lot that are located on Tier I, II, III, and IIIA. This analysis excludes Undesignated Tier, Tier 0 and 148 vacant parcels located in Ocean Reef (Ocean Reef is vested for 2,663 dwelling units – see page 125). This is a growth span of approximately 16 years.

Table 2.59 - Vacant Lots with Density of One Dwelling Unit per Lot in Tier I, II, III, and IIIA

	Total vacant Lots with a Density of 1du/lot	Current ROGO Allocation	Years of Growth
Lower Keys	2016	**197**	**15.8**
Middle Keys	4		
Upper Keys	1,101		
TOTAL	**3,121**		

Source: Monroe County Growth Management, 2010, Geographic Information System file"MC_ELU_510"; Monroe County Growth Management, 2010, "Zoning"; Source: Monroe County Growth Management, 2010, Geographic Information System file "MC_FLUM_510"; Monroe County Growth Management, 2010, "Tier 0110"; Policy 101.4.2

NOTE: Slight differences in totals due to rounding.

As seen in **Table 2.60** below, there is a total of 2,286 vacant parcels located in a zoning district that allows one dwelling unit per lot that are located on Tier II, III, and IIIA. This analysis excludes Undesignated Tier, Tier 0 and 148 vacant parcels located in Ocean Reef (Ocean Reef is vested for 2,663 dwelling units – see page 125). It also excludes Tier I, which although developable, are primarily natural areas. This is a growth span of approximately 12 years. There appears to be a sufficient amount of vacant parcels located in a zoning district that allows one dwelling unit per lot to support residential development throughout the 2030 planning horizon.

Table 2.60 - Vacant Lots with Density of One Dwelling Unit per Lot in Tier II, III, and IIIA

	II	III	III-A	Total Vacant Lots with a Density of 1du/lot in Tier II, III and III-A	Current ROGO Allocation	Years of Growth
Lower Keys	313	1,107	17	1,437	**197**	**11.6 yrs**

Middle Keys	0	4	0	4		
Upper Keys	0	720	125	845		
TOTAL	**313**	**1,831**	**142**	**2,286**		

Source: Monroe County Growth Management, 2010, Geographic Information System file "MC_ELU_510"; Monroe County Growth Management, 2010, "Zoning"; Source: Monroe County Growth Management, 2010, Geographic Information System file "MC_FLUM_510"; Monroe County Growth Management, 2010, Geographic Information System file "Tier 0110"; Policy 101.4.2

Tiers are:

I = Tier I – Natural Areas

II = Tier II (Big Pine Key and No Name Keys in the Lower Keys PA only)

III = Tier III – Infill Areas

III-A = Special Protection Area (SPA)

U = Undesignated Tier - Properties that originally had a Tier designation but became undesignated by a court order. This court order was in response to the Everglades Law Center's analysis of the Tier System. Therefore, it was determined that a number of parcels should be re-designated. The Tier Designation Review Committee is currently addressing the issues.

0 = Property does not have a Tier designation. Most of these occur in the Upper Keys and some are right-of-way parcels. Some lots were not originally designated because of mapping errors; the majority of which are currently being reviewed by the Tier Designation Review Committee and will be designated at a later date.

NOTE: Slight differences in totals due to rounding.

Lower Keys

As seen in the **Table 2.61**, the LKPA has 2,212 vacant lots which allow one dwelling unit to be developed; these are, for the most part, under a Residential Medium or Residential High future land use designation. Of the 2,212 lots, 196 are located under UNDES Tier or Tier 0; their development potential cannot be determined until they are assigned a tier. The majority (1,004) of the lots allowing one dwelling unit in this PA is designated Tier III.

Table 2.61 - Vacant Lots with a Density of 1 DU per lot by Tier and Future Land Use – Lower Keys Planning Area (LKPA)

Future Land Use	I	II	III	III-A	U	0	Total
Residential Medium	564	310	1,004	17	190	3	2,088
Residential High	15	1	99	0	1	2	118
Institutional	0	0	4	0	0	0	4
Conservation	0	2	0	0	0	0	2
Total	**579**	**313**	**1,107**	**17**	**191**	**5**	**2,212**

Source: Monroe County Growth Management, 2010, Geographic Information System file "MC_ELU_510"; Monroe County Growth Management, 2010, "Zoning"; Source: Monroe County Growth Management, 2010, Geographic Information System file "MC_FLUM_510""; Monroe County Growth Management, 2010, Geographic Information System file "Tier 0110"; Policy 101.4.2

Tiers are:

I = Tier I – Natural Areas

II = Tier II (Big Pine Key and No Name Keys in the Lower Keys PA only)

III = Tier III – Infill Areas

III-A = Special Protection Area (SPA)

U = Undesignated Tier - Properties that originally had a Tier designation but became undesignated by a court order. This court order was in response to the Everglades Law Center's analysis of the Tier System. Therefore, it was determined that a number of parcels should be re-designated. The Tier Designation Review Committee is currently addressing the issues.

0 = Property does not have a Tier designation. Most of these occur in the Upper Keys and some are right-of-way parcels. Some lots were not originally designated because of mapping errors; the majority of which are currently being reviewed by the Tier Designation Review Committee and will be designated at a later date.

NOTE: Slight differences in totals due to rounding.

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Middle Keys

The Middle Keys, as illustrated in the **Table 2.62**, has four lots that allow one dwelling unit each; these lots are in the Residential Medium land use category and are designated Tier III.

Table 2.62 - Vacant Lots allowing 1 DU per lot by Tier and Future Land Use – Middle Keys Planning Area (MKPA)

Future Land Use	I	II	III	III-A	U	0	Total
Residential Medium	0	0	4	0	0	0	4
Total	**0**	**0**	**4**	**0**	**0**	**0**	**4**

Source: Monroe County Growth Management, 2010, Geographic Information System file "MC_ELU_510"; Monroe County Growth Management, 2010, "Zoning"; Source: Monroe County Growth Management, 2010, Geographic Information System file "MC_FLUM_510""; Monroe County Growth Management, 2010, Geographic Information System file "Tier 0110"; Policy 101.4.2

Tiers are:

I = Tier I – Natural Areas

II = Tier II (Big Pine Key and No Name Keys in the Lower Keys PA only)

III = Tier III – Infill Areas

III-A = Special Protection Area (SPA)

U = Undesignated Tier - Properties that originally had a Tier designation but became undesignated by a court order. This court order was in response to the Everglades Law Center's analysis of the Tier System. Therefore, it was determined that a number of parcels should be re-designated. The Tier Designation Review Committee is currently addressing the issues.

0 = Property does not have a Tier designation. Most of these occur in the Upper Keys and some are right-of-way parcels. Some lots were not originally designated because of mapping errors; the majority of which are currently being reviewed by the Tier Designation Review Committee and will be designated at a later date.

NOTE: Slight differences in totals due to rounding.

Upper Keys

As seen in the **Table 2.63**, the UKPA has 1,859 vacant lots, which allow a dwelling unit to be developed and are, for the most part, under a Residential Medium and Residential High future land use designation. Of the 1,859 lots, 610 are located under UNDES Tier or Tier 0; their development potential cannot be determined until they are assigned a tier. In the UPKA, 845 of the lots or 45.5 percent allow one dwelling unit to be developed, and are located under Tiers III and III-A, which encourage development. Further, 148 lots or 8.0 percent are located in the Ocean Reef area (Ocean Reef is vested for 2,663 dwelling units – see page 125), where the Tier System does not apply; all are located within the Residential Medium future land use designation.

Table 2.63 - Vacant Lots allowing 1 DU per lot by Tier and Future Land Use – Upper Keys (UPKA)

Future Land Use	I	II	III	III-A	U	0	Not in Tier	Total
Residential Medium	232	0	550	124	575	0	148	**1,629**
Residential Low	1	0	0	0	0	0	0	**1**
Residential High	8	0	166	1	33	1	0	**209**
Recreation	1	0	1	0	1	0	0	**3**
Mixed Use/Commercial Fishing	14	0	0	0	0	0	0	**14**
Mixed Use/Commercial	0	0	3	0	0	0	0	**3**
Total	**256**	**0**	**720**	**125**	**609**	**1**	**148**	**1,859**

Source: Monroe County Growth Management, 2010, Geographic Information System file "MC_ELU_510"; Monroe County Growth Management, 2010, "Zoning"; Source: Monroe County Growth Management, 2010, Geographic Information System file "MC_FLUM_510"; Monroe County Growth Management, 2010, Geographic Information System file "Tier 0110"; Policy 101.4.2

Tiers are:

I = Tier I – Natural Areas

II = Tier II (Big Pine Key and No Name Keys in the Lower Keys PA only)

III = Tier III – Infill Areas

III-A = Special Protection Area (SPA)

U = Undesignated Tier - Properties that originally had a Tier designation but became undesignated by a court order. This court order was in response to the Everglades Law Center's analysis of the Tier System. Therefore, it was determined that a number of parcels should be re-designated. The Tier Designation Review Committee is currently addressing the issues.

0 = Property does not have a Tier designation. Most of these occur in the Upper Keys and some are right-of-way parcels. Some lots were not originally designated because of mapping errors; the majority of which are currently being reviewed by the Tier Designation Review Committee and will be designated at a later date.

NOTE: Slight differences in totals due to rounding.

2.7.4.6 Analysis of Proposed Development of Floodplains

[Rule 9J-5.006(2)(e),F.A.C.]

Floodplain areas within the County, as defined by the Federal Emergency Management, include the 100-year floodplain (Zone AE) and the velocity zone (Zone VE) (see *Chapter 3.0 Coastal and Conservation Management Element* for additional details). Most of the Keys lie within the 100-year floodplain. Exceptions include strips of along US1 on Key Largo, Plantation Key, Windley Key, and Plantation Key as well as other small areas (see **Map Series 3-2**).

Because most of the County lies within the 100-year floodplain, the effects of the Future Land Use Plan on floodplain areas will be similar to the effects on the County as a whole. The residential and non-residential rate of growth allocation point system directs growth away from areas particularly susceptible to damage from flooding, within the 100-year floodplain by assigning negative points for developments proposed within the VE zone.

2.7.5 Future Land Use Opportunities

2.7.5.1 Need for Redevelopment
[Rule 9J-5.006(2)(d), F.A.C.]

As noted in **Section 2.2.10**, of this Element, in the late 1990s, the County Planning Department developed the Livable CommuniKeys Program (LCP), which recognizes the distinctive nature of each island's resources and community needs and desires; addresses quality of life issues; and provides a future vision for the community. The general policy direction for the enhancement of existing areas is that the LCPs "will be used in conjunction with the Point System to discourage urban sprawl," protect natural resources, and enhance the character of the community "by encouraging infill development in established residential and commercial areas."

The concept of Community Centers is an important part of the LCPs. The County recognizes the special nature of Community Centers identified in the LCPs and supports the creation of area specific regulatory strategies and design standards to achieve local objectives. Over the past few years, the County has worked with local stakeholders to create policies and standards to ensure individual projects meet local needs, contribute to the creation of compact, walkable destinations, protect existing small businesses, and enhance the unique character of individual communities.

While the LCPs identify appropriate areas for redevelopment, the issue of how best to address non-conforming sites is challenging. While sites with non-conformities may continue in their current state and use, the nonconforming status may be a barrier to reinvestment and improvement. Non-conformities may limit changes in use, investment in modest improvements and additions, rebuilding after damage by fire or storm, and affect the owners and tenant's ability to procure insurance and financing. Additionally, the County should consider conducting an analysis to determine the redevelopment potential of obsolete residential and non-residential structures with U.S. 1 frontage in areas designated on the FLUM as Mixed Use Commercial development.

2.7.5.2 Nonconformities
[Rule 9J-5.006(2)(d)(2), F.A.C.]

Throughout the Keys there are an extensive number of parcels that should be evaluated for non-conformity with the Future Land Use and/or Land Use districts. An analysis of these parcels should be made to determine their specific issues since their non-conforming status may result from a variety of conditions (e.g. parking may be inadequate, setbacks and landscaping may not meet current standards, existing uses may not be permitted, or the intensity of development may be higher than is currently allowed). Upon completion of this analysis, the County should evaluate the land use designation of lawfully-established non-conforming non-residential land uses and structures and determine if changes in planning policy or land development regulations are appropriate assure community services may be maintained and to encourage rehabilitation, improvement, and modest additions.

2.7.5.3 Need for Additional Dredge Spoil Sites

There are no designated dredge spoil sites in the County. Furthermore, due to the environmental impacts associated with the placement and storage of these materials, there is no identified need for new dredge spoil disposal sites.

2.7.5.4 Mixed Use Commercial Land in Tier I

As noted in **Tables 2.54** and **2.56,** a substantial amount of vacant land in Tier 1, within the UKPA and the LKPA, have a Mixed Use land use designation. The County should consider examining these lands for future land use map amendments and/or rezoning.

2.7.5.5 Need for Conservation Land Protection

Every three years Monroe County should evaluate land acquired through ROGO dedication and/or grant funding for inclusion into a future land use conservation district and/or a conservation land use district (CLUD)/Zoning district.

2.7.5.6 Geographic Information System (GIS)

The Monroe County Growth Management Division should coordinate with the Property Appraiser's Office to continually update the existing Geographic Information System (GIS) database regarding land uses and densities and intensities of use in the County. The database should be updated to reflect the amount of development within the County as well as land use categories that are mapped on the Existing Land Use Map.

The Monroe County Growth Management Division should consider including in the LDR's a geographic description of the four PAs, as defined in ***Section 2.2.1*** "*Geographic Location".* In particular the Mainland PA which has been newly added to GIS data for this Comprehensive Plan Update.

The Monroe County Growth Management Division should consider further analysis of density and intensity once the Tier 0 and Undesignated Tier issues have been resolved.

The Monroe County Growth Management Division should consider designating the offshore islands that have an "Undesignated" classification on the Future Land Use Map (**Map Series 2-3)** These are the offshore islands that are primarily located in the Everglades National Park and the Lower Keys PA including but not limited to the Marquesas and the Dry Tortugas Keys. More accurate acreage may be provided on **Section 2.3.5** *"Offshore Islands* if the existing land use layer had offshore island names.

2.7.5.7 Consideration of Trends and Recommendations for Alternative Method

Since the implementation of NROGO, applications for square footage have not exceeded the amount available. The process is cumbersome; awards are made every six months. The County should consider as an alternative method that maintains the NROGO but allows existing business to expand outside the NROGO process, utilizing building permits as the method by which track the square footage issued.

2.7.5.8 US-1 Residential Capacity

As noted in **Section 2.6.9.1** of this Element, and discussed in detail in *Chapter 4.0 Traffic Circulation*, the US-1 level of service methodology identifies the reserve traffic capacity of the various roadway segments. This reserve capacity has been translated to residential dwelling unit capacity and projected out to 2030 as seen in **Table 2.64,** below. It is important to note that these capacity projections are based upon the reserve speeds for 2010 as established in the *2010 U.S. 1 Arterial Travel Time and Delay Study* (the "Study"*)*; and as such are valid until the next update of the Study or until mitigation actions are implemented. The County should continue to monitor the US-1 annual studies and update this analysis accordingly to assure that development within these segments do not negatively impact the level of service nor exceed the residential capacity.

2.7.5.9 Mixed Use -Commercial Fishing Land Use District

The County should evaluate the Mixed Use – Commercial Fishing Land Use District and the associated zoning categories related to Commercial Fishing and evaluate whether or note uses should be expanded to meet industry and reflect market changes.

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Table 2.64 – U.S. 1 Reserve Volume and Residential Unit Capacity (2010-2030)

U.S. 1 Segment		2010		2015		2020		2025		2030	
		Reserve Volume [1]	Residential Unit Capacity	Reserve Volume [1]	Residential Unit Capacity	Reserve Volume [1]	Residential Unit Capacity	Reserve Volume [1]	Residential Unit Capacity	Reserve Volume [1]	Residential Unit Capacity
1	Stock Island	2,186	342	1,991	311	1,864	291	1,737	271	1,609	251
2	Boca Chica	4,973	777	4,156	649	3,566	557	2,968	464	2,358	368
3	Big Coppitt	549(2)	*86*	[3]	[3]	[3]	[3]	[3]	[3]	[3]	[3]
4	Saddlebunch	2,593	405	1,419	222	584	91	[3]	[3]	[3]	[3]
5	Sugarloaf	265	41	[3]	[3]	[3]	[3]	[3]	[3]	[3]	[3]
6	Cudjoe	2,525	395	2,024	316	1,670	261	1,310	205	942	147
7	Summerland	1,967	307	1,531	239	1,223	191	911	142	593	93
8	Ramrod	1,866	292	1,409	220	1,086	170	758	119	424	66
9	Torch	2,087	326	1,668	261	1,372	214	1,072	167	765	120
10	Big Pine	1,520	238	846	132	371	58	[3]	[3]	[3]	[3]
11	Bahia Honda	7,187	1,123	5,806	907	4,836	756	3,851	602	2,845	445
12	7-Mile Bridge	3,716	581	2,366	370	1,299	203	248	39	[3]	[3]
13	Marathon	17,771	2,777	16,094	2,515	14,792	2,311	13,537	2,115	12,269	1,917
14	Grassy	0(2)	*0*	[3]	[3]	[3]	[3]	[3]	[3]	[3]	[3]
15	Duck	1,565	245	1,023	160	542	85	77	12	[3]	[3]
16	Long	6,722	1,050	4,784	748	3,018	472	1,315	206	[3]	[3]
17	Lower Matecumbe	940 (2)	*147*	[3]	[3]	[3]	[3]	[3]	[3]	[3]	[3]
18	Tea Table	727(2)	*114*	3	[3]	[3]	[3]	[3]	[3]	[3]	[3]
19	Upper Matecumbe	611	95	[3]	[3]	[3]	[3]	[3]	[3]	[3]	[3]
20	Windley	4,468	698	4,086	638	3,699	578	3,306	517	2,907	454
21	Plantation	2,881	450	952	149	[3]	[3]	[3]	[3]	[3]	[3]
22	Tavernier	9,539	1,490	7,778	1,215	5,991	936	4,178	653	2,337	365
23	Key Largo	9,121	1,425	7,897	1,234	6,065	948	4,501	703	2,915	455
24	Cross	7,187	1,123	5,906	923	4,605	719	3,285	513	1,945	304

Source 2010 US-1 Arterial Travel Time and Delay Study (Monroe County)

Notes:

1. Notes: These individual reserve volumes may be unobtainable, due to the constraint imposed by the overall reserve volume.
2. Value shown is 5% Allocation for 2010. County regulations and FDOT policy allow segments that fail to meet LOS C standards to receive an allocation not to exceed five percent below the LOS C standard. The resulting flexibility allows a limited amount of additional land development (number of residential units as shown) to continue until traffic speeds are measured the following year or until remedial actions are implemented. 3. Residential capacity not determined for future years where forecast reserve capacity is negative.

Appendix 2-1: Existing Land Use Designation with Corresponding Property Code (PC)

Existing Land Use	PC	Description
Commercial	11	STORES, ONE STORY
	12	MIXED USE - RESIDENTIAL / COMMERCIAL
	13	DEPARTMENT STORE
	14	SUPERMARKET
	15	REGIONAL SHOPPING CENTER
	16	COMMUNITY SHOPPING CENTER
	17	OFFICE BUILDING, ONE STORY
	18	OFFICE BUILDING, MULTI STORY
	19	PROFESSIONAL SERVICES BUILDING
	20	AIRPORT, MARINA, BUS TERM
	21	RESTAURANT OR CAFETERIA
	22	FAST FOOD DRIVE THRU RESTAURANT
	23	FINANCIAL INSTITUTION
	24	INSURANCE COMPANY OFFICE
	25	REPAIR SHOP (NOT AUTOMOTIVE)
	26	SERVICE STATION
	27	AUTO SALES/REPAIR, MARINE EQUIP
	28	PARKING LOTS, MOBILE HOME PARKS
	29	WHOLESALE OUTLET
	30	FLORIST OR GREENHOUSE
	31	DRIVE-IN THEATER OR OPEN STADIUM
	32	ENCLOSED THEATER OR AUDITORIUM
	33	NIGHTCLUB OR LOUNGE OR BAR
	34	BOWLING ALLEY, POOL HALL, MIN GOLF
	35	TOURIST ATTRACTION
	36	CAMPS
	37	RACE TRACKS, AUTO, DOG, HORSE
	38	GOLF COURSE
	39	HOTEL OR MOTEL
Conservation	82	U S MAINLAND FOREST, PARKS, REC AREA
	88	FEDERAL
	89	MUNICIPAL
	96	WASTE LAND, MARSH, SAND DUNES
	96	NON GOV. OWNED LAND-EVERGLADES
	99	NON AG ACREAGE 5AC OR MORE
	99	NATURE CONSERVANCY, FL KEYS LAND TRUST
Conservation or Other Public - Utilities and Rights of Ways	87[18]	STATE

[18] To arrive at the existing land use category aerials were considered and if the area was mainly mangrove is was classified as conservation. If it contained development, it was classified as Other Public - Utilities and Rights-of-Ways.

Appendix 2-1: Existing Land Use Designation with Corresponding Property Code (PC) (continued)

Existing Land Use	PC	Description
Conservation or Public Buildings and Grounds	86[19]	COUNTY
Educational	72	PRIVATE SCHOOL OR COLLEGE,
	83	PUBLIC SCHOOL
Industrial	41	LIGHT MANUFACTURING
	42	HEAVY INDUSTRIAL
	43	LUMBER YARD
	44	PACKING PLANT, SEAFOOD ETC.
	45	CANNERIES OR DISTILLERIES
	46	OTHER FOOD PROCESSING
	47	GRAVEL PIT
	48	WAREHOUSING
	49	OPEN STORAGE
Institutional	71	CHURCH
	72	RESEARCH CENTER
	73	PRIVATE HOSPITAL
	74	NURSING HOME
	75	ORPHANAGE
	76	MORTUARIES OR CEMETERY
	77	CLUB OR LODGE
	78	REST HOMES, HOMELESS SHELTER
	84	PUBLIC COLLEGE
	85	PUBLIC HOSPITAL
Military	81	MILITARY
Other Public - Utilities and Right-of-Ways	91	UTILITIES
	94	RIGHT OF WAY
Recreational	80	FL. PARKS OR MEMORIALS
	92	PRIVATE PARK
Residential	01	SINGLE FAMILY
	02	MOBILE HOME
	03	MULTI FAMILY (10 UNITS OR MORE)
	04	CONDOMINIUM
	05	TIMESHARE
	06	RETIREMENT HOME
	07	COMPOUNDS
	08	MULTI FAMILY (LESS THAN 10 UNITS)
	09	RESERVED BY DOR (DO NOT USE)
Vacant or Undeveloped	00	VACANT RESIDENTIAL
	10	VACANT COMMERCIAL
	40	VACANT INDUSTRIAL
	70	VACANT INSTITUTIONAL

Source: Monroe County Growth Management (GIS) Division

[19] To arrive at the existing land use category aerials were considered and if the area was mainly mangrove is was classified as conservation. If it contained development, it was classified as Public Buildings and Ground.

Appendix 2-2: Existing Density and Intensity by Property Code (PC)

PC	Description	Area (SF)	Area (Acres)	Units	Building SF	Density (DU/Acres)	FAR (SF/SF)
SINGLE FAMILY							
01	SINGLE FAMILY	269,036,094	6,176.2	13,596	NA	2.20	NA
MOBILE HOMES							
02	MOBILE HOME	304,084,770	6,980.8	4,987	NA	0.71	NA
MULTI FAMILY							
03	MULTI FAMILY (10 UNITS OR MORE)	1,108,698	25.5	261	NA	10.25	NA
04	CONDOMINIUM	19,997,628	459.1	2,393	NA	5.21	NA
05	TIMESHARE	372,267	8.5	70	NA	8.19	NA
07	COMPOUNDS[20]	19,124	0.4	8	NA	18.22	NA
08	MULTI FAMILY (LESS THAN 10 UNITS)	12,488,031	286.7	1,493	NA	5.21	NA
NA	LICENSED PUBLIC LODGING FACILITIES	7,624,630[21]	175.0	2,199[22]	NA	12.56	NA
	SUBTOTAL	**41,610,378**	**955.2**	6,424	NA	6.72	NA
MIXED USE							
12	MIXED-USE(Residential)	5,177,622.40	118.9	196	NA	1.65	NA
12	MIXED-USE (Commercial)	5,177,622.40	118.9	NA	518,972	NA	0.10023

[20] According to the Monroe County Property Appraiser, these are single family homes that have a shared interest in a common area. (email communication from Robbie Shaw dated August 26, 2010) New Lodging Establishments - Current
[21] Square foot area from Property Appraiser's Office dataset "Public_Parcel" PC code 39, dating January 2010
[22] Number of rooms from licensed hotel/motel acquired from *Economic Trends and Opportunities in Unincorporated Monroe County* by Fishkind and Associates, Inc. February 23, 2011 report.

Appendix 2-2: Existing Density and Intensity by Property Code (continued)

PC	Description	Area (SF)	Area (Acres)	Units	Building SF	Density (DU/Acres)	FAR (SF/SF)
GENERAL COMMERCIAL							
11	STORES, ONE STORY	2,560,859	58.8	NA	386,764	NA	0.15103
13	DEPARTMENT STORE	20,627	0.5	NA	1,600	NA	0.07757
14	SUPERMARKET	237,189	5.4	NA	51,415	NA	0.21677
15	REGIONAL SHOPPING CENTER	0	0.0	NA	0	NA	0.00000
16	COMMUNITY SHOPPING CENTER	3,129,330	71.8	NA	629,659	NA	0.20121
17	OFFICE BUILDING, ONE STORY	1,838,872	42.2	NA	233,770	NA	0.12713
18	OFFICE BUILDING, MULTI STORY	1,045,452	24.0	NA	111,862	NA	0.10700
19	PROFESSIONAL SERVICES BUILDING	1,677,210	38.5	NA	110,303	NA	0.06577
20	AIRPORT, MARINA, BUS TERM	165,922,094	3,809.0	NA	269,381	NA	0.00162
21	RESTAURANT OR CAFETERIA	1,486,046	34.1	NA	128,242	NA	0.08630
22	FAST FOOD DRIVE THRU RESTAURANT	276,325	6.3	NA	25,598	NA	0.09264
23	FINANCIAL INSTITUTION	676,353	15.5	NA	67,139	NA	0.09927
24	INSURANCE COMPANY OFFICE	0	0.0	NA	0	NA	0.00000
25	REPAIR SHOP (NOT AUTOMOTIVE)	2,016,526	46.3	NA	162,679	NA	0.08067
26	SERVICE STATION	741,167	17.0	NA	62,575	NA	0.08443
27	AUTO SALES/REPAIR, MARINE EQUIP	611,711	14.0	NA	31,457	NA	0.05142
28	PARKING LOTS, MOBILE HOME PARKS	9,372,308	215.2	NA	231,780	NA	0.02473

Appendix 2-2: Existing Density and Intensity by Property Code (continued)

PC	Description	Area (SF)	Area (Acres)	Units	Building SF	Density (DU/Acres)	FAR (SF/SF)
29	WHOLESALE OUTLET	193,653	4.4	NA	9,224	NA	0.04763
30	FLORIST OR GREENHOUSE	218,456	5.0	NA	1,742	NA	0.00797
31	DRIVE-IN THEATER OR OPEN STADIUM	20,071	0.5	NA	5,238	NA	0.26098
32	ENCLOSED THEATER OR AUDITORIUM	11,940	0.3	NA	2,378	NA	0.19916
33	NIGHTCLUB OR LOUNGE OR BAR	174,782	4.0	NA	13,059	NA	0.07472
34	BOWLING ALLEY, POOL HALL, MIN GOLF	28,768	0.7	NA	0	NA	0.00000
	SUBTOTAL	**192,259,737**	**4,413.7**	**NA**	**2,535,865**	**NA**	**0.01319**
TOURIST COMMERCIAL							
35	TOURIST ATTRACTION	440,844	10.1	NA	30,172	NA	0.06844
36	CAMPS	40,001	0.9	NA	2,594	NA	0.06485
37	RACE TRACKS, AUTO, DOG, HORSE	764,519	17.6	NA	73,522	NA	0.09617
	SUBTOTAL	1,245,364	28.6	NA	106,288	NA	0.08535
COMMERCIAL FISHING							
44	PACKING PLANT, SEAFOOD ETC.	1,032,510	23.7	NA	60,152	NA	0.05826

Appendix 2-2: Existing Density and Intensity by Property Code (continued)

PC	Description	Area (SF)	Area (Acres)	Units	Building SF	Density (DU/Acres)	FAR (SF/SF)
INDUSTRIAL							
41	LIGHT MANUFACTURING	874,279	20.1	NA	56,326	NA	0.06443
42	HEAVY INDUSTRIAL	449,499	10.3	NA	14,721	NA	0.03275
43	LUMBER YARD	150,723	3.5	NA	19,374	NA	0.12854
46	OTHER FOOD PROCESSING	38,477	0.9	NA	3,009	NA	0.07820
47	GRAVEL PIT	7,853,609	180.3	NA	31,642	NA	0.00403
48	WAREHOUSING	6,016,921	138.1	NA	700,219	NA	0.11637
49	OPEN STORAGE	3,090,718	71.0	NA	4,521	NA	0.00146
	SUBTOTAL	**18,474,226**	**424.1**	**NA**	**829,812**	**NA**	**0.04492**
EDUCATION							
72	PRIVATE SCHOOL OR COLLEGE, RESEARCH CENTER	521,485	12.0	NA	90,885	NA	0.17428
83	PUBLIC SCHOOL	3,588,519	82.4	NA	280,183	NA	0.07808
84	PUBLIC COLLEGE	0	0.0	NA	0	NA	0.00000
	SUBTOTAL	**4,110,004**	**94.4**	**NA**	**371,068**	**NA**	**0.09028**

Appendix 2-2: Existing Density and Intensity by Property Code (continued)

PC	Description	Area (SF)	Area (Acres)	Units	Building SF	Density (DU/Acres)	FAR (SF/SF)
INSTITUTIONAL							
71	CHURCH	3,358,403	77.1	NA	190,612	NA	0.05676
73	PRIVATE HOSPITAL	93,436	2.1	NA	27,705	NA	0.29651
74	NURSING HOME	7,667	0.2	NA	1,485	NA	0.19370
75	ORPHANAGE	0	0.0	NA	0	NA	0.00000
76	MORTUARIE OR CEMETERY	1,181,899	27.1	NA	8,611	NA	0.00729
77	CLUB OR LODGE	16,848,964	386.8	NA	352,887	NA	0.02094
85	PUBLIC HOSPITAL	361,346	8.3	NA	90,300	NA	0.24990
	SUBTOTAL	**21,851,714**	**501.6**	**NA**	**671,600**	**NA**	**0.03073**
PUBLIC BUILDINGS/GROUNDS							
86	COUNTY (OTHER THAN PC LIST)	66,517,589	1,527.0	NA	233,680	NA	0.00351
87	STATE (OTHER THAN PC LIST)	602,792,054	13,838.2	NA	79,915	NA	0.00013
89	MUNICIPAL (OTHER THAN PC LIST)	524,181	12.0	NA	0	NA	0.00000
94	RIGHT OF WAY	28,584,780	656.2	NA	96	NA	0.00000
	SUBTOTAL	**698,418,605**	**16,033.5**	**NA**	**313,691**	**NA**	**0.00045**
PUBLIC FACILITIES							
91	UTILITIES	6,891,176	158.2	NA	188,552	NA	0.02736

Appendix 2-2: Existing Density and Intensity by Property Code (continued)

PC	Description	Area (SF)	Area (Acres)	Units	Building SF	Density (DU/Acres)	FAR (SF/SF)
MILITARY							
81	MILITARY	66,245,929	1,520.8	NA	2,674	NA	0.00004
RECREATION							
38	GOLF COURSE	11,360,085	260.8	NA	51,499	NA	0.00453
92	PRIVATE PARK	6,722,004	154.3	NA	17,075	NA	0.00254
	SUBTOTAL	**18,082,089**	**415.1**	**NA**	**68,574**	**NA**	**0.00379**
CONSERVATION							
NA	NA	NA	NA	NA	NA	NA	NA
VACANT							
00	VACANT RESIDENTIAL	834,287,416	19,152.6	NA	NA	NA	NA
10	VACANT COMMERCIAL	29,443,348	675.9	NA	NA	NA	NA
40	VACANT INDUSTRIAL	0	0.0	NA	NA	NA	NA
70	VACANT INSTITUTIONAL	65,585,215	1,505.6	NA	NA	NA	NA
	SUBTOTAL	**929,315,979**	**21,334.2**	**NA**	**NA**	**NA**	**NA**

Appendix 2-2: Existing Density and Intensity by Property Code (continued)

PC	Description	Area (SF)	Area (Acres)	Units	Building SF	Density (DU/Acres)	FAR (SF/SF)
NOT CLASSIFIED							
96	WASTE LAND, MARSH, SAND DUNES, NON GOV OWNED LAND-EVERGLADES	5,235,306.82	120.2	NA	0	NA	0.00000
99	NATURE CONSERVANCY, FL KEYS LAND TRUST	214,813,929.24	4,931.4	NA	0	NA	0.00000
	SUBTOTAL	**220,049,236.06**	**5,051.6**	**NA**	**0**	**NA**	**0.00000**
TOTAL UNINCORPORATED KEYS		**2,797,885,433.70**	**64,230.61**	26,274	5,667,248	NA	NA
MAINLAND/SUBMERGED							
82	U S MAINLAND FOREST, PARKS, REC AREA	21,147,221,210.09	269,007	NA	119,577	NA	0.00001
88	FEDERAL (OTHER THAN PC LIST)	8,190,914,532.32	122,909	NA	73,725	NA	0.00001
95	SUBMERGED LAND	41,234,132.12	944	NA	820	NA	0.00002
NO PC CODE		879,651.12	20	NA	0	NA	0.00000
	SUBTOTAL	29,380,249,525.65	392,880	NA	194,122	NA	NA
GRAND TOTAL MONROE COUNTY		**32,178,134,959.35**	**457,110.61**	**26,274**	**5,861,370**	**NA**	**NA**

Source: Monroe County Property Appraiser's Office, January 2010, "Parcel_Public"

Appendix 2-3: Population Projection Methodology Report

1.0 Background - Forecast Approach

The population forecast was prepared[23] for unincorporated Monroe County through year 2030 for the update of the County's Comprehensive Plan. Population is identified according to upper/middle/lower (UML) keys. It is based on the countywide functional population control total forecast through 2030; functional population is the sum of permanent plus seasonal population.

The Keith and Schnars (K&S) team begins with a permanent population forecast and a seasonal population forecast at the county level. The seasonal population series is based on the Florida Keys Aqueduct Authority (FKAA) data series. This series includes estimates of seasonal residences, RV's, hotel/motel, camps, boat liveaboards, mobile home, and other. The Department of Community Affairs (DCA) has recommended using the FKAA series for the purposes of estimating the seasonal population component, with appropriate updates to the methodology.

The permanent population series is the latest published by the University of Florida, Bureau of Economic and Business Research (BEBR). In as much as ROGO has been in place since 1993, BEBR population projections reflect a ROGO constrained growth trend. This means permanent population growth projections implicitly assume the continuation of the ROGO constraint and the effects of the ROGO constraint are implicitly embedded in the history.

2.0 ROGO Based Permanent Population Series

The ROGO based permanent population series will be used in the Comp Plan update as one component of the functional population. At the county level, for control totals, DCA has recommended using the latest BEBR annual estimates and the BEBR Medium series population projections from PS 156, published March 2010 for permanent population estimates.

3.0 Analysis of Permanent Population Data

University of Florida annual population estimates for municipalities and unincorporated areas indicates permanent population fell in the Keys from 2006-2008, with some a return to growth evidenced in 2009. The effect of the short term decline is to drive the long term population projections down. Thus, both recent history and future projections from BEBR suggest a downward trend in permanent population. This is reflected in the resulting Functional Population series shown in **Figure 1**. This series represents the sum of the most recent BEBR permanent projection and the FKAA seasonal projection.

[23] The population forecast was prepared by Fishkind and Associates with support from Keith and Schnars, P.A.

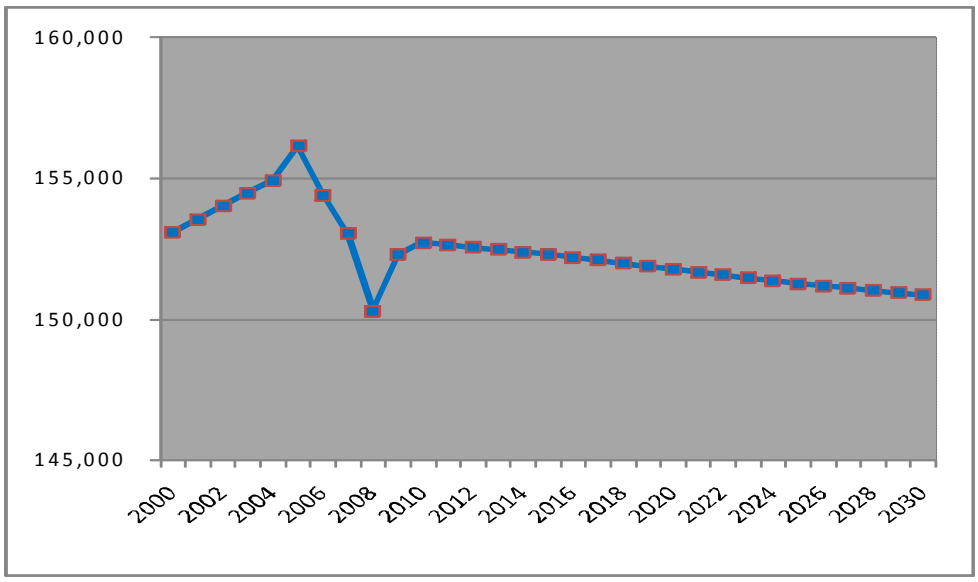


Figure 1 – Preliminary Functional Population Projection

4.0 Analysis of Seasonal Population Data

There is ongoing ROGO based residential growth and there is a substantial inventory of non-conforming, substandard, live-aboard and RV camp housing. Substandard, non-conforming units are being gradually removed from inventory, however, not at a rate fast enough to net out all residential growth. It is our view a portion of the permanent population losses have occurred as a result of the recession, a rise in foreclosures, depletion of affordable housing and increased unemployment. Nearly 3,500 units have been foreclosed throughout the Keys since 2005. The rise in home prices and threat of hurricanes has also contributed in our view to some permanent population loss. Losses associated with some of these conditions may be temporary, resulting in renewed growth after the recession. The BEBR annual permanent population estimate for 2009 indicated, net positive permanent population growth in 2009 and small losses in 2010.

On the other hand, of all the new single family housing growth in Monroe County since 1999, nearly 70% has been in non-homesteaded units. It is likely this is a function of both growth in seasonal population as well as permanent population loss, which may cause once permanently occupied existing units to become non-homesteaded. This latter aspect represents a shift from existing permanent population to seasonal population and is why the non-homesteaded mix is so high.

5.0 Seasonality

Seasonal population is one component of Functional population. K&S has researched three functional population series. The three functional series in this analysis include permanent populations based on Census, BEBR and FKAA. In each of these scenarios the same Seasonal series, from FKAA, is used. The FKAA seasonal series is the seasonal series developed by Monroe County Planning Department (MCPD). The detailed methodology for the Seasonal series is found in the MCPD report included as Appendix 1. The FKAA seasonal series methodology generated from the MCPD report is found in **Appendix 2**.

As permanent population has fallen we must examine whether and the degree to which it is replaced by seasonal population. The American Communities Survey from 2005, 2008 and the Census 2000 data indicate a substantial increase in housing units held for seasonal use. These data indicate the number of seasonal units has risen from 12,628 in 2000 to 15,262 in 2005 to 19,195 in 2008 (**Table 2**). This is an increase of 6,567 seasonal units. This would represent a shift into seasonal population by as much as 16,418 persons. During the same period permanently occupied units have fallen from 35,086 to 29,084, some 6,002 units or a decline of 15,005 persons (**Table 1**). Based on the ACS and Census data, the loss in permanent population is approximately equivalent to the gain in seasonal population since year 2000.

Table 1- H1 – Vacant and Occupied Unit Counts

Table H1. Housing Units by Vacancy Status and Tenure by Units in Structure, 2000 - Monroe County

Monroe County Units in Structure	Occupied Units			Vacant Units	Total Units	Vacant %
	Owner	Renter	Total			
1, detached	13,866	3,496	17,362	6,850	24,212	28.29%
1, attached	1,045	1,503	2,548	1,655	4,203	39.38%
2	480	1,598	2,078	453	2,531	17.90%
3 or 4	306	1,875	2,181	589	2,770	21.26%
5 to 9	215	1,042	1,257	897	2,154	41.64%
10 to 19	403	425	828	899	1,727	52.06%
20 to 49	375	180	555	1,039	1,594	65.18%
50 or more	346	1,043	1,389	444	1,833	24.22%
Mobile home	4,468	1,945	6,413	3,401	9,814	34.65%
Boat, RV, van, etc.	396	79	475	304	779	39.02%
Total	21,900	13,186	35,086	16,531	51,617	32.03%

Table H1. Housing Units by Vacancy Status and Tenure by Units in Structure, 2005 - Monroe County

Monroe County Units in Structure	Occupied Units			Vacant Units	Total Units	Vacant %
	Owner	Renter	Total			
1, detached	16,618	2,024	18,642	7,448	26,090	28.55%
1, attached	1,427	2,106	3,533	2,978	6,511	45.74%
2	621	973	1,594	636	2,230	28.52%
3 or 4	52	1,521	1,573	638	2,211	28.86%
5 to 9	458	482	940	1,440	2,380	60.50%
10 to 19	597	46	643	505	1,148	43.99%
20 to 49	132	1,125	1,257	1,198	2,455	48.80%
50 or more	435	532	967	203	1,170	17.35%
Mobile home	2,876	1,485	4,361	3,904	8,265	47.24%
Boat, RV, van, etc.	405	46	451	0	451	0.00%
Total	23,621	10,340	33,961	18,950	52,911	35.81%

Table H1. Housing Units by Vacancy Status and Tenure by Units in Structure, 2008 - Monroe County

Monroe County Units in Structure	Occupied Units			Vacant Units	Total Units	Vacant %
	Owner	Renter	Total			
1, detached	15,019	3,344	18,363	10,351	28,714	36.05%
1, attached	490	1,233	1,723	3,209	4,932	65.06%
2	371	803	1,174	764	1,938	39.42%
3 or 4	283	699	982	1,581	2,563	61.69%
5 to 9	272	845	1,117	2,158	3,275	65.89%
10 to 19	170	202	372	1,011	1,383	73.10%
20 to 49	161	56	217	828	1,045	79.23%
50 or more	463	504	967	816	1,783	45.77%
Mobile home	2,739	1,121	3,860	4,011	7,871	50.96%
Boat, RV, van, etc.	164	145	309	0	309	0.00%
Total	20,132	8,952	29,084	24,729	53,813	45.95%

Table 2-H3

Table H3. Number of Vacant Units by Vacancy Status, 2000 - Monroe County

Monroe County Vacancy Status	Vacant Units	%
For rent	1,663	10.06%
For sale only	759	4.59%
Rented or sold, not occupied	304	1.84%
For seasonal, recreational, or occasional use	12,628	76.39%
For migrant workers	48	0.29%
Other vacant	1,129	6.83%
Total	**16,531**	**100.00%**

Table H3. Number of Vacant Units by Vacancy Status, 2005 - Monroe County

Monroe County Vacancy Status	Vacant Units	%
For rent	943	4.98%
Rented, not occupied	458	2.42%
For sale only	448	2.36%
Sold, not occupied	123	0.65%
For seasonal, recreational, or occasional use	15,738	83.05%
For migrant workers	0	0.00%
Other vacant	1,240	6.54%
Total	**18,950**	**100.00%**

Table H3. Number of Vacant Units by Vacancy Status, 2008 - Monroe County

Monroe County Vacancy Status	Vacant Units	%
For rent	1,581	6.43%
Rented, not occupied	53	0.22%
For sale only	1,545	6.28%
Sold, not occupied	441	1.79%
For seasonal, recreational, or occasional use	19,195	78.03%
For migrant workers	0	0.00%
Other vacant	1,914	7.78%
Total	**24,729**	**100.53%**

Source: US Census and American Communities Survey;
Prepared by the South Florida Regional Planning Council

Contributing to the support of the seasonal increase phenomenon is the rate of foreclosures and the Monroe County Property Appraiser data regarding homestead exemptions. It is generally believed non-homesteaded properties represent seasonal vacant, second homes, or for-rent units. Population in these should be distinguished from short-term tourist visitors. However, in times of high foreclosure rates, a shift to non-homestead may represent a temporary loss in permanent population.

During the housing bubble from 2003-2008 in fact non-homesteaded units did rise. This coincided with a rise in foreclosures, as well as speculative investing and reported permanent population losses. There were 3,431 foreclosures in Monroe County from 2005-2009.

During the 2000-2009 period, total homesteaded units increased from 16,005 to 16,698 units, a net increase of 693 units. Non-homesteaded units moved from 20,784 to 22,197, a net increase of 1,413 units. This compares with the 3,431 foreclosures from 2005-2009, recognizing it is likely as much as half of the foreclosed units may have been resold since the initial foreclosures which began in 2005, and some tendency to for those units to return to a homesteaded status. By 2009, after speculative investing ceased, the share of non-homesteaded properties went back down, falling to 2003 levels. This is consistent with the expectation of resold foreclosures regaining homesteads (**Figure 2**). Also, as noted, permanent population increased during 2009 according to BEBR, supporting an increase in permanent population.

The non-homestead rate for all units is now 57.1%. This is essentially the same rate both pre and post bubble. Single family non-homestead rates began to move up more closely in concert with rising foreclosures (**Figure 2**). This supports our belief a considerable portion of permanent population losses may be attributable to foreclosures arising from the speculative housing bubble, and thus temporary. The expectation is some permanent population may return to these units over the course of the planning horizon – thus permanent population may increase over this period in substantially greater numbers than the growth in new housing units. To the degree this condition occurs, the BEBR medium series permanent population projection will be in error and will under-project permanent population growth. Planning for this contingency in the face of an unknown resolution to thousands of foreclosures is necessary. Thus, reflecting the population associated with portions of these foreclosed units as non-homestead and seasonal population will also correct and compensate for this potential longer term problem with the BEBR projection.

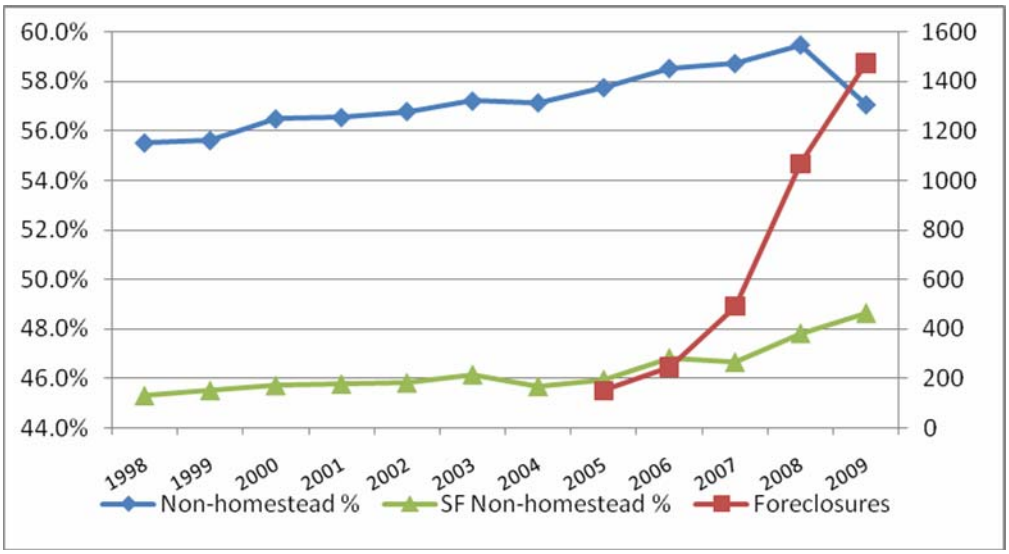


Figure 2- Monroe County – Foreclosures and The Percent of Non-Homestead Residential Units

There has been an increase in vacant units from 2005-2009. During this period both the Census and BEBR indicated permanent population loss. From 2005 to 2008 the ACS indicated an increase in seasonal vacancy of 3,457 units. During the 2005-2009 period, foreclosure data indicated there were 3,431 foreclosures, as noted earlier. Thus, the ACS data indicates, on net, the permanent population losses and associated housing vacancy is being shifted into seasonal units. Further, it is believed there is associated seasonal (non-permanent population) associated with these vacant units. With a reported permanent population growth in 2009 and increasing homestead exemptions in 2009 on one hand and coinciding numbers of foreclosures and seasonal increase through ACS, it is equally possible in our view, the permanent population loss is temporary and due as much to the end of the housing bubble, foreclosures and rising unemployment as it is due to a shift from permanent to seasonal residency. It is likely both conditions exist and are occurring.

6.0 Methodological Flaw in MCPD and FKAA Regarding Seasonal Shift

The MCPD seasonal population methodology and the FKAA seasonal population methodology did not contemplate or recognize the shift of the existing population base from permanent to seasonal. The MCPD methodology considered residential unit growth only and the depletion of available buildable lots, when contemplating the future level of either permanent or seasonal populations. This is partly due to the MCPD methodology not having the benefit of the data beyond year 2000 which shows a more pronounced shift among existing units from permanent/homesteaded units to non-homesteaded units, and the American Communities Survey data, which supports the seasonal shift.

The failure to consider or incorporate the shift in the existing population base is the reason for the change that has been made to the previously approved FKAA population methodology in this update. The methodological change employed here is to both shift some of the projected dwelling unit growth into seasonal residences ***and*** account for the loss of existing permanent residents through an offsetting shift to seasonal residents.

Further, in the MCPD analysis, rather than showing seasonal population increasing as it has been, on pages 32 and 33 of the MCPD report it states an assumption was employed causing the seasonal population to decline in a similar fashion to anticipated permanent population decline.

The MCPD methodology employed an assumption called the "drag factor" of .1% per year to reduce the growth of seasonal populations over time. The "drag factor" is used to illustrate the assumption of seasonal population declines from the historic actual. However there is no analysis or data which is presented to support the use of the "drag factor", nor the .1% level of the "drag factor" with respect to seasonal populations. Further there is no mention or discussion in the MCPD analysis which recognizes that the loss in the existing permanent population base may be offset by an increase in the seasonal population. The current population projections in this report correct this methodological flaw.

The discussion of the "drag factor" assumption is found in the MCPD permanent population methodology on page 30 and is excerpted below:

> A "drag" factor was applied to each year's percent increase figures by PAED. This drag factor increases by .1% each year over the ten year period, so that by 2015, the rate of increase in permanent resident population by PAED will have declined by 1.1%. This drag factor was employed as an assumption that the availability of building permits will decline as the carrying capacity of the Keys is reached. It is also likely that the availability of building sites will also decline in the early years of the twenty-first century. Analysis has shown that a 1.1% decline in mean percentage increases in population over a ten year period would not significantly affect the validity of the population forecasts. It is important to note this methodology reveals the beginnings of a decline in the total number of permanent residents in unincorporated Monroe County by 2014.

Source: Appendix 1; MCPD, Pg 30 re: discussion of permanent population

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The use of the "drag factor" assumption as applied to growth in seasonal population is found in the methodology on page 33 is excerpted below:

> A similar methodology was employed to determine the seasonal resident and vacation rental visitor population by PAED from 2005 to 2015. Essentially, the average percent increase figure was applied to the previous year's population figures. The product of this equation was then added to the previous year's population to estimate the following year's total seasonal resident and vacation rental visitor population. A "drag" factor was applied to each year's percent increase figures by PAED (similar to the one applied to the permanent resident population figures). This drag factor increases by .1% each year over the ten year period, so that by 2015, the percent increase in seasonal resident and vacation rental visitor population by PAED will have declined by 1.1%. It is important to note this methodology reveals the beginnings of a decline in the total number of seasonal residents and visitors in vacation rentals in unincorporated Monroe County by 2013, one year prior to similar declines expected for the permanent resident population forecasts.

Source: Appendix 1, MCPD; Pg 33 re: discussion of seasonal population

In this analysis the attempt has been made to analyze and determine whether and to what degree the existing permanent base has shifted to seasonal population, and to correct the population projections to reflect this phenomenon.

7.0 Seasonality in Retail Sales

In a further test of seasonal conditions K&S examined historic monthly retail sales from 1998-2009 to determine if seasonal trends were becoming more pronounced. In this investigation we conducted a regression analysis using inflation adjusted monthly gross retail sales for Monroe County as the dependent variable. The econometric model developed tests both the effects of cyclical economic conditions and seasonal variations as predictors of retail sales. We further tested this model to determine if, over time, the seasonal pattern became more pronounced.

The model's initial results indicate seasonal patterns are the strongest and most significant predictor of monthly retail sales. Cyclical factors including Gross Domestic Product, gasoline prices, unemployment and housing starts are also all significant predictors of retail sales. It is these cyclical factors which led to the 2006-2009 overall decline in sales. Thus these declines are not permanent as would be the case with a loss in permanent and seasonal population. Despite population losses in Monroe County estimated by BEBR for year 2010, retail sales did not decline, further validating the cyclical nature of sales.

The second part of the test indicates that the seasonal pattern did not increase over time compared with the average seasonality. The econometric model results are shown below in Table 3. These results indicate the overall predictive ability of the model is very high (R2=.963). Further, the seasonal dummy variable (SeasDum1), which tests seasonality over the historic test period, is highly significant (t=11.2) and finally, a second set of seasonal dummy variables to test for additional seasonality after 2005 and also for

additional peak season seasonality after 2005 (SeasDum2 and SeasDum3) both resulted in a lack of significance (t=.27 and t=.16 respectively). Thus, we conclude seasonal sales patterns are not changing nor were they becoming more pronounced from 2005-2009 compared with the 1998-2004 period. We believe this supports the theory that permanent

population losses has been offset and replaced by a new type of seasonal population which spends, travels and behaves similarly to permanent population. This could be the case if a) homeowners lose a home to foreclosure and are forced to rent causing a shift to non-homesteaded (seasonal) units but still remain present in the market or b) newly built seasonal units are rented out for increasing periods and durations throughout the year, mimicking a "permanent" household. Anecdotal evidence supports both these conditions are presently occurring.

Other significant variables in the model include Gross Domestic Product, national gasoline prices, national housing starts and national unemployment rates. Interestingly, the change in Monroe County permanent population growth was not a significant predictor of retails sales, despite permanent population losses and a decline in of sales in 2007, 2008 and 2009. In such a case one would expect negative population growth would cause retail sales declines. Because this was not evident in the statistical analysis, our belief that the decline in retail sales was cyclical garners greater support. Thus we conclude economic recession and seasonal activity determine sales volumes but declining permanent population, which is not statistically significant, does not.

Again, the retail model analysis supports the view as permanent population is lost; it has been replaced by longer duration seasonal population or renters with no change in retail spending patterns. This would explain that while permanent population falls, there may be limited change in functional population due to seasonal replacement, as evidenced by retail sales.

Table 3 - Econometric Test Results for Increasing Seasonality

	SUMMARY OUTPUT			
	Regression Statistics			
	Multiple R	0.981816		
	R Square	0.9639626		
	Adjusted R S	0.9447427		
	Standard Err	9209659		
	Observations	24		
	ANOVA			
		df	*SS*	*MS*
	Regression	8	3.40318E+16	4.25E+15
	Residual	15	1.27227E+15	8.48E+13
	Total	23	3.53041E+16	
		Coefficients	*Standard Error*	*t Stat*
	Intercept	14947330	70400081.75	0.21232
GDP00	X Variable 1	28577.724	8869.439916	3.222044
WGAS	X Variable 2	-136177.6	110696.9446	-1.23018
HUSTQ	X Variable 3	27846.359	6935.672302	4.014947
RUQ	X Variable 4	-8224690	2684043.539	-3.06429
SeasDum1	X Variable 5	60680019	5395979.787	11.24541
SeasDum2	X Variable 6	2884055.9	10598795.93	0.272112
SeasDum3	X Variable 7	1368525.4	8297684.899	0.164929
Pop Ch	X Variable 8	1473.2782	2520.714671	0.584468

Table 4 - Florida Keys Visitors

Florida Keys Visitor Person-Trip Estimates

	2003	2004	2005	2006	2007	2008	2009
Key West Overnight Visitors	1,309,559	1,303,633	1,046,111	1,063,752	1,094,647	1,112,978	1,165,327
Key West Day Trippers	242,268	241,172	237,460	196,794	202,510	205,901	206,263
Cruise Ship Passengers	1,067,222	934,070	925,795	888,183	816,919	739,218	859,409
Total Key West Visitors	2,619,049	2,478,875	2,209,366	2,148,729	2,114,076	2,058,097	2,230,999
All Keys Overnight Visitors	2,425,110	2,414,135	1,937,244	2,030,062	2,089,021	2,169,565	2,092,732
All Keys Day Trippers	448,645	446,615	439,742	375,561	386,469	401,369	370,414
Cruise Ship Passengers *(Key West Only)*	1,067,222	934,070	925,795	888,183	816,919	739,218	859,409
Total All Keys Visitors	3,940,977	3,794,820	3,302,781	3,293,806	3,292,409	3,310,152	3,322,555
Monroe County Lodging Occupancy %:	72.2%	71.2%	70.0%	66.5%	68.1%	67.5%	70.3%

Sources: Monroe County Tourist Development Council; Smith Travel Research

Further, the seasonal stability and long term growth trend in retail sales is not attributed to additional retail spending by tourists or cruise ship passengers. Cruise ship and other tourists have declined over the past six years (**Table 4**) indicating the underlying retail sales growth pattern does not appear to be tourist related.

8.0 Long term Trends in Retail Sales and Traffic

Retail sales have been trending up on an inflation adjusted basis over time (**Figure 3**). Total trend based growth is about 4% from 1998-2009. The declines in sales in 2007, 2008 and 2009 are as a result of rising gasoline prices in 2008 which reduced trips and travel and the cyclical effects of recession. As the recession ended retail sales stabilized and sales through November 2010 indicated no further loss in year over year retail sales countywide, despite a decline in permanent population in 2010 as reported by BEBR annual population estimates.

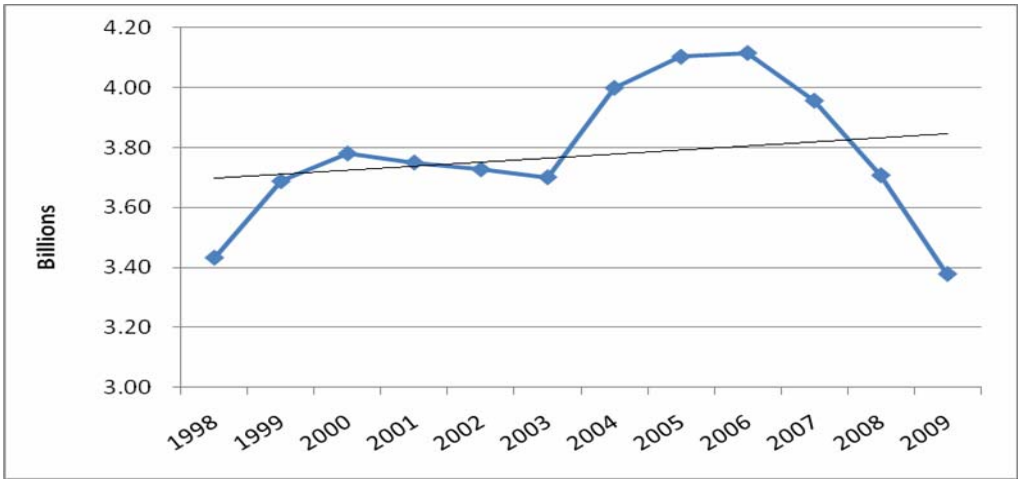


Figure 3 - Monroe County Annual Retail Sales (inflation adjusted)

Similarly, in average daily traffic flows, the long term trend has been gradually increasing. Total trend based growth is about 6% (see Figure 4). This is generally consistent with and of similar magnitude to the trend in retail sales data. Based on sales and traffic it appears that the permanent population losses are being replaced by seasonal residents and there is

no permanent net decline in economic activity (sales and traffic), as would be suggested by sustained permanent population losses without replacement.

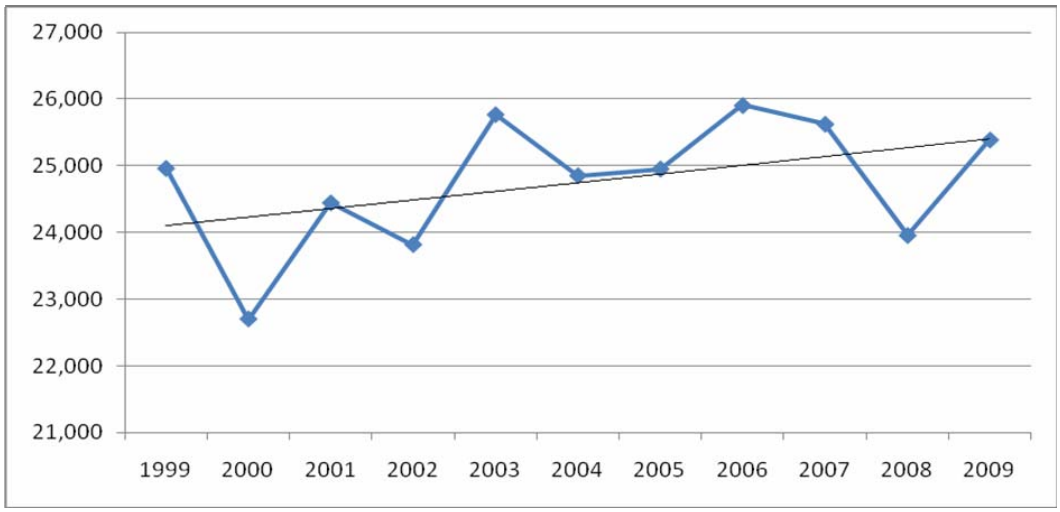


Figure 4 - Annual Average Daily Traffic Counts (Average of Selected Count Stations)

The trend analysis of traffic data was examined in a variety of ways. These included selection of data stations to reflect only single locations per Key and data for which the entire history was available in a consistent fashion. This prevented overweighting by location or the effects of changing data collection methodologies. The trend analysis was conducted looking at 1999-2009, as well as 1999-2007 (eliminating the most recent highly volatile recession years and the period of highly volatile gasoline prices). A third approach was taken comparing the average of traffic counts from 1999-2002 with 2006-2009. The average of these three methods results in a 6% growth rate over time.

The overall statistical significance of the trend line from 1999-2007 improved substantially over the 1999-2009 trend line through removal of the volatile outlying data points, however the magnitude of the trend line increase did not substantially change. After careful review of the traffic data we conclude the increasing trend in traffic counts is both valid and significant. This means traffic activity is not declining despite a decline in permanent population. We conclude then the growth in traffic is supported by a shift from permanent to seasonal population.

9.0 Countywide Functional Population

The best available data in our view indicates a loss in permanent population with likely replacement through an increase in seasonal residents. Further, both sales and traffic are trending up by similar magnitude suggesting there is limited growth, and no sustained decline in economic activity. This volume of limited growth is consistent with growth which occurs under the ROGO cap.

American Communities Survey data and homestead exemption data support the growth of seasonal population. Total non-homesteaded units are 57% today compared with 55% in 1998. Among single family units only, the non-homestead share has risen from 45% in 1998 to 49% in 2009. For single family units, 70% of the growth since 1998 has been in non-

homestead units, and the American Communities Survey indicates a substantial rise in seasonal households during the 2000-2008 time period. This supports an increase in non-permanent/seasonal occupancy, which offsets the permanent population losses.

As a decline in permanent population has occurred, there is a real increase in non-permanent/seasonal replacement as evidenced by an increase in the trend in auto-traffic volume, an increase in the trend in inflation adjusted retail sales, an increase in non-homesteaded residential properties, and an increase in seasonal population shown in the American Communities Survey.

A complicating aspect is the 2008 permanent population figures from both the annual Census population and American Communities Survey population data which indicate permanent population in the Keys is now between 70,000 and 72,000; this is well below the BEBR 2009 estimate of 78,000. There is some probability the April 2010 Census count may indicate a sharply reduced permanent population level. With the understanding that permanent losses do appear to be replaced by seasonal population, and some losses in permanent population may be temporary and cyclical due to recession and foreclosures, if all of the recent Census or ACS based permanent losses were shifted into the seasonal population, the resulting 2030 functional population would still likely demonstrate small levels of growth consistent with the ROGO allocations.

Based on this analysis, K&S prepared a county level functional population series to reflect these conditions. This series begins with the medium series population projection from the BEBR medium series projection, PS156, published in 2010. Next, the FKAA seasonal series through 2025 was used and to this was applied the 2000-2025 CAGR growth rate of the FKAA seasonal series to extend the series from 2025 to 2030. In addition, from 2006-2030 K&S has added 70% of the permanent population loss as forecast by BEBR to the seasonal population. Further, we have added the equivalent of 70% of the ROGO growth to seasonal population to the FKAA seasonal series, reflecting the seasonal shift component not evidenced in FKAA's original data. The resulting functional population is seen in **Figure 5** and **Table 7**.

K&S believes this data series is the most reflective of actual economic and market conditions and is most representative of the long term functional population outlook. Our findings are based on extensive analysis of multiple data series. K&S recommends the use of this functional population data series for use in the 2010 EAR comp plan update.

It is also noted, for units shifting to seasonal status and for seasonal population associated with ROGO growth, a persons-per-household figure of 2.7 was used. On pages 34 and 36 of the MCPD population report in **Appendix 1**, it is noted the measures of seasonal persons per household were greater than 2.7.

Further supporting the use of 2.7 persons per household for seasonal population, Property Appraiser data (**Table 5**) suggests a steady increase in persons per household through year 2008, as described by an increase in the number of bedrooms per unit. This increase in bedrooms also suggests an increase in overall unit size; however, the Monroe County Property Appraiser data for unit size is unavailable. K&S believes seasonally occupied homes and rentals have a greater number of bedrooms and higher person per household occupancy due to the increasing size of newly built units. Newly built units today are

primarily non-homesteaded and likely to have a higher proportion of seasonal residents. For these reasons, as well as the data analysis presented in the original MCPD population study, 2.7 persons per household was used for seasonal household size.

Table 5 - Average Number of Bedrooms per Single Family Unit by Year Built

2.1	Pre-1970
2.4	1970-1989
2.5	1990-1999
2.8	2000-2008

Source: Monroe Co. Property Appraiser, Fishkind & Associates, Inc.

The preliminary population series shown in **Figure 5** represents the BEBR medium series projection plus the FKAA seasonal series. The Final Revised series is recommended for use. This series represents this same data as the preliminary with the addition of the seasonal replacement population, which offsets the permanent population loss. The Final series is the recommended series and corrects the FKAA methodological flaw. This flaw finds the original MCPD study looked only at growth and did not contemplate the shift of the existing population from permanent to seasonal.

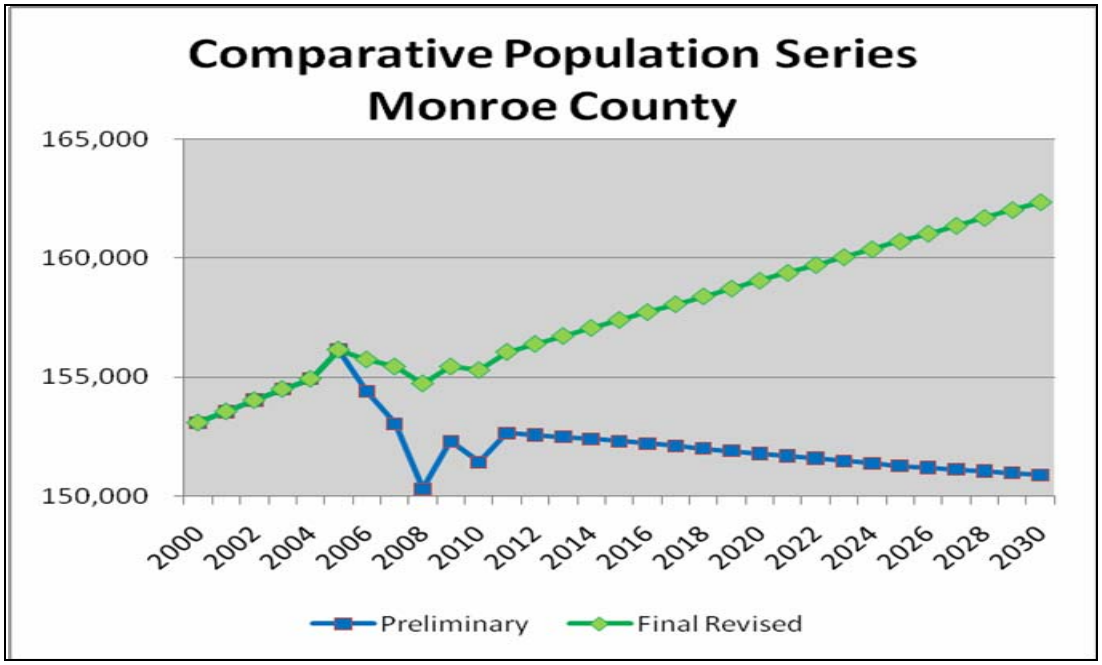


Figure 5 – Recommended Functional Population

Table 7- Recommended Functional Population Series

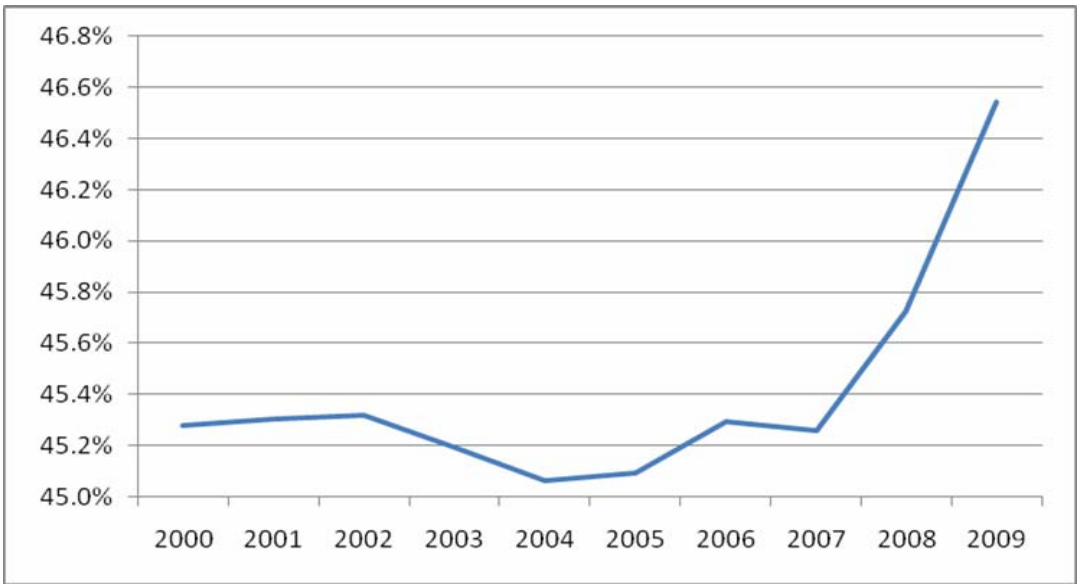
Monroe County Population Projection Seasonal Replacement Series			
YEAR	Permanent	Seasonal	Functional
2000	79,589	73,491	153,080
2001	80,011	73,540	153,551
2002	80,434	73,589	154,023
2003	80,856	73,639	154,495
2004	81,236	73,688	154,924
2005	82,413	73,737	156,150
2006	80,510	75,228	155,738
2007	78,987	76,453	155,440
2008	76,081	78,647	154,728
2009	77,925	77,516	155,441
2010	76,887	78,401	155,288
2011	78,080	77,974	156,054
2012	77,960	78,431	156,391
2013	77,840	78,887	156,727
2014	77,720	79,343	157,063
2015	77,600	79,800	157,400
2016	77,460	80,270	157,730
2017	77,320	80,740	158,060
2018	77,180	81,211	158,391
2019	77,040	81,681	158,721
2020	76,900	82,151	159,051
2021	76,760	82,622	159,382
2022	76,620	83,092	159,712
2023	76,480	83,562	160,042
2024	76,340	84,033	160,373
2025	76,200	84,503	160,703
2026	76,060	84,973	161,033
2027	75,920	85,444	161,364
2028	75,780	85,914	161,694
2029	75,640	86,384	162,024
2030	75,500	86,855	162,355

Source: Fishkind & Associates, Inc.; Fl Keys Aqueduct Authority; Univ. FL BEBR, PS 156 and annual estimates

10.0 Determination of Unincorporated Area Functional Population

Permanent Population

The unincorporated population as a share of countywide population has increased from 45.3 percent in 2002 to 46.5 percent in 2009. **Figure 6** shows the 10 year trend in the unincorporated share, based on the University of Florida annual population estimates.



Source: University of Florida, Annual Population Estimates

Figure 6 - Unincorporated Population Share of Countywide Population

The unincorporated permanent share has increased in the past three years likely due to foreclosures and conversions from permanent to seasonal in incorporated areas. As foreclosures abate, the change in unincorporated permanent population as a share of countywide totals will stabilize. Further, the permanent population share in the unincorporated area is likely to fall as unoccupied homes in municipal areas once again become occupied and come under ownership. Based on this discussion, for the future estimates of permanent population as a share of countywide totals we have used 46 percent as the stabilized figure representing the unincorporated share of permanent population over time.

Seasonal Population

The unincorporated areas contain 46 percent of all non-homesteaded residential units in Monroe County, based on 2009 Monroe County Property Appraiser Tax Roll data. This represents some 11,664 units. Using seasonal persons per household size of 2.7 the seasonal population in residential housing units is 29,160.

In addition, the unincorporated areas contain 27 percent of all hotel motel space in Monroe County. This converts to an estimated 2,197 hotel/motel rooms within the unincorporated area. With average annual hotel occupancy of 69.8% (based on Smith Travel Hotel Trends Reports 2003-2010) and average persons per room of 2.73, the hotel based seasonal population in the unincorporated areas is 5,558.

Further, the original MCPD/FKAA population methodology did not include the functional population associated with Keys Tourist Day Trips. This is a daily number which increases the functional population. Based on the average share of annual unincorporated day trips divided by 365, the number of unincorporated day trippers represents an addition of 325 persons to the functional population, as described in **Table 8**.

Table 8 – Day Trippers As A Component of Unincorporated Seasonal Population

	2003	2004	2005	2006	2007	2008	2009
All Keys Day Trippers	448,645	446,615	439,742	375,561	386,469	401,369	370,414
Key West Day Trippers	242,268	241,172	237,460	196,794	202,510	205,901	206,263
All Else Keys Day Trippers	206,377	205,443	202,282	178,767	183,959	195,468	164,151
Other Municipal Day Trip	69,659	69,344	68,277	60,340	62,093	65,977	55,407
Uninc Keys Day Tripers	136,718	136,099	134,005	118,427	121,866	129,491	108,744
Functional Day Trippers	***375***	***373***	***367***	***324***	***334***	***355***	***298***

Source: Monroe County Tourist Development Council, Fishkind & Associates, Inc.

Combining the household based seasonal populations, hotel based seasonal population, day trippers, and adjusting for non-standard dwelling units populations including those in camps, liveaboards and other, it is estimated there are 35,053 seasonal residents throughout unincorporated Monroe County, in 2009. This represents 45 percent of the 2009 countywide seasonal population as shown in Table 4. Applying this percentage to the countywide seasonal population projection yields a seasonal population in the unincorporated areas of 39,226 by year 2030. **Table 9** provides the permanent, seasonal and functional population for unincorporated Monroe County, through year 2030.

Total unincorporated functional population is expected to increase from 71,311 in year 2009 to 73,956 by year 2030. This represents an increase of 2,645 persons over the entire planning horizon. **Table 9** provides the determination of unincorporated permanent and seasonal population.

Table 9- Unincorporated Functional Population Series

Unincorporated Population Projection Seasonal Replacement Series			
	Permanent	Seasonal	Functional
2000	36,036	33,241	69,277
2001	36,250	33,263	69,512
2002	36,452	33,285	69,737
2003	36,543	33,307	69,850
2004	36,606	33,329	69,935
2005	37,164	33,351	70,515
2006	36,466	34,019	70,485
2007	35,749	34,568	70,317
2008	34,788	35,550	70,338
2009	36,268	35,043	71,311
2010	35,368	35,440	70,808
2011	35,917	35,249	71,166
2012	35,862	35,453	71,315
2013	35,806	35,658	71,464
2014	35,751	35,862	71,613
2015	35,696	36,067	71,763
2016	35,632	36,277	71,909
2017	35,567	36,488	72,055
2018	35,503	36,698	72,201
2019	35,438	36,909	72,348
2020	35,374	37,120	72,494
2021	35,310	37,330	72,640
2022	35,245	37,541	72,786
2023	35,181	37,752	72,933
2024	35,116	37,962	73,079
2025	35,052	38,173	73,225
2026	34,988	38,384	73,371
2027	34,923	38,594	73,518
2028	34,859	38,805	73,664
2029	34,794	39,016	73,810
2030	34,730	39,226	73,956

Source: Fishkind & Associates, Inc.

11.0 Unincorporated Population in Upper/Middle/Lower Keys

Permanent Population - Upper/Middle/Lower

With the functional unincorporated population determined, the distribution between upper, middle and lower regions is based on the permanent population, ratio of seasonal to permanent population plus the distribution of hotel/motels by sub-area.

Permanent population is based on the on-line service I-Site which provides updated block group information based on US Census data (**Table 10**). The distribution of permanent population based on these data is shown in **Table 11**.

Table 10 - Unincorporated Monroe County-Distribution of Permanent Population

	Upper Keys	Middle Keys	Lower Keys	Total
Population	44%	3%	52%	100%
	42%	3%	55%	100%
	41%	3%	56%	100%
(2014)	40%	3%	57%	100%

Source: Fishkind & Associates, Inc.; I-Site online demographic database

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Table 11 – Permanent Population Distribution by Sub-Area

Unincorporated Permanent Population Projection			
	Seasonal Replacement Series		
	Upper	Middle	Lower
2000	15,135	1,081	19,820
2001	15,185	1,087	19,978
2002	15,229	1,094	20,130
2003	15,226	1,096	20,221
2004	15,212	1,098	20,296
2005	15,402	1,115	20,647
2006	15,073	1,094	20,299
2007	14,737	1,072	19,940
2008	14,263	1,044	19,481
2009	14,797	1,088	20,383
2010	14,430	1,061	19,877
2011	14,654	1,078	20,185
2012	14,632	1,076	20,154
2013	14,609	1,074	20,123
2014	14,586	1,073	20,092
2015	14,564	1,071	20,061
2016	14,538	1,069	20,025
2017	14,511	1,067	19,989
2018	14,485	1,065	19,953
2019	14,459	1,063	19,916
2020	14,433	1,061	19,880
2021	14,406	1,059	19,844
2022	14,380	1,057	19,808
2023	14,354	1,055	19,772
2024	14,327	1,053	19,735
2025	14,301	1,052	19,699
2026	14,275	1,050	19,663
2027	14,249	1,048	19,627
2028	14,222	1,046	19,591
2029	14,196	1,044	19,554
2030	14,170	1,042	19,518

Source: Fishkind & Associates, Inc.

Seasonal Population - Upper/Middle/Lower

Seasonal population within the upper/middle/lower unincorporated areas is estimated based on the ratio of unincorporated seasonal population to unincorporated permanent population, multiplied by the permanent population distributions by sub-area (**Table 12**).

Table 12- Seasonal Population Distribution by Sub-Area

Unincorporated Seasonal Population Projection			
	Seasonal Replacement Series		
	Upper	Middle	Lower
2000	14,048	1,056	18,137
2001	14,020	1,057	18,185
2002	13,993	1,058	18,234
2003	13,966	1,058	18,283
2004	13,938	1,059	18,332
2005	13,910	1,060	18,381
2006	14,150	1,080	18,789
2007	14,339	1,096	19,133
2008	14,665	1,126	19,759
2009	14,388	1,111	19,545
2010	14,550	1,122	19,768
2011	14,472	1,117	19,660
2012	14,555	1,123	19,775
2013	14,639	1,129	19,890
2014	14,722	1,135	20,005
2015	14,806	1,141	20,120
2016	14,891	1,148	20,238
2017	14,977	1,154	20,357
2018	15,063	1,160	20,475
2019	15,149	1,167	20,593
2020	15,235	1,173	20,712
2021	15,321	1,179	20,830
2022	15,407	1,185	20,948
2023	15,493	1,192	21,067
2024	15,579	1,198	21,185
2025	15,665	1,204	21,304
2026	15,751	1,211	21,422
2027	15,837	1,217	21,540
2028	15,923	1,223	21,659
2029	16,009	1,230	21,777
2030	16,095	1,236	21,896

Source: Fishkind & Associates, Inc.

Based on these data we are able to determine the functional population for unincorporated Keys according to the upper/middle/lower sub-areas of the unincorporated portion of Monroe County. **Table 13** presents the functional population for unincorporated Monroe and the sub-areas.

Table 13 – Unincorporated Functional Population Distribution by Sub-Area

Unincorporated Functional Population Projection Seasonal Replacement Series				
	Upper	Middle	Lower	TOTAL
2000	29,183	2,138	37,957	69,277
2001	29,205	2,145	38,163	69,512
2002	29,222	2,151	38,364	69,737
2003	29,192	2,155	38,504	69,850
2004	29,150	2,157	38,628	69,935
2005	29,313	2,175	39,027	70,515
2006	29,222	2,174	39,089	70,485
2007	29,075	2,169	39,073	70,317
2008	28,928	2,169	39,240	70,338
2009	29,185	2,199	39,927	71,311
2010	28,980	2,183	39,645	70,808
2011	29,126	2,194	39,846	71,166
2012	29,187	2,199	39,929	71,315
2013	29,248	2,203	40,013	71,464
2014	29,309	2,208	40,097	71,613
2015	29,370	2,212	40,181	71,763
2016	29,429	2,217	40,263	71,909
2017	29,489	2,221	40,345	72,055
2018	29,549	2,225	40,427	72,201
2019	29,608	2,230	40,510	72,348
2020	29,668	2,234	40,592	72,494
2021	29,728	2,238	40,674	72,640
2022	29,787	2,243	40,756	72,786
2023	29,847	2,247	40,838	72,933
2024	29,907	2,252	40,921	73,079
2025	29,966	2,256	41,003	73,225
2026	30,026	2,260	41,085	73,371
2027	30,086	2,265	41,167	73,518
2028	30,145	2,269	41,249	73,664
2029	30,205	2,274	41,332	73,810
2030	30,265	2,278	41,414	73,956

Source: Fishkind & Associates, Inc.

Bibliography

American Community Survey, 2006-2008, 2009

Air Installation Compatible Use Zone (AICUZ) Study, 1977 and 2007

Big Pine Key / U.S. 1 Corridor Area Enhancement Plan

Ewing, R, September 2010. *Monroe County Hurricane Evacuation Clearance Time*

Key Largo US1 Corridor Enhancement Plan

Miami-Dade Comprehensive Development Master Plan

Monroe County Public Facilities Capacity Assessment Report, 2008

Monroe County Public Facilities Capacity Assessment Report, 2009

Monroe County, 2010, *Draft U.S. 1 Arterial Travel Time and Delay Study*

Tavernier Commercial Corridor Enhancement Master Plan,

Livable CommunyKeys Plan, Big Pine and No Name Key

Livable CommunyKeys, Key Largo

Livable CommunyKeys, Tavernier Master Plan

Livable CommunyKeys, Stock Island/Key Haven

Livable CommunyKeys, Lower Keys Master Plan

Collier County Growth Management Plan

City of Key West Comprehensive Plan Data and Analysis, 1993

City of Key Colony Beach Comprehensive Plan, Amended 2010

City of Layton Comprehensive Plan, Revised 2009

City of Marathon Comprehensive Plan, 2005 www.ci.marathon.fl.us/index.aspx?NID=29

Village of Islamorada Future Land Use Data and Analysis, January 2001

U.S. Census 2000 and 2010

US Corps of Engineers, 1991, *Lower SE Florida Hurricane Evacuation Study*

Geographic Information System

Florida State Historic Preservation Office, 2000, *Historic Structures*

Monroe County Growth Management, 2010, *MC_ELU_510* (Existing Land Use GIS layer received May 2010)

Monroe County Growth Management, 2010, *MC_FLUM_510* (Future Land Use GIS layer received May 2010)

Monroe County Growth Management, 2010, *Tier 0110* (Tier Overlay)

Monroe County Property Appraiser's Office, 2010, *Public_Parcel*

Chapter 2.0 – Future Land Use – Comment Responses

Commenter: Mitchell Harvey, AICP, Comprehensive Planning Manager, Monroe County
Date Received: June 27, 2011

Location	Comment	K&S Response
	Concerns: 1. Removal of all 9J-5 references and replacing them with Ch. 163 references 2. Removal of all references to DCA and replacing with State Land Planning Agency 3. The continued use of 1990's and older data and references which were used in the existing Technical Document when more current data may be available 4. The FLUE cites many adopted goals, objectives and policies that are subject to change over the planning time horizon time or as EAR-based amendments. Perhaps references to the concept and not the specific GOP citation should be considered. 5. The FLUE makes several recommendations for GOP amendments. I'm not sure if this is the proper place. GOP amendment recommendations should be reserved for the EAR data and analysis support and justification of EAR-based amendments. 6. The conclusions of Fishkind's economic study could result changes to the data and analysis as presented in the Tech Doc. 7. The population methodology was missing from the appendix of the current draft FLUE and would have been helpful in supporting the population projections described in the FLUE.	1. Have added narrative in the opening section of the Technical Document identifying the changes related to 9J-5 and where incorporated into Ch. 163. 2. Have added narrative in the opening section of the Technical Document relative to the change from DCA to State Land Planning Agency. 3. Material we use appears to be the most recent available data. 4. At the time this material was developed, 9J-5 required identification of specific policies. 5. At the time this material was developed, 9J-5 required identification of specific changes that may be needed. 6. No changes identified at this time. 7. Agree. Have included.

Commenter: Last Stand Date Received: June 27, 2011		
Location	**Comment**	**K&S Response**
Section 2.2.11	While the Federal government has limited regulatory powers over local land development, local governments are directly responsible for assuring that development is safe and prudent in their jurisdictional areas. Certainly, now is not the time to loosen regulations pertaining to discouragement of development of the County's most vulnerable and critically exposed lands.	This request for change is currently being reviewed by the County attorney.
Section 2.3.4	We encourage the County to include new and specific policies in the Comprehensive Plan update, which will directly discourage residential development in extreme erosion-prone areas such as offshore spoil islands.	At this time, there is no mapping available of erosion prone areas in the Keys. This request is under consideration by County staff and the County attorney.
Commenter: Eric Pelton **Date Received: June 27, 2011**		
Location	**Comment**	**K&S Response**
Maps 2-1.1, pages 1 and 3 of 4 and Maps 2.3.1 pages 1 and 3	My property may be shown only as Conservation – with no residential overlay.	Regarding your concerns regarding your property on Little Knock'em Down Key, RE #0014370-000000, please be aware that the current Future Land Use Map designation of your property is Residential Conservation (RC), which allows an allocated density of one dwelling unit per 10 acres. The current Monroe County Code Land Use District (zoning) designation for your property is Off-Shore Island (OS), which also allows one dwelling unit per 10 acres. The Comprehensive Plan Update will not be changing the designations for your property, therefore your residential use will continue to be allowed.
Commenter: Ed Buxton, Manager Sunshine LLC (Bayview Inn) **Date Received: June 27, 2011**		
Location	**Comment**	**K&S Response**
Section 2.7.5.9	1. Consider expansion of the allowed uses within Commercial Fishing Land Use district to, "…allow and encourage development of water-dependent/related support facilities and working waterfront uses, including tourist lodging, restaurants, and recreational	1. Have added a recommendation to the Technical document to evaluate the MU-CF Land Use District and the associated zoning categories and evaluate whether or not uses should be expanded to reflect industry and market changes.

	dockage." 2. Additionally suggest a policy to, "…encourage replacemnert or conversion of public lodging of obsolete trailer/RV park units without a loss of existing density. "	2. This suggestion is under consideration by County staff for future discussion.
Commenter: Roger Bernstein, President FEB Corp.		
Location	**Comment**	**K&S Response**
2.3.4	Consider developing a new land use category for certain types of offshore islands such as Wisteria, "…to accommodate the unique characteristics and development potential of a spoil island bordering a dense urban area and an active deep water port, and adjacent to fully-developed Sunset Key.	This section has been modified to more closely reflect the existing language established in the current Technical Document. This request is under consideration by County staff.
Location	**Comment**	**K&S Response**
2.2.7	1. "ordered facilitated" This is unclear. 2. Revise page 12 to reflect new Rule 28-20.140	1. The judge ordered the rulemaking/mediation to be facilitated by DCA. 2. Agree. Have revised as suggested.
2.2.9.1	Text has moved, delete "see below" reference to Rule 28-20.140	Agree. Have deleted.
Table 2.4 and Page 19	Add "2006" to table title	Agree. Have revised as suggested. Have also updated the Rule 28-20-140 information.
Section 2.2.10	Revise Lower Keys Master plan adoption date to 2012.	Agree. Have revised as suggested.
2.3.4	Revise Offshore Island section to more closely follow existing 2010 Technical Document language.	Agree. Have revised as suggested.
Table 2.64	Revise footnotes/subscripts to be consistent in size.	Agree. Have revised as suggested.
Table 2.37	Revise to add Note regarding Vested Rights Order for Ocean Reef.	Agree. Have revised as suggested.
Section 2.7.4.5 (pp 147-149, 152)	Add Ocean Reef vesting information.	Agree. Have revised as suggested.
Date Received: June 20, 2011		
Location	**Comment**	**K&S Response**

2.2.2	Rate of Growth Section omits reference to Ocean Reef's exemption from the rate of growth allocation process. Section 2.2.2 states in error the only exemption is for affordable housing.	Agree; have revised to reflect suggested change.
2.2.3	Rate of Growth Section omits reference to Ocean Reef's exemption from the rate of growth allocation process. Section 2.2.2 states in error the only exemption is for affordable housing.	Agree; have revised to reflect suggested change.
Tables 2.37, 2.41,2.48, 2.57,2.58, 2.59, 2.60, 2.7.3; Section 2.7.4.5	Deletion is warranted in light of the recent legislative elimination of Rule 9J-5. If it is kept, should modify to reflect the vested units remaining to be built in Ocean Reef.	Needs analysis is still a requirement of Chapter 163 F. S.; we have modified the various sections to note the remaining number of vested units as identified in the December 23, 2010 communication from DCA to David Ritz.

Commenter: Frank Toppino, President Charley Toppino & Sons, Inc.

Location	Comment	K&S Response
Map 4-9	Outdated level of service projections.	Agree; the revised study has recently been completed and is not reflected in the data analysis in the Tech. Document. The County will review and update this section annually. In the meantime, the County will review development proposals based upon the recent report.

Date Received: January 12, 2011

Location	Comment	K&S Response
Section 2.2.1	Why are planning areas not combined?	The Planning Area boundaries are County defined.
Section 2.2.2	Big Pine Key and No Name Key allocations are awarded quarterly.	Agree. The language reflects that in the County's "Layman's Guide to ROGO". Have revised the text to reflect change. The County's guide should be revised accordingly.
Section 2.2.3.1 pg 6	The paragraph states the amount of nonresidential floor area to be allocated is limited…for any one site. Should be application.	Section 138-51(b) states, that, "…is limited to a maximum of 2500 square feet…for any one site." No change made.
Section 2.2.6 (6th bullet)	Delete additional "Promote"	Agree. Deleted.
Section 2.3.1 – paragraph 4	Change "Native" to "Nature".	Agree. Revised.
Section 2.3.2.1 paragraph 1	Revise to reflect that Tier I lands are has development potential outside of conservation	Agree. Revised.

Table 2.7 Vacant Land by Tier and Planning Area	Should break out BPK and NNK.	Vacant land in other keys or neighborhoods is not broken out separately in the Technical Document. This information should be requested separately from the County's GIS Dept.
Section 2.3.6.5 paragraph 3	"County Government Complex" not there anymore.	Revised to reflect County Government "buildings".
Section 2.3.6.7	"Is the 3,796 acres or people?"	Added "acres".
Section 2.3.7.1.1 paragraph 2	Spell out "HCP".	Agree. Revised to "Habitat Conservation Plan".
Table 2.29	Numbers in table do not add correctly.	Agree. Revised to reflect correct numbers.
Section 2.4.1	Inquired as to the reason for the loss of population from 2000-2007.	Revised this section to incorporate the findings of the April 5, 2011 approved Monroe County population projection. For a detailed discussion of the population numbers, please see *Section 2.6 Population Projections.*

Commenter: Shane Laakso, Department of Community Affairs Date Received: December 15, 2010		
Location	**Comment**	**K&S Response**
Section 2.2.13	Add language, as prepared by DEP, regarding Coastal Zone Management Act.	Agree. Added to Section 2.2.13 Future Land Use Element; and Section 3.18.1.2 Conservation and Coastal Mgmt. Element
Commenter: Mayté Santamaria Date Received: 3/25/2011 (2/18/11 submittal)		
Location	**Comment**	**K&S Response**
Pg. 14	Policy 216.1.8 is missing the last sentence (see ORD 023-2005): • Was this policy amended since 2005 to remove or revise the last paragraph of the Policy?	This language was not provided to K&S and is not included in the Comprehensive Plan document provided by the County.
Pg. 23	Why are public colleges (PC84) included in the Institutional land uses? Educational land use? Note on Page 46-47 public colleges (PC84) are not included in the Institutional land uses	This exercise was conducted by Bryan Davisson under the guidance of Mitch Harvey. You have noted a discrepancy of where public colleges (PC84) should be group. However, since PC 84 has no acreage, it should not impact pg. 46-47 calculations. We will address the issue of where to group (PC84) with Bryan Davisson.
Pg. 31	Do Tier 0 and Military Tier exist in the County LDR or Plan? If not why are they referenced here?	GIS analysis revealed the existence of Tier O and Military Tier. Tier 0 is used for accounting purposes only. As indicated by text Tier 0 is for property does not have a Tier designation. Most of these occur in the Upper Keys and some are right-of-way parcels. Some lots were not originally designated because of mapping errors; the majority of which are currently being reviewed by the Tier Designation Review Committee and will be designated at a later date.
Pg. 32-41	1) "transient residential units" – does the County consider these as part of their existing residential uses?? 2) Will there be a discussion of the allocated density & maximum development potential for transient units (i.e. rooms/spaces)? a) Policy 101.2.6 prohibits new transient residential units until July 31, 2010. b) Is there the potential for future (2010-2030) transient development? c) Is there an inventory of transient units (hotels, motels, RV parks) for unincorporated Monroe? Should this be included?	1) As defined by Sec. 138-19(a) *Residential dwelling unit means a dwelling unit as defined in section 101-1, and expressly includes the following other terms also specifically defined in section 101-1: lawfully established hotel rooms, campground spaces, mobile homes, transient residential units, institutional residential units (except hospital rooms) and live-aboards.* 2) a) Sec. 138.23 extents moratorium to December 31, 2011. 2) b) Not based on moratorium (12/31/11). Section 7.3.4.1 Housing Supply by Type (future need) provides a discussion. 2) c) Summary of inventory of hotel/motel located in the *Housing Element* Section 7.2.1.1

Location	Comment	K&S Response
Pg. 35	Mixed Use designations comprise 10.3 percent of vacant land, with a theoretical development potential of 4 **2.7** million square feet of non-residential floor area; 1.9 million square feet (7.1%) Mixed Use/Commercial (MU-C); and 2.1 **778,852** million square feet (3.2%) Mixed Use/Commercial Fishing (MU-CF).	Agree, revised as suggested
Pg. 36	The Mixed Use designation makes-up the remaining use within this PA with 4.6 percent as Mixed Use/ Commercial and 1.4 percent as Mixed Use/Commercial Fishing, resulting in a maximum theoretical development potential of 104,892.5 **125,235** square feet of commercial floor area.	Agree, revised as suggested.
Pg. 34	"The County's ROGO system supports development on parcels designated Tier II, III and Tier III-A." Why is Tier I excluded?	**Will revise to include Tier I.**
Pg. 38-39	Tier II, III and IIIA do not add up to 576.9 acres. This acreage includes the "undesignated" lands	Agree, revised as suggested.
Pg. 39-40	Tier III and IIIA do not add up to 389.9 acres. This acreage includes the "undesignated" lands	Agree, revised as suggested.
Pg. 39-41	Suggest labels on the Tables (acres, units, sf)	Agree, revised as suggested.
Pg. 43	Multi-Family includes "licensed public lodging facilities" (page 23 states hotels & motels are grouped into Commercial land uses) (Appendix 2-1 includes hotels & motels in the Commercial land uses and has multi-family units in the Residential land use)	As defined by Sec. 138-19(a) hotel/motel are considered residential units in the County. It is true that hotels & motels PC 39 was grouped into Commercial (Appendix 2-1) at the time of PC conversions to generalized codes by Bryan. This PC may have to be deleted from the Appendix because the way hotels are being reported (table 2.14): number of rooms from Florida Department of Business and Professional Regulation, Division of Hotels and Restaurants acreage from PC 39 from the property appraisers, as requested by Christine Hurley. The Appendix and existing land use should be revisited by County Staff to resolve any discrepancies.

Location	Comment	K&S Response
Pg. 50	"Of the general commercial PC codes, the highest FAR is in the "Supermarket" (PC 14) category at 0.216. The subtotal FAR in the general commercial category is .013. In the tourist commercial category, the subtotal FAR is .140. Commercial fishing has the lowest FAR at.058." • In the general commercial PC codes, the highest FAR is in the Drive in Theater or Open Stadium (PC31) FAR 0.26098. • In the tourist commercial category, the subtotal FAR is 0.08535	Agree, revised as suggested.
Pg. 55	Offshore Islands section has been changed – not the same text as original Technical Document.	Comment noted.
Pg. 109	"maximum service volume threshold standard is established as LOS D" Minimum? Add "for US 1, LOS of C…."	Agree. Comment noted.
Pg. 112	Parks and Recreation – why does the discussion revolve around "Conservation lands?" How was the 26,434 acres calculated? Recreation LOS 0.82 acre/1000 functional population 70,808 – 2010 functional population (page 130) -> 58,062 acres	These questions are answered in the Chapter 13.0 Recreation and Open Space.
Pg. 115-119	Update with 2010 population 27,300 should be 27,003	Agree, revised as suggested.
Pg.112	"the County should consider whether to maintain the existing comprehensive plan policies related to the CBRS"??	This is language proscribed and prepared by the County attorney.
Pg. 123	Military Encroachment (title) Military Compatibility?	Have revised the title to reflect the desire of the EIS Oversight Committee.
Pg. 129	Two rows labeled the same Second "all keys day trippers" label in table	Agree. Have revised to add "other". New label: All other Keys Day Trippers.
Pg. 136-142	Future Land Use Needs and Opportunities • Transient residential units?	See Section 7.2.1.1 Hotel/Motel Transient Units and Section 7.3.4.1 Housing Supply by Type in the *7.0 Housing Element*
Pg. 142	Table 2.49 – how were the functional households and functional dwellings calculated?	*See Section 7.3.1 Projected Number of Households and 7.3.2 Projected Housing Need of the 7.0 Housing Element*

Location	Comment	K&S Response
Pg. 147	Appendix 1 -What is "Reserved by DOR (do not use)" – see Residential Land Use	Intergovernmental coordination is advised in order to refine PC classification and existing land use. PC09 belongs to the Property Appraiser.
Map 2-1 Existing Land Use	Need a date on the maps. What is ICWW? No definition provided. Is there any existing agricultural lands? None identified on the Existing Land Use Maps	Agree, date will be added on next iteration due to comments and adjusted received after 12/22/11 submittal. ICWW – Inter Coastal Waterway Existing Land Use Map GIS layer was generated by Bryan Davisson and received on May 2010. Therefore, the reference on the Source: *Monroe County Growth Management, 2010, MC_ELU_5_10.*
Map 2-2 Areas of Critical State Concern	Are the excluded properties Federal lands? (Sugarloaf, Saddlebunch, Cudjoe, Knockemdown, Big Torch, Big Pine, No Name, Key Largo, & North Key Largo)	Map displayed as data provided by Bryan Davisson as originated by DCA.
Map 2-3 Future Land Use Map	Is it necessary to include Historic Structures on the Future Land Use map? – they already included on the Existing Land Use maps. The dots for the historic structures make it difficult to see the FLUM designation of certain properties.	9J-5 requires the inclusion only on the Existing Land Use maps. The inclusion of Historic Structures on both future and existing maps was done upon direction from Mitch Harvey. Dot size was resolved with County staff in the earlier stage of the drafting process; to revise again would entail revision to 30 maps. The dot size may be adjusted by County staff as desired.
Map 10-1 Sanitary Sewer	• Municipal service areas and unincorporated service areas are switched (blue & red)	Colors have been fixed.
Commenter: Mark Rosch **Date Received: 2/15/11 (from 12/22/10 submittal)**		
Location	**Comment**	**K&S Response**
Pg. 2	2.1.2 'the public participation process'	Please clarify the purpose of comment or note.
Pg. 7	2.2.4, 2nd paragraph, 'it is scored based on which the Tier within which the'	Revised to read "it is scored based on which Tier the property is located."
Pg. 17	2nd paragraph, 3rd sentence, Since the Lower Keys PA is the largest in land mass, it is not surprising that it has the _____ number of…' Please explain	Revised to read "…it is not surprising that it has the highest ratio of existing land use designations, when compared to the other PAs"

Location	Comment	K&S Response
Pg. 18	2.3.1.2 Include "the County" as entity acquiring sensitive land.	Agree, revised as suggested.
Pg. 24	2.3.2.1 A) 'Parcels under Tier I are lands that can be restored for conservation and environmental resource protection.' This is not entirely true. Tier I parcels are already conservation lands. There is very little restoration for Tier I lands. Definition in current comp plan is still true. B) Tier 0 is submerged lands in some analysis. C) I don't know if we have a Military Tier.	A) Agree, revised as suggested. B) Added to Tier 0 discussion. C) Yes, there is a Military Tier. However none of it is was found to be vacant during analysis.
Pg. 56	2.3.7 Areas of Critical County Concern - may want to differentiate between this and the Area of Critical State Concern. (Kathy)	Agree, revised as suggested.
Pg. 105	Table 2.29 add the year in the section marked Unidentified Keys. Above the year 1980, there is an empty cell.	Cell has been filled in with the year 1970.
All Tables	Tables in this element: very confusing to look at tables with decimals. Might be better to round up or down	No changes on tables including decimal points. It was decided not to round up or down. This was approved at the early stages of the plan. This request would require extensive adjustment to tables AND narratives, which may result in less accurate calculations.
Maps	Historic Structures dots are very large. There is one dot right about the word LOWER on the bottom part of the map, on the other side of the ICWW line! The dot is on most maps.	No changes on the dots size. Dots were approved on previous iterations. Changing dots requires a major undertaking of about 30 maps. The dot right about the word LOWER corresponds to MO01295, which is the American Shoals Lighthouse built in 1876. It is not an error.

Location	Comment	K&S Response
Maps	May need a write up/d&a in the text portion of the element pertaining to maps, there may be a need for an explanation of why the maps in existing map and the future map look different. They have different legends and different data sources (zoning, FLUM, property appraiser data, GIS data, parcel data). It's hard to tell why the maps are like they are, explain legend Ramrod Key– shown as future land use maps on page 1 and 3, the FLUM is not correct	Future and existing maps are illustrated as GIS layers were provided by Growth Management both dating 5/10. There are obvious discrepancies between layers that need to be consolidated. **Existing Land Use Map** write up provided in Section 2.3 Existing Land Use. Please refer to Appendix 2-1, received by Growth Management, for more details on how Property Appraiser PC codes were converted into generalized land uses for the creation of the Existing Land Use Map and dates 5/10. Therefore, sources for the Existing land Use Map are **Monroe County Growth Management, 2010, "MC_ELU_510"** (layer created by Bryan Davisson) and **Monroe County Property Appraiser, 2010, "Public_Parcel"** (dated 1/10 from which Bryan Davisson made conversions of PC to generalized land uses designations) These two sources are included in both narrative and mapped document. **Future Land Use Map** Language noting the discrepancy of Conservation between both maps is noted in section 2.7.2.1 Future and Existing Land Use Discrepancies. Source data for Future Land Use Map is Monroe **County Growth Management, 2010, "MC_FLUM_510** (layer sent by Bryan Davisson dated 5/10) referenced in both narrative and map document. No notations of zoning data have been made in the technical document or map documents.
Commenter: Christine Hurley **Date Received: via email: 2/7/11 from 12/22/10 submittal**		
Location	**Comment**	**K&S Response**
Section 2.1.1 pg 1 para 1	Add, "State Land Planning Agency" before "Department of Community Affairs.	Agree. Added.
	Explain "Principles for Guiding Development" or refer to section that explains it in detail.	Agree. Added reference to see Section 2.26 for additional details.
	Add reference to Rule 28-20.100	Agree. Added brief outline regarding Rule.
Section 2.1.4	N/A	Update section to reflect partial release of US Census data.
Section 2.2	Add Endangered Special Act (Federal)	Agree. Added.
	Add, "…a federal law" after CBRS	Agree. Added.

Location	Comment	K&S Response
Section 2.2.2	Revise section to reflect the number of allocations and description of program based upon suggested edits.	Agree. Revised to incorporate edits.
	Add summary of criteria to get ROGO points	Agree. Added.
	Add, "…an hurricane evacuation clearance times" after "centralized wastewater system"	Agree. Added.
N/A	Add new section 2.2.3.4 Consideration of Trends and Recommendations for Alternative Method with suggested language.	Agree added new section.
Section 2.2.4	Add revised language, add the sentence regarding tier designations	Agree. Added revised language.
Section 2.2.7	Add "20%" to 2nd paragraph, 3rd sentence; Add "(although the tasks have been substantially retired)"to 3rd paragraph, 1st sentence; Add a new paragraph at end of section, "Because the tasks have been refined…"	Agree. Have added revisions.
Section 2.2.8	Explain "FKNMS".	Agree. Have revised to add full name.
Section 2.2.9	Reorder 2nd paragraph to move the Miller Model discussion before the Regional model. Begin second paragraph with "Additionally" Revise section based upon email dated: Wed 1/5/2011 12:48 PM.	Agree. This section has been completely revised.
Section 2.2.10	Add another bullet, "Currently one plan, the Lower Keys Communikeys Plan is underway and expected to be adopted in 2011."	Agree. Added.
Section 2.2.11	Add "Federal" to Section title and to the first sentence.	Agree. Added.
Section 2.2.12	Do we have any information on Commercial Fishing	Please see Future Land Use Analysis
	How many acres of Land in existing land use map?	Revised as suggested (73,138 acres)
	Add word "greatest"	Agree, revised as suggested.
Pg. 24	Exchange section 2.3.2.1 for 2.3.2.2	Agree, revised as suggested.
Section 2.3.2	Relocate and reorder Vacant Land Analysis; add new tables	Agree, relocated to 2.7.4; incorporated new tables.
Pg. 27	Insert table for total MC vacant land density an intensity…	Agree, revised as suggested.

Commenter: Christine Hurley Date Received via email: 2/16/11 3:01 PM		
Location	**Comment**	**K&S Response**
N/A	Add the following finding to the Technical Document: "Every three years Monroe County shall evaluate land acquired through ROGO dedication and/or grant funding for inclusion into a future land use conservation district and/or a conservation land use district (LUD)/Zoning District."	Added to the Feb. 2011 version on Page 143, under new subsection 2.7.3.6
Commenter: Christine Hurley Date Received via email: 12/07/10		
N/A	Add the following language regarding nonconforming uses: Throughout the keys, especially in Key Largo there are an extensive number of parcels that should be evaluated for non-conformity with the future land use and/or zoning districts. An analysis of these parcels should be made and the County should initiate amendments where appropriate so the community services may be maintained.	Agree. Added to Section 2.7.3.2.
Commenter: Christine Hurley Date Received: 6/29/10		
Location	**Comment**	**K&S Response**
Pg. 3	1st Paragraph: If we never adopted these (the guidelines for future development established in the Florida Keys Carrying Capacity Study) are guided by it?	Added section explaining the how the FKCCS came about. See sections *2.2.5 Work Program* and 2.2.6 *Florida Keys Carrying Capacity Study*.
Pg. 3	Add Coastal Barrier Resource System (CBRS)	Agree, revised as suggested.
Pg. 3	Add "Big Pine Key and No Name Key are also guided by the Habitat Conservation Plan and Incidental Take Permit"	Agree, revised as suggested.
Pg. 3	Should still reference "Mainland Planning Area"	Agree, revised as suggested. Added (d) geographic description of Mainland.
Pg. 4	Pertaining to FKCCS, "Was it adopted, what is the legal status of this document, now""	See revision to *Section 2.2.6 Florida Keys Carrying Capacity Study*
Pg. 4	Monroe county is one of the most hurricane vulnerable areas. We were asked to site source.	Minor modification by adding historical hurricane and referred to see the Conservation and Coastal Management Element
Pg. 4	Coastal High Hazard Area: "Not sure if Monroe is designated in any of the maps"	Recommend no change because this is addressed in the *Conservation and Coastal Management Element.*

Location	Comment	K&S Response
Pg. 4	Add "2001" to Miller Model	Agree, revised as suggested
Pg. 5	First paragraph: List each of the Livable CommuniKeys Plans by name and adoption date. Also the transportation plans.	Agree, revised as suggested. The Livable CommuniKeys Plans name and adoption dates have been added. The Corridor Enhancement plans have been referenced.
Pg. 5	Third paragraph: need to add appendix on how each PC code was grouped.	Agree, revised as suggested. *Appendix 2-1* found at end of element.
Pg. 5	Last paragraph: add "with acreage".	Agree, revised as suggested.
Pg. 6	First paragraph: "Does this include all Improved Subdivision (IS zoning) vacant lots".	Yes. See Section *2.3.4 Platted Lots.*
Pg. 6	Create sub sections for the each of the Planning Areas existing land use.	Agree, revised as suggested.
Pg. 6	Vacant land by Planning Area – should be broken down by FLU category so we can see how much development, potentially is existing for each PA.	Agree, revised as suggested. *See Section 2.3.2 Vacant Land Analysis*
Pg. 7	Regarding Commercial existing land use section. "Since we have a square foot per house number, in our own Comp Plan for NROGO, we need to analyze this number compared to today's number."	Will not address at this time. Item is scheduled to be release with the EAR.
Pg. 8	Regarding Military existing land use section. "This is the amount in unincorporated –wow- how much in Monroe County including Key West"	Affirmative. This is according to the Existing Land Use Map. Please refer to *Section 2.3.6 Adjacent Jurisdiction* for Key West.
Pg. 8	Vacant land of 3,000 versus 2,339 acres discrepancy	Agree, revised as suggested.
Pg. 8	Requested tables of Vacant Lands by Planning Area and by Tier.	Agree. An analysis of vacant land by planning area and by tier has been added as *Section 2.3.2 Vacant Land Analysis*
Pg. 9	Add "Existing" to title.	Agree, revised as suggested.
Pg. 9	Provide appendix of PC code to existing land use conversion.	Agree, revised as suggested.
Pg. 10	Add "Existing" to table title	Agree, revised as suggested.
Pg. 10	What is PC "07 Compounds"	Addressed as a footnote.
Pg. 10	Move hotel/motel numbers to combine with multi-family	Agree, revised as suggested. Data gathering addressed in footnote.
Pg. 10	Milti-family subtotal	Agree, revised to include multi-family only.
Pg. 10	Regarding PC code "14 Supermarket" FAR: "This is our larges FAR, so none of our FLU categories or LDC should exceed 0.25 FAR. Look at this FARs, why are the FARs in our Comp Plan/LDC so huge!"	Comment noted.

Location	Comment	K&S Response
Pg. 11	Revise PC "34 Bowling Alley, Pool Hall, Mini Gulf" density numbers.	Revised. Number is correct, no change.
Pg. 11	Distinguish between the subsidized programs that are for rental and for ownership	Agreed, revised as suggested.
Pg. 11	Move PC "39 to Hotel Motel" to residential	Agree, revised as suggested. Data gathering addressed in footnote.
Pg. 13	Far for PC "73 Private Hospital" has been circled.	Unclear on what is being requested.
Pg. 14	Is there a reason for why there are no why there are parcels with no PC codes?	We are investigating this matter with Robbie Shaw at the Property Appraiser's Office.
Pg. 14	What are "Compounds"	Revised to include as footnote for table
Pg. 14	Second paragraph note	Unclear on what is being requested.
Pg. 14	Second paragraph: Average density for multifamily "29", is incorrect.	Agree, revised as suggested.
Pg. 14	Add: Overall no category exceeds 0.3 FAR	Agree, revised as suggested.
Pg. 15	What does "Vacant Undeveloped" mean?	This heading and title has been revised and is found in *Section 2.3.4 Platted Lots*
Pg. 15	Create tables for what the lots which allow one dwelling unit vis-à-vis the Tier System.	Agree, revised as suggested. Found in *Section 2.3.4 Platted Lots*
Pg. 16	Create tables for what the lots which allow one dwelling by Planning Area.	Agree, revised as suggested. Found in *Section 2.3.4 Platted Lots*
Pg. 20	"Bryan now has offshore island future land use designation could be good to include"	Agree. We now have the FLU designations for offshore islands. However, the current FLUM identifies a few islands. The vast majority of islands are not identified in the FLUM, nor appear in the Property Appraiser's records. Only a few offshore islands FLU can be identified at this time.
Pg. 21	Verify Acres for Wisteria Island	Agree, revised as suggested.
Pg. 21	Add column to Table for those in CBRS	See Conservation Coastal Management Element for a list.
Pg. 21	Paragraph 2 Circled word "several"	It is unclear as what is being asked, please explain.
Pg. 22	Who is exploring ownership issues related to the offshore islands?	Will not address at this time but will provide as future recommendation for intergovernmental coordination between Growth Management and Property Appraiser's Office.
Pg. 22	For islands designated what?	Revised as suggested.
Pg. 22	Where are the offshore islands with less than 10 acres?	Revised to indicate with asterisk.
Pg. 22	What does ???	????
Pg. 23	Include Miami-Dade in text.	Revised as suggested.

Location	Comment	K&S Response
Pg. 24	Move "70 percent" to beginning the sentence.	Revised as suggested.
Pg. 24	Discrepancy between acre numbers for Key West	Revised as suggested.
Pg. 24	Include the number of housing units for Key West	No changes made. This is found in the Key West Comprehensive Plan or US Census.
Pg. 24	Are the acres reported for Military in Key West exclusive of the ones in the County	Affirmative.
Pg. 26	Is the Florida Master Site File info the same as the one in the Housing Element? If so, reference the Housing Element	9J-5 requires that Historic Resources are listed
Pg. 38	Spell out SHPO	Already spelled out in page old pg 26. No change.
Pg. 51	Holy Cow- are we doing anything to protect these?	Will not address at this time but will provide as future recommendation for intergovernmental coordination between Growth Management and Property Appraiser's Office.
Pg. 52	Spell out SHPO	Already spelled out in page old pg 26. No change.
Pg. 54	We found an organization to do our own revisions for us.	Please provide their data for input on Comp Plan update.
Pg. 62-63	Add 2010 Census numbers	No change at this time because population numbers are being revised. Actual numbers are scheduled for release in January 2011.
Pg. 65	Add 1990 and 2010 age cohort numbers	Agree, 1990 has been added. For 2010 population numbers are being revised. Actual numbers are scheduled for release in January 2011.
Pg. 66	Regarding: Vacant land analysis	Agreed, revised as suggested in *Section 2.3.2 Vacant Land Analysis*

CONSERVATION AND COASTAL MANAGEMENT
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3.0 CONSERVATION AND COASTAL MANAGEMENT ELEMENT

The Conservation and Coastal Management Element of the Monroe County (County) Comprehensive Plan addresses the data inventory requirements of 9J-5.005(2) of the Florida Administrative Code (F.A.C.). The data inventory requirements will support the development of goals, objectives, policies, and implementation programs for the Conservation and Coastal Management Element.

The Conservation and Coastal Management Element is a required comprehensive plan element under Florida's Local Government Comprehensive Planning and Land Development Regulation Act (Chapter 163, Florida Statutes). The Conservation Element and Coastal Management Element are identified as separate elements in the Florida Statutes, but are combined herein because the requirements for the two elements are nearly identical for Monroe County. The purpose of the Coastal Management Element (Rule 9J-5.012, F.A.C.) is to plan for, and where appropriate, restrict development activities where such activities would damage or destroy coastal resources; and protect human life and limit public expenditures in areas that are subject to destruction by natural disaster. The purpose of the Conservation Element (Rule 9J-5.013, F.A.C.) is to promote the conservation, use, and protection of natural resources.

3.1 Introduction

The County is made up of the low-lying limestone islands comprising most of the Florida Keys (the keys north of Key Largo along Biscayne Bay are within Miami-Dade County) and the southwesternmost portion of the Florida peninsula. The mainland part of the County is made up of Everglades National Park and the southern portion of Big Cypress National Preserve. The Florida Keys extend 233 miles southwestward in a gradual arc from Biscayne Bay to the Dry Tortugas in the Gulf of Mexico. Southeast of the Keys is the Florida Reef Tract, a band of coral reefs bordering the Straits of Florida, lying five to seven miles offshore and extending 220 miles from Soldier Key to the Dry Tortugas. To the northwest of the Upper Keys and the northern part of the Middle Keys is Florida Bay, a shallow embayment with an extensive network of carbonate mud shoals and seagrass beds (Kruczynski, 1999). At the top of the Upper Keys, Card Sound and Barnes Sound are shallow embayments that connect to Biscayne Bay. West of Florida Bay, to the north of the Lower Keys and north of the southern part of the Middle Keys, is the Gulf of Mexico.

The southern tip of Florida and the Florida Keys contains one of the Country's most diverse assemblages of terrestrial, estuarine, and marine flora and fauna. The region includes the vast freshwater wetlands of the Florida Everglades and Big Cypress, the transitional areas where the waters of the Everglades discharge into the estuarine environment of Florida Bay, one of the world's largest coral reef tracts (the only one in the continental United States), the largest contiguous seagrass community in the world, and the subtropical habitats of the island chain. The environmental setting of the Keys is exceptional and unique, making the region a major travel destination.

The protection of the environment has been the focus of much of the land use planning effort since the adoption of the 2010 Comprehensive Plan in the early 1990s. Since that time, three major changes have been implemented to protect the Keys unique environment.

The first significant action was the establishment of the Florida Keys National Marine Sanctuary (FKNMS) in 1990. The Sanctuary encompasses approximately 2,600 square nautical miles of nearshore waters extending from just south of Miami to the Dry Tortugas. The FKNMS Comprehensive Management Plan was implemented in 1997 and the Revised Management Plan went into effect in 2007. A key feature of the FKNMS Management Plan was the establishment of the FKNMS Water Quality Protection Program (WQPP). The program identified actions to restore and/or maintain water quality conditions to maintain healthy native plant and animal populations in FKNMS waters. The Program has funded three long-term monitoring projects to monitor overall water quality, coral reef and hardbottom community health, and seagrass community health.

The second significant action was the enactment and implementation of the Rate of Growth Ordinance (ROGO) in 1992 and the Non-residential Rate of Growth Ordinance (NROGO) in 2002. ROGO and NROGO have slowed the rate of growth and have directed development to already disturbed lands or to infill areas. Subsequently in 2006, the Tier Overlay Ordinance, a zoning map overlay, was developed, which established open space requirements for environmentally sensitive lands. The Tier Overlay Ordinance also modified the ROGO/NROGO point system to help steer development away from environmentally sensitive lands. On Big Pine Key and No Name Key, particular attention was made to land use protection with the adoption of the Habitat Conservation Plan (with the Incidental Take Permit) and the Livable CommuniKeys Management Plan for these keys. These plans were implemented to complement ROGO/NROGO and the Tier Overlay Ordinance to protect habitat on Big Pine Key and No Name Key for key deer, eastern indigo snake, and lower keys marsh rabbit.

The third significant action was the initiation of major steps to improve nearshore water quality throughout the Keys. Historically, development in the Keys relied on on-site cesspits and septic tanks, which resulted in water quality degradation of inshore areas. In 1985, the Florida Keys were designated as Outstanding Florida Waters. In 2002, the Florida Keys were designated as a No Discharge Zone, which prohibits the discharge of boater sewage into all State waters of the FKNMS. Water quality is monitored under the FKNMS WQPP and the U. S. Environmental Protection Agency (USEPA) Strategic Targets for the Water Quality Monitoring Project. County efforts to improve nearshore water quality have included measures such as new criteria for on-site sewage treatment and disposal systems, and connection of individual homes and subdivisions to County wastewater treatment plants.

This document describes the existing conditions of the County, as specified by Rule 9J-5 F.A.C., for the Conservation and Coastal Management Element. The entire County is located within the coastal area. Thus, this element describes the existing geology and physiography, soils, marine resources, freshwater resources, wetlands, upland resources, wildlife, threatened and endangered species, fisheries, air quality, water quality, and

conservation areas. The effect of future land uses on these natural resources is examined. Throughout this element, problem areas are identified and recommendations are made to address them.

This element also examines water-dependent and water-related uses, especially the competition for shoreline development uses. The element examines natural disaster planning and includes an inventory of public access facilities and existing infrastructure. Finally, the element examines energy consumption and energy conservation areas.

This Technical Document provides the data inventory necessary to support the Policy Document. It does not establish the policies, which is done in the Policy Document. However, some recommendations for improvement in policies are readily evident and are discussed in this Technical Document, including but not limited to the following:

- Regarding abandoned mine sites, additional regulations are needed to more fully address the environmental and public safety issues. The County should undertake coordination with the Florida Department of Environmental Protection (FDEP) and the South Florida Water Management District (SFWMD) to review existing State and local mine reclamation standards for consistency and to determine the appropriate revisions to the County Code which will better protect the environment and residents of the County from the impacts of mining. The County should prepare an inventory of abandoned mining sites and, working where possible with landowners, develop plans for the cleanup and productive reuse of these sites.

- Given the potential for offshore oil and gas drilling to affect the County, the County should continue to be engaged in issues related to potential drilling in State and federal waters.

- Further improvements in sewage treatment practices are needed to improve canal and other nearshore waters.

- Further study of the benefits and adverse impacts associated with the use of aerators in artificial canals is needed, including evaluation of alternative aerator technologies.

- The USEPA and the FDEP, in consultation with the National Oceanographic and Atmospheric Administration (NOAA), were given the responsibility for developing a comprehensive WQPP for the FKNMS. The WQPP was developed to reverse the trend of environmental degradation and restore and maintain the Florida Keys marine ecosystem. County participation in the WQPP studies and monitoring is important.

- Because most of the Keys are located within the 100-year floodplain, potential activities for conservation, use or protection of floodplain are related to those which (1) prevent disturbances to areas which provide critical flood water storage and filtration functions, including mangroves, salt ponds, saltmarsh and buttonwood wetlands, and freshwater wetlands; (2) prevent excessive clearing and disturbance to natural upland vegetation

within the floodplain; and (3) minimize the alteration of natural drainage patterns within the floodplain. Lands that retain natural floodplain functions or water storage and filtration (wetlands) should be retained where possible, in their natural condition. Development activity should be directed away from areas of high quality upland vegetation which lies in the floodplain, including hardwood hammocks and pinelands. Land clearing, grading, and filling should not disturb natural drainage patterns.

- Regarding wetlands, the Land Development Regulations (LDRs) should be revised to (1) provide a definition of wetlands that is consistent with the State definition and/or the federal definition and provide a definition of wetland boundaries that is the same as those established through wetland jurisdictional determinations; (2) specify setbacks from wetlands that are based on the jurisdictional wetland boundary line; and (3) reflect a review and evaluation of the Keys Wetland Evaluation Procedure (KEYWEP), which is used to determine mitigation requirements. The KEYWEP evaluation method, while highly useful to evaluate wetlands in the Keys, is not used elsewhere in Florida. In addition, the use of the Uniform Mitigation and Assessment Method (UMAM) is mandated by State law. The use of KEYWEP is appropriate and is consistent with State law in determining whether the County will authorize impacts to wetlands.

- The map series produced for the Advance Identification of Wetlands (ADID) program were produced on hand-drawn maps that were then digitized. The analysis of the data for the inventory of natual habitats for this Technical Document revealed that the ADID data did not correspond to the other databases (i.e., the maps did not line up exactly). The ADID data can be useful for an individual parcel to determine if it contains a wetland with a KEYWEP score but, because of the mapping limitations, the ADID data could not be used as an inventory tool on a County-wide basis. The County should reconcile the ADID mapping with the parcel-based maps/databases so that this information can be available for land use analyses.

- Currently in the regulations, disturbed wetlands that are suitable for filling have a KEYWEP score below 7.0 (or are assigned a green flag). However, based on the Technical Summary Document for the Advance Identification of Wetlands of the Florida Keys (Kalla, 2000), the County should consider revising that definition, with agency coordination, to those wetlands that receive a KEYWEP total functional index of 5.5 or less.

- The County should determine when and how the Keys Environmental Restoration Fund (KERF) should be used for wetland mitigation. The Comprehensive Plan and the LDRs should be revised to reflect this policy. The County should provide a definition of "environmentally sensitive land" so that wetlands can be adequately included in the ROGO/NROGO and Tier Overlay Ordinance.

- Section 118-4 of the LDRs prohibits development activities in mangroves, freshwater wetlands, and in undisturbed saltmarsh and buttonwood wetlands. The

Comprehensive Plan and the LDRs should be amended to include salt ponds determined to be of high quality in this prohibition.

- Regarding freshwater wetlands, continued government acquisition of freshwater wetlands in the Lower Keys offers the greatest opportunity for conservation of these critical resource areas. Acquisition efforts should continue to focus on freshwater wetlands, freshwater ponds, buffer areas, and the critical recharge areas of the groundwater lenses which sustain freshwater flows into the wetland habitat areas.

- Projects undertaken by the Keys Environmental Restoration Fund, the Florida Keys Invasive Exotic Task Force, and the County Land Steward routinely include disturbed wetlands as well as other disturbed habitat types. In addition, mitigation projects implemented as part of larger residential or commercial projects have also restored areas of privately-owned disturbed wetlands throughout the Florida Keys. If practical and desired, restoration of these wetlands should be undertaken to restore biological functions.

- Beach management plans are needed for public beaches to address problems of erosion and invasive plants.

- Numerous efforts are underway in the Florida Keys to control the proliferation of exotic plants and animals. Since 2005, the Monroe County Land Steward has undertaken numerous exotic plant removal projects in County-owned parcels, using annual grant funding from the Florida Fish and Wildlife Conservation Commission Invasive Plant Management Section. The Land Steward is a partner with the Florida Keys Invasive Exotics Task Force. Task Force partners include the County, State and federal agencies, non-profits and public utilities. The Task Force coordinates efforts to eliminate invasive, non-native plant and animal species. The County should continue this partnering with the Task Force.

- The County can continue to work cooperatively with the U.S. Fish and Wildlife Service (USFWS), Florida Fish and Wildlife Conservation Commission (FFWCC), and Florida Department of Agriculture and Consumer Services (FDACS) to promote the recovery of designated wildlife species. The County can cooperate with these agencies to locate potential introduction sites for designated species, particularly for those which are federally- or State-listed. The County should assist, to the extent that it is able, with acquisition of reintroduction sites and sites having known populations of designated species. The County Biologist should participate in development of new recovery plans and revisions to old recovery plans for federally-designated species. When State or federal agencies undertake specific recovery actions in the County, the County should support these activities as appropriate through public education, law enforcement, and data collection.

- The County should develop brief information brochures for use by developers and landowners within critical habitat areas to inform them regarding activities disruptive

or harmful to specific wildlife species. As appropriate for each species, the guidelines should address items such as feeding, free-roaming domestic pets, noise, traffic, fencing, pesticide applications, invasive exotic species, and other threats. Existing laws and penalties for their violation should be identified. Guidelines should be made available to the general public.

- Regarding free-roaming domestic pets, the County Biologist should work cooperatively with the Animal Control Department to develop and implement an animal control plan. This plan should identify areas within the County where priority should be placed in enforcing animal control laws so as to protect native wildlife populations, particularly listed species. These priorities should be reviewed periodically. The Animal Control Department should be responsible for addressing the long-term staffing, facility and financial requirements to support implementation of the plan.

- The County prohibits the planting of some highly invasive exotic plants throughout the County and should continue in its efforts to educate the public of the need to remove invasive plant materials from existing developed areas.

- The spread of the Burmese python and the red lionfish (among others) into the Florida Keys demonstrates the need to address the introduction of exotic wildlife. The County Biologist is a partner with the Florida Keys Invasive Exotics Task Force. The County should consider adoption of an invasive exotic wildlife ordinance which shall prohibit and/or restrict the sale and handling of listed undesirable exotic species.

- Fee title acquisition by public agencies generally guarantees the permanent protection of conservation lands from development. However, it does not ensure the long-term health and stability of the natural systems present on a property. A primary threat to upland habitats is loss and fragmentation of habitats and the resultant loss of ecosystem function due to residential and commercial development. Canals, mosquito ditches, fill, and roads have altered natural hydrologic processes. Residential development has impacted management capabilities for fire-adapted pinelands by expanding the wildland-residential edge. This has resulted in the alteration of natural fire processes and a demand for fire suppression. Although many wetland and upland habitats have been restored, continued restoration is needed to help mitigate habitat loss elsewhere.

- The County should continue to support the conservation efforts of State and federal agencies by working cooperatively with resource managers at publicly-owned refuges, parks, and special-interests sites to address adjoining lands issues. Prescribed fire is an important tool for effectively managing and restoring pinelands. Fire can also manage the encroachment of overstory vegetation and restore open habitat features of coastal salt marsh and freshwater marsh habitats. The County can continue to support the habitat management strategies of resource agencies to include measures of the effectiveness of prescribed fire treatments. Such monitoring is essential for an adaptive management process to maintain and restore habitat. The County should continue its

outreach efforts to increase the public's awareness and understanding of this management technique.

- Exotic, invasive, and nuisance species cause habitat loss by disrupting natural communities. They can displace native species and alter ecosystem functions. The most widespread and problematic plant species include Brazilian pepper, Australian pine, latherleaf, seaside mahoe, lead tree, and non-native grasses. Federal and State agencies, as well as the Florida Keys Invasive Exotics Task Force and the County Land Steward, have invested substantial time and money in removing invasive exotic plant and animal species. Continual monitoring and maintenance treatment is required to keep exotics under control, prevent new infestations, and detect new species invasions. Adjacent private lands and roadways can serve as seed sources that may re-infest conservation lands. The use of non-native, invasive plants in landscaping causes the introduction of exotics to conservation lands. Feral and free-roaming domestic cats are a predator of the endangered lower keys marsh rabbit, silver rice rat, and native birds and reptiles. Free-roaming dogs can attack and injure or kill key deer. The County should continue to support programs to control exotic, invasive, and nuisance plant and animal species.

- Hurricanes and tropical storms and sea level rise have consequences for the management of conservation lands. It is predicted that the Florida Keys will experience changes from global climate change, particularly from changing temperatures in the air and water, rising sea level, and coastal storms. Saltwater intrusion into the freshwater lens from sea level rise and saltwater inundation of surface freshwaters from storm surges can alter pinelands and freshwater marshes resulting in more salt-tolerant plant communities. Species that are found only in pinelands may disappear as the pine forests die out. Storm events can cause considerable physical damage to beach/berm and coastal habitats. The County should continue to support the resource agencies as they gather scientific data to understand the natural processes and subsequent changes from sea level rise and to assist in the development of adaptive management strategies for future conservation needs.

- To protect and manage conservation lands, the County should maintain its land stewardship program and continue its existing partnerships, and develop new ones as needed, with resource agencies, organizations, and individuals. Partnerships can achieve the goals of complex programs and can considerably reduce costs.

- In general, future development in the County should be directed to the maximum extent possible away from the undeveloped Coastal Barrier Resources System (CBRS) units. This should be accomplished through land use policies of the Comprehensive Plan and its implementing LDRs. Other actions which the County should take to discourage further private investment in undeveloped CBRS units include (1) no new bridges, causeways, paved roads or commercial marinas should be permitted to or on CBRS units; (2) shoreline hardening structures should not be permitted along shorelines of CBRS units; (3) public expenditures on CBRS units should be limited to property

acquisition, restoration and passive recreation facilities; (4) privately-owned undeveloped land located within the CBRS units should be considered for acquisition by the County; and (5) the County should coordinate with the Florida Keys Aqueduct Authority (FKAA) and private providers of electricity and telephone service to assess measures that could be taken to discourage extension of facilities and services to CBRS units. Since the intent and effect of the CBRS has been to discourage development (prohibiting flood insurance and other federal program funds) in the County's designated coastal barriers, the County should consider whether to maintain the existing comprehensive plan policies related to the CBRS, or to focus on the development impacts on endangered species and habitat should unsubsidized development still occur.

- Long-term protection of natural resources is best accomplished through acquisition for permanent conservation purposes by the federal, State, or local government, or by non-profit conservation organizations. While acquisition is not a realistic solution for most lands in the Keys, it should be pursued aggressively for those which are determined by County staff, local scientists, and regulators to be the most ecologically sensitive and the most susceptible to development or environmental threat, despite the protections afforded by the Comprehensive Plan. However, effective management of that land is necessary to ensure it remains in a condition to support the viability of natural systems being protected.

- Research is needed to investigate impacts on habitats of commercial and recreational fishing gear and methods.

- Research is needed on the decline of certain populations of reef animals, such as staghorn coral and other corals.

- Improved management techniques are needed to mitigate or reduce physical damage to corals and other benthic communities caused by visitors to the reefs. The FKNMS Management Plan addresses the number of visitors that a reef can support annually and still be ecologically viable.

- Several anchorage sites need improved anchorage management and facilities, including but not limited to engineered mooring fields and pump-out facilities.

- During canal clean-up efforts following Hurricane Georges in the 1990s, it became apparent that official ownership of canals in the Florida Keys was inconsistent or not easily determined. Legal descriptions and parcel data have property lines ending at the canal banks, extending 10 feet into the canal, or to the center of the canal, or a combination of these variations. Plat maps have indicated that some canal systems may be owned by the property owners of a subdivision, or that ownership could potentially revert back to the developer of the subdivision. To pass ordinances or regulate the maintenance of canals, the ownership of canals needs to be clarified when ownership is used to determine responsibility.

3.2 Climate

The Florida Keys experience a subtropical savanna-type climate characterized by warm humid summers and mild dry winters. The mean annual sunshine is 3,300 hours, 10 percent more than the Florida peninsula to the north.

The average temperature in the Florida Keys ranges from a summer high of 89 degrees in July to a winter low of 63 degrees in February. Temperatures below freezing have not been recorded in the Keys, primarily due to the moderating effects of the warm marine waters in the area and the presence of the warm Gulf Stream along the coast.

The normal annual total precipitation in the Keys is about 40 inches (41.00 inches in Marathon, and 38.94 inches in Key West; www.srh.noaa.gov). Most of the rainfall comes in the wet season during the months of May through October. Winter rainfall accounts for less than one-third of the annual precipitation. Thunderstorms are the primary source of precipitation during the wet season. During hot summer days, moist oceanic air heats up over the land, becoming unstable as it rises. As the moisture condenses, thunderstorms form. During the dry winter season, most of the rainfall is due to cold fronts, which pass over the area on the average of once a week. Day-long dry-season storms are rare.

There is a decrease in precipitation and seasonal differences in precipitation southward from the Upper Keys to the Middle Keys to the Lower Keys. This is due to two factors. Winter cold fronts do not pass into the Lower Keys as often as they pass into the Upper Keys. Further, convective thunderstorms do not develop as readily over small islands as they do over the mainland.

Prevailing tradewinds from the east and southeast in the Keys are relatively mild, averaging 11 to 12 knots throughout the year. The strongest winds occur during the winter months from December through March, when cold fronts move over the area from the north.

The Keys lie in an area which is susceptible to tropical cyclones and hurricanes. These low pressure systems vary in intensity and orientation. Tropical depressions or disturbances are cyclones with winds of less than 38 miles per hour (mph). By comparison, tropical storms exhibit distinct circulation patterns, with winds exceeding 38 mph. When the maximum winds exceed 74 mph, the storm is categorized as a hurricane.

3.3 Physiography, Geology, and Mineral Resources

3.3.1 Physiographic Features

The Florida Keys belong to the Southern Zone of the Coastal Lowlands physiographic province. This area lies south and southeast of Lake Okeechobee, is primarily underlain by Pleistocene limestone, and is characterized by low relief, poor drainage, and extensive

areas of coastal mangrove swamps. Elevations on the Keys are low, generally less than 5 feet above sea level. Most of the land area is only 2 to 3 feet above high tide. The highest point lies on Windley Key, where the maximum elevation is 18 feet above sea level.

The islands generally slope gradually up from the sea to flattened, gently rounded tops (Lane, 1986). Irregularities of the rock surfaces are a result of the heterogeneous topography of the coral reefs that created the islands, and also as a result of erosion and solution of the limestone rocks (Lane, 1986). Solution features, such as pitted and pinnacled surfaces, occur throughout the Keys. There are also many sinkholes, filled with peat or carbonate sediments, up to several feet in diameter and several feet deep (Lane, 1986).

Geologically and physiographically, the County can be divided into four main areas: the mainland, the coral reef keys; the oolitic keys; and the distal atolls.

3.3.1.1 Mainland

The mainland part of the County is made up of Everglades National Park and the southern portion of Big Cypress National Preserve. The mainland is part of the low-lying wetland system of the Everglades that historically extended over 200 miles from the Kissimmee chain of lakes south through Lake Okeechobee into the freshwater marshes of the Everglades and to the mangrove estuaries. In the northwest portion of the mainland, the swamps of Big Cypress National Preserve define the western boundary of the Everglades. This area is slightly higher in elevation than the Everglades basin. Throughout the Everglades, freshwater flows slowly southward over a vast flat plain (the "river of grass"), eventually reaching Florida Bay. The southern reaches of the Everglades transition to the coastal marshes and mangrove swamps along the coastlines of Florida Bay and the Gulf of Mexico. The transitional zone is comprised of bands of swamps and brackish marshes just above sea level.

3.3.1.2 Coral Reef Keys

The coral reef keys are a linear chain of islands made up primarily of limestone coral rock (Randazzo and Halley 1997). The main axis of each island lies parallel to the main axis of the island chain. They include the islands of the Upper Keys and Middle Keys planning areas, and extend from Key Largo to the Newfound Harbor Keys (just south of Big Pine Key) in northeasternmost part of the Lower Keys.

3.3.1.3 Oolitic Keys

The oolitic keys are primarily composed of oolites, small spherical grains of calcium carbonate, cemented together to form an oolitic limestone (Randazzo and Halley 1997). The axis of each island runs at a right angle to the general trend of the island chain rather than parallel to it, as in the coral reef keys. The islands are separated by numerous long

narrow channels. The oolitic keys extend from Big Pine Key (except the southern tip of the island, which belongs geologically to the coral reef keys) to Key West.

3.3.1.4 Distal Atolls

West of Key West, the distal atolls represent the last outlier islands of shallow sediments of the Florida Platform. These include approximately 30 roughly circular sand keys. Moving west from Key West, major features are the Boca Grande island group, the islands forming the Marquesas, the Quicksands Banks through Rebecca Shoals, and the islands of the Dry Tortugas, which are separated from Rebecca Shoals by a trough of relatively deep water (CSA, 1991).

3.3.2 Geology

3.3.2.1 Structure and Geologic Setting

The Florida Keys, Florida Bay, and Everglades National Park are on the Floridan Plateau. This plateau separates the Gulf of Mexico from the Atlantic Ocean, extending offshore beyond the present land mass beneath all of the submerged areas surrounding the State to the edge of the continental shelf at approximately the 300 foot depth contour (SFWMD, 1991). In the Gulf, the plateau slopes gently to the west and extends out 150 miles offshore; on the south and east, the plateau drops off sharply into the Bahamas Trench approximately 5 to 7 miles offshore.

Marine carbonate sediments nearly 20,000 feet in depth underlie the Keys. These sediments range in age from Jurassic to Holocene and have accumulated over a period of 136 million years above a Triassic-Jurassic basement of volcanic rocks (Antoine and Harding, 1963). Beneath the Florida Peninsula, the basement is comprised of various igneous and sedimentary rocks of chiefly Precambrian and early Paleozoic age (SFWMD, 1991).

3.3.2.2 Stratigraphy

Although the Mesozoic sediments represent thicknesses well in excess of 10,000 feet, only the more recent Cenozoic sediments have a direct bearing on the history and formation of the Keys. Of these, the most important are the sediments deposited since Miocene time, including the Miami Oolite, the Key Largo Limestone, the Tamiami Limestone, and the Hawthorne Group.

Reconstruction of the past is complicated by oscillations in sea level which have occurred since Middle Tertiary Miocene times. Some 20,000 years ago, sea level may have been as low as 450 feet below present level. Geologic evidence, such as the presence of peat under Crane Key 4 to 10 feet below present sea level, indicates a much lower sea level as recently as 4,000 years ago. Recent indications are that sea level has risen approximately 8 to 10 inches during the past century.

3.3.2.2.1 Key Largo Limestone

The Key Largo Limestone outcrops at the surface from Soldier Key to the southernmost end of Big Pine Key - a distance of 110 miles. Subsurface drilling indicates that it is present beneath the land surface from Miami to the Dry Tortugas. It varies in thickness from 70 to over 170 feet. It is a fossil coral reef whose main structure is a network of coral heads with intervening spaces filled with detrital reef material. Star coral, and less commonly brain corals, are the dominant species found in the exposed Key Largo Limestone, indicating that the reef was once a patch reef. Oceanward drilling away from the exposed portion of the limestone reveals the presence of elkhorn coral (*Acropora palmata*), a species characteristic of fringe reefs. The lowering of the sea which allowed cementation of the Miami Limestone killed the reef as it emerged. The subsequent rise of the sea, which reshaped the oolitic limestone of the Lower Keys, also destroyed most of the outer fringe reef. Only the inner patch reef is visible today and forms the backbone of the Upper and Middle Keys.

The Key Largo Limestone is a very porous coralline limestone. It is riddled with solution features and voids, allowing water ready passage, both vertically and horizontally. Although an excellent potential aquifer, it contains very little freshwater because its permeability allows ready outflow of freshwater and inflow of saltwater.

3.3.2.2.2 Miami Oolite

The Miami Oolite overlies Key Largo Limestone as a surficial deposit from Big Pine Key through Key West, gradually increasing in depth from east to west to as much as 35-40 feet in Key West. It is a medium to hard limestone, white to yellowish in color, oolitic in places, rich in bryozoans in part, and may also contain some quartz sand. It underlies most of the Florida Bay where it is covered by varying thicknesses of calcareous mud derived from the disintegration of calcareous algae. This limestone is primarily represented by the oolitic facies and the bryozoan facies.

The Miami Oolite is a porous limestone containing numerous vertical solution features most likely formed during the Pleistocene. Because these features are not commonly connected, water does not move laterally as readily as in the Key Largo Limestone. Freshwater lenses floating on top of saline water occur in the Lower Keys oolitic deposits have historically been used as freshwater sources, and some wells are still used by local residents, mostly for landscape irrigation purposes. The freshwater lenses also support differing vegetation, including the pineland forest on Big Pine Key. However, dredging of canals has disrupted the lenses in many areas, resulting in saltwater intrusion (Ross et al., 1994).

3.3.2.2.3 Tamiami Limestone

The Tamiami Limestone is the oldest formation outcropping in South Florida. It is a tan to light grey limestone, quite variable in appearance with some sandy units and some reef

rock units. The Tamiami Limestone reaches a maximum thickness of 150 feet in the Miami area. To the west, the formation thins rapidly.

In the Miami area, the upper portion of the Tamiami Formation is one of the most permeable and productive formations of the Biscayne Aquifer. The upper portion is separated from the lower portion by an unconformity, which locally corresponds to a hydrologic separation as well. The upper productive zone is composed of permeable limestones, underlain by relatively impermeable marls and limestones of the Lower Tamiami and Hawthorne Formations, which in part, form the confining beds between the deeper Floridan Aquifer and the shallower Biscayne Aquifer.

Although the Floridan has sufficient water pressure to allow artesian flow in the Keys, the high concentration of dissolved materials renders the water unfit for public consumption without treatment. Pennekamp Spring on Key Largo is a 6-inch artesian well 1,300 feet deep in the Florida Aquifer. It has a chloride concentration of 2,440 mg/L, nearly ten times the recommended U.S. Public Health Service levels (Rosenau et al., 1977).

3.3.2.2.4 Hawthorne Group

The Hawthorne Group underlies both the Miami Oolite and Key Largo Limestone and acts as a confining layer, which inhibits the downward movement of groundwater. It separates the surficial aquifer system from the Floridan Aquifer System. It is relatively impermeable and consists of silt, clayey sand, and sand. It is phosphatic and greenish in color. The formation averages approximately 200 to 300 feet in thickness throughout the Florida Keys area.

3.3.3 Mineral Resources [Rule 9J-5.013(1)(a)3., F.A.C.]

3.3.3.1 Known Sources of Commercially Valuable Minerals and Existing Mineral Resource Extraction Activities

Mineral commodities that are available for production in South Florida generally include sand, limestone, and oil and gas (Lane, 1981). Mining in the County is regulated by two agencies: FDEP and SFWMD. FDEP regulates mines that have onsite processing, such as limestone mines. The SFWMD processes the Environmental Resource Permit (ERP) application if the mine is a borrow pit and will not have on-site material grading or sorting facilities. The FDEP mandatory nonphosphate program administers the laws and regulations related to the reclamation of mined land and the protection of water resources (water quality, water quantity and wetlands) at mines extracting heavy minerals, fuller's earth, limestone, dolomite and shell, gravel, sand, dirt, clay, peat, and other solid resources (except phosphate).

Based on the FDEP Bureau of Mine Reclamation Mandatory Nonphosphate web mapping site (http://ca.dep.state.fl.us/imf?focus=mannon), there are no mines in the County that are regulated by FDEP. Based on a review of the SFWMD online ePermitting database

(http://my.sfwmd.gov/ePermitting), SFWMD has no active or pending permits for mining in the County.

3.3.3.1.1 Limestone

In the Florida Keys, the resource extraction industry has historically been limited to limestone mining. Over most of the Keys, limestone occurs at the surface or at relatively shallow depths, beneath thin sand or peat deposits. Abandoned limestone mining pits, or "borrow pits" can be found throughout the Keys, where, because of the low relief, they are typically filled with water. In the early 1990s, nine limestone mining operations in the Keys had active Monroe County permits. These were found throughout the Keys. None were located on the mainland portion of the County. Material was mined by blasting and by shovel removal. Generally water was not pumped from mining pits. Excavated material was used in the construction trades for fill, landscaping, cement manufacture, road construction, and shoreline protection.

By 2010, most mining operations had ceased. Borrow pits on Rockland Key (Pinewood Enterprises, Inc.), Rockland Key (CTB, Inc.), Shark Key (Keevan), Cudjoe Key (CTB, Inc.), and Big Pine Key (CTB, Inc.) were no longer active (Monroe County, pers. comm., August 25, 2010). On Big Pine Key, a borrow pit managed by A & B Land Investments was inactive in 2010 with all machinery removed from the site and the application for permit renewal (County permit #10101485) had not been approved. On Rockland Key, the borrow pit managed by Toppino was active under permit #09101026 and an application for permit renewal #10101476 submitted.

On No Name Key, a borrow pit owned by Pinewood Materials, Inc. had equipment on site and appeared to be active in 2010; the last readily-available issued permit was #02101421. This pit had been in operation since the early 1970s. The Pinewood property is approximately 20 acres in size, and an existing conditions report dated 2002 (attached to the permit renewal application) indicated the mining pit was a deep saline lake about 18 acres in size. The 2002 existing conditions report indicated that that invasive exotic vegetation control measures had been implemented for the prior decade and invasive exotic vegetation was almost completely eradicated. The exiting conditions report also noted that soil spreading had occurred in 1989 to promote natural regeneration of native vegetation. No additional information was available. Review of a 2010 aerial photograph revealed a second borrow pit on No Name Key. The second borrow pit is southwest of the intersection of Spanish Channel Drive and Marginella Drive. Permit information was not readily available, but a local resident indicated that the borrow pit was active as recently as 2010, and that the mining process has included blasting using dynamite.

3.3.3.1.2 Sand

Compared to the rest of Florida, there is very little quartz sand on the Keys (Lane, 1986). Some offshore sand extraction has been undertaken by the Florida Department of Transportation (FDOT) to obtain fill for local improvements to U.S. 1. Bare sand substrate is known to occur adjacent to the Keys' shoreline only in the vicinity of tidal channels of the

Lower Keys and in the nearshore region of Boca Chica Key, Big Munson Island, Bahia Honda Key, Ohio Key, and Grassy Key (Marszalek, 1984).

Low beach berms have formed along the south-facing shoreline of several of the Lower Keys, including Big Pine Key, Sugarloaf Key, and Big Coppitt Key. These berms are composed of calcium carbonate sediments biogenically produced in nearshore waters, which are deposited in accumulating layers by major storm events. They are typically approximately 50 feet deep and 6 to 8 feet in elevation at the highest point, so are much smaller than beach berms along larger, silicate beaches in northern Florida, but serve a similar function in providing some localized protection from storm surge.

3.3.3.1.3 Oil and Gas

A total of seven oil wells have been drilled in State of Florida waters of the South Florida Basin near the Florida Keys from 1947 through 1983 (Lloyd, 1991). One of these wells (drilled in 1959), located north of the Marquesa Islands, had a significant oil show (Lloyd, 1991) but no commercial production was ever undertaken. No further drilling or geophysical oil exploration activity has occurred in the vicinity of the Keys. Effective July 1990, all oil drilling activity was prohibited in State of Florida waters. Oil drilling within the Florida Keys National Marine Sanctuary (FKNMS) is prohibited by the Florida Keys National Marine Sanctuary and Protection Act, passed in 1990. There have been no sales of federal oil and gas leases in the Straits of Florida Planning Area (Lloyd, 1991). This area encompasses the Straits of Florida on the Atlantic side of the Keys extending offshore from the Keys to the "Three League Line." Florida banned drilling in State waters in 1992, and has opposed additional drilling in federal waters off Florida. However, some major oil companies have continued to evaluate the potential for exploratory drilling off the Keys, and various proposals were evaluated in 2009 and 2010 for exploratory drilling in waters outside the FKNMS.

3.3.3.2 Known Pollution Problems and/or Issues Related to Mineral Resource Extraction Operations

Environmental problems at abandoned mining sites or sites at which extraction activities are no longer in operation are related to: stormwater and groundwater management; erosion and sedimentation control; safety to persons, wildlife and adjoining property; control of invasive exotic vegetation; and visual impacts. Reclamation requirements of the County and the FDEP address each of these problem areas, exclusive of mitigation of visual impacts from inactive sites.

3.3.3.3 Potential for Conservation, Use, or Protection of Mineral Resources

3.3.3.3.1 Limestone and Sand

Additional regulations are needed to more fully address the environmental and public safety issues related to abandoned mine sites. The County should undertake coordination

with FDEP and SFWMD to review existing State and local mine reclamation standards for consistency and to determine the appropriate revisions to the County Code which will better protect the environment and residents of the County from the impacts of limestone mining. The County should prepare an inventory of abandoned mining sites and, working where possible with landowners, develop plans for the cleanup and productive reuse of these sites. An example of productive reuse is Lazy Lakes RV Resort, located off Johnson Road on Sugarloaf Key, where a seven-acre borrow pit has been converted into a resort amenity.

3.3.3.3.2 Oil and Gas

The National Marine Sanctuary Act (H.R. 5909) prohibits leasing, exploration, development, or production of minerals or hydrocarbons within the FKNMS. This has provided effective protection of oil and gas resources and protection against environmental damage from oil and gas drilling within the boundaries of the FKNMS. Drilling outside the FKNMS also has the potential to affect the County and the County should continue to be engaged in issues related to offshore drilling in State and federal waters outside the FKNMS.

3.4 Soils

3.4.1 Soils Inventory

Soils in the Keys are sparsely distributed and are generally confined to hammocks at the higher elevations and mangrove stands in the lower lying areas of the islands. Soil thickness is generally less than 10 inches. The Natural Resource Conservation Service (NRCS) of the U.S. Department of Agriculture (USDA) has mapped 16 soil units in the Florida Keys (exclusive of the mainland) (USDA 2010). These include:

- eleven soil series found only in the Keys,
- beach soils, and
- four soil complexes comprised of natural soils in combination with other substrate, such as rock outcrops, fill and/or crushed limestone.

Soil characteristics are correlated with topographic, hydrologic and vegetation conditions. Based upon these factors, the 16 soil units in the Keys can be divided into six general groups, as follows:

- **Beach Soils:**
- Beaches (B)

- **Marine Wetland Soils:** (Mangroves, Saltmarsh and Buttonwood Wetlands)
- Cudjoe Marl (CM)
- Keywest Marl (KW)
- Lignumvitae Marl (LM)
- Islamorada Muck (IM)

- Key Largo Muck (KM)
- Rock Outcrop-Cudjoe Complex (tidal) (RCT)
- Rock Outcrop-Tavernier Complex (RT)

- **Tropical Hardwood Hammock Soils:**
- Bahia Honda Fine Sand (FS)
- Matecumbe Muck (MM)
- Pennekamp Gravelly Muck (extremely stony) (PM)
- Saddlebunch Marl (SM)

- **Pineland Soils:**
- Keyvaca Very Gravelly Loam (KL)

- **Freshwater Wetland Soils:**
- Rock Outcrop-Cudjoe Complex (frequently flooded) (RCF)

- **Filled and Developed Land:**
- Udorthents-Urban Land Complex (U)
- Urban Land (UL).

Table 3.1 summarizes selected physical and chemical properties of the soil units. **Table 3.2** summarizes the water features for each soil unit. **Map Series 3.1** depicts the soil units found in the Florida Keys. The soil maps are for informational purposes only and the data were not field verified in connection with the Comprehensive Plan update.

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Table 3.1 - Monroe County Soils – Physical and Chemical Properties of Soils

Symbol	Soil Name	Depth (in.)	Texture	Saturated Hydraulic Conduc tivity (mm/sec)	Soil Reac tion (pH)	Organic matter (%)	Kw	Kf	T
Beach Soils									
B	Beaches	0-6	Sand	>6.0	-	<0.1	0.05	0.05	5
		6-60	Coarse sand, sand, fine sand	>6.0	-	<0.1	0.05	0.05	-
Marine Wetland Soils									
CM	Cudjoe marl	0-9	Marl	4-42	6.6-8.4	1-5	0.32	0.32	1
		9-16	Marl	4-42	6.6-8.4	0.0-0.5	0.32	0.32	-
		16-20	Weathered bedrock	14-141	-	-	-	-	-
KW	Keywest marl	0-9	Marl silt loam	4-42	6.6-8.4	1-5	0.32	0.32	2
		9-15	Muck	42-141	6.1-7.8	60.0-80.0	0.32	0.32	-
		15-27	Mucky silt loam	14-42	6.6-8.4	10.0-20.0	0.28	0.28	-
		27-65	Marly silt loam	4-42	6.6-8.4	0.0-1.0	0.32	0.32	-
		65-69	Weathered bedrock	14-141	-	-	-	-	-
LM	Lignumvitae marl	0-4	Marl	4-42	6.6-8.4	1-5	0.32	0.32	2
		4-32	Marl	4-42	6.6-8.4	0.0-0.5	0.32	0.32	-
		32-36	Weathered bedrock	14-141	-	-	-	-	-
IM	Islamorada muck	0-35	Muck	42-141	6.1-7.8	75-90	-	-	1
		35-39	Weathered bedrock	14-141	-	-	-	-	-
KM	Key Largo muck	0-70	Muck	42-141	6.1-7.8	75-90	-	-	3
		70-74	Weathered bedrock	14-141	-	-	-	-	-
RCT	Rock Outcrop – Cudjoe complex tidal	0-60	Unweathered bedrock	-	-	-	-	-	-
RT	Rock Outcrop – Tavernier complex tidal	0-60	Unweathered bedrock	-	-	-	-	-	-
Tropical Hammock Association Soils									
FS	Bahiahonda fine sand	0-8	Fine sand	42-141	6.6-7.8	1-3	0.05	0.05	5

Table 3.1 - Monroe County Soils – Physical and Chemical Properties of Soils (continued)

Symbol	Soil Name	Depth (in.)	Texture	Saturated Hydraulic Conduc tivity (mm/sec)	Soil Reac tion (pH)	Organic matter (%)	Kw	Kf	T
		8-35	Fine sand	42-141	6.6-7.8	0.0-1.0	0.05	0.05	-
		35-68	Sand	42-141	6.6-7.8	0.0-1.0	0.05	0.05	-
		68-82	Very gravelly sand	141-282	7.4-8.4	0.0-1.0	0.02	0.05	-
		82-86	Weathered bedrock	14-141	-	-	-	-	-
MM	Matecumbe muck	0-6	Muck	42-141	5.6-7.3	80-90	-	-	1
		6-10	Weathered bedrock	14-141	-	-	-	-	-
PM	Pennekamp gravelly muck	0-3	Gravelly muck	14.12-42.36	5.6-6.5	40-70	-	-	1
		3-8	Very gravelly loam	14.12-42.36	7.4-8.4	1.0-5.0	0.10	0.37	-
		8-12	Weathered bedrock	14.12-141.20	-	-	-	-	-
SM	Saddlebunch marl	0-5	Marly silt loam	4-42	6.6-8.4	1-5	0.32	0.32	1
		5-17	Marly silt loam	4-42	6.6-8.4	0.0-1.0	0.32	0.32	-
		17-21	Weathered bedrock	14-141	-	-	-	-	-
Slash Pineland Soils									
KL	Keyvaca very gravelly loam	0-4	Very gravelly loam	14-42	7.4-8.4	2-6	0.05	0.20	1
		4-8	Weathered bedrock	14-141	-	0	-	-	-
Freshwater Wetland Soils									
RCF	Rock Outcrop – Cudjoe complex – frequently flooded	0-60	Unweathered bedrock	-	-	-	-	-	-
Filled and Developed Land									
U	Udorthents	0-32	Extremely gravelly sand	42-141	7.4-8.4	1-2	0.02	0.10	1
		32-60	Marly silt loam	4-42	6.6-8.4	0.0-0.5	0.32	0.32	-
		60-64	Weathered bedrock	14-141	-	-	-	-	-
UL	Urban land	0-6	Variable	-	-	-	-	-	-

Source: USDA, 2010. http://websoilsurvey.nrcs.usda.gov/app (Soil Maps Version 1, Aug 2, 2007; Soil Data Version 2, Jan 13, 2010). Absence of an entry indicates that data were not available or were not estimated.

Table 3.2 - Monroe County Soils – Soil and Water Features

Symbol	Soil Name	Hydrologic Soil Group	Flooding Frequency	Flooding Duration	Flooding Months	Water Table Upper Limit (ft)	Water Table Lower Limit (ft)
Beach Soils							
B	Beaches	-	Frequent	Very bief	Jan-Dec	0.0-0.5	>6.0
Marine Wetland Soils							
CM	Cudjoe marl	B/D	Frequent	Very brief	Jan-Dec	0.0-0.5	>6.0
KW	Keywest marl	A/D	Frequent	Very brief	Jan-Dec	0.0-0.5	>6.0
LM	Lignumvitae marl	B/D	Frequent	Very brief	Jan-Dec	0.0-0.5	>6.0
IM	Islamorada muck	A/D	Frequent	Very brief	Jan-Dec	0.0-0.5	>6.0
KM	Key Largo muck	A/D	Frequent	Very brief	Jan-Dec	0.0-0.5	>6.0
RCT	Rock Outcrop – Cudjoe complex tidal	B/D	Frequent	Very brief	Jan-Dec	0.0-0.5	>6.0
RT	Rock Outcrop – Tavernier complex tidal	A/D	Frequent	Very brief	Jan-Dec	>6.0	>6.0
Tropical Hammock Association Soils							
FS	Bahiahonda fine sand	A	Rare	Very brief	Jun-Nov	2.5-3.5	>6.0
MM	Matecumbe muck	D	Occasional	Brief	Jul-Dec	1.5-3.0	>6.0
PM	Pennekamp gravelly muck	D	Rare	Very brief	Jun-Nov	3.5-5.0	>6.0
SM	Saddlebunch marl	B/D	Occasional	Long	Jun-Nov	0.5-1.0	>6.0
Slash Pineland Soils							
KL	Keyvaca very gravelly loam	D	Rare	Very brief	Jun-Nov	3.0-5.0	>6.0
Freshwater Wetland Soils							
RCF	Rock Outcrop – Cudjoe complex – frequently flooded	B/D	Frequent	Brief	Jun-Nov	0.0-0.5	>6.0

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Table 3.2 - Monroe County Soils – Soil and Water Features (continued)

Symbol	Soil Name	Hydrologic Soil Group	Flooding Frequency	Flooding Duration	Flooding Months	Water Table Upper Limit (ft)	Water Table Lower Limit (ft)
Filled and Developed Land							
U	Udorthents	A	Rare	Very brief	Jun-Nov	2.0-4.0	>6.0
UL	Urban land	-	Rare	Very brief	Jun-Nov	-	-

Source: USDA, 2010. http://websoilsurvey.nrcs.usda.gov/app (Soil Maps Version 1, Aug 2, 2007; Soil Data Version 2, Jan 13, 2010).

Absence of an entry indicates that data were not available or were not estimated.

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms. The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

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3.4.1.1 Beach Soils

Approximately 49 acres of Beach (B) soils occur in the Keys (includes incorporated and unincorporated areas). These include beaches adjacent to the Atlantic Ocean on Long Key and the Lower Keys. Slopes are generally 1 to 2 percent.

3.4.1.2 Marine Wetland Soils (Mangroves, Saltmarsh, and Buttonwood Wetlands)

Cudjoe Marl (CM), Keywest Marl (KW), and Lignumvitae Marl (LM) occur on tidal, sparsely vegetated mangrove swamps. Cudjoe and Keywest soils occur primarily in the Lower Keys. Cudjoe soils are loamy, carbonatic, isohyperthermic, shallow Tropic Fluvaquents (5,564 acres). Keywest soils are coarse silty, carbonatic, isohyperthermic Thapto-Histic Tropic Fluvaquents (648 acres). Lignumvitae soils, more common in the Middle Keys, are coarse, silty, carbonatic isohyperthermic Tropic Fluvaquents (1,653 acres). All three soils are frequently flooded for very brief durations by tidal action and tropical storms.

Islamorada Muck (IM), Keylargo Muck (KM), Rock Outcrop-Cudjoe Complex (tidal; RCT), and Rock Outcrop-Tavernier Complex (RT) occur on tidal, densely vegetated mangrove swamps. Islamorada and Keylargo soils occur primarily in the Upper Keys. Islamorada soils are euic, isohyperthermic Lithic Troposaprists (7,425 acres). Keylargo soils are euic, isohyperthermic Typic Troposaprists (11,796 acres). Both soils are frequently flooded by daily tidal action. The Rock Outcrop-Cudjoe Complex is found throughout the Keys, and consists of 60 percent rock outcrop and 40 percent Cudjoe Marl (8,675 acres). The Rock Outcrop-Tavernier Complex occurs primarily in the Upper Keys, and consists of 65 percent rock outcrop and 35 percent Tavernier Muck (899 acres). Both soil complexes are frequently flooded by tidal action and tropical storms.

3.4.1.3 Tropical Hardwood Hammock Soils

Bahiahonda Fine Sand (FS) occurs on approximately 412 acres of coastal dunes and tropical hammocks on Long Key and Bahia Honda Key. The soils are isohyperthermic, uncoated Aquic Quartzipasamments. They are rarely flooded and have a high water table of 2.5 to 3.5 feet below land surface.

Matecumbe Muck (MM) occurs on tropical hammocks throughout the Keys (3,998 acres). The soils are euic, isohyperthermic Lithic Tropofolists. They have a high water table of 1.5 to 3 feet and are occasionally flooded by hurricanes and other tropical storms.

Pennekamp Gravelly Muck (extremely stony; PM) occurs on tropical hammock uplands of the Upper Keys (7,443 acres). Pennekamp soils are loamy-skeletal, carbonatic, isohyperthermic Lithic Rendolls. Approximately 20 percent of the surface is typically covered by stones. The soils are rarely flooded by hurricanes and other tropical storms and have a high water table of 3.5 to 5 feet.

Saddlebunch Marl (SM) occurs on tropical hammock uplands of the Lower Keys (1,870 acres). Saddlebunch soils are loamy, carbonatic, isohyperthermic shallow Tropic Fluvaquents. They are occasionally flooded for brief periods by surface runoff from adjacent higher land.

3.4.1.4 Pineland Soils

Keyvaca very gravelly loam (KL) occurs in the pinelands of Big Pine Key and adjacent keys (2,517 acres). The soils are loamy, skeletal, carbonatic, isohyperthermic Lithic Rendolls. Approximately 10 percent of the surface is typically covered by stones. The soils are rarely flooded by hurricanes and other tropical storms and have a high water table of 3 to 5 feet.

3.4.1.5 Freshwater Wetland Soils

The Rock-Outcrop Cudjoe Complex (RCF) occurs on the sawgrass-dominated freshwater wetlands of Big Pine Key and adjacent keys (1,491 acres). It consists of 55 percent rock outcrop and 45 percent Cudjoe Marl. The soils are frequently flooded by surface runoff from adjacent higher land.

3.4.1.6 Filled and Developed Land

Filled and developed lands characterized by the Udorthents-Urban Land Complex (U) and Urban Land soils occupy approximately 16,105 acres of the Keys, or 23 percent of the land area. The Udorthents-Urban Land Complex (U) occurs on coastal uplands. These areas were created to allow for new development by placement of crushed limestone over marl and other soil materials (13,481 acres). Up to 40 percent of the mapped areas are covered by urban structures. Urban Land (U) occurs on uplands that are 80 percent covered by urban development on Key West and adjacent keys (2,624 acres).

3.4.2 Soil Limitations for Developed Uses

Soils in the Florida Keys are “very limited” for developed uses, including shallow excavations, dwellings without basements, local roads and streets, and septic tank absorption fields (see **Table 3.3**). The USDA defines very limited as follows:

> “the soil has one or more features that are unfavorable for the specified use. The limitations generally cannot be overcome without major soil reclamation, special design, or expensive installation procedures. Poor performance and high maintenance can be expected” (USDA, 2010).

In the Keys, the soils are most commonly limited due to shallow depth to bedrock, flooding, and wetness. Localized limiting characteristics include flood potential, inadequate depth to bedrock or saturated zone, tendency to cave, low strength, poor filtration capability, subsidence potential, and presence of large stones. Soils characterized as "urban land" are potentially better development sites when compared to natural soils in the Keys. These

soils have "variable" limitations for developed uses, reflecting their history of disturbance. Most of these areas are already fully developed.

3.4.3 Areas Known by the Local Soil and Water Conservation District to Have Experienced Soil Erosion Problems [Rule 9J-5.013(1)(a)4., F.A.C.]

3.4.3.1 Identification of Soil Erosion Problem Areas

The USDA NRCS has a District Conservationist in Florida City that provides soil and water conservation assistance to Miami-Dade and Monroe Counties. The County does not have a county soil and water conservation district, but receives assistance from the South Dade Soil and Water Conservation District.

Outside of former mining and current construction activities in the County, shoreline and canal banks erosion have been identified by the USDA NRCS as soil erosion problem areas. Shoreline and canal bank erosion are expected during hurricanes and tropical storms. The degree of erosion will depend on wind speed, direction of wind and wave action, duration of storms, as well as rainfall rates associated with each storm event (USDA NRCS District Conservationist, May 3, 2010).

The County Department of Environmental Resources has identified several types of sites where accelerated erosion and sedimentation has or may occur in the Florida Keys:

- construction sites;
- existing developments where there is inadequate stormwater management;
- limestone mining sites;
- unstable dredged spoil disposal sites;
- beaches; and
- altered shorelines.

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Table 3.3 - Monroe County Soils – Soil Limitation Ratings for Selected Developed Uses

Map Symbol	Soil Name	Acres	Percent of Total Acres	Soil Limitations for Shallow Excavations	Soil Limitations for Dwellings without Basements	Soil Limitations for Local Roads and Streets	Soil Limitations for Septic Tank Absorption Fields
Beach Soils							
B	Beaches	49	0.1	Not rated	Not rated	Not rated	Not rated
Marine Wetland Soils							
CM	Cudjoe marl	5564	7.9	Very limited (D, DS, F, U)	Very limited (F, DS, O, D)	Very limited (DS, D, F)	Very limited (F, D, DS, SE)
KW	Keywest marl	648	0.9	Very limited (DS, O, F, U)	Very limited (F, DS, O)	Very limited (DS, F)	Very limited (F, DS, SE, D)
LM	Lignumvitae marl	1653	2.3	Very limited (DS, O, F, D, U)	Very limited (F, DS, O)	Very limited (DS, F)	Very limited (F, DS, D, SE)
IM	Islamorada muck	7425	10.5	Very limited (DS, O, F, D)	Very limited (S, F, DS, O)	Very limited (DS, S, F)	Very limited (F, DS, SE, D, FC)
KM	Key Largo muck	11,796	16.7	Very limited (DS, O, F)	Very limited (S, F, DS, O)	Very limited (DS, S, F)	Very limited (F, DS, S, SE, FC)
RCT	Rock Outcrop – Cudjoe complex tidal	8,765	12.4	Not rated	Not rated	Not rated	Not rated
RT	Rock Outcrop – Tavernier complex tidal	899	1.3	Very limited (D, DS, F)	Very limited (S, DS, O, D)	Very limited (DS, D, F)	Very limited (F, D, DS, SE)
Tropical Hammock Association Soils							
FS	Bahiahonda fine sand	412	0.6	Very limited (U, DS)	Very limited (F)	Somewhat limited (F)	Very limited (DS, SE, FC, F)
MM	Matecumbe muck	3998	5.7	Very limited (D, DS, F)	Very limited (F, O, D, DS)	Very limited (D, F, DS)	Very limited (F, D, DS)
PM	Pennekamp gravelly muck	7443	10.5	Very limited (D, DS)	Very limited (F, O, D)	Somewhat limited (D, F)	Very limited (D, SE, DS, F)
SM	Saddlebunch marl	1870	2.6	Very limited (D, DS, F, U)	Very limited (F, DS, O, D)	Very limited (DS, D, F)	Very limited (F, D, DS, SE)

Table 3.3 - Monroe County Soils – Soil Limitation Ratings for Selected Developed Uses (continued)

Map Symbol	Soil Name	Acres	Percent of Total Acres	Soil Limitations for Shallow Excavations	Soil Limitations for Dwellings without Basements	Soil Limitations for Local Roads and Streets	Soil Limitations for Septic Tank Absorption Fields
Slash Pineland Soils							
KL	Keyvaca very gravelly loam	2517	3.6	Very limited (D, DS)	Very limited (F, D)	Somewhat limited (D, F)	Very limited (D, SE, DS, F)
Freshwater Wetland Soils							
RCF	Rock Outcrop – Cudjoe complex – frequently flooded	1491	2.1	Not rated	Not rated	Not rated	Not rated
Filled and Developed Land							
U	Udorthents	13,481	19.1	Not rated	Not rated	Not rated	Not rated
UL	Urban land	2624	3.7	Not rated	Not rated	Not rated	Not rated

Source: USDA, 2010. http://websoilsurvey.nrcs.usda.gov/app (Soil Maps Version 1, Aug 2, 2007; Soil Data Version 2, Jan 13, 2010)
The information on this table does not eliminate the need for on-site investigation.
Percent of Total Acres is based on a total of 70,635 acres, which excludes 3,638.0 acres mapped as Water, 12,879.2 acres mapped as Waters of the Atlantic Ocean, and 56.9 acres not mapped.
Includes incorporated and unincorporated areas.
Not limited indicates that the soil has features that are very favorable for the specified use. Good performance and very low maintenance can be expected. *Somewhat limited* indicates that the soil has features that are moderately favorable for the specified use. The limitations can be overcome or minimized by special planning, design, or installation. Fair performance and moderate maintenance can be expected. *Very limited* indicates that the soil has one or more features that are unfavorable for the specified use. The limitations generally cannot be overcome without major soil reclamation, special design, or expensive installation procedures. Poor performance and high maintenance can be expected.
Major limiting conditions (up to five shown):
D depth to bedrock
DS depth to saturated zone
F flooding
FC filtering capacity
O organic matter content
S subsidence
SE seepage, bottom layer
U unstable excavation walls

3.4.3.2 Existing Commercial, Recreational, or Conservation Uses in Soil Erosion Problem Areas

The potential for construction site erosion occurs anywhere there is development activity. In the Keys, as in most communities, development includes a mix of residential, commercial, and industrial activities, as well as limited development of active recreation facilities.

Problems with accelerated erosion and sedimentation due to inadequate stormwater drainage also occur throughout the Keys and include a mix of residential, commercial, and industrial activities. Unstable dredged material disposal sites occur in isolated locations along residential canals in developed and partially developed subdivisions.

Beach erosion is typically due to natural causes, exacerbated by human activities (walking, off-road vehicles, and disturbances associated with adjacent development) that have disturbed natural beach vegetation, facilitated colonization by invasive plants, and weakened the sandy beach substrate. The beaches with erosion problems are identified in Section 3.10 (Beach/Berm Communities).

Accelerated shoreline erosion (exclusive of beaches) occurs in the Florida Keys where natural shorelines are disturbed or altered and then left unstabilized and exposed to the erosive forces of marine waters, precipitation and stormwater runoff. Although not widespread, such areas can be found in limited locations on most keys in residential areas along artificial canals where fringing mangroves have been disturbed. Shoreline erosion is not common on open water shorelines, except for the beaches noted above.

3.4.3.3 Known Pollution Problems and/or Issues Related to Soil Erosion Problem Areas

Sediment can be deposited or redistributed in waterways impacting navigation in canals and shallow inlets. In 1989, Hurricane Georges resulted in 124 miles of canals in the Florida Keys being cleaned out with the assistance of the USDA NRCS and the Florida Department of Community Affairs (DCA). Canals in the Florida Keys are not maintained by homeowner associations or the County government, which compounds the impact that storms have on sediment and debris deposition in navigable waterways (USDA NRCS District Conservationist, May 3, 2010).

Exposure of unstabilized soil during construction is a source of stormwater pollutant loading. Runoff collects unstabilized soil material and pollutants from the ground surface, transporting them to surface drainage channels and ultimately to groundwater or nearshore waters.

Erosion due to poor stormwater management is typically a problem of older subdivisions in the Keys where drainage is inadequate to handle runoff discharges from major short-duration, high intensity storms. During such events, the concentration of runoff in

unstablized and undersized drainageways results in localized accelerated erosion and consequent sedimentation of ditches and residential canals.

Although dredging is limited to maintenance dredging which primarily occurs in the incorporated areas, dredged spoil is a potential soil pollution problem. Dredged spoil is comprised of bottom sediments removed from the dredging site. Typically these sediments are fine-textured silts and muds which are very susceptible to erosion. When deposited on upland sites and not properly stabilized, they can be carried in stormwater and discharged into surface drainage channels or nearshore waters. Unstabilized dredge spoil containing contaminants such as heavy metals are a source of pollutant loadings and turbidity.

Unstabilized shoreline areas are directly exposed to the erosive potential of tides, boat wakes, and storm waves. Consequently they are a source of sedimentation and nearshore turbidity.

3.4.3.4 Potential for Conservation, Use, or Protection of Soil Erosion Problem Areas

Beach erosion can be mitigated through a combination of beach renourishment and restoration of natural beach vegetation. Beach management plans are needed for public beaches to address problems of erosion and invasive plants. Beach erosion and management is discussed in Section 3.10.5 (Past Trends in Beach Erosion and Accretion).

Shoreline erosion problem areas could be controlled using vegetative or structural stabilization techniques. Along open water shorelines, and along altered shorelines where shoreline erosion is less severe and there is a residual mangrove fringe remaining, it is preferable and possible to restore the natural shoreline. This will retain and/or restore the biological functions of the shoreline community providing shoreline stabilization, local storm buffering habitat, and water quality benefits. Along altered shorelines where erosion is advanced and where the mangrove fringe is destroyed, riprap, sloping rock revetments, or vertical shoreline structures may be necessary to curb further shoreline erosion. Improvements to shoreline erosion areas are required at the time of permit issuance for work of any kind on a property on which such erosion problems are occurring. Shoreline stabilization plans need to consider future sea level rise.

A canal maintenance program could be implemented to address current erosion and sediment issues and minimize future impacts. Responsibilities could include depth surveys, tree trimming, bank restoration and stabilization, revegetation, inspection of water quality, and canal bank stability before and during construction activities, debris removal, and education of homeowners along canals.

During canal clean-up efforts following Hurricane Georges in the 1990s, it became apparent that official ownership of canals in the Florida Keys was inconsistent or even undetermined. Legal descriptions have property lines ending at the canal bank, extending 10 feet into the canal, or to the center of the canal, or a combination of these variations. To

pass ordinances or regulate the maintenance of canals, the ownership of canals needs to be clarified when ownership is used to determine responsibility.

3.5 Marine Water Resources [Rule 9J-5.012(2)(d), F.A.C.]

3.5.1 Hydrographic Setting

3.5.1.1 Overview

The Florida Keys lie between the oceanic waters of the Straits of Florida of the Atlantic Ocean (to the south and southeast), and the lagoonal system of Florida Bay and the gulf system of the Gulf of Mexico (to the north and northwest). In the northern part of the Upper Keys (northern Key Largo), the major waterbodies to the north and northwest are Card Sound and Barnes Sound – these are the southernmost embayments of the Biscayne Bay watershed. In the rest of the Upper Keys and the northern part of the Middle Keys, the major waterbody to the north and west is Florida Bay. In the southern part of the Middle Keys and in the Lower Keys, the major waterbody to the north is the Gulf of Mexico. Waters of Florida Bay, the Gulf of Mexico, Biscayne Bay, and the Straits of Florida (Atlantic Ocean) are tropical and oligotrophic, characterized by a mosaic of interacting biological communities, including coral reefs, seagrass beds, and mangrove forests.

The configuration and orientation of the Keys control the nature of tidal mixing between the estuarine/gulf waters and the oceanic waters. The islands comprising the Upper Keys constitute a generally continuous barrier to the exchange of water between Florida Bay, Biscayne Bay, and the Atlantic Ocean. In this area, only a few small tidal creeks on Key Largo allow interaction between the bays and the ocean. The largest of these are Tavernier Creek and the Broad Creek/Angelfish Creek inlet complex (from Card Sound in the Biscayne Bay estuary system to the Atlantic Ocean) in the northernmost portion of North Key Largo.

In the Middle and Lower Keys, the islands are separated by numerous channels. These channels, or tidal passes, allow for tidal- and wind-driven circulation between the bay / gulf waters and ocean waters.

Some cyclical lateral flow of groundwater occurs throughout the Keys from one side of the islands to the other (Ginsburg, 1956; Chester, 1974; and Enos, 1977). This is the result of the high porosity of the geologic layers, tidal gradients, and the narrow width of the Keys.

3.5.1.2 Florida Bay

Florida Bay is an extensive shallow estuary. It is defined by the Everglades National Park to the north, the Florida Keys to the southeast, and the Gulf of Mexico to the west, which is a gradational boundary near Long Key in the Middle Keys. It has an area of approximately 600 square miles and a typical depth of 5.0 to 6.5 feet. The most characteristic feature of Florida Bay is an anastomosing array of shallow mud banks composed of shelly calcareous

silts that cordon the bay into a lacework of interconnected shallow oval-shaped basins, referred to as "lakes" (Multer, 1977). These basins are generally shallow, 5 to 6 feet deep, and nowhere do they exceed depths of 10 feet (Ginsburg, 1964). To the west, these banks gradually mix with the rock fragment sediments of the southwest continental shelf (U.S. Department of Commerce, 1995).

Florida Bay is a receiving basin for runoff from the mainland. The Bay varies from a positive functioning estuary during high rainfall years to a tropical, highly saline, lagoon during years when evaporation exceeds upland runoff and oceanic exchange (Tilmant, 1989). Circulation within the Bay is primarily tidal- and wind-driven. Florida Bay is generally isolated from the Gulf Loop Current and Florida Current. The most significant environmental parameters affecting Florida Bay are the quantity, quality, distribution, and timing of freshwater runoff from the Florida mainland. Contributing drainage routes to the Bay include Shark Slough and associated estuaries on the western side; and Taylor Slough and the C-111 basin on the east. There is an inverse relationship between salinity in northern Florida Bay and the height of the south Florida groundwater table (Tabb, 1967; Thomas, 1974; SFWMD, 1991).

Much of Florida Bay is characterized by extensive seagrass beds. The majority of the carbonate sediments on the bayside of the Keys have been trapped by marine seagrasses and calcareous green algae (Schomer and Drew, 1982). Because of the shallow depth, it is common to observe large seasonal variations in temperature and salinity, and abundant sediment loads contribute to high turbidity levels. As winter storms pass through the area, large amounts of sediment-rich water are transported through the channels between the Keys to the Florida Reef Tract. During periods of warm, stable weather, tidal currents can transport high-temperature waters in the same direction. This influx directly affects reef production by changing water temperature, salinity, and turbidity levels (Jaap and Hallock, 1990a).

Florida Bay was historically known for its commercial and sport fishing and abundant birdlife. In the 1960s, the C-111 Canal was constructed near the eastern boundary of the Everglades National Park. Combined with other drainage modifications, the C-111 diverted flows from Taylor Slough, which historically emptied into Florida Bay through a broad sheet flow. The new release was into Barnes Sound where it created a pulsed and concentrated release point. Diverted freshwater flows resulted in periods of hypersalinity in Florida Bay. Declines in these natural resources and water quality were noted beginning in the 1970s. Between 1987 and 1990, about 15 square miles of seagrass beds died in the western half of the bay and about 90 square miles were damaged (Robblee et al., 1991). Sporadic algae blooms and losses of wading birds, fish, spiny lobsters, shrimp, sponges, and mangrove islands were documented (Boesch et al., 1993). Because of the degradation of Florida Bay, a number of research projects were initiated and are discussed in various sections of this element.

3.5.1.3 Atlantic Ocean

The shallow submerged seastrate on the east side of the Florida Keys extends from the shoreline to the shallow shelf break at the edge of the Floridan Plateau. There, at 300 feet deep, approximately 3 to 7 miles offshore, the bottom falls off into the Bahamas Trench.

The Florida Current, running south and east of the Keys generally controls the hydrology of the oceanic waters landward of the Straits of Florida. Circulation is influenced by tides and winds, both of which vary by season. In winter, water movement is toward the south-southwest, caused in part by changes in atmospheric pressure. In summer, waters move in a northeastern pattern in response to southeast winds.

Shoreline features of the Atlantic coastline include small tidal creeks, harbors, and embayments. Major tidal channels connecting to the northern basins of Florida Bay include Tea Table Channel, Indian Key Channel, Lignumvitae Channel, Channel Two, and Channel Five. In the Middle and Lower Keys, numerous large channels provide connections between the oceanic waters and the bay/gulf waters.

Major habitats include the mangrove fringe and nearshore hardbottom, inshore patch reef, Hawk Channel (mid-channel) reef, seagrass and softbottom, and reef tracts (U.S. Department of Commerce, 1995). The reef tract community is composed of habitats including offshore patch reef, seagrass, back reef/reef flat, bank reef/transitional reef, intermediate reef, deep reef, outlier reef, and sand and softbottom environments (U.S. Department of Commerce, 1995).

Shallow water, less than 20 feet in depth, extends approximately two miles offshore in the Upper and Middle Keys. In the Lower Keys, depths drop to 20 feet within one to two miles of the shoreline. The nearshore area is typified by a belt of exposed rocky bottom. The intertidal zone is a broad, shallow shelf of exposed bedrock material with a thin veneer of sediment. The bedrock surface is crenelate and contains many solution holes, the result of the soluble nature of limestone and the burrowing and boring organisms that inhabit the intertidal zone (Florida DNR, 1991a).

In subtidal areas, the hardbottom is interspersed with accumulations of calcareous mud associated with areas of restricted circulation. This mud is extremely fine and is the product of the decomposition of calcareous algal skeletons (Enos, 1977). Some mud is produced within Florida Bay and is introduced through tidal channels. Where mud depth exceeds three inches and where current velocities are low, the mud bottom is often stabilized by seagrasses (Scoffin, 1970). In contrast, where sediment is thin, the bottom is colonized by hardbottom coral communities. Patch reefs develop on the sand, mud, and rock substrate of the Straits of Florida where light, nutrient, and current conditions are favorable and where the bottom is protected from high nutrients and sediment circulating from Florida Bay. Bank reefs of the Florida Reef Tract occur at or near the shallow shelf break at the edge of the Straits of Florida, where they are bathed by warm waters of the Florida Current.

Bare sand substrate is known to occur adjacent to the Keys' shoreline in the vicinity of tidal channels of the Lower Keys and in the nearshore region of Boca Chica Key, Big Munson Island, Bahia Honda Key, Ohio Key, and Grassy Key (Marszalek, 1984).

3.5.1.4 Gulf of Mexico

In the southern part of the Middle Keys and in the Lower Keys, the major waterbody to the north is the Gulf of Mexico. The Gulf of Mexico is west of Florida Bay and has a gradational open-water boundary with Florida Bay near Long Key in the Middle Keys. All areas of the Gulf of Mexico north of the Keys, including the Dry Tortugas, are on the continental shelf and have relatively shallow water and relatively warm water compared to the Straits of Florida.

3.5.2 Ambient Water Quality Conditions [Rule 9J-5.012(2)(d), F.A.C.]

Declining water quality throughout south Florida, from Lake Okeechobee through the Everglades into Florida Bay and ultimately to offshore waters of the Keys, is well documented (Brand, 2002; Lapointe et al., 2002). Path analysis of nutrient concentrations, however, reveals an extremely low nutrient system through Everglades National Park and into Florida Bay (Stober et al., 2001), indicating a general lack of connection between the Everglades system and the waters surrounding the Keys. Sewage pollution from local sources and possibly untreated stormwater runoff is the primary cause of water quality degradation and ecosystem decline in the Keys (Lapointe et al., 1990; USACE and SFWMD, 2004).

Although it is difficult to distinguish between natural events and man-made impacts, the most important environmental factors affecting coral reefs are nutrification and overfishing, followed by turbidity, temperature changes, pesticides, metals, and hydrocarbons (Szmant and Forrester, 1996). It should be noted that several other studies, including Cook (1997) and Rudnick et al. (1999), identify Florida Bay and the Gulf of Mexico as significant contributors of nutrients to the marine waters of the Keys. Other researchers have demonstrated large fluctuations in background nutrient concentrations due to strong tidal upwelling. While scientific research regarding the sources of nutrient inputs into the marine ecosystem in the Keys continues, there is widespread consensus that conditions of the coral reef environment have changed dramatically in recent years and that man-made activities are a major cause (Porter and Porter, 2002). Additional research is necessary to identify the relative contributions of the various sources of nutrient input into the ecosystem and associated water quality degradation in the nearshore and offshore waters of the FKNMS (USACE and SFWMD, 2004).

In general, studies have found effects of nutrient pollution from inland sources within the Keys are greater for nearshore than offshore due to greater dilution from currents and tidal movement in nearshore waters. Szmant and Forrester (1996) measured distribution patterns of nutrients to determine whether the nutrients may be reaching the outer coral

reefs in the Keys. In the middle Keys, water column nitrogen, and chlorophyll were elevated near marinas and canals, but returned to low nutrient conditions within three miles of shore (Kruczynski, 1999, Szmant and Forrester, 1996). Phosphorus concentrations were higher at offshore stations and were attributed to upwelling of deep water along the shelf edge at the time of sampling (Kruczynski, 1999; Szmant and Forrester, 1996; USACE and SFWMD, 2004).

Historically, development in the Keys relied on the use of cesspits and septic tanks which provide little treatment of domestic wastewater in porous lime rock substrates. In addition, stormwater flows untreated into nearshore surface waters. Lack of nutrient removal from domestic wastewater and stormwater has resulted in the addition of nutrient-rich waste waters into confined waters and adjacent nearshore areas. The cumulative effects of these discharges have led to water quality degradation of these inshore areas (Kruczynski, 1999). Kruczynski (1999) provided the following summary statements on water quality issues in the Florida Keys:

- There is a rapid exchange of groundwater and surface waters in the Keys that is driven by tidal pumping.
- Cesspits are not appropriate for disposal of wastewater because they are illegal, provide very little treatment, and are a health hazard. Cesspit effluent can rapidly migrate to surface waters.
- Properly functioning septic tank systems remove very little nutrients (4 percent nitrogen, 15 percent phosphorous) from wastewater and, depending upon their location, effluent from septic tank drainfields can rapidly migrate to surface waters.
- Sewage discharged from cesspits and septic tanks are a source of nutrients and human pathogens to ground and surface waters.
- Contaminants in stormwater runoff contribute substantially to the degradation of nearshore water quality.
- Water quality problems due to on-site sewage disposal practices and stormwater runoff have been documented in residential canals. Water quality parameters that are degraded include nutrient enrichment, fecal coliform contamination, and biochemical oxygen demand.
- Long, dead-end canal systems, deep canals of any length, and poorly flushed basins accumulate weed wrack and other particulate matter.
- The water column of many canals over six feet deep is stratified and bottom waters are oxygen deficient. Because they usually violate Class III Surface Water Quality Standards, canals were excluded from Outstanding Florida Waters (OFW) designation.
- Artificial aeration of canals does not eliminate the sources of excessive nutrients in canal waters but may result in better mixing which may facilitate nitrogen cycling.
- Improving flushing of degraded canal systems may improve the water quality within the canal, but will also result in adding additional nutrients to the adjacent waters.
- Canal systems and basins with poor water quality are a potential source of nutrients and other contaminants to other nearshore waters.
- Seagrass beds located near the mouths of some degraded canal systems exhibit signs of eutrophication, such as increased epiphyte load and growth of benthic algae.

- Vessel generated turbidity (re-suspended sediments) is a growing concern in many areas with high boat traffic including canals and open waters.
- Aerobic treatment units and package plants provide secondary treatment, removing 80 percent (90 percent of the total suspended solids (TSS) and organic wastes that are responsible for biochemical oxygen demand). In poor soil conditions with high groundwater tables, where drainfields are rendered inefficient, secondary treatment systems are better than septic tanks at removing organically bound nutrients associated with the TSS. These systems, however, are not designed to remove dissolved nutrients.
- Disposal of wastewater from package treatment plants or on-site disposal systems into Class V injection wells results in nutrient enrichment of the groundwater. However, it is not known whether discharges into Class V wells results in substantial nutrient loading to surface waters.
- In areas where groundwater is saline, injected wastewater is buoyant and rapidly rises to the surface.
- Tracer studies have demonstrated rapid migration of Class V effluent to surface waters (hours to days). These studies demonstrated that tracers were greatly diluted before reaching surface waters and that some phosphorus was stripped from groundwater by the substrate. The long term ability of phosphorus stripping by the substrate is under investigation.
- Sewage discharges from vessels degrade the water quality of marinas and other confined water anchorages.
- Florida Bay discharge, oceanic and Gulf of Mexico upwelling and currents, rainwater and other natural sources add nutrients to surface waters of the Keys.
- Net water movement through the tidal passes between the Keys is toward the Atlantic Ocean. Once entering Hawk Channel, water direction and speed is controlled by prevailing winds and ocean currents.
- Coral habitats are exhibiting declines in health; coral diseases are more common and benthic algae have increased in abundance and spatial coverage.
- There are no definitive studies on the geographic extent of the impact of human-caused nutrient enrichment. Scientists agree that canal and other nearshore waters are affected by human-derived nutrients from sewage. Improved sewage treatment practices are needed to improve canal and other nearshore waters. Impacts further from shore that may be due to human-derived nutrients may be reduced or eliminated by cleaning up nearshore waters.
- Planning and implementation of improvements to wastewater treatment are underway.
- A long term monitoring program has been implemented to provide information on the status and trends of water quality, coral, and seagrass communities.
- The costs of water quality improvements are a small fraction of the long term asset value that natural resources (such as reefs, hard bottoms, and seagrasses) provide to the economy of the Florida Keys.

FDEP's Florida Keys Reasonable Assurance Plan (http://www.dep.state.fl.us/water/watersheds/docs/bmap/fkrad-northern-keys.pdf), prepared in December 2008, provides the following summary of water degradation in the Keys. In 1985, when the

Florida Keys were made an OFW, water quality data were collected to define the existing ambient water quality at the point of designation. Data were collected at 165 stations from January to February 1985 in three areas: Bayside (49 stations north and northwest of the islands), Oceanside (46 stations south and southeast of the islands), and Canal (70 stations within the artificial waterways interior to the islands in canals, boat basins, and marinas). Parameters measured included dissolved oxygen, pH, temperature, conductivity, salinity, nitrogen species, total phosphorus, and fecal coliform. For the Bayside and Oceanside, the results for nutrients were as follows:

1985 FDEP OFW Water Quality Data						
	Total Nitrogen (µg/L)			Total Phosphorus (µg/L)		
Location	Average	Minimum	Maximum	Average	Minimum	Maximum
Bayside	370	130	697	14	1	54
Oceanside	288	145	489	15	4	80

The above table represents the range of nutrient water quality at the time of OFW designation and the water quality that needs to be protected according to the OFW designation. The following table provides estimated nutrient concentrations as a result of the nutrient models prepared for the Florida Keys Reasonable Assurance Plan and represent the ambient nutrient content of the nearshore waters in 1999.

1999 Baseline Nutrient Concentrations						
	Total Nitrogen (µg/L)			Total Phosphorus (µg/L)		
Location	Average	Minimum	Maximum	Average	Minimum	Maximum
Bayside	381	211	782	19	10	50
Oceanside	159	119	275	15	6	48

These data show that average total nitrogen and total phosphorus values (except Oceanside) exceed those of the 1985 OFW data, indicating, according to OFW criteria, a degradation of nutrient concentrations.

Anecdotal information and observations from FDEP staff, scientists, and engineers working in the Keys, and other observers, point out increasing problems with water clarity, proliferation of macrophytic and epiphytic algae in the nearshore waters which can be linked to nutrient enrichment [see Section 3.8.2 (Seagrass Beds)].

Boyer and Briceño (2008) provide an annual summary of the Water Quality Monitoring Project for the FKNMS as part of the Water Quality Protection Program. The period of record for the 2008 report is March 1995 through December 2008 and includes data from 50 quarterly sampling events at 154 stations within the FKNMS including the Dry Tortugas National Park. Field parameters measured at each station included salinity, temperature, dissolved oxygen, turbidity, relative fluorescence, and light attenuation. Water quality variables include the dissolved nutrients nitrate, nitrite, ammonium, dissolved inorganic nitrogen, and soluble reactive phosphate. Total unfiltered concentrations include those of nitrogen, organic nitrogen, organic carbon, phosphorus, silicate, and chlorophyll *a*.

The U.S. Environmental Protection Agency (USEPA) developed Strategic Targets for the Water Quality Monitoring Project, which state that beginning in 2008, they will annually maintain the overall water quality of the nearshore and coastal waters of the FKNMS according to the 2005 baseline. For reef sites, chlorophyll *a* should be less than or equal to 0.2 µ/L and the vertical attenuation coefficient for downward irradiance (light attenuation) should be less than or equal to 0.13 per meter. For all monitoring sites in FKNMS, dissolved inorganic nitrogen should be less than or equal to 0.75 micromolar (µM) and total phosphorus should be less than or equal to 0.2 µM. The following data shows the number of sites and percentage of total sites exceeding these Strategic Targets for 2008 (Boyer and Briceño, 2008):

- 88 of 136 reef values are greater than 0.2 µg/L chlorophyll *a* (64.7 percent)
- 33 of 129 reef values are greater than 0.13/m light attenuation (25.6 percent)
- 106 of 1,003 total values are greater than 0.75 µM ammonium (10.6 percent)
- 530 of 1,005 total values are greater than 0.20 µM phosphorus (52.7 percent)

Boyer and Briceño (2008) noted elevated nitrate in the inshore waters of the Keys. The distribution implies an inshore source which is diluted by low nutrient Atlantic Ocean waters. Since the 2005 hurricane season, water quality on the reef, especially dissolved inorganic nitrogen, were elevated but have mostly returned to normal levels. Boyer and Briceño (2008) note that it is clear that some of the trends observed inside the FKNMS are influenced by regional conditions outside the FKNMS boundaries and are not in the control of the County.

3.5.2.1 Florida Bay Water Quality

A number of studies were initiated to identify the causes of water quality degradation in Florida Bay. These studies were reviewed in Lodge (2005) and are summarized as follows:

- Due to drainage modifications, the freshwater and nutrient inputs to Florida Bay from the Everglades are negligible compared to tidal exchanges through the passages in the Middle Keys and across the western connection of Florida Bay with the Gulf of Mexico.
- Nutrients and water quality problems in the bay are drawn from currents from the eastern Gulf of Mexico. This implicates enriched discharges of waters from Lake Okeechobee and the Caloosahatchee River.
- The limiting nutrient for the western Florida Bay is nitrogen, not phosphorus (phosphorus is an important pollutant in inland waters). Nitrogen from agricultural sources has enriched eastern and central Florida Bay, where phosphorus is limiting. Nitrogen combined with phosphorus from the west has caused algal blooms and turbidity problems.
- Pulsed freshwater releases carry contamination loads from agricultural runoff. The pulses also result in low salinities, which is seldom a problem (unless the biota that receives the pulse is intolerant). These pulses have been implicated in the occurrence of algal blooms (Rudnick et al., 2006).

- Roseate spoonbills are an indicator of the health of the bay. Their abundance and reproductive success is tied to the production of juvenile fishes.
- Many studies have demonstrated the complexity of the bay because it has a range of characteristics over its extent. No data exist to provide a pre-drainage baseline that could serve as a restoration target.

3.5.2.2 FKNMS Water Quality Protection Program (WQPP)

To support the resource protection purpose of the FKNMS, Congress directed the USEPA and the State of Florida, represented by FDEP, to develop a Water Quality Protection Program (WQPP) for the Sanctuary. The purpose of the WQPP is to recommend corrective actions that restore and maintain the water quality conditions needed to maintain healthy native plant and animal populations in FKNMS waters. The Act also requires the development of a water quality monitoring program.

The WQPP consisted of a set of initial recommendations for corrective actions, monitoring, research and special studies, and education and outreach. Recommendations for monitoring and special studies were conducted by the USEPA and FDEP. Most recommendations for corrective actions require coordination activities by numerous agencies. The Program has funded three long-term monitoring projects: overall water quality, coral reef and hardbottom community health, and seagrass community health.

3.5.2.3 Water Quality Hot Spot Areas

The USEPA prepared the *Water Quality Protection Program for the Florida Keys National Marine Sanctuary: Phase 1 Report,* which listed 84 water quality hot spots. These areas have been identified as sites of known or suspected water quality degradation, based upon workshops and discussion groups. The list was later increased to a list of 88 hot spots in 1996, primarily as a result of water quality issues and wastewater influences. Hot spot locations correspond with higher density urban areas, representing neighborhoods and subdivisions with the poorest sewage treatment and strongest need for central sewage facilities. During preparation of the Monroe County Sanitary Wastewater Master Plan, a priority ranking system was developed to determine the order in which these areas should be provided with wastewater collection and treatment facilities, using Best Available Technology. Three recommendations were made for all higher priority, poorly designed canal systems:

- install Best Availiable Technology sewage treatment,
- collect and treat stormwater runoff, and
- improve canal circulation (Kruczynski, 1999; USACE and SFWMD, 2004).

3.5.2.4 Nutrient Loadings to Nearshore and Offshore

Water quality monitoring data have been collected in and around the Keys by Florida International University since 1995 as part of the WQPP. These studies revealed significant

increases in total phosphorus and nitrate (a form of nitrogen) in the Keys and Tortugas over a five year sampling period. Increases did not occur in areas influenced by Florida Bay water transport and these results may suggest that increasing nutrients outside the influence of Florida Bay are due to local influences of nearshore waters. In contrast, total organic nitrogen decreased over the five year sampling period and may be a result of regional circulation patterns of the Loop and Florida Currents (Jones and Boyer, 2001; USACE and SFWMD, 2004).

Results from the WQPP (1995-2006) indicated that Middle and Lower Keys inshore waters had higher nitrate concentrations than waters from the reef tract. In the inshore waters of the less populated Upper Keys and the Tortugas, nitrate levels were low and similar to those found on the reef tract. This difference suggests that shoreline development may be the source of nitrate in the Middle and Lower Keys.

The USEPA estimates that nutrient loadings from the Keys to nearshore marine waters total 2,377 lbs/day of total nitrogen and 544 lbs/day of total phosphorus. About 80 percent of this total nitrogen and 56 percent of the total phosphorus were attributed to wastewater disposal, while the remainder was attributed to stormwater runoff. An analysis of inputs from municipal wastewater, live-aboard boats, and stormwater indicated nutrient rich groundwater accounts for about 63 percent of total nitrogen and about 44 percent of total phosphorus loading from the Keys to the nearshore marine waters (USEPA, 1996; USACE and SFWMD, 2004).

3.5.2.5 Health Advisories

In addition to nutrient loading and anaerobic conditions, degraded water quality in canals and isolated waterbodies also pose a human health concern. Multiple studies have been conducted to determine the presence of pathogens and their origins. One study in 1997 involved the testing of 19 sites throughout the Keys, including 17 residential canals and two nearshore sites selected from a USEPA hot spot list based on suspected poor water quality. The testing detected the presence of viruses, but did not determine whether they were infectious in nature. In the survey, 15 of the 19 sites tested positive for enteroviruses and 12 sites tested positive for the hepatitis A virus. Clinical symptoms of enteroviruses are generally mild, but occasional infections may cause serious disease such as paralytic poliomyelitis, meningitis, or myocarditis (USACE and SFWMD, 2004).

Another study, funded by the USEPA (Fuss, 2000), showed that at least one Keys canal contained live infectious viruses linked to human waste. Among the viruses identified in the water sampling were those that cause polio and viral meningitis, along with a variety of others that cause lesser viral illnesses. Researchers sampled water at six sites from Key Largo to Key West, and one canal in lower Matecumbe Key that was defined as a hot spot. Test results indicated the presence of live enteroviruses, including polio, Coxsackie A and B and echoviruses in Captains Cove, a canal basin in the Port Antigua neighborhood of lower Matecumbe Key. Coxsackie A and B can cause diseases such as herpangina and myocarditis. Echoviruses can cause a variety of illnesses, ranging from fever to viral

meningitis. Coxsackie B has also been repeatedly implicated as a causal agent for chronic fatigue syndrome (USACE and SFWMD, 2004).

These studies indicate that current wastewater treatment practices are contributing to health hazards in the canals in the Keys. All of the detected viruses are transmissible through human feces and are believed to have been transported into Keys canals in raw sewage from leaking cesspools and septic tanks (Fuss, 2000) (USACE and SFWMD, 2004).

Clean public beaches and nearshore water quality are leading health concerns in the County. The number of beach health advisories due to elevated contamination levels has risen during recent years. Of 15 County beaches monitored in 2001, five were found to have elevated bacterial levels and received water quality advisories (**Table 3.4**; USACE and SFWMD, 2004).

In 2002, 15 Keys beaches were tested, and two, John Pennekamp Coral Reef State Park in Key Largo and Higgs Beach in Key West, were found to have high concentrations of enterococcus indicating contamination from mammalian waste through wastewater or stormwater. While there were no beach closings reported in 2001, the total number of advisories was up substantially from earlier years. A total of 30 days of beach advisories and closings were reported in 2000 as compared to 60 in 2001 (FEMA, 2002). The total number of beach advisories and closings for 2002 was 138 days for all health advisories. These advisories were issued throughout the year, with little apparent association with time of year (USACE and SFWMD, 2004).

Table 3.4 - Monroe County Beach Advisories and Closings (2001)

Beach	Advisory or closing	Number of advisories or closings	Number of days, respectively	Reason	Indicator
Bahia Honda Oceanside	Advisory	2	24 and 11	Elevated bacteria levels	Enterococci
Coco Plum Beach	Advisory	2	11 and 11	Elevated bacteria levels	Enterococci
Curry Hammock State Park (Marathon)	Advisory	1	1	Elevated bacteria levels	Enterococci
Higgs Beach (Key West)	Advisory	4	14, 11, 24, and 27	Elevated bacteria levels	Enterococci and fecal coliform
Veteran's Beach (Marathon)	Advisory	1	4	Elevated bacteria levels	Enterococci

Source: Florida Department of Health, 2003, online data.

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3.5.3 Known Existing Point and Non-Point Source Pollution Problems [Rule 9J-5.012(2)(d), F.A.C.]

3.5.3.1 Point Sources Affecting Water Quality

Point sources of water pollutants are defined as discharges from any discernible, confined, and discrete conveyance, such as a pipe, ditch, container, etc., which flow directly into surface water. In the County, point source discharges include releases from concrete batch plants, a sanitary wastewater treatment plant, and urban runoff. Some stormwater discharges (urban runoff) are considered point sources according to the USEPA and some are non-point sources. In this document, urban runoff is discussed in Section 3.5.3.2.8 (Urban Runoff) below. All point sources are required to operate under a National Pollutant Discharge Elimination System (NPDES) Permit pursuant to the Federal Clean Water Act. In 1995, the USEPA authorized the FDEP to administer the NPDES Wastewater Program in Florida. Consequently, the NPDES permit requirements are now included in the State-issued permit for most wastewater facilities providing the permittee with one set of requirements for each facility. In 2000, FDEP was authorized to administer the NPDES Stormwater Program.

3.5.3.1.1 Inventory of Permitted Point Sources

Since 1974, there has been a steady decline in the number of permitted facilities discharging wastewater into surface waters in Monroe County. According to USEPA data, the number of NPDES Permits dropped from 70 in 1974, to 35 at the beginning of 1991, and to 23 in November 1991 (CSA, 1991). The FDEP data, as of July 2010, list five dischargers in Monroe County (incorporated and unincorporated areas): four are concrete batch plants and one is a domestic sanitary wastewater plant (FDEP 2010). Discharges have been discontinued as a result of a combination of business closures, stringent water quality standards, and/or permits for alternative disposal methods such as regional deep well injection facilities. Pursuant to Section 62-302.700(9), F.A.C., the waters in the Florida Keys have been designated as OFW, which are afforded special protection. Because discharges must meet these stricter surface water quality standards, it is difficult to obtain a surface water permit. Therefore, most treatment facilities elect to discharge into Class V injection wells (boreholes), which are considered non-point discharges [see Section 3.5.3.2.8 (Urban Runoff)]. FDEP anticipates that eventually all point source discharges will be eliminated in favor of the deep well injection method.

To ensure that discharges meet surface water and groundwater criteria, the permitted facilities are required to submit monthly Discharge Monitoring Reports to FDEP. The reports provide effluent monitoring data for toxicity, effluent quality, fecal coliform, and discharge rates. Together with FDEP site inspections, the reports help FDEP ensure that the facilities are meeting their discharge limitations and are operating in accordance with the permitted requirements.

3.5.3.2 Non-Point Sources Affecting Water Quality

Non-point sources of water pollutants are defined as discharges made directly or indirectly to overland flow or groundwater. They are associated with land use and activities associated with everyday life, such as: vehicles and machinery leaking gas, oil and grease; disposal of oil in storm drains; overuse of fertilizer and pesticides; litter; and pet waste. In addition, typical non-point sources in the County include domestic and industrial wastewater facilities, on-site sewage treatment and disposal systems (OSTDS), erosion and sedimentation from unvegetated lands, abandoned and inactive landfills, marinas, live-aboard vessels, application of mosquito control pesticides, and urban runoff**.**

3.5.3.2.1 Wastewater Facilities

For permitting purposes, wastewater facilities are designated as industrial or domestic based on the type of wastewater the facility treats. Domestic wastewater is generated by dwellings, business buildings, and institutions. All wastewater that is not defined as domestic is considered industrial. Industrial wastewater sources include manufacturers and commercial businesses, such as concrete batch plants, laundries, and dry cleaners (http://www.dep.state.fl.us/ water/wastewater/permitting.htm).

In addition to the five point source dischargers described above, FDEP records (FDEP 2010) indicate that there are 234 domestic and seven industrial wastewater treatment facilities with operating permits in Monroe County (incorporated and unincorporated areas). These facilities provide wastewater treatment and disposal for municipalities, schools, hospitals, restaurants, hotels/motels, trailer parks, campgrounds, marinas, office buildings, condominiums, resort complexes, shopping centers, and laundries. FDEP data indicate that on July 6, 2010, 46 domestic wastewater permits and one industrial wastewater permit were under review (http://appprod.dep.state.fl.us/ www_pa/county_summary.asp?county=MONROE).

To ensure that discharges meet surface water and groundwater criteria, the permitted facilities are required to submit monthly Discharge Monitoring Reports to FDEP. The reports provide effluent monitoring data for toxicity, effluent quality, fecal coliform, and discharge rates. Together with FDEP site inspections, the reports can help FDEP ensure that the facilities are meeting their discharge limitations and are operating in accordance with the permitted requirements.

Wastewater treatment plants in the County treat effluent to advanced standards and discharge via deep well injection. This methodology is the preferred method according to FDEP staff. It is anticipated that regional wastewater treatment plans will be constructed using deep well injection. Improved properties within the service areas of these facilities will be required to connect to the regional plants, reducing the use of septic tanks. Well construction and discharge are regulated by FDEP pursuant to Chapter 62-528, F.A.C.

3.5.3.2.2 On-Site Sewage Treatment and Disposal Systems (OSTDS)

The Florida Department of Health (FDOH) regulates and permits the use of OSTDS. However, FDOH does not permit the use of an OSTDS where the estimated domestic sewage flow is over 10,000 gallons per day (gpd) or the commercial sewage flow is over 5,000 gpd (www.doh.state.lf.us/ environment/ostds/index.html). In the early 1990s, it was estimated that there were 24,000 septic tanks and 5,000 cesspits in the Florida Keys. In the late 1990s, it was estimated that there were 20,000 septic tanks and 4,000 cesspits (Kruczynski, 1999). Based upon best estimates presented in Kruczynski (1999), approximately 80 percent of nitrogen loadings to nearshore waters came from wastewater. OSTDS (septic tanks and aerobic treatment systems) and cesspits accounted for 40.3 percent of nitrogen loadings. For phosphorous, approximately 55 percent of phosphorus loadings were from wastewater. OSTDS and cesspits accounted for 33.2 percent of total phosphorus loadings (Kruczynski, 1999). According to *The Florida Statewide Inventory of Onsite Sewage Treatment and Disposal Systems, June 4, 2009,* there is no comprehensive database for the number of OSTDS in the County. Based on the number of known OSTDS (permitting records) and the number of improved parcels, that report estimated that there may be as many as 46,977 OSTDS in the Keys. Improperly designed, constructed, and maintained OSTDS can allow wastewater to enter canals, groundwater, and other nearshore waters. The 2010 Florida Legislature passed Senate Bill 550 (SB 550) to ensure proper management of OSTDS to protect the health, safety, and welfare of the public. Governor Crist signed the bill on June 4, 2010 and site ealuations will begin in 2011. As a result of SB 550, FDEP is mandated to adopt a special rule for the OSTDS in the Florida Keys. The new criteria will:

- increase setbacks from surface waters, saltmarsh, and buttonwood association habitat areas;
- preclude discharges from OSTDS by December 31, 2015 if higher discharge standards are not met;
- require basic disinfection for systems discharging to an injection well;
- require all new, modified, or repaired OSTDS to meet new criteria as of July 1, 2010 unless the area will be served by a regional sewer by December 31, 2015; and
- require documented inspections of OSTDS once every five years.

3.5.3.2.3 Inactive Landfills and Abandoned Dumps

The County does not have any active landfills receiving solid waste for on-site disposal. Solid waste collection is provided by several private franchise operators, each servicing a specific geographical area of the County. Disposal of solid waste is currently handled by three transfer station operations (Cudjoe Key Transfer Station at Mile Marker (MM) 21.5, Long Key Transfer Station at MM 68, and Key Largo Transfer Station at County Road 905) where waste is prepared for transportation and disposal out of the County (http://www.monroecounty-fl.gov /Pages/MonroeCoFL_Waste/index).

In years prior to 1992, unincorporated Monroe County operated municipal landfills at Long Key Landfill, Cudjoe Landfill, and Key Largo Landfill. Both the Long Key and Key Largo facilities operated under a FDEP Consent Order.

In addition to the three inactive municipal landfill sites, USEPA identified five abandoned dump sites in the County (USEPA, no date). These include the following:

- Boca Chica Key (south U.S. 1 SR 5, MM 8). Site owned by the U.S. Government, operated as a landfill from 1947 to 1955. It is currently part of the runway on the Naval Air Station;
- Saddlebunch Key (north U.S. 1 SR 5, MM15). Site owned by the U.S. Government. Operated by Bland Disposal as a landfill from 1957 to 1977;
- Middle Torch Key (north U.S. 1 SR 5, MM 27). Privately owned. Operated by Bland Disposal 1969 to 1978;
- Boot Key (south U.S. 1 SR 5, MM 48). Privately owned, operated by the County as a landfill 1951 to 1977; and
- Key Largo (SR 905, 4 miles NE U.S. 1 SR 5). Privately owned, operated by Key's Sanitary Service as a landfill 1957 to 1980.

All landfill sites in the Florida Keys, with the exception of the Cudjoe Key expansion, were developed prior to current regulations that require bottom liners and leachate collection. At many sites, filling with solid waste probably occurred below the water table in the early stages. Consistent with common practice at the time, there was probably little or no control over materials deposited in the landfills. These conditions result in a significant potential for groundwater and surface water contamination. The underlying strata is either the Miami Oolite or Key Largo Limestone, both of which are highly porous and permeable and subject to saltwater intrusion and mixing (CSA, 1991). Leachate, when introduced to this type of substrate can migrate off-site through a number of subsurface cavities, fracture zones, or cavernous zones (CSA, 1991). Conditions favor the migration of materials that tend to upwell a considerable distance away (e.g., at an offshore location) (CSA, 1991). Although the potential exists for problems, monitoring data do not indicate leaching or water quality degradation due to landfills (U.S. Department of Commerce, 2007). The NOAA Florida Keys National Marine Sanctuary Revised Management Plan (U.S. Department of Commerce, 2007) recommends searching for and assessing abandoned landfills and dumps, intensifying existing monitoring programs around landfills to ensure that no significant leaching into marine waters is occurring, and implementing remedial actions if problems are discovered.

3.5.3.2.4 Marinas

Water quality in the vicinity of marinas is affected by general marina operations, such as boat scraping and painting operations, fueling, and engine repair, as well as by discharges from live-aboard vessels docked in marina slips. Data are not available to quantify loadings of pollutants from marina operations (Kruczynski, 1999). Some of the more potentially toxic or harmful materials associated with marinas include paints and wood preservatives

containing copper and other heavy metals (Snedaker, 1990). Metal corrosion and oxidation represents an additional source of metal contamination due to the widespread use of zinc to protect boat hulls. Bilge waste is a source of oils, coolants, lubricants, and cleaners.

Research suggests that toxic materials, which normally accumulate in organic bottom sediments, are more dispersed in nearshore marine environments such as are typical of the Keys where there is an absence of rich organic bottom sediments (Snedaker, 1990). A study of a marina in Marathon (FDER, 1987) indicated that water quality was significantly impacted in comparison with ambient conditions based on dissolved oxygen, pH, coliform bacteria, biological oxygen demand, Total Kjeldahl Nitrogen, total phosphorus, copper, and zinc. The presence and distribution of coprostanol in bottom sediments within and adjacent to the marina confirmed that the marina basin, particularly beneath boat slips, was acting as a sink for sewage contaminated water (FDER, 1987). Water quality studies for Boot Key Harbor (FDER, 1990) and Campbell's Marina on Key Largo (FDER, 1988) have also linked marina activities to water degradation.

Although there is the potential for toxic materials in water and sediments of marinas, poor water quality in marinas is more often attributed to poor onsite wastewater systems in the area, poor stormwater treatment, and live-aboards releasing wastewater.

3.5.3.2.5 Live-Aboard Vessels

Live-aboard vessels are found throughout the nearshore waters of the Florida Keys. In 1988, the total number of live-aboard boats in the Keys was estimated to be 1,410, housing some 3,000 residents (Antonini et al., 1990). This estimate included vessels used for continuous overnight stays of at least two months. Live-aboards include a large number of permanent and seasonal residents. The most common type of live-aboard boat was a sailing vessel, comprising 69 percent of the total. Most live-aboard vessels were tied up in marinas, although a sizable number were anchored offshore. Approximately 70 percent of live-aboard vessels were found at shoreside sites (marinas, clubs, boat yards, piers, seawalls) and 30 percent of live-aboards anchor in coastal waters. Shoreside live-aboard sites are found throughout the Keys while anchorages tend to be concentrated. Over half of them were in Boot Key Harbor in the Middle Keys. Other major anchorage locations were Cow Key Channel and Wisteria Island (locally known as Christmas Tree Island) in the Lower Keys, which accounted for 27 percent of the anchorages.

In 2002, the Monroe County Department of Marine Resources (now referred to as the Marine Resources Office) prepared the Keys-Wide Mooring Field System Preliminary Planning Document which included a survey of 15 anchorage sites throughout the Keys. A variety of site data were collected, including physical and biological data (depth, seagrass, etc.), cultural data (types of boats and boaters), and logistical data (where boaters access land, availability of pump-outs, etc.) An Anchorage Site Evaluation Form was generated for each site using the collected data. Based on the evaluation forms, approximately 500 to 800 boats were anchored at the sites, with approximately 200 to 250 in unincorporated

areas. The type of each boat was not described, but most anchorage sites were described as containing predominantly live-aboard vessels.

Wastewater flows from live-aboard vessels have been estimated at 100 gpd per boat (FDER, 1988). Antonini et al. (1990) reports that disposal of sanitary waste is by one or more methods: overboard by flushing, holding tank storage and subsequent shoreside pump-out, and/or on-board pretreatment and discharge. Antonini et al. (1990) estimated that less than 10 percent of the live-aboard vessels use sewerage pump-out facilities. A Monroe County Grand Jury received testimony that up to 80 percent of live-aboard vessels do not use sewage dumping facilities (Kruczynski, 1999).

Kruczynski (1999) reported that disposal of wastewater from live-aboard vessels is a significant localized problem because of the low level of treatment, the tendency for live-aboard vessels to congregate in certain marinas or anchorages, and potential adverse health effects of discharging untreated wastewater.

The Clean Vessel Act of 1992 (Florida Statute 327.53) prohibits the discharge of raw sewage from any vessel, houseboat, or floating structure into Florida waters. A houseboat is a vessel that is used primarily as a residence (21 days out of any 30 day period) and its use as a residence precludes its use as a means of transportation. Houseboats and floating structures must have permanently installed toilets attached to Type III Marine Sanitation Devices (MSD) or connect their toilets directly to shoreside plumbing. A Type III MSD is one that stores sewage onboard in a holding tank for pump-out. Houseboats may also have other approved MSD on board; but, if they do, the valve or other mechanism selecting between devices shall be selected and locked to direct all sewage to the Type III device while in State waters. All vessels that have MSD capable of flushing raw sewage directly overboard or of being pumped into a holding tank, must set and secure the valve directing all waste to the holding tank, so that it cannot be operated to pump overboard while in State waters. All waste from a Type III MSD or from portable toilets must be disposed in an approved sewage pump-out or waste reception facility (Kruczynski, 1999).

While the Clean Vessel Act prohibited the dumping of raw sewage, treated wastewater from transient vessels still could be discharged into State waters. Wastewater treatment (disinfection) by Type I and II MSD does not remove nutrients from wastewater. Graywater did not have to be stored or treated from any vessel and could be discharged directly into waters of the State. Thus, many live-aboard vessels and most transient vessels discharged wastewater into surface waters. It was estimated that live-aboard vessel wastewater account for 2.7 percent of nitrogen and 2.9 percent of phosphorus loadings into nearshore waters of the Keys (Kruczynski, 1999). Although nutrient loadings from vessels may be relatively minor contributions to the total loading, loadings from vessels are a significant localized source to harborages and result in eutrophication of waters that typically exhibit poor circulation/flushing (Kruczynski, 1999).

The USEPA, State, and the County designated the Florida Keys as a No Discharge Zone for boater sewage. Effective June 19, 2002, the No Discharge Zone designation prohibits discharging sewage into all State waters of the FKNMS. This includes treated sewage from

marine sanitation devices but does not apply to gray water from showers or sinks, only sewage. The No Discharge Zone strengthened existing regulations under the Florida Clean Vessel Act so that even chemically-treated sewage cannot be discharged overboard.

All State waters of the FKNMS are included in the No Discharge Zone. Waters of the State extend to three miles from land on the Atlantic side of the Florida Keys and 9 miles from land on the Gulf of Mexico side of the Florida Keys.

Pump-out facilities are available for boaters at various locations throughout the Florida Keys. The Monroe County Marine Resources Office periodically updates a list of facilities in the Keys (incorporated and unincorporated areas) that offer pump-out service. The October 2010 list indicated that 16 marinas provide pump-out service for private use by their guests (5 in the Upper Keys, 9 in the Middle Keys, and 2 in the Lower Keys), and 27 other marinas provide pump-out service for the general public (7 in the Upper Keys, 8 in the Middle Keys, 4 in the Lower Keys excluding Key West, and 8 in Key West).

Many live-aboard vessels are permanently anchored and mobile pump-out facilities are required to service those vessels. In 1999, there were no mobile pump-out facilities in the Keys, but by October 2010 five vessels were providing mobile pump-out services. Mobile pump-out service areas include (1) Key Largo oceanside and bayside, (2) Duck Key to Key Colony Beach, (3) Boot Key Harbor area, (4) Stock Island area and Boca Chica basin, and (5) Key West area including Fleming Key and Wisteria Island. Even in areas having mobile pump-out service, some anchored live-aboard vessels do not take advantage of mobile pump-out facilities and can degrade water quality by discharging their waste overboard.

The FFWCC and its marine law enforcement partners (FDEP, U.S. Coast Guard, and Monroe County Sheriff's Office) occasionally conduct inspections. From Key Largo to Key West, officers check live-aboard occupants for compliance with Coast Guard-required safety equipment, State registration requirements, nighttime anchor lighting, and marine toilet specifications.

3.5.3.2.6 Seafood Processing Facilities

Seafood processing facilities generate large amounts of wastewater and historically discharged wastewater to open waters. FFWCC maintains data on the amount of seafood harvested in the County. In the County, the average seafood harvest for 2004-2008 was 12 million pounds annually (http://research.myfwc.com/ features/ view_article.asp?id=19224). Wastes from seafood processing operations include fish carcasses, cooking water, and wash-down water. Seafood processing facilities must now be connected to an approved wastewater treatment system in compliance with Sections 403.086 and 403.087 F.S. Seafood processing facilities no longer discharge to open waters.

3.5.3.2.7 Application of Mosquito Control Pesticides

The Florida Keys Mosquito Control District (http://www.keysmosquito.org/index.html) conducts year-round applications of pesticides for mosquito control. These applications

are a source of atmospheric and land-based non-point loading on the Florida Keys environment (CSA, 1991).

Ground spraying by truck is the current method for controlling the adult mosquito population. However, aerial spraying is initiated only when the mosquito population reaches a certain threshold, as determined by mosquito landing counts at test sites. Although the Florida Keys Mosquito Control District attempts to avoid marine areas during aerial spraying, there is the potential for pesticides to reach marine waters. Use of ultra low-volume aerial spray in recent years has significantly reduced the volume of pesticide applied and has eliminated the use of fogging oil contamination. However, the area being sprayed is now harder to define because the spray is not visible, and the finer particles are susceptible to greater drift. The Florida Keys Mosquito Control District refines flight lines, evaluates alternative spray technologies, and makes equipment improvements to reduce the amount of pesticide released over water.

Housing patterns, design, and landscaping affect the demand for mosquito control. Most pesticide applications are limited to areas surrounding residential communities, commercial and light industrial site locations, within the boundaries of the County's inactive landfills, and within areas of standing water (CSA, 1991). Applications are restricted on most conservation lands owned by the State and federal governments, particularly on North Key Largo due to the presence of the State- and federally-listed endangered Schaus' swallowtail butterfly.

The Florida Keys Mosquito Control District uses several larvicides (products to control mosquitoes in their larval stage) and adulticides (products to control adult mosquitoes) depending on the situation. Both of the adulticides (naled and permethrin) are also used in agriculture. They may be used on food crops at rates much higher than are used for mosquito control. They are also used in pet shampoos (permethrin) and flea collars (naled). Permethrin is also applied directly to livestock to control pest insects, and is the active ingredient in some human louse shampoos.

- *Bacillus thuringiensis israelensis*, or Bti, is a naturally-occurring soil bacterium. It is applied for control of mosquito larvae in large areas of water.
- *Bacillus sphaericus*, or Bs, is a common soil-inhabiting bacterium. It is applied to control mosquito larvae in highly polluted water, such as sewage treatment plants.
- Methoprene is a synthetic mimic of juvenile hormone, a hormone found in insects. Methoprene is used in situations like cisterns and abandoned swimming pools.
- Temephos is used very sparingly and infrequently. It is applied only to temporary pools that contain mosquito larvae but do not support nontarget organisms.
- Chlorpyrifos is used to treat ornamental bromeliads (water-holding plants).
- Oils and monomolecular surface films are used to control pupae and larvae by interfering with their ability to breathe. These products are used only when an adult emergence will occur without treatment.
- *Gambusia* are a species of mosquito-eating fish. The Florida Keys Mosquito Control District raises these fish and stocks them in permanent freshwater bodies.

- Naled is used to control adult mosquitoes with the aerial program. Naled is a fast acting, non-systemic contact, and stomach poison in insects and mites. It is used as a short-term fumigant to control agricultural pests on ornamental in greenhouses, animal and poultry houses, kennels, and food processing plants.
- Pyrethrum is used to control adult mosquitoes with spray trucks. Pyrethrum is a botanical insecticide produced primarily from the flowers of a species of the chrysanthemum plant family. Pyrethrum is made up of six complex chemical esters known as pyrethrins that work in combination to repel and kill insects.

The specific pesticides used have varied over time. In the early 1990s, the most commonly used insecticides (by tradename) included the following (CSA, 1991):

Dibrom 14C	Teknar	Artosurf
Malathion	Biomist 4 + 12	Scourge
Acrobe	Bactimos	Fog Oil
Abate	Altosid	Fyntex
Ortho Additive	Bectobac	Diesel Oil

Material Safety Data Sheets from the Pesticide Information Office of the Florida Cooperative Extension Service indicate that many of these chemicals are toxic to fish, aquatic life and/or wildlife and should not be applied directly to water (CSA, 1991).

Some pesticides used in mosquito control are nonspecific; that is, in addition to controlling mosquitoes, the chemicals also affect the larval stages of crustaceans, fish, and other natural mosquito predators. Pesticides used for mosquito control, or their toxic breakdown products, have been found in some canals in concentrations high enough to adversely affect marine organisms. USEPA funded a study in 1997 to assess potential impacts of mosquito spray chemicals and their breakdown products. Although the study was not conclusive, it did determine that sprayed chemicals reach surface waters in concentrations that are of concern. Additional data concerning pesticide concentrations in sediments and biological tissues throughout the FKNMS are being collected through the Water Quality Research Program.

In the past, the USEPA has not required an NPDES permit for point source discharges from the application of pesticides to surface waters. Instead, this activity was regulated through the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA). However, effective April 9, 2011, an NPDES permit will be required for discharges to surface waters of biological and chemical pesticides that leave a residue. Florida will be developing its own rule to cover such discharges. (http://cfpub.epa.gov/npdes/home.dfm?program_id=410).

3.5.3.2.8 Urban Runoff

Non-point source contamination of nearshore waters in the Keys by urban runoff is limited by the small area of developed land in the County in relation to the surrounding water area, and by the natural high permeability of the underlying limestone (FDER, 1987). However,

despite these conditions, researchers warn that given the low assimilation threshold of oligotrophic waters, the potential impacts on non-point source loading from urban runoff should be recognized (Snedaker, 1990). Some evidence suggests that when stormwater discharges are located in artificial waterways, contamination from runoff can be magnified, with the result that even minor inputs may become harmful over extended periods (FDER, 1987). Water quality parameters which are typically degraded in areas receiving contaminated stormwater include DO, pH, phosphorus, total coliform bacteria, heavy metals, and petroleum hydrocarbons.

In Florida, the water management districts and local governments now impose a minimum level of stormwater treatment for all new developments, and the standards that apply to the Florida Keys are the most stringent in the State. The criteria are intended to protect surface waters according to their use classification. Much of the development in the Florida Keys occurred prior to the existence of these criteria. Similar to other parts of the State at the time, stormwater was considered a nuisance since it resulted in flooding. Therefore, if stormwater control systems were employed at all, they were typically designed to efficiently convey water off land surfaces as quickly as possible. These old systems are considered to be the most liable to cause water pollution and, therefore, policies now in place seek to retrofit them whenever possible (Kruczynski, 1999).

In the Keys, stormwater runoff from roadways, bridges, driveways and yards, roof tops, and shopping center parking lots contribute stormwater loading to surface waters. The amount of pollutant load caused by stormwater runoff can be estimated mathematically from rainfall quantity, imperviousness (i.e. the degree to which rainwater cannot soak into soil), and land use. Estimates of total loadings of nitrogen and phosphorus from wastewater and stormwater were summarized in Kruczynski (1999). These estimates attributed about 20 percent of the nearshore nitrogen load and about 45 percent of the phosphorus to stormwater. These estimates, however, can vary widely depending on the magnitude of each factor (Kruczynski, 1999).

3.5.3.2.9 Hazardous Wastes and Hazardous Materials

Hazardous waste sites and hazardous materials are addressed below in Section 3.17 (Hazardous Wastes and Hazardous Materials). The discussion addresses:

- hazardous waste disposal sites;
- hazardous waste generators;
- household hazardous wastes;
- underground and aboveground storage tanks; and
- terrestrial and marine hazardous material spills.

Included is a brief inventory of existing hazards and incident reports as well as a brief summary of soil, groundwater, and/or surface water quality monitoring studies for specific sites where hazardous waste contamination has occurred.

3.5.3.2.10 Marine Litter

Marine litter originates from a variety of sources including intentional and unintentional releases from recreational boaters, shoreline users, commercial fishing operations, sportfishing and diving boats, and oceanic sources such as merchant ships, cruiseships, and oil drilling vessels. In addition, litter on the land blows into the waterways of the Keys.

Entanglement and ingestion of marine litter can directly damage wildlife. Birds, sea turtles, and other animals can die when they become entangled in fishing lines, six-pack rings and other trash, or when they mistake garbage for food. Marine litter can also cause habitat destruction including smothering of seagrasses and coral (UNEP, 2010). According to Chiappone et al. (2002), fishing gear (hooks and lines) and debris from lobster traps causes damage to the coral reefs in the Florida Keys.

Marine litter along beaches and waterways can reduce the beauty and enjoyment of those areas, and hence, negatively affect tourism. Maintaining the beauty of these areas also costs time and money for both the private and public sectors (UNEP, 2010).

Discarded fishing line, rope, and plastic trash or food bags can disable boats and ships by wrapping around boat propellers or being sucked into outboard boat engines. Medical wastes transported onto beaches by winds and waves can threaten public health through disease transmission and broken glass and other sharp objects (UNEP, 2010).

3.5.3.3 External Sources of Pollutant Loads

Natural and man-made sources of pollutants affect waters of the FKNMS, including increased turbidity or suspended solids, temperature changes, increased nutrients, salinity changes or increased levels of heavy metals, synthetic organic chemical, and man-made organic chemicals (CSA, 1991).

3.5.3.3.1 Florida Bay

Water quality in Florida Bay is highly variable depending upon prevailing weather and climatic conditions (Schomer and Drew, 1982; SFWMD, 1991) and is the result of natural and man-made causes (U.S. Department of Commerce, 2007). Causes of poor water quality include wind-driven transport of suspended particulates; the presence of soluble nutrients; decomposition; transport of mangrove detritus; seagrass decomposition with associated biologic activity; and naturally-occurring low dissolved oxygen at night attributed to plant respiration (CSA, 1991). The Bay has shown man-made contaminants with freshwater inputs (U.S. Department of Commerce, 2007). Elevated nutrients in the Bay have been documented due to releases from the C-111 Canal and other drainage modifications (Lodge, 2005).

3.5.3.3.2 C-111 Canal

The C-111 Canal is the southernmost canal of the Central and Southern Florida (C&SF) Project, completed in 1967 and operated by the SFWMD. The C-111 drains agricultural areas in south Miami-Dade County and discharges into Manatee Bay (Barnes Sound) west of Key Largo. The canal functions are: to supply water to the eastern panhandle of Everglades National Park; to prevent saltwater intrusion (with the construction of a water control structure to prevent the inland movement of salt water), and; to provide flood protection for upstream agricultural uses (SFWMD, 1991). Large episodic releases of freshwater have occurred from the C-111 basin into Card Sound and Barnes Sound. These releases have been due to the periodic opening of the S-197 structure from the mouth of the C-111 Canal to alleviate upstream flooding (SFWMD, 1991). They have had severe impacts on marine biota and may have impacted water quality in the estuary due to the potential presence of suspended sediments containing contaminants from the urban and agricultural areas of south Miami-Dade County (SFWMD, 1991). These impacts are exacerbated by the tendency of large volumes of freshwater to move as freshwater pulses and by the restricted circulation and increased residence time of water in Card Sound and Barnes Sound.

The C-111 spreader canal is one of the Comprehensive Everglades Restoration Plan (CERP) projects. This project will help restore the quantity, timing, and distribution of water delivered to Florida Bay via Taylor Slough, improve hydroperiods and hydropatterns in the Southern Glades and Model Lands, and return coastal zone salinities in western Florida Bay as close as possible to pre-drainage scenarios.

The recommended plan for the "Western" part of the project (Project Implementation Report 1) includes the 590-acre Frog Pond detention area and a 225 cubic feet per second (cfs) pump station; creating a mound of groundwater to the south and west, by reducing groundwater seepage to the east and improving water deliveries (quantity, timing, and distribution) to eastern and central Florida Bay. It also includes a second 225 cfs pump station and modifications to increase the water level in the Aerojet Canal to further reduce groundwater seepage to the east. A Draft Project Implementation Report and Draft Environmental Impact Statement was completed in 2009 and published in the Federal Register on April 24, 2009. Expedited construction of the C-111 Spreader Canal Western Project began in January 2010.

The "Eastern" (Project Implementation Report 2) project will replace existing portions of the lower C-111 Canal with a spreader canal to enhance sheetflow to Florida Bay, and restoration efforts within the Southern Glades and Model Lands. Due to numerous uncertainties associated with the actual spreader canal feature, a spreader canal design test is being implemented to gain information that will guide planning efforts for the Eastern project. The Eastern project will address the restoration of the remainder of the project area through such features as a spreader canal and backfilling the C-111 Canal.

3.5.3.3.3 Biscayne Bay

Biscayne Bay is a potential source of poor water quality to the FKNMS due to flows of various types from the City of Miami, other local municipalities, and Miami-Dade County (CSA, 1991). North Biscayne Bay, extending from Dumfounding Bay to Rickenbacker Causeway, is contaminated by large numbers of man-made sources including manufacturing, boat building and repair, urban runoff, raw sewage from illegal connections, degraded systems and overflows during heavy rains (CSA, 1991). The Miami River has the poorest water quality in Biscayne Bay (CSA, 1991). Offshore disposal of dredged Miami River sediments may potentially have detrimental effects on the reef tract due to longshore transport from the north (CSA, 1991).

3.5.3.4 Other Water Quality Issues

3.5.3.4.1 Unplugging Artificial Canals

Several artificial canals in the Keys have been plugged to prevent connections to open water, or were never connected to open water when the canals were dredged. In some, water quality conditions have deteriorated due to excessive depths (frequently as much as 20 feet), nutrient loading from adjacent OSTDS, and lack of flushing. Residents along many of these canals seek relief from FDEP and USACE, requesting that the canals be opened. Removal of plugs requires federal, State and County permits. Permit agencies recognize that existing open canal systems often represent a source of degraded water quality to receiving waters and that water quality within open canals may violate State water quality standards, because the receiving waters are designated OFW by the State, thus implementing a zero degradation water quality standard. Therefore, there is a reluctance to consider requests to open additional canal systems. Before such a request can be considered, there must be strong evidence that the canal system does not violate water quality standards and that the opening of the canal system will not degrade receiving waters. In general, currently plugged canal systems will not meet those requirements (Kruczynski, 1999). In a limited number of cases, the FDEP and USACE have permitted opening of plugged canals where water quality in the canals meets the standards of the water outside the canal. Typically, unplugging requires backfilling the canal to depths of four to six feet. New dredging is not currently permitted by the County in conjunction with canal unplugging.

3.5.3.4.2 Dead End Canals and Aerators

Deep, dead end canal systems exhibit poor water quality due to the geometry of the canal system. The orientation of some canals make them susceptible to accumulation of wind-driven, floating organic matter, predominantly seagrass leaves, known as weed wrack (Kruczynski, 1999).

Several physical alterations have been considered to improve canal water quality (Kruczynski, 1999). These include:

- Physically preventing transport of floating organic matter into canals by installing floating booms, air curtains, and other devices used as weed gates at the mouths of canals;
- Dredging canals or otherwise treating canal bottoms to remove accumulation of organic, oxygen-demanding sediments;
- Backfilling canals to a maximum of -6 feet mean sea level at the mouth of the canal and sloped to -4 feet mean sea level at its distal end;
- Installing flushing channels/culverts in suitable areas if actions will not degrade receiving waters; and
- Aerating canal waters to assist vertical circulation.

Poor water quality in artificial canals in several areas of the Keys has led residents to request permits from FDEP for installation of aerators. Artificial aeration of canals does not eliminate the sources of excessive nutrients in canal waters but may result in better mixing which may facilitate nitrogen cycling (Kruczynski, 1999). Further study of the benefits and adverse impacts associated with the use of aerators in artificial canals is needed, including evaluation of alternative aerator technologies.

3.5.3.4.3 Shoreline Setbacks

The County Comprehensive Plan and the LDRs (Section 118-12, Monroe County Code of Ordinances) currently prohibits uses within a shoreline setback that would have an adverse water quality impact. The shoreline setback is typically 20 to 50 feet from the mean high water line, depending on the type of structure and shoreline. Where no adverse water quality impacts are anticipated from a proposed activity within a shoreline setback, structures can be permitted provided that stormwater and pollutant runoff is contained on site. Pools, spas, fish cleaning tables, and similar pollutant sources are not allowed to discharge directly to surface waters.

3.5.4 Actions Needed to Protect Water Quality/State, Regional, and Local Regulatory Programs, which will be Used to Maintain or Improve Water Quality/Potential for Conservation, Use, or Protection of Water Resources

3.5.4.1 Florida Keys National Marine Sanctuary Management Plan

The FKNMS was established on November 16, 1990 with the signing of the Florida Keys National Marine Sanctuary and Protection Act (Public Law 101-965). The purpose of this act is "to protect the resources of the FKNMS, to educate and interpret for the public regarding the Florida Keys marine environment, and to manage such human uses of the FKNMS consistent with the Act."

The FKNMS consists of all submerged lands and waters, along with all the living marine and other resources within and on those lands and waters, from the mean high water mark to the offshore FKNMS boundary described in Public Law 101-965, generally lying at the 300-

foot depth contour line. Included within this designated area are approximately 2,600 square nautical miles of nearshore waters extending from just south of Miami to the Dry Tortugas. Excluded from the FKNMS are Everglades National Park, Biscayne National Park, and Fort Jefferson National Monument (now the Dry Trotugas National Park). On December 18, 1990, the Governor and Florida Cabinet passed a resolution to include State lands and resources within the boundary of the FKNMS, subject to certain provisions which retained State ownership and management responsibilities of State-owned land until completion of the FKNMS Comprehensive Management Plan.

The National Oceanic and Atmospheric Administration (NOAA) of the U.S. Department of Commerce was charged with responsibility for developing a Comprehensive Management Plan and implementing regulations to achieve the policy and purpose of Public Law 101-965. The Comprehensive Management Plan was implemented in 1997. The Revised Management Plan went into effect in December 2007 (U.S. Department of Commerce, 2007).

The management plan focused on ten action plans that involved educating citizens and visitors, using volunteers to build stewardship for local marine resources, appropriately marking channels and waterways, installing and maintaining mooring buoys for vessel use, surveying maritime heritage resources, and protecting water quality. In addition to action plans, the 1997 management plan designated five types of marine zones to reduce pressures in heavily used areas, protect critical habitats and species, and reduce user conflicts. The efficacy of the marine zones is monitored Sanctuary-wide under the Research and Monitoring Action Plan (U.S. Department of Commerce, 2007). By the 2007 review of the program, a number of plan goals were completed:

- "Area to be Avoided" Designation. This maritime designation in 1990 resulted in a significant decrease in the number of major ship groundings on coral reefs.
- Oil Drilling and Hard Mineral Mining Ban. A ban on these activities was established when the Sanctuary was created.
- The FKNMS Water Quality Protection Program. This program has produced the first Water Quality Protection Program for a national marine sanctuary and has fully implemented 26 of 49 high-priority activities, many of which are carried out in cooperation with other action plans.
- The Comprehensive Everglades Restoration Plan (CERP). One of CERP's goals is to protect the ecosystem's water quality by eliminating large releases of freshwater along the coastal waters of South Florida (including Florida Bay) following rain events.
- Designation of the Florida Keys as a Particularly Sensitive Sea Area. In November 2002, the United Nations International Maritime Organization approved designation of the Florida Keys as a PSSA. The non-regulatory designation elevates public awareness of the threat of oil spills and hazardous materials to sensitive marine environments.
- Long-term and continuing progress in the Research and Monitoring and Zoning action plans. Research and monitoring has produced scientific data, hypothesis testing, mapping, trend documentation, and wide dissemination of these findings.

- Education, Public Outreach, Sanctuary Stewardship, and Volunteerism. Information is flowing from scientists to managers and then to educators.
- Enforcement and Regulations. The State of Florida has declared Florida Keys waters as "no-discharge" zones. Cooperative efforts have occurred among the Florida Fish and Wildlife Conservation Commission, the Florida Park Service, the U.S. Coast Guard, and NOAA, which allow them to enforce State and federal laws.
- Damage Assessment and Restoration. Crossdisciplinary strategies have been useful in reducing the number of vessel groundings and restoration of damaged resources.
- Maritime Heritage Resources. The Maritime Heritage Resources Action Plan balances resource protection, investigation and interpretation of submerged historic resources.
- Mooring Buoys and Waterway Management. This action plan has implemented simple but effective strategies for reducing vessel damage to the coral reef and to seagrass beds due to a unique interface of education, outreach, enforcement and research and monitoring activities.
- Operations. The administrative functions of two former sanctuaries (at Key Largo and Looe Key) were combined into a single headquarters with two regional offices.

3.5.4.2 FKNMS Water Quality Protection Program

The USEPA and the FDEP, in consultation with NOAA, were given the responsibility for developing a comprehensive Water Quality Protection Program (WQPP) for the FKNMS. The WQPP was developed to reverse the trend of environmental degradation and restore and maintain the Florida Keys marine ecosystem. The WQPP has had some major accomplishments. In 2002, State waters of the FKNMS were declared a No Discharge Zone for vessels. Since then, the new vessel pump-out facilities have processed thousands of gallons of wastewater that would have otherwise gone untreated into nearshore waters. Thousands of pounds of nitrogen and phosphorus are also being kept out of Key West waters each year now that Key West is using advanced wastewater treatment. However, many Keys residents and businesses still need to upgrade their wastewater treatment systems to meet the treatment standards set by the State of Florida. As required by Public Law 101-965, the FKNMS WQPP is a coordinated effort of federal, State, and local regulatory agencies designed to protect the living marine resources and waters of the Florida Keys.

The WQPP has funded three long-term monitoring projects: overall water quality, coral reef and hardbottom community health, and seagrass community health. These three projects represent a five-year commitment by the USEPA to assess the health of coral reef, hardbottom, and seagrass communities within the FKNMS focusing on issues and health concerns related to water quality. There is also a research/special studies component which consists of a multitude of smaller, more focused studies looking at specific cause and effect relationships and the impacts of specific environmental perturbations.

The Southeast Environmental Research Center (SERC), headquartered at Florida International University, conducts the monitoring project. The function of the SERC Water Quality Monitoring Network is to address regional water quality concerns. Biscayne Bay,

Florida Bay and Whitewater Bay, Ten Thousand Islands, and Marco-Pine Island Sound are sampled monthly, while the FKNMS and the Southwest Florida Shelf are sampled quarterly. The data summary maps are produced on a quarterly basis by integrating the individual projects into one data file for the month sampled (http://serc.fiu.edu/ wqmnetwork/ County/). County participation in these studies is important.

3.5.4.3 Surface Water Improvement Management Plans

In the late 1980s, it was determined that Florida had to do more to protect and restore its surface waters. While point sources (end-of-pipe sewage and industrial wastes) were being controlled, nonpoint source pollutants that enter water bodies in less direct ways were still a major concern. In 1987 the Florida Legislature enacted the Surface Water Improvement and Management (SWIM) Act. SWIM was the first major State program to address a waterbody's needs as a system of connected resources rather than simply as isolated wetlands or water bodies. The SWIM Act requires each of the State's water management districts to design and implement plans and programs for the improvement and management of surface waters for priority water bodies.

SWIM develops plans for at-risk water bodies, and directs the work needed to restore damaged ecosystems, prevent pollution from stormwater runoff and other sources, and educate the public. SWIM plans are used by other State programs, like Save Our Rivers, to help make land-buying decisions, and by local governments to help make land-use management decisions (http://www.dep.state.fl.us/water/watersheds/swim.htm).

Originally, the Florida Legislature funded the SWIM program annually, matched by moneys raised by the water management districts. This original dedicated annual funding was ended after the 1997-98 fiscal year. However, many SWIM water bodies have benefited from significant individual legislative appropriations throughout the years, associated with the Community Budget Issue Request water project funding process under Section 403.885 F.S. (http://www.dep.state.fl.us/water/watersheds/swim.htm).

The list of priority water bodies within the SFWMD was updated in January 2003[1] and includes the following:

Tier 1[2]

- Biscayne Bay
- Florida Keys
- Lake Istokpoga
- Lake Okeechobee
- Lake Trafford
- Lower Charlotte Harbor (including Charlotte Harbor, Estero Bay, and Caloosahatchee River and Estuary)
- Loxahatchee River

[1] Source: FDEP (http://www.dep.state.fl.us/water/watersheds/swim.htm) Last updated: July 9, 2008.
[2] These tiers are used by the SFWMD under the SWIM program. They are not to be confused with the Tier System used to rank land under the ROGO/NROGO ordinance.

- St. Lucie Estuary

Tier 2
- Florida Bay
- Indian River Lagoon
- Lake Worth Lagoon
- Naples Bay/Gordon River
- Rookery Bay/Marco

Tier 3
- Lake Arbuckle
- Lake Butler
- Lake Weohyakapka
- Upper Kissimmee Chain of Lakes

Within the County, the Florida Keys is identified as a Tier 1 priority, and Florida Bay is identified as a Tier 2 priority. As of 2010, there are no SWIM Plans for the Florida Keys or Florida Bay, and none are planned. Surface water improvement planning is accomplished through the County's Stormwater Management Master Plan and the Florida Keys Water Quality Improvements Program Management Plan (USACE and SFWMD, 2006) as well as through FDEP's Total Maximum Daily Load (TMDL) Program (http://www.dep.state.fl.us/ water/ watersheds/bmap.htm).

3.5.4.4 Coastal Barrier Resources Program

The Coastal Barrier Resources Act (CBRA) of 1982 established the John H. Chafee Coastal Barrier Resources System (CBRS). The CBRA legislation is specifically designed to restrict Federal expenditures and financial assistance, such as flood insurance through the National Flood Insurance Program and other Federal program funds. The law does not restrict activities carried out with private or other non-Federal funds and only applies to the areas that are within the defined and mapped CBRS. Thus, the CBRA has the effect of discouraging the development and/or modification of undeveloped coastal barriers to minimize the loss of human life, reduce the wasteful expenditure of Federal revenue, and reduce damage to habitat and other valuable natural resources of coastal barriers.

The CBRA defines an "undeveloped coastal barrier" as a depositional geologic feature that is subject to wave, tidal and wind energies; and protects landward aquatic habitats from direct wave attack. CBRA further defines a coastal barrier as all associated aquatic habitats, including the adjacent wetlands, marshes, estuaries, inlets and nearshore waters, but only if such features and associated habitats contain few man-made structures and these structures, and people's activity associated with them, do not significantly impede geomorphic and ecological processes. The Coastal Barrier Reauthorization Act of 2000 specified that a coastal barrier area is considered undeveloped if (1) the density of development is less than one structure per five acres of land above mean high tide; and (2) there is not a full suite of existing infrastructure consisting of a road with a reinforced road

bed, wastewater disposal system, electric service, and fresh water supply to each lot or building site in the area[3].

The CBRS is comprised of undeveloped coastal barriers along the Atlantic and Gulf of Mexico coasts, including the coasts of the Keys, Puerto Rico, and the Virgin Islands. The CBRS includes 25 units in the County. Designated Units of the Coastal Barrier Resource System in the County are listed in Section 3.18.4 (Units of the Coastal Barrier Resources System).

Because the intent and effect of the CBRS has been to discourage (but not prohibit) development in the County's designated coastal barriers (withouth hurting existing communities where serious commitments of time and money have already been made), the County should consider whether to maintain the existing comprehensive plan policies related to the CBRS, or to focus on the development impacts on endangered species and habitat should unsubsidized development still occur.

3.5.4.5 Monroe County Programs, Plans, and Special Studies that Protect Water Quality

3.5.4.5.1 Monroe County Marine Resources Office

The Monroe County Marine Resources Office (formerly Department of Marine Resources) was established in 1991. It's mission is to help protect and conserve the marine environment of the Florida Keys within Monroe County, consistent with the Monroe County 2010 Comprehensive Plan, and provide for the adequate and appropriate use of the Keys' marine resources.

The focus of the Marine Resources Office is on public water access, provision of maritime infrastructure, and protection of the marine environment. In support of these objectives, the Office maintains a Keys-wide system of Aids to Navigation and boating regulatory zones designed to both assist boaters and protect valuable shallow water resources. In its coordination with other County offices and State and Federal agencies, the Marine Resources Office provides vessel launching facilities, disposes of derelict and abandoned vessels, and addresses a wide variety of public concerns regarding boating issues and shoreline protection.

3.5.4.5.2 Sanitary Wastewater Master Plan

The County completed a Sanitary Wastewater Master Plan (SWMP) in June 2000 (CH2M Hill, 2000) to provide an equitable, ecologically sound, and economical implementation strategy for managing wastewater and improving the water quality in the Florida Keys. The scope of the SWMP is presented in *Chapter 10.0 Sanitary Sewer Element.*

[3]http://www.fws.gov/habitatconservation/coastal_barrier.html

3.5.4.5.3 Stormwater Management Master Plan

The County prepared a Stormwater Management Master Plan (SMMP) (Camp, Dresser, and McKee, 2001) to guide stormwater management facilities. The scope of the SMMP is presented in *Chapter 11.0 Drainage Element*.

3.5.4.5.4 Florida Keys Water Quality Improvements Program (FKWQIP)

On December 21, 2000, Public Law 106-554 authorized the USACE to assist local municipalities in the County with the development and implementation of wastewater and stormwater improvements as part of the Florida Keys Water Quality Improvements Program (FKWQIP). The South Florida Water Management District (SFWMD) is the non-federal Sponsor for the FKWQIP. FKWQIP is designed to:

- Reduce nutrient loading to nearshore waters of the FKNMS;
- Improve water quality throughout waters of the FKNMS; and
- Meet relevant federal and State regulatory standards.

The FKWQIP will be accomplished through the implementation of several wastewater and stormwater master plans that have been prepared for the County and other local municipalities in the County. These plans are designed to provide cost-effective, environmentally sound, and feasible programs for managing pollutants that are now, or have the potential to, adversely impact the water quality of the Keys and the FKNMS. The FKWQIP is intended to provide the technical and financial assistance for planning, engineering, and construction of wastewater and stormwater treatment improvement projects (USACE and SFWMD, 2006). A Program Delivery Team has been formed to ensure effective and coordinated actions are undertaken for successful implementation of the FKWQIP. Membership of the Program Delivery Team consists of one representative from each municipal governmental agency in the County as well as State and federal agency representatives.

3.5.4.6 Federal, State, and Local Regulatory Programs Protecting Water Quality

3.5.4.6.1 Applicable Federal Water Quality Standards

The federal Clean Water Act provides the statutory basis for State water quality standards programs. The regulatory requirements governing these programs (Water Quality Standards Regulation) are published in 40 CFR 131. Section 303(d) of the Clean Water Act requires all states to develop a list of priority surface waters that do not meet applicable water quality standards (impaired waters) after implementation of technology-based effluent limitations. Florida currently employs narrative nutrient standards to guide the management and protection of its surface waters; standards that were previously reviewed and approved by the USEPA. Florida conducts site-specific assessment of the proposed discharges for a project to determine whether the proposed action will cause an "imbalance".

In July 2008, several environmental groups initiated a lawsuit to force USEPA to establish numeric nutrient criteria (versus narrative standards) for all of Florida's surface waters. By letter dated January 14, 2009, USEPA notified FDEP that numeric water quality standards for nutrients would be necessary for the State to comply with the requirements of the Clean Water Act. The State of Florida's efforts to establish primarily freshwater numeric nutrient criteria had been ongoing for at least six years. With a lawsuit in the background, the efforts to establish numeric criteria were accelerated and became litigation driven. On August 19, 2009, USEPA settled the lawsuit by entering into a consent decree with the environmental groups whereby USEPA agreed to establish numeric nutrient criteria for all lakes, streams, and canals by January 2010, to be implemented by October 2010. The deadlines for South Florida canals have been extended until August 2012. In addition, timelines for development of criteria for estuarine and for coastal waters have also been extended are expected to now be proposed by November 2011 and promulgated by August 2012. In addition, USEPA will undergo a peer review through its Scientific Advisory Board for both the South Florida canals as well as estuarine and coastal waters likely over the next six to twelve months.

3.5.4.6.2 Applicable State Water Quality Standards

FDEP has been delegated the responsibility of reviewing, establishing, and revising the reclassification of surface waters under Chapter 62, F.A.C. Water quality criteria for Class II waters are set forth in Rule 62-302.400, F.A.C. The FDEP has classified the nearshore waters of the County as follows:

- Class II Waters: Shellfish Propagation or Harvesting: from Collier and Miami-Dade County lines southward to and including that part of Florida Bay within Everglades National Park.

Current Class II standards allow FDEP to legally issue permits for activities that would lower water quality to the minimum for that particular water quality classification, but in recognition of the exceptional ecological and recreational significance of the waters of the Florida Keys, FDEP has further designated most of the waters of the County as Outstanding Florida Waters (OFWs), including the following:

- Waters within Biscayne National Park and Everglades National Park;
- Waters within Bahia Honda State Recreation Area, John Pennekamp Coral Reef State Park, and Long Key State Recreation Area;
- Waters within Lignumvitae Key State Botanical Site and New Mahogany Hammock State Botanical Site;
- Waters within Biscayne Bay, Card Sound Aquatic Preserve, Coupon Bight Aquatic Preserve, and Lignumvitae Aquatic Preserve; and
- All Class III waters of the County, excluding the following three areas:
  - Key West Sewage Outfall (being a circle 150 feet in radius from the point of discharge);

- Stock Island Power Plant (being a circle 150 feet in radius from the end of the power plant discharge canal; and
- Artificial waterbodies, defined as any waterbody created by dredging, or excavation, or by filling in of its boundaries, including canals as defined in Chapter 62-312, F.A.C.

The OFW designation prohibits any human activity or discharge which will degrade the existing ambient water quality.

Canals in Monroe County are not part of the OFW designation. There are more than 200 canals and access channels that were dredged from the 1950s to 1970s; FDEP has specifically designated them an "area of concern".

In May 2010, the State of Florida Enviromental Regulatory Commission approved a new "Class III limited" designation. The new Class III limited designation is only available for certain man-made or altered waterbodies, it is not available for any toxic substances, and it cannot result in any degrading of current water quality. For each waterbody, there will have to be a determination of what the appropriate uses are for that waterbody, and a petition for a reclassification will have to include proposed site-specific alternative criteria that will adequately protect those uses. The Rule also specifically allows local governments to have more stringent standards. The new Rule approved by the Enviromental Regulatory Commission must be approved by USEPA.

In 1999, the Florida Legislature set statutory effluent standards and associated compliance schedules for existing and new wastewater treatment systems in the County. These standards address treatment for several water quality constituents and require best available technology (BAT) standards for flows less than 100,000 gallons per day (gpd) and advanced wastewater treatment (AWT) standards for design flows greater than 100,000 gpd. The law prohibited new surface water discharges of wastewater and required elimination of existing surface water discharges by July 1, 2006. These requirements apply to the owners of the facilities and OSTDS systems, whether they are local governments, public or private utilities, other private entities, or individual homeowners. Section 6 of Chapter 99-395, Laws of Florida, requires all new sewage facilities in the County, including OSTDS permitted after June 18, 1999, to comply with the following standards by July 1, 2010 (USACE and SFWMD, 2006):

Constituent	**BAT (mg/L)**	**AWT (mg/L)**
Biochemical Oxygen Demand (BOD5)	10	5
Total Suspended Solids (TSS)	10	5
Total Nitrogen (TN)	10	3
Total Phosphorus (TP)	1	1

States are required to establish TMDLs which designate the maximum amount of a pollutant a water body can assimilate without exceeding water quality standards. Chapter 99-223, Laws of Florida, sets forth the process by which the 303(d) list is refined through more detailed water quality assessments. It also establishes the means for adopting TMDLs, allocating pollutant loadings among contributing sources, and implementing

pollution reduction strategies. Implementation of TMDLs can include any combination of regulatory, nonregulatory, or incentive-based actions necessary to reduce pollutant loading. Non-regulatory or incentive-based actions may include development and implementation of BMPs, pollution prevention activities, and habitat preservation or restoration. Regulatory actions may include issuance or revision of wastewater, stormwater, or environmental resource permits necessary for consistency with the TMDL. Permit conditions may be quantitative effluent limitations or, for technology-based programs, a combination of structural and non-structural BMPs necessary for achieving the desired pollutant load reduction (USACE and SFWMD, 2006).

Florida is comprised of 52 major hydrologic basins, which have been categorized geographically into TMDL groups, and will be assessed for pollutant levels. The five phases of the study for each group are as follows:

- Phase I Preliminary Basin Assessment;
- Phase II Strategic Monitoring;
- Phase III Data Analysis and TMDL Development;
- Phase IV Management Action Plan; and
- Phase V Implementation.

The Keys are in the fifth group of water bodies to undergo TMDL implementation and were scheduled to undergo Phase I from 2005 to 2009 (USACE and SFWMD, 2006).

In lieu of a TMDL for Monroe County, a Reasonable Assurance Plan was developed in December 2008 for the Florida Keys (http://www.dep.state.fl.us/water/ watersheds/ bmap.htm) to set forth and accelerate the actions that have been taken or are planned to be taken to reduce nutrient loadings to nearshore waters throughout the Florida Keys so that water quality standards are met and beneficial uses are restored. The Reasonable Assurance Plan is based on achieving Total Phosphorus levels of 1 mg/L and Total Nitrogen levels of 10 mg/L (3 mg/L for AWT standards). The plan was sent to USEPA for review and comment in February 2009. Because it has not yet been accepted by USEPA, the Reasonable Assurance Plan is not an accepted alternative to establishing TMDLs under the Clean Water Act.

The Reasonable Assurance Plan consists of separate documents for four geographical regions of the Keys. To provide reasonable assurance, the following are provided in the Plan:

- Description of the Impaired Water;
- Description of the Water Quality and Aquatic Ecological Goals;
- Description of the Proposed Management Actions to Be Undertaken;
- Description of Procedures for Monitoring and Reporting Results; and
- Description of Proposed Corrective Actions.

The Plan identifies the applicable standard as Chapter 62-302.530(47)(b), F.A.C. – *"in no case shall nutrient concentrations of a water body be altered so as to cause an imbalance of natural populations of flora and fauna."*

Since the farfield sources (see Section 3.5.2) dominate the nutrient concentrations in nearshore waters, the water quality target is defined to be "*an insignificant concentration at 500 meters increase above natural background; insignificant means less than 10 µg/L for Total Nitrogen and 2 µg/L for Total Phosphorus and background means the Halo Zone (an area from the coastline to offshore within which the impairment has been defined) condition in the absence of anthropogenic loads. Another target is that the nearshore ambient nutrient concentrations at 500 meters average less than the ambient concentrations measured for the Outstanding Florida Water designation*". The Plans identify management actions for each geographical area of the Keys to reduce nutrient loads.

3.5.5 Impacts of the Future Land Use Plan on Water Quality

Natural and man-made pollutant loadings will determine the future quality of the waters of the Florida Keys. Man-made loadings will be most affected by the level of population growth, the spatial distribution of the increased population, required treatment efficiencies of wastes from the existing and additional populations, and selected disposal mechanisms for wastewater (CSA, 1991).

Nutrient loadings are expected to be reduced through implementation of nutrient effluent and water quality standards. County water quality levels of service, particularly for OSTDS nutrient removal, have become stricter following completion of the Sanitary Wastewater Management Plan and the Stormwater Management Master Plan. Other programs targeting specific nutrient loading sources of the County, combined with State and federal actions resulting from implementation of the Florida Keys National Marine Sanctuary Program, are also expected to further reduce loadings.

Recent direction of USEPA to promulgate numeric nutrient criteria for all lakes, streams, and canals by January 2010 (and to be implemented by October 2010, with criteria for coastal waters to be established by January 2011 and implemented by October 2011) will result in more requirements for proposed new development. With a numeric standard, the issuance of an NPDES permit will be a comparison of proposed discharge numbers versus actual benchmark numbers and it is likely future development will have to meet more stringent water quality standards.

3.6 Fresh Surface Water Resources [Rule 9J-5.013(1)(a)1. and (b), F.A.C.]

3.6.1 Occurrence of Fresh Surface Water Resources

Within the Keys, there are no natural freshwater lakes or streams. Rainfall is the only natural source of freshwater in the Keys. Discharge is by evapotranspiration, surface runoff, pumpage, and lateral seepage from the shallow groundwater table. On most islands,

groundwater throughflow moves quickly down-gradient into marine nearshore waters. In many areas, mosquito control ditches and canals dug from the coast to inland parts of the islands to obtain fill for housing construction, have reduced the historical residence times of freshwater on the islands, thereby accelerating surface water runoff (Schomer and Drew, 1982; Hanson, 1980). On the mainland, the freshwater of the Everglades flow into Florida Bay.

In areas on several larger islands in the Lower Keys, freshwater infiltrating from the surface enters the groundwater table and forms freshwater lenses (see *Chapter 12.0 Natural Groundwater Aquifer Recharge Element*). The size of these lenses is controlled by rainfall, freshwater discharge (seepage, pumpage, runoff, and evapotranspiration), response to tidal fluctuations, proximity to saltwater bodies, permeability of the subsurface materials, and elevation of the island above sea level (Klein, 1970; Hanson, 1980).

Permanent freshwater lenses occur on the larger keys, specifically Key West and Big Pine Key. Ephemeral or brackish lenses are present on the smaller keys, including Sugarloaf Key, Little Torch Key, Cudjoe Key, No Name Key, Little Pine Key, and Ramrod Key. The Lower Keys are more likely to have lenses because of their geometry and geology (see *Chapter 12.0 Natural Groundwater Aquifer Recharge Element*). On many of these keys, freshwater wetlands are associated with these freshwater lenses [see Section 3.9.7 (Freshwater Wetlands) below].

The Keys contain natural, shallow, inland depressions that collect rainwater but also fill with salt water directly from the sea. With evaporation, the water in these depressions can become very saline and these depressions are termed salt ponds. Historically, some salt ponds were improved to capture the flow of seawater and were used to harvest salt (see Section 3.9.6 (Salt Ponds).

3.7 **Floodplains** [Rule 9J-5.013(1)(a)2. and (b), F.A.C.]

3.7.1 Floodplain Occurrences

Most of the land area in the Florida Keys is 2 to 3 feet above high tide. Maximum elevations reach 18 feet in two locations. As a result, the Keys are extremely susceptible to storm flooding.

Floodwater sources potentially affecting the Keys include the Atlantic Ocean, Florida Bay, Biscayne Bay, and the Gulf of Mexico. In general, coastal areas which border these water bodies are subject to storm surge flooding as a result of hurricane and tropical storm activity. Large tidal surges, combined with wave action and heavy rainfall that accompany these storms, can result in severe flooding.

In 1989, the Federal Emergency Management Agency (FEMA) completed a detailed coastal flooding analysis of the complete coastline of the County (FEMA, 1989). This study investigated the existence and severity of flood hazards. Floodplain maps and flood

elevations were developed. Analyses were carried out to establish the peak elevation-frequency relations for each flooding source. Hydraulic analyses, considering storm characteristics and the shoreline and bathymetric characteristics of the flooding sources, were completed to provide estimates of the elevations of floods of the selected recurrence intervals along all shorelines in the Keys (FEMA, 1989).

Map Series 3.2 depicts the flood zones present in the County. Flood zone designations which have been assigned to areas within the County are:

- Zone AE - A Special Flood Hazard Area subject to inundation by the 1 percent annual chance flood (the 1 percent annual chance flood, also known as the 100-year flood or base flood, is the flood that has a 1 percent chance of being equaled or exceeded in any given year.) In Zone AE, the base flood elevations are determined (derived from detailed hydraulic analyses).
- Zone VE - A Special Flood Hazard Area subject to inundation by the 1 percent annual chance flood. In Zone VE, the base flood elevations are determined (derived from detailed hydraulic analyses) and there are additional coastal hazards associated with storm wave action.
- Zone X - An area determined to be outside the 0.2 percent annual chance flood. Also includes areas subject to inundation by the 0.2 percent annual chance flood, areas of 1 percent annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile, and areas protected by levees from 1 percent annual chance flood.

3.7.2 Existing Commercial, Recreational, or Conservation Uses in Floodplains

Because of the extensive nature of the 100-year floodplain (Zone VE and Zone AE) in the Florida Keys, most developed land uses within the Keys lie within the flood zone. Conservation lands are almost exclusively located on land within the 100-year floodplain.

Only a few keys have land which lies above the 100-year flood elevation (within Zone X). This includes residential and commercial land along U.S. 1 on Key Largo, Plantation Key, Windley Key and Upper Matecumbe Key, comprised of a strip encompassing the highway right-of-way and adjacent lands.

3.7.3 Known Pollution Problems and/or Issues Related to Flooding Hazard

The potential for surface water contamination from flooding in the Keys arises primarily from the widespread use of poorly functioning OSTDS or complete lack of a system. When flooded, these systems typically can provide little or no treatment and wastewater is discharged relatively untreated into the soil or directly into adjacent surface waters. This condition persists following subsidence of flood waters until soil moisture is reduced to normal levels. Pollutant loadings to surface water from urban runoff would be elevated during major storms.

The potential for surface water contamination from flooding also exists where hazardous materials and hazardous wastes are stored. Aboveground and underground storage tanks, if constructed and maintained according to current State and federal regulations, should be adequately protected from rupture by flood waters and should not constitute a serious threat of contamination. However, a number of tanks in the Florida Keys have leaked and are part of the State cleanup program. While most are rated as providing a low threat to public health and safety and are low on the cleanup priority list, the fuel contaminants - which contain a number of known carcinogens - remain in soil and groundwater and are flushed into nearshore waters during flood events.

Sea level rise will exacerbate flooding hazards.

3.7.4 Potential for Conservation, Use, or Protection of Floodplains

Because most of the Keys are located within the 100-year floodplain, potential activities for conservation, use or protection of floodplain are related to those which:

- prevent disturbances to areas which provide critical flood water storage and filtration functions, including mangroves, salt ponds, saltmarsh and buttonwood wetlands, and freshwater wetlands;
- prevent excessive clearing and disturbance to natural upland vegetation within the floodplain; and
- minimize the alteration of natural drainage patterns within the floodplain.

Lands that retain natural floodplain functions or water storage and filtration should be retained where possible, in their natural condition. In the Keys these include all wetlands. Development activity should be directed away from areas of high quality upland vegetation which lies in the floodplain, including hardwood hammocks and pinelands. Land clearing, grading and filling should not disturb natural drainage patterns.

3.8 Living Marine Resources [Rule 9J-5.013(1)(a) and (b), F.A.C.]

The waters of the Florida Keys include three unique and critically important marine biological communities (CSA, 1991):

- mangrove forests along the shorelines of the Keys;
- seagrass beds (estimated to be among the largest in the world) located off mainland Florida, on both sides of the Keys, extending offshore to the reef tract; and
- The Florida reef tract, containing the only true coral reefs within the continental United States.

For the inventory of mangrove habitats, the County's Geographic Inventory System (GIS) was examined. For each parcel within the Florida Keys[4], the GIS databases include

[4] Because the mainland portion of the County is comprised of the federally-owned Everglades National Park and Big Cypress National Preserve, the inventory of natural habitats did not include these lands.

separate files for natural habitats, conservation lands (County-owned lands), existing land use, property ownership from the County Property Appraiser, presence of listed species, tier designation, and wetlands identified by the Advance Identification of Wetlands Program (ADID). Because the County files did not identify those parcels contained within parks and refuges (e.g., John Pennecamp Coral Reef State Park), the Florida Managed Land Use database was obtained from the Florida Natural Areas Inventory (FNAI). In addition to parks and refuges, this database identifies local and non-profit conservation lands. All of these databases were combined into one file so that information could be generated for each parcel and the combined databases could be queried. Habitat type (land use) was the governing attribute (e.g., tropical hardwood hammock) and key characteristics were generated and summarized for each land use: the acreage of parcels within the given habitat, tier designations, and ownership (public, private, non-profit, utility, or military). The analysis was compiled separately for the Upper, Middle, and Lower Keys. A similar analysis was completed for future land uses [see Section 3.22 (Effects of Future Land Uses on the Coastal Environment)].

Due to the combination of the various databases, the GIS analysis for existing conditions revealed some inconsistencies. The database for the identification and extent of natural habitats and the database for the presence of listed species was compiled and generated by the USFWS; the database for the ADID was generated by the USACE/USEPA using hand-drawn maps that were then digitized; the Tier Overlay Ordinance maps were generated using parcel data from the County Property Appraiser's maps. The combination of these databases demonstrated that the various mapping methods yielded areas that could not be reconciled (i.e., the maps did not line up exactly). This led to the generation of areas that did not have corresponding data attributes. These areas accounted for approximately 1-3 percent of the given land use type. Given the small area, the County decided to omit these areas from the analysis. Similarly, while the ADID is useful for the examination of wetlands present on an individual parcel, it could not be used for the analysis because the mapping information did not correspond to parcel information.

Map Series 3.3 depicts the terrestrial habitats in the County. Detailed mapping of the coral communities and seagrass beds of the Florida Keys has been conducted under the FKNMS Management Plan and its ongoing WQPP. The map of benthic habitats from the Management Plan is depicted in **Map Series 3.4**.

3.8.1 Mangroves

The natural margins of the Florida Keys are characterized as dense, low forests occurring along relatively flat, intertidal and supratidal shorelines of low wave energy along Florida coasts (FNAI, 1990). Approximately 234,000 acres of mangroves are found within the County, the majority lying within the boundaries of Everglades National Park and the small islands in Florida Bay (Meyers and Ewel, 1990). Approximately 23,000 acres of mangroves are present in the unincorporated parts of the Keys (Upper, Middle, and Lower).

3.8.1.1 Flora of Mangrove Communities

The mangrove community is comprised of a diverse association of salt tolerant plants that provide food and habitat for a characteristic fauna. The major environmental conditions that characterize mangrove communities are:

- loose, wet, saline soil;
- periodic tidal submergence;
- occasional tropical storms and/or hurricanes; and
- low-energy wave and current regimes.

In South Florida and the Keys, three species of mangroves occur. Red Mangrove (*Rhizophora mangle*) has characteristic stilt, prop and aerial roots and bears the cigar-shaped, viviparous seedlings, and is located at the lowest elevations supporting mangrove communities. Black Mangrove (*Avicennia germinans*) has pneumatophores (breathing roots) and gray-green leaves encrusted with excreted salts. White Mangrove (*Laguncularia racemosa*) has rounded leaves with a pair of salt glands on the petiole. Black and White Mangroves occupy slightly-higher elevations than Red Mangroves. Buttonwood (*Conocarpus erectus*) is often associated with mangroves but is not considered a mangrove itself. It occurs more frequently in the transitional zone that lies on slightly higher ground between the mangroves and upland systems. Other plants commonly associated with the mangroves include a number of fleshy halophytes, such as Saltwort (*Batis maritima*) and Glasswort (*Salicornia virginica*).

Four major factors limit the distribution of mangroves and determine the extent of mangrove ecosystem development: climate; salt water; tidal fluctuation; and substrate (Odum et al., 1982). Mangroves do not develop where the annual average temperature is below 66 degrees Fahrenheit or where water temperatures exceed 107 degrees to 113 degrees Fahrenheit Mangroves are facultative halophytes, which do not thrive in freshwater environments because they are not able to compete successfully with other plants in that environment. However, they can be found locally in freshwater systems. Hurricanes have blown propagules of red mangrove far into the Everglades where they have become well-established (e.g., Nine-Mile Pond).

Lugo and Snedaker (1974) and FNAI classifies mangrove systems into six subtypes based upon their physical structure and hydrologic flushing: overwash forest, fringe swamps, riverine swamps, basin swamps, hammock swamps, and scrub swamps. However, the land use maps for the County are based on the Advance Identification of Wetlands (ADID) categories [see Section 3.9.2 (Monroe County Advance Identification of Wetlands (ADID) Program)] and distinguish only between Scrub Mangroves and Mangroves (which include the other subtypes). The inventory of mangroves is shown in **Table 3.5**. The inventory of scrub mangroves is shown in **Table 3.6**. There are a total of 31,800.2 acres of mangrove and scrub mangrove habitat in unincorporated parts of the Keys (Upper, Middle, and Lower). Most of the mangrove habitats (85.8 percent) are publicly-owned or owned by non-profit organizations and 14.2 percent are privately owned. Similarly, most of the scrub

mangroves (81.2 percent) are publicly-owned or owned by non-profit organizations and 18.8 percent are privately owned.

3.8.1.1.1 Overwash Mangrove Swamps

Overwash swamps are found on small keys or peninsulas. In many cases, overwash forest is the only community on a small island. These swamps are regularly overwashed by tides and often contain no land that rises above mean high water. All three mangrove species may be present, but Red Mangroves are usually the dominant form, with canopy height ranging as high as 20 to 25 feet. Because of the regular tide sheet overflow, leaf litter does not accumulate and organic export rates are high.

3.8.1.1.2 Fringe Mangrove Swamps

Fringe swamps form a relatively narrow fringe along waterways and embayments along low-energy shorelines. Mangrove islands are included in this category. They are variable in width and canopy height, with trees typically widely spaced and medium to large (ranging as high as 20 to 30 feet in height). They exhibit traditional zonation patterns. Low tide and current velocities allow for colonization by mangroves and for the import and subsequent accumulation of sediments. The prop roots of Red Mangrove and the pneumatophores of Black Mangrove are particularly effective in sediment accumulation. Fringing swamps that face open bodies of water to the north accumulate vast amounts of detritus, much of which is generated by the productive nearshore seagrass communities. The organic sediments that accumulate within the fringe forest are often strongly anaerobic, comprised of a mixture of organic sediments and coarse, calcareous sand. In these soils, Black Mangroves tend to dominate, probably because their pneumatophores allow access by underground portions of the tree to atmospheric gases. In fringe swamps, populations of succulent, salt tolerant plants often form a dense ground cover, most commonly including Saltwort and Glasswort.

3.8.1.1.3 Riverine Mangrove Swamps

Riverine swamps occur along creeks and rivers on the mainland. In the Keys, they occur only along tidal creeks. All three species of mangroves may occur, but the dominant form is usually Red Mangrove. On the mainland, this forest contains the largest trees of all the forest types, with canopy heights in excess of 60 feet; however, in the Keys the structure is similar to that of the fringe forest. Regular tidal influence promotes relatively high rates of nutrient export.

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Table 3.5 - Inventory of Mangrove Habitats

Site Name [1]	Total[3]	Ownership[4]							
		Federal	State	County	Non Profit	Cities	Utilities	Private	Species Recorded[5]
Lower Keys									
Bahia Honda State Park			171.2						KD
Florida Keys Wildlife and Environmental Area[2]			263.0	0.5	0.1			12.0	KD, MR, SR
Great White Heron National Wildlife Refuge		1,285.0	176.9	0.8	2.3			33.5	KD, MR, SR
John J. Pescatello Torchwood Hammock Preserve					29.5				KD
Monroe County Managed Areas			18.3					0.2	KD, SR
National Key Deer Refuge		3,667.4	53.9					0.4	KD, SR
Naval Air Station		1,064.5	0.1					14.9	MR
Saddlebunch Key Sanctuary					2.6				SR
Saddle BunchKeys					158.2				SR
Outside of Parks/Refuges		213.0	327.9	147.4	111.9	0.2	156.7	1,920.3	
Lower Keys Total	9,832.7	6,229.9	1,011.3	148.7	304.6	0.2	156.7	1,981.3	
Middle Keys									
Lignumvitae Key Botanical State Park			25.8						
Long Key State Park			524.8	0.4					
Outside of Parks/Refuges			7.0	1.6			0.3[7]	101.8	
Middle Keys Total	661.7		557.6	2.0			0.3	101.8	
Upper Keys									
Crocodile Lake National Wildlife Refuge		5,232.8	64.9	0.1	30.7			12.9	SS, TS, IS, WR, CM, TC
Crocodile Lake Sanctuary		12.7	0.1		102.6				
Cross Key					125.8				
Dagney Johnson Key Largo Hammock Botanical State Park		1.4	722.9					0.1	SS, TS, IS, WR, CM, TC
Everglades National Park6		805.7	10.4						
Florida Keys Wildlife and Environmental Area2			275.2	0.1				1.6	

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Table 3.5 - Inventory of Mangrove Habitats (continued)

Site Name [1]	Total[3]	Ownership[4]							
		Federal	State	County	Non Profit	Cities	Utilities	Private	Species Recorded[5]
John Pennecamp Coral Reef State Park		0.1	2,911.1	0.3				36.9	
Monroe County Managed Areas			73.5					0.7	
Naval Air Station		24.2							
Tarpon Basin		9.7	3.8		461.3				
Outside of Parks/Refuges		118.9	192.8	49.8	40.4		112.8[8]	1,133.6	SS, TS, IS, WR, CM, TC
Upper Keys Total	12,569.9	6,205.5	4,254.7	50.3	760.8	0	112.8	1,185.8	
Total County	**23,064.3**	**12,435.4**	**5,823.6**	**201.0**	**1,065.4**	**0.2**	**269.8**	**3,268.9**	

Unincorporated areas only.

[1] Site names are from the FNAI GIS database.

[2] Florida Keys Wildlife and Environmental Areas are managed by the FFWCC for the preservation of listed species that inhabit mangroves, tropical hardwood hammocks, and salt marshes.

[3] Total in acres.

[4] Ownership information is from the Monroe County Property Appraiser.

[5] Species recorded are those threatened and endangered species recorded by the USFWS for a particular parcel; a blank cell does not necessarily indicate an absence of protected species on that parcel(s).
SS = Schaus Swallowtail Butterfly; TS = Tree Snail; IS = Eastern Indigo Snake; WR = Key Largo Woodrat; CM = Key Largo Cottonmouse; SR = Silver Rice Rat; KD = Key Deer; TC = Tree Cactus

[6] Portion of the Everglades National Park that extends into Florida Bay; acreage does not necessarily include Mainland habitats.

[7] Florida Keys Aqueduct Commission

[8] Florida Keys Mosquito Control District

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Table 3.6 - Inventory of Scrub Mangrove Habitats

Site Name [1]	Total[3]	Ownership[4]							
		Federal	State	County	Non Profit	Cities	Utilities	Private	Species Recorded[5]
Lower Keys									
Bahia Honda State Park			22.5						KD, MR
Florida Keys Wildlife and Environmental Area[2]			626.8	0.8	0.1			11.5	KD, MR, SR
Great White Heron National Wildlife Refuge		1,652.6	18.7		0.1			16.7	KD, MR, SR
John J. Pescatello Torchwood Hammock Preserve					92.8				KD, MR
Monroe County Managed Areas			29.3						KD, SR
National Key Deer Refuge		2,467.6	200.5					4.0	KD, MR, SR
Naval Air Station		593.1						0.8	MR, SR
Saddlebunch Key Sanctuary					18.6				MR, SR
Saddle Bunch Keys					70.5				KD, MR, SR
Outside of Parks/Refuges		166.0	617.5	193.8	25.5			1,586.3	KD, MR, SR
Lower Keys Total	8,416.1	4,879.3	1,515.3	194.6	207.6	0	0	1,619.3	
Middle Keys									
Long Key State Park			25.9						
Outside of Parks/Refuges								3.2	
Middle Keys Total	29.1		25.9					3.2	

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Table 3.6 - Inventory of Scrub Mangrove Habitats (continued)

Site Name [1]	Total[3]	Ownership[4]							
		Federal	State	County	Non Profit	Cities	Utilities	Private	Species Recorded[5]
Upper Keys									
Crocodile Lake National Wildlife Refuge		62.0							
Crocodile Lake Sanctuary		7.7			23.4				
Dagney Johnson Key Largo Hammock Botanical State Park			6.3						
Everglades National Park[6]		93.2							
Florida Keys Wildlife and Environmental Area[2]			8.2						
John Pennecamp Coral Reef State Park			92.7					0.5	
Monroe County Managed Areas			0.1						
Tarpon Basin		1.6			3.1				
Outside of Parks/Refuges		2.4	5.7	2.9				31.2	
Upper Keys Total	341.0	166.9	113.0	2.9	26.5	0	0	31.7	
Total County	**8,786.2**	**5,046.2**	**1,654.2**	**197.5**	**234.1**	**0**	**0**	**1,654.2**	

[1-6] Footnotes same as Table 3.5

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3.8.1.1.4 Basin Mangrove Swamps

Basin swamps typically occur in the Keys where large shallow depressions in the caprock foster the accumulation of soil and channelize tidal flow. Most are located on Key Largo. Basin forest structure is similar to overwash swamps, but the Red Mangrove is not as dominant. The occurrence of Black and White Mangroves becomes more frequent with increasing soil elevation and diminishing tidal influence.

3.8.1.1.5 Hammock Swamps

Hammock Swamps are similar to Basin Swamps except they occur at higher elevations. They receive less frequent tidal flushing. Like Basin Swamps, Black and White Mangroves become more dominant as hydrological conditions become drier. They may grade into Buttonwood forest types.

3.8.1.1.6 Scrub or Dwarf Mangroves

Scrub or dwarf mangroves are best developed in the Lower Keys. These communities lack the canopy height and high productivity characteristic of the other forest types. Both the scrub and dwarf associations are characterized by small trees (generally less than five feet tall) with an understory of scattered, salt tolerant shrubs, herbs, and grasses. The scrub community generally contains all three species of mangrove but is usually dominated by Black Mangroves. Most trees are widely spaced and stunted. Dwarf mangrove associations contain trees less than five feet in height, with less distance between trees than in scrub swamps. The association is dominated by dwarfed Red Mangroves. Both the scrub and dwarf swamps occur in intertidal areas that occur on marl substrates and do not experience daily tidal flushing. The minimal flushing may be attributable to natural waterward impediments to flow or to a great spatial separation from open water that alternates tidal flow. Dwarf Red Mangroves appear to occur on slightly lower elevations than scrub black mangroves.

In many areas of the Lower Keys (e.g. Sugarloaf, Saddlebunch and Torch Keys), scrub and dwarf swamps occur where a number of conditions exist making it difficult for mangroves to colonize. The oolitic caprock is emergent in these areas, providing limited opportunity for soil accumulation. Where soils do occur, they are characteristically thin, saline marls within shallow caprock depressions. Due to the lack of regular tidal flushing, soils often become hypersaline during the dry season and dilute during the wet season. Propagules are less likely to reach these areas since they are dispersed by the tides.

3.8.1.2 Fauna of Mangrove Communities

Wildlife found in Mangrove Communities is discussed in Section 3.12.1.1 (Wildlife Typically Inhabiting Mangrove Communities).

3.8.1.3 Existing Commercial, Recreational, or Conservation Uses of Mangroves

3.8.1.3.1 Uses in Mangroves on Private Lands

Section 118-4 of the Monroe County LDRs does not permit any development activities, except with a written deviation issued by the County Biologist, in all mangroves, freshwater wetlands, and undisturbed saltmarsh and buttonwood wetlands. A 100 percent open space requirement is specified.

Section 118-10 (4)(a) of the LDRs provides further protection to mangroves by specifying the restrictions for projects located in mangroves. Only docks and docking facilities, boat ramps, walkways, water access walkways, water observation platforms, boat shelters, non-enclosed gazebos, riprap, seawalls, bulkheads, and utility pilings are permitted on or over mangroves, wetlands, and submerged lands. Mangrove trimming is permitted by FDEP pursuant to the Mangrove Trimming and Preservation Act (Sections 403.9321-403.9333, F.A.C.) The SFWMD can also authorize mangrove trimming (and alteration) as part of an environmental resource permit. These regulations restrict mangrove trimming to the minimal alteration necessary to maintain navigation in existing navigable channels and canals, where necessary to allow an upland owner limited ingress and egress to open waters, and/or to maintain views of the water. Current regulations specify the heights and amount of trimming. In addition, a certified professional mangrove trimmer must conduct the work. Mangrove alteration is defined as anything other than mangrove trimming.

3.8.1.3.2 Conservation Lands Encompassing Large Tracts of Mangroves

Conservation lands in the Florida Keys that encompass large tracts of mangroves include:

- Everglades National Park;
- Florida Keys National Marine Sanctuary;
- National Key Deer Refuge;
- Great White Heron National Wildlife Refuge;
- Key West National Wildlife Refuge;
- Crocodile Lake National Wildlife Refuge;
- John Pennekamp Coral Reef State Park;
- Lignumvitae Key Aquatic Preserve;
- Biscayne Bay-Card Sound Aquatic Preserve;
- Coupon Bight Aquatic Preserve; and
- Coupon Bight State Aquatic Preserve.

3.8.1.4 Known Pollution Problems and/or Issues Related to Mangroves

Until 1975, mangroves habaitats in the Florida Keys were filled routinely for purposes of providing dry land for development. In 1986, the County adopted its current LDRs which effectively stopped such activities in the Keys.

Pollution problems and other concerns related to mangroves which remain today include:

- problems related to mangrove trimming by private landowners;
- problems related to removal of fringing shoreline mangroves for construction of shoreline structures, particularly docks;
- problems related to water quality deterioration in the nearshore environment as a result of existing population levels and practices;
- problems related to marine debris; and
- problems related to sea level rise.

Mangrove trimming may be allowable under permit or permit exemptions from FDEP to maintain navigational access or water views. However, there are occasional reports of some homeowners and business owners that perform unauthorized mangrove trimming, which may damage the mangroves if done improperly.

Fringing shoreline mangroves occur along much of the Keys' unaltered open water shorelines as well as along altered shorelines and shorelines of artificial waterways. Where mangroves are growing in partially built-out residential subdivisions, they provide biological functions locally beneficial to nearshore water quality and wildlife. Typically, when development occurs on lots with shoreline mangroves, the developer/landowner seeks to stabilize the shoreline, to backfill, and to construct shoreline structures and/or structures over the water, such as docks. Current LDRs limit this type of development disturbance in mangroves, but unauthorized alteration occurs.

To date there are no documented reports of mangrove losses in the Keys due to water quality. Mangroves are generally insensitive to nutrient loading and are not adversely affected by highly eutrophic waters (CSA, 1991; Odum and McIvor, 1990). However, some studies have revealed sensitivities to certain contaminants. Mangroves, particularly red mangroves, are highly susceptible to herbicides (CSA, 1991; Teas and Kelly, 1975). Petroleum and petroleum byproducts have deleterious effects on mangroves due to the toxic effects of oil and to the prevention of aeration caused by clogging of root lenticels and pneumatophores (CSA, 1991; Lewis 1980; de la Cruz, 1982). Mangroves can be killed by heavy suspended loads of fine, flocculent material which clog root lenticels and pneumatophores (CSA, 1991).

3.8.1.5 Potential for Conservation, Use, or Protection of Mangroves

The FKNMS Management Plan provides the basis for future federal, state and local conservation activities affecting the resources of the FKNMS, including its mangrove forests. The Plan identifies the regulatory strategies and alternative institutional responsibilities for resource protection. It includes a plan for public education regarding mangrove conservation, as well as recommendations for a mangrove research program. This has been completed through a memorandum of agreement with NOAA, USEPA, SFWMD, and FDEP.

3.8.2 Seagrass Beds

The seagrass community is a highly productive, faunally rich system that covers an area larger than any other ecosystem in the County (see **Map Series 3.4**). Research from the FKNMS WQPP has identified three million acres of seagrass beds that lie within and adjacent to the FKNMS. Some variability in seagrass cover and abundance has been identified since the monitoring program began in 1996, although populations seem relatively stable (U.S. Department of Commerce, 2007). Seagrass meadows are important in stabilizing sediments that would otherwise exist as shifting sand and mud. Thus, they are critical in preventing, or at least retarding, the erosion of continental materials to the deep ocean. They are also highly productive systems and provide habitat to a wide variety of commercial and recreational species as feeding grounds, nurseries, and refuges from predation. Their position at the base of detrital food webs provides food for various organisms. The seagrasses themselves act as substrates for epiphytic algae, which are an important component of the seagrass food webs.

In areas where seagrass beds are patchy, between seagrass beds, and in the intertidal zone, the bottom is typically composed of sediment including sand and mud. These areas of unconsolidated sediment provide habitat for many species, especially invertebrates, and are an important habitat in the food web.

3.8.2.1 Flora of Seagrass Beds

The seagrass beds in the County are dominated by three species: Turtle Grass (*Thalassia testudinum*), Manatee Grass (*Syringodium filiforme*), and Shoal Grass (*Halodule wrightii*). These species persist from year to year in the same general location and form large, complex, and extremely significant biological habitats. These grasses make up approximately 95 percent of the total submerged vegetation biomass in the FKNMS (U.S. Department of Commerce, 1995).

Turtle grass is the most robust and widespread of the seagrasses, forming extensive meadows throughout its range. It is a climax species, and as such, is considered the primary producer of the seagrass community. Manatee Grass is more surficially rooted than Turtle Grass and rarely forms extensive meadows, occurring most commonly mixed with other species or in small dense monospecific patches. Shoal Grass is found primarily in disturbed or less stable areas that have little Turtle Grass or Manatee Grass and is an important early colonizer of such sites and in seagrass restoration areas. It thrives in water too shallow or too deep for the other species and is the most tolerant to variations in temperature and salinity (Zieman, 1982; Livingston, 1990). Less common seagrass species include three species of *Halophila* (*Halophila decipiens*, *H. engelmanni*, and *H. johnsonii*).

Grassbed distribution is determined primarily by factors influencing light intensity, current velocity, and sediment depth. Turtle Grass requires sediment depths of from 3 to 20 inches (Scoffin, 1970; Zieman, 1972) for optimum growth. Areas with thin sediments may be

more readily colonized by less-selective Shoal Grass or species from the hardbottom community (Florida DNR, 1991a).

Monitoring of benthic communities by the National Undersea Research Center and the University of North Carolina at Wilmington has documented that algae of various species are present in bottom habitats at all sites throughout the FKNMS, notably members of the genera *Halimeda*, *Penicillus*, *Caulerpa*, *Rhipocephalus*, and *Udotea*. These species are early colonizers of marine sediments which act to stabilize the substrate so that seagrasses may become established bottom habitats at all sites throughout the FKNMS. They are highly variable, depending on the region being surveyed and the time of year. Among the many species of benthic macroalgae commonly seen in FKNMS waters, several have creeping rhizoids that help anchor them in sediments, while others are capable of forming large mats. *Laurencia*, a genus of drift red algae, also commonly occurs in grassbeds. Seagrass leaves also provide substrate for some 66 species of epiphytic algae (Ballantine and Humm, 1975).

3.8.2.2 Fauna of Seagrass Beds

The seagrass beds are transitional habitats between the coral reef and mangrove habitats. As such, they are important to many species of both ecosystems. They provide abundant food and shelter for a myriad species of fish, and invertebrates. They represent the richest nursery and feeding grounds in South Florida's coastal waterways. In addition to representing a primary resource for grazers, seagrasses provide vast amounts of energy via detritus that may cycle internally or be exported to mangrove or coral reef communities.

Faunal constituents of the marine grassbed community include a diversity of microscopic zooplankton, infauna, epiphytic biota, invertebrates, fishes, and mammals. Infaunal organisms live buried in sediments and include a variety of polychaetes, burrowing crustaceans, tube-dwelling annelids, and mollusks. Representative benthic species include gastropods such as horse conch (*Pleuroploca gigantea*) and echinoderms such as the cushion sea star (*Oreaster reticulatus*) and cornet star (*Echinaster sentus*). Soft corals are rare because of the relative lack of hard bottom for attachment and stony corals are represented by only a few species including rose coral (*Manicina areolata*), tube coral (*Cladacora arbuscula*), and various species of finger corals (*Porites* spp.). The only reptile for which seagrass constitutes a principal feeding habitat is the Green Sea Turtle (*Chelonia mydas*). A large number of birds feed extensively in shallow seagrass meadows:

Common Name	Species Name	Preferred Feeding Tide
Waders		
Great Blue Heron	*Ardea herodias*	Low
Great White Heron	*A. herodias*	Low
Great Egret	*Casmerodius albus*	Low
Snowy Egret	*Egretta thula*	Low
Little Blue Heron	*E. caerulea*	Low
Tricolored Heron	*E. tricolor*	Low
Reddish Egret	*E. rufescens*	Low

Common Name	Species Name	Preferred Feeding Tide
White Ibis	*Eudocimus albus*	Low
Roseate Spoonbill	*Ajaia ajaja*	Low
Black-bellied Plover	*Pluvialis squatarola*	Low
Wilson's Plover	*Charadrius wilsonia*	Low
Semipalmated Plover	*C. semipalmatus*	Low
Willet	*Catoptrophorus semipalmatus*	Low
Ruddy Turnstone	*Arenaria interpres*	Low
Red Knot	*Calidris canutus*	Low
Western Sandpiper	*C. mauri*	Low
Least Sandpiper	*C. minutilla*	Low
Dunlin	*C. alpina*	Low
Short-billed Dowitcher	*Limnodromus griseus*	Low
Swimmers		
Horned Grebe (winter only)	*Podiceps auritus*	High
American White Pelican (winter only)	*Pelecanus erythrorhynchos*	High
Double-crested Cormorant	*Phalacrocorax auritus*	High
Red-breasted Merganser	*Mergus serrator*	High
Flying Plungers		
Brown Pelican	*Pelecanus occidentalis*	High
Osprey	*Pandion haliaetus*	High
Bald Eagle	*Haliaeetus leucocephalus*	High
Laughing Gull	*Larus atricilla*	High
Ring-billed Gull (winter only)	*L. delawarensis*	High
Herring Gull (winter only)	*L. argentatus*	High
Royal Tern	*Sterna maxima*	High
Forster's Tern (winter only)	*S. forsteri*	High
Least Tern (summer only)	*S. antillarum*	High

Source: Monroe County Department of Planning, 1986 (with current taxonomy)

Seagrass beds support several commercially important species vital to South Florida's shrimp fishery. Although the brown shrimp (*Penaeus aztecus*) and the pink-spotted shrimp (*P. braziliensis*) are present in Gulf waters, the pink shrimp (*P. duorarum*) is the most important commercially. It is the dominant species within the Dry Tortugas shrimping grounds and in Florida Bay. Juvenile shrimp spend 2-7 months in the bay's seagrass nursery grounds before moving into the deeper shrimping grounds (U.S. Department of Commerce, 1995). Section 3.14 (Fisheries) discusses the numerous fish common to seagrass beds. Seagrass beds are especially important for juvenile fishes, providing both food and refuge. The West Indian Manatee (*Trichechus manatus*) and the Bottlenose Dolphin (*Tursiops truncatus*) also commonly utilize seagrass communities, whether consuming it directly (manatees) or indirectly by feeding on the various fishes and invertebrates that use it for refuge.

3.8.2.3 Existing Commercial, Recreational, or Conservation Uses of Seagrass Beds

Recreational boating and fishing are the primary activities that occur in seagrass beds in the Florida Keys. Popular sportfishing in seagrass beds is for tarpon (*Megalops atlanticus*), bonefish (*Albula vulpes*), and permit (*Trachinotus falcatus*).

The FKNMS encompasses all of the submerged lands and waters of the Florida Keys extending from the mean high water mark to the offshore FKNMS boundary. This lies at the approximate 300-foot depth contour line (Public Law 101-965). The FKNMS overlaps four national wildlife refuges, six state parks, three state aquatic preserves, and has incorporated the Key Largo and Looe Key National Marine Sanctuaries. Everglades National Park, Biscayne National Park, and Dry Tortugas National Park are excluded from FKNMS waters, but each shares a contiguous boundary with the FKNMS. All seagrass beds within these designated FKNMS boundaries are protected and subject to management through the FKNMS Management Plan and the FKNMS Water Quality Protection Program [see Sections 3.5.4.1(Florida Keys National Marine Sanctuary Management Plan) and 3.5.2.2 (FKNMS Water Quality Protection Program)]. Marine resources presently under State management on State-owned lands are subject to memoranda of agreement between NOAA, FDEP, and SFWMD (Co-Trustees Agreement for Cooperative Management, effective May 19, 1997). Areas outside the FKNMS are managed by federal programs.

Submerged conservation lands within the boundaries of the FKNMS characterized by seagrass communities include:

- John Pennekamp Coral Reef State Park;
- Lignumvitae Key State Aquatic Preserve;
- Coupon Bight State Aquatic Preserve;
- Great White Heron National Wildlife Refuge; and
- Key West National Wildlife Refuge.

Other submerged conservation lands outside the boundaries of the FKNMS that have extensive seagrass communities include:

- Everglades National Park;
- Biscayne National Park; and
- Dry Tortugas National Park.

3.8.2.4 Known Pollution Problems and/or Issues Related to Seagrass Beds

Impacts on seagrass communities can be categorized as direct physical damages or indirect effects related to water quality [see also discussion in Section 3.8.3.3 (Known Pollution Problems and/or Issues Related to Coral Communities)]. Direct human impacts to seagrass beds include mechanical dredging, vessel groundings, anchor damage, and propeller damage. Boat propellers and large ships have damaged over 30,000 acres of seagrasses and more than 20 acres of coral reef habitat in the FKNMS (U.S. Department of Commerce,

2007). Dredging in seagrass beds has historically caused the greatest amount of man-induced direct damage to nearshore submerged vegetation. Since the turn of the century, an estimated 5,000 acres of seagrass beds have been lost by mechanical destruction, primarily dredging on submerged lands within the FKNMS, representing a loss of approximately 0.35 percent of the total seagrass acreage (CSA, 1991). Dredged areas are rendered unsuitable for seagrass recolonization for long periods or permanently in locations where dredged depths exceed those tolerated by seagrasses or where repeated boat passage renders the area unsuitable for recolonization (as sometimes occurs in boat channels).

Today, damage from boat propellers is the most common type of man-induced direct damage to seagrass beds in the Florida Keys, and is characterized by the FKNMS as the single-largest threat to seagrasses (NOAA, 2004). Damage occurs when recreational boaters take watercraft and jet skis through shallows, and propellers cut through beds of seagrass and shallow sediments. Damage from a single prop scar recovers slowly, if at all, because seagrass plants are not capable of growing downward, away from light, into the damaged area. Currents can also wash away loose sediments and prevent the establishment of new plants. Boat mooring and dock construction in the vicinity of seagrass beds have potential adverse impacts on seagrasses both directly through bottom disturbances and shading, and indirectly through pollutant discharges from vessels.

Since 1995, seagrasses in the Florida Keys have been studied as part of the Water Quality Protection Program for the FKNMS. Four kinds of data are being collected in seagrass beds in the FKNMS:

- Document the distribution and abundance of seagrasses and other benthic plants and animals using rapid assessment surveys;
- Seagrass nutrient availability using tissue concentration assays;
- Nutrient quality information using stable isotopic composition of seagrass leaves; and
- Water quality data collected with the seagrass data (Fourqurean and Escorcia, 2008).

Over time, scientists have noted various trends within seagrass beds in the FKNMS. Turtle grass thrives in shallow waters with relatively low-nutrient levels. When nutrient levels are high, other plants that are adapted to a nutrient-rich environment can out-compete turtle grass. The monitoring project has documented nutrient enrichment (eutrophication) which can cause the decline of seagrass meadows. Under very high nutrient levels, microalgae flourish and can become so dense that they block sunlight promoting the growth of small plants that grow directly on the grass blades. Both situations make it difficult for the seagrass to absorb the sunlight needed for photosynthesis (Fourqurean and Escorcia, 2008).

The monitoring project compares the concentrations of two important nutrients found in the blades of turtle grass: nitrogen and phosphorus. For turtle grass, when the ratio of nitrogen to phosphorus reaches 30:1 (called the Redfield Ratio), turtle grass will decline and will be replaced by nutrient-loving plants like seaweeds and microalgae. To obtain the

nitrogen to phosphorus ratio data needed for the monitoring model, leaf tissue samples were taken from 30 permanent monitoring sites throughout the FKNMS. The nitrogen to phosphorus ratio was determined for each sample. For the sites monitored in 2007, five exhibited trends toward the 30:1 Redfield Ratio, which means nutrient levels at these sites were approaching those conditions that may eventually result in the loss of turtle grass. However, a few sites trended away from the Redfield Ratio, indicating lower nutrient availability. These sites had likely been scoured clean by hurricanes, and the new plant species that colonized the bare areas rapidly used up available nutrients. Even small changes in a limiting nutrient can translate to shifts in the kinds of plants inhabiting an area (Fourqurean and Escorcia, 2008).

Sea level rise can threaten seagrass communities as water depths increases. Deeper water can reduce sunlight penetration to the seafloor and can change tidal patterns. These changes can alter seagrass distribution and the quality of seagrass habitats.

3.8.2.5 Potential for Conservation, Use, or Protection of Seagrass Beds

The FKNMS Water Quality Protection Program tracks changes in grassbeds over time, particularly changes in seagrass cover caused by eutrophication. No significant overall loss of seagrass coverage has occurred in the FKNMS, but major changes have occurred in the composition of species in plant communities. In 13 of the 30 monitoring sites in 2007, the dominant species had shifted from turtle grass to another species, suggesting higher availability of nutrients. In most of these sites, turtle grass decreased, but sites with increases in turtle grass density were also observed. Both trends indicate that nutrients are increasing in those locations. As nutrient levels rise, an increase in turtle grass density occurs first, and then with more nutrients, dense turtle grass dies and is replaced with faster-growing species (Fourqurean and Escorcia, 2008).

Good water quality is an essential ingredient for healthy seagrass meadows and the marine ecosystem. Many of the causes of local seagrass changes due to water quality problems originate beyond the jurisdiction of Monroe County. Like the health of coral reefs (discussed in the next section) water quality is influenced by nutrients and water currents from southwest Florida and the Everglades. However, research suggests that regional-scale changes in nutrient availability are causing changes in seagrass beds over a wide portion of the FKNMS (Fourqurean and Escorcia, 2008). Implementing solutions that will preserve the Florida Keys seagrass beds will require action on local as well as regional and global scales.

While propeller damage to benthic communities is prohibited within the FKNMS, only about 2 percent of damage annually is the subject of enforcement action, as law enforcement officers are seldom present and able to identify offending vessels when the damage occurs (Precht, 2010). Therefore, extensive boat-caused damage throughout the FKNMS accumulates each year, and often grows substantially larger through erosion. To address this, the FKNMS prepared the *Programmatic Environmental Impact Statement for Seagrass Restoration in the Florida Keys National Marine Sanctuary* (PEIS), published in

2004, which prioritizes restoration of orphan damage to seagrass and identifies measures to prevent this damage in the future (NOAA, 2004).

The PEIS studied a variety of methods to restore propeller scarring and adopted specific methods that have shown significant success. In most restoration efforts, scarred areas are first filled to restore continuity of the substrate with the surrounding seagrass habitat. This is usually done using either a patented method called "sediment tubes" or similar device that contains appropriately-sized sediments within a cloth lining that breaks down over a four- to six-month period. This prevents currents and storms from eroding fill material. Then, the damaged areas are planted with shoal grass, and, where appropriate, "bird stakes" or fertilizer spikes are installed along the scar.

T-shaped bird stakes are pounded into the sediments along the length of the prop scar. They are attractive to cormorants, terns, and other birds, which, while resting on the stakes, defecate in the water, adding nutrients that promote the growth of seagrass, especially shoal grass. Nutrient input from seabirds roosting on the bird stakes has been shown to speed recovery of shoal grass. Once the scar has been stabilized by shoal grass, the stakes are removed to allow succession to turtle grass, because it appears shoal grass may out-compete turtle grass in a fertilized environment. Some estimates for recovery to complete coverage by shoal grass are as short as 1.5 years, but usually range from 3 to 7 years. Although methods of restoration exist for damaged seagrass meadows, they can be costly and take years to restore. Prevention of groundings and prop dredging is the preferred way to protect seagrass habitat.

The FKNMS Management Plan provides the basis for future federal, State, and local conservation activities affecting the resources of the FKNMS, including its seagrass beds. Monroe County's Comprehensive Plan and LDRs provide similar goals, strategies, and code regulations to provide protection to seagrass communities of the Florida Keys. Efforts to maintain or improve water quality that are provided in FKNMS Water Quality Protection Program are discussed in Section 3.5.2.2 [FKNMS Water Quality Protection Program (WQPP)].

The physical protection of seagrass beds can be achieved through the Monroe County LDRs and the actions of the Monroe County Marine Resources Office. The Comprehensive Plan and the LDRs currently prohibit new dredging in the Florida Keys and prohibit maintenance dredging within areas vegetated with seagrass beds. Exceptions for maintenance dredging in seagrass bed areas are currently permitted only for public navigation channels. Maintenance dredging is performed in several incorporated areas within the County, including Marathon and Key West, as well as in certain parts of unincorporated Monroe County. Dredging is also regulated by the FDEP, SFWMD, and the USACE. Permits to conduct new or maintenance dredging from these agencies are required prior to the issuance of a County permit. In addition, FDEP has adopted a rule specifically regulating docks in the Florida Keys. These prohibitions and permitting requirements have eliminated the most historically significant direct impact of man's activities on seagrass beds in the Keys. However, as many existing docking facilities and canals are surrounded by shallow flats, and boaters new to the Florida Keys are often unaware of how to navigate

in the shallow conditions, significant and cumulative damage to benthic resources continues to occur.

As part of the management plan for the FKNMS, the Mooring Buoy and Waterway Management Action plans have implemented simple but effective strategies for reducing vessel damage to seagrass beds (as well as coral reefs and other benthic communities). Mooring buoy strategies have been used in local FKNMS waters since 1981 when they were introduced at the Key Largo National Marine Sanctuary and their success has been due to a unique combination of education, outreach, enforcement, and monitoring activities (U.S. Department of Commerce, 2007). The Marine Resources Office identifies mooring fields and acquires funding to install buoys. Mooring buoy sites are not permitted over seagrass beds, regardless of water depth. This eliminates potential concentrated impacts of bottom disturbances and pollutant discharges from moored vessels in the immediate vicinity of seagrass beds. The Marine Resources Office coordinates with FDEP to develop a consistent policy related to the prohibition of mooring buoy fields over seagrass beds. The Marine Resources Office identifies derelict vessels and receives assistance from FEMA to remove vessels after hurricanes.

The Comprehensive Plan and the LDRs regulate the placement of new docks, marina facilities, and walkways. They must be constructed at least 4 feet at mean low water over seagrass beds (or hardbottom, corals, macro algae, sponges, or other sessile communities with at least 4 feet of depth from the docking facility to open water). Dock location and design are also regulated by the FDEP and the USACE and permits from these agencies are required prior to the issuance of a County permit.

The Waterway Management Action Plan (formerly known as the Reef/Channel Marking Action Plan) component of the FKNMS Management Plan addresses the challenges of the physical damages to seagrass beds. The plan includes strategies that implement and maintain a comprehensive and effective waterway marking and management system for boaters within the FKNMS. The plan incorporates improvements to channel markers as well as surveys and databases to aid waterway management. The Monroe County Marine Resources Office has primary responsibility for implementing this action plan in County waters. The USCG has primary responsibility for marking federal navigation channels, including the Intracoastal Waterway, and shipping lanes. The FKNMS is responsible for marking its regulatory zones. The FKNMS also coordinates the Waterway Management/Marking Working Group and promotes cooperation among the different agencies. The Fish and Wildlife Research Institute and the FKNMS created the vessel grounding database from FFWCC grounding citations. "Hot spots" of resource damage can be illustrated by plotting the data. These data are then used to design/improve waterway marking schemes through partnering with USCG and the County (U.S. Department of Commerce, 2007).

3.8.3 Coral Communities

Florida is located at the convergence of the subtropical and temperate climate zones. The Gulfstream has a major influence on water temperature and the transport of flora and fauna to the region. The Gulfstream intrudes into the Gulf of Mexico as the Loop Current and reverses flow to return to the Straits of Florida, joining the main body of the Florida Current before flowing northeast towards Europe. The influence of the Gulfstream together with the presence of a broad-shallow continental shelf around Florida and the absence of any major rivers have provided conditions for the development of extensive coral reefs (Andrews et al., 2008; Jaap and Hallock, 1990b). Coral communities are among the Earth's most complex and productive natural systems. The Florida Reef Tract of the Florida Keys is the only living coral reef system in the continental United States. It lies at the northern edge of the geographic range of coral systems. It extends southeast from Cape Florida, forming an arc paralleling the Keys for 220 miles from Soldier Key to the Dry Tortugas. Coral communities are found from almost intertidally to 8 miles offshore, in depths ranging from less than 3 feet to depths of 135 feet (CSA, 1991). Oceanward of the reef tract, the Florida Current provides a constant source of warm, tropical waters allowing coral development. The Florida Reef Tract reaches optimum development in the deeper waters, oceanward of Hawk's Channel and landward of the Straits of Florida (Jaap and Hallock, 1990b).

The structural framework of coral communities is composed of colonies of tiny organisms collectively called coral. The hard corals most prevalent in reef formation include boulder coral (*Montastrea annularis*), large-cupped boulder coral (*Montastrea cavernosa*), brain coral (*Diploria* spp.) and round starlet coral (*Siderastrea siderea*) (Japp, 1984). Elkhorn coral (*Acropora palmata*) and staghorn coral (*Acropora cervicornis*) were formerly dominant members of reef communities but their numbers have been reduced due to a variety of factors [see Section 3.13.5 (Corals)]. The tiny organisms making up these colonies extract calcium carbonate from seawater to secrete calcareous chambers within which they live (the hard coral skeleton).

The pattern of reef development in the Keys approaches the "barrier reef" model. The most oceanward component of this barrier complex is an outer reef system that develops at the crest of the escarpment at the outer edge of the shallow continental shelf that occurs along the Atlantic edge of the Keys. Because of the linear regularity of this geomorphological feature, outer reefs tend to be linear systems that parallel the Keys. Landward of the outer reef a shallow lagoon is present and the coral system is characterized by an irregular distribution of "patch reefs," which have various shapes and sizes.

In the Keys, the linear pattern of reef development is more broken than is typical of reef development in more southerly waters. It is actually composed of a narrow band of disjunctive reefs with many horizontal gaps or breaks in the reefs (U.S. Department of Commerce, 1995). This generally reflects the discontinuities in the chain of islands comprising the Keys, corresponding with the creeks, cuts, or passes between the islands.

The islands comprising the Upper Keys constitute a fairly continuous barrier to the exchange of water between Florida Bay and the Atlantic Ocean. Consequently, the Florida Current's thermally moderating influence is more constant than in the Middle or Lower Keys, where the archipelago is fragmented and there is greater tidal exchange between Florida Bay/Gulf of Mexico and the Atlantic Ocean. This exchange allows more pronounced differences in seasonal temperatures and generates more turbid water. Consequently, the Middle and Lower Keys reefs tend to be characterized more by isolated patches or marginal reefs rather than bank/barrier reefs. In the Lower Keys, the best developed communities occur in the southern "shadows" of the major Lower Keys islands where environmental conditions are more constant (e.g., the Sambo Reefs south of Big Coppitt and Geiger keys, and Looe Key Reef south of Big Pine Key).

3.8.3.1 Biota of Coral Communities

Coral communities can be divided into four types based upon physical habitats and community structure patterns: bank reef, transitional reef, patch reef, and hardbottom (also referred to as livebottom) (Jaap, 1984). Differences in the types of reef are reflected in the differing environments of their dominant coral species. The patch reefs of the lagoon area and the Lower Keys inhabit shallow water that is more strongly influenced by wave action that can increase turbidity, and by weather changes that can result in a range of thermal variation that is not present in the deeper waters of the outer reef. As a result, massive boulder-shaped corals whose morphology is better able to withstand high wave energy and turbidity dominate the reef system. By comparison, the corals along the outer reef do not experience such stressful conditions. In deeper waters, thermal conditions are stabilized by the influence of warm Florida Current waters, and sediments that could contribute to turbidity are instead transported into the ocean's depths by sand channels. As a result, in part, many corals with branched and plated morphologies characterize the outer reef.

3.8.3.1.1 Bank Reefs

Bank reefs are located parallel to the coast at or near the shallow continental shelf break. The elongated reefs form a discontinuous belt that is best developed oceanward of Key Largo and the Lower Keys, where the size of the major islands protect the reefs from the detrimental influence of Florida Bay waters (Jaap and Hallock 1990b). This community receives the most beneficial nutrients, displays the most diverse associations, and exhibits the most highly developed super-structure (U.S. Department of Commerce, 1995). Many of the massive, reef-building corals in the reef banks do not occur in the other coral community types. Kissling (1977) identified over 350 macrobenthic species, including 42 species of stony corals, 41 species of soft corals, and 21 species of brittle stars on nine outer reefs off the Lower Keys. Somerfield et al. (2008) found a high degree of variability among reef types over time (shallow offshore, deep offshore, patch) and reef location (Lower, Middle, Upper Keys). Over the time of the study (1996-2003), some sites were affected by particular events (e.g., hurricanes, high and low water temperatures). The changes in

composition were small in comparison to differences between different reefs. In other words, each reef type and location was relatively unique.

Representative biota of the outer reefs includes mustard hill coral (*Porites astreoides*), lettuce coral (*Agaricia agaricites*), massive starlet coral (*Siderastrea siderea*), elkhorn coral (*Acropora palmata*), staghorn coral (*A. cervicornis*), pillar coral (*Dendrogyra cylindrus*), various brain corals (*Diploria* spp.), the *Alcyonarians* or soft corals such as sea rods (*Plexaura* spp. and *Eunicea* spp.), sea fans (*Gorgonia ventalina*), and sea whips (*Pterogorgia* spp.), the hydrozoans (*Millepora complanata* and *M. alcicornis*), the green algae (*Halimeda* spp.), the brittle stars (*Ophiothrix orstedii* and *Ophocnida* spp.), and various coralline algae.

3.8.3.1.2 Transitional Reefs

Between bank reefs and patch reefs there is frequently a coral community with fauna found in both communities, referred to as the transitional reef. Under more favorable conditions (higher sea level), the transitional reef may in time develop into the more diverse reef bank (Florida DNR, 1991a). It also occurs on artificial substrates, such as sunken ships or other debris used to construct artificial reefs (Jaap, 1984).

3.8.3.1.3 Patch Reefs

There are over 6,000 patch reefs between Miami and the Marquesas Keys (U.S. Department of Commerce, 1995), with over 80 percent between northern Elliott Key and southern Key Largo. Most occur in areas of sand, mud or rock substrate located in a band 2 to 4 miles from the islands between Hawk Channel and the outer reefs (Marszalek et al., 1977). Colonization occurs where light, water temperature, and nutrient conditions are favorable and where patch reef organisms are protected from the excessive sediments, temperature and salinity fluctuations of water circulating from Florida Bay and the Gulf of Mexico. Patch reef development in nearshore waters (landward of Hawk's Channel) is known to occur in only a few locations in the Keys (Florida DNR, 1991a).

There are two basic types of patch reefs (Marszalek et al., 1977; Japp, 1982). Dome patch reefs usually occur in clusters in water depths of less than 30 feet and vary in size from several square feet to more than 2,300 square feet (Schomer and Drew, 1982). They are typically circular or elliptical and are surrounded by a halo of barren substrate. Prior to a massive die-off in 1983, the long-spined urchin (*Diadema antillarum*) was a common inhabitant of these reefs. It is an effective grazer and keeps algae away from the reefs, producing the halo around certain patch reefs (U.S. Department of Commerce, 1995). The community's biota varies greatly depending on reef age and environmental condition (Jaap, 1982), but typically consists of scleractinian and alcyonarian corals, other coelenterates, mostly erect sponges, echinoderms, crustaceans, molluscs, red and green algae, and a variety of fishes. Species diversity and density generally increase in proportion to the size of the patch reef (U.S. Department of Commerce, 1995).

Jones (1977) described a successional sequence for dome patch reefs in which the pioneer corals are likely to be *Porites* spp., *Manicinia areolata*, and *Favia fragum*. These forms are

replaced by primary reef-building corals like Starlet Coral (*Siderastrea siderea*), Brain Coral (*Diploria labyrinthiformis* and *D. strigosa*), Star Coral (*Montastrea annularis* and *M. cavernosa*), Finger Coral (*Porites furcata*), and Boulder Brain Coral (*Colpophyllia natans*).

The coral assemblage of linear patch reefs is similar to that of dome patch reefs, but where present, elkhorn coral joins star coral as a principal reefbuilder. Linear patch reef usually occur oceanward of dome patch corals and lie roughly in a chain parallel to the outer reefs. Both types of reefs commonly have the algae *Gonialithon* sp. and *Halimeda opuntia*, numerous erect sponges, bivalves of the genera *Acra*, *Lithophaga,* and *Barbatia*; the gastropods *Strombus gigas* and *Corallophils abbreviata*, spiny lobster (*Panulirus argus*), stone crab (*Menippe mercenaria*) the echinoids *Diadema antillarium* (when present) and *Echinometra lucunter*, numerous ostracods, bryozoans, foramnifera, and fishes (Enos, 1977; Multer, 1977; Jaap, 1982; U.S. Department of Commerce, 1995).

3.8.3.1.4 Hardbottom

Hardbottom communities occur on large portions of the Atlantic sea floor and smaller portions of the lagoon bottom, extending from less than 3 feet deep to depths greater than 100 feet. The main criterion is solid substrate upon which members of the epibiotic community can attach. Substrate can consists of reef limestones to rocky outcrops on the sea floor to artificial reefs, seawalls, buoys, bridge piling, and boat bottoms (Jaap and Hallock, 1990b). Marine grassbeds, sand, and mud bars are usually intermixed with the hardbottom, occupying shallow depressions in the limestone. Distribution of macrofauna is generally scattered in random patterns and is never as compact or diverse as are seagrass beds or coral reefs (Jaap and Hallock, 1990b).

This habitat does not actively accrete or build massive coral reef structures but does support a diverse sessile and motile biota and provides important nursery and foraging habitat for a variety of recreationally and commercially important species, including spiny lobster, snappers, and grouper (Jaap and Hallock 1990b; U.S. Department of Commerce, 1995).

Hardbottom habitat supports a diverse invertebrate and vertebrate fauna, dominated by algae and invertebrate species such as soft corals, sponges, and small stony corals. The soft corals are visually dominant. The most common species are the sea whip (*Pterogorgia* spp.), sea fan (*Gorgonia ventalina*), sea rod (*Plexaura* spp.), and sea plume (*Pseudopterogorgia* spp.) (U.S. Department of Commerce, 1995; Jaap and Hallock, 1990b). Stony corals found in the hardbottom community include clubbed finger coral (*Porites falcata*), mustard hill coral (*P. asteroides*), starlet coral (*Siderastrea radians*), rose coral (*Manicina areolata*), lobed star coral (*Solenastrea hyades*), and smooth star coral (*S. bournoni*). Sponges are dominant in some areas of the lagoon, with the most prevalent species including the chicken liver sponge (*Chondrilla nucula*), vase sponge (*Ircinia campana*), cake sponge (*I. etherea*), stinker sponge (*I. felix*), little blue heavenly sponge (*Dysidea etherea*), large loggerhead sponge (*Spheciospongia vesparia*), and tube sponge (*Aplysina cauliformis* and *Callispongia* spp). Algal species are well represented by the

calcareous greens, *Acetabularia*, *Batophora*, *Halimeda*, and *Udotea* spp. (U.S. Department of Commerce, 1995).

3.8.3.1.5 Macrofauna of Coral Communities

Coral reef systems provide protection and shelter for colorful and diverse macrofauna, including small shrimp, crabs, fish and several species of lobsters. Many species, especially the larger predators, are important species for local fisheries. Hardbottom communities are valuable nursery areas for many invertebrates and fishes of both the patch reef and seagrass communities, providing microhabitats for many juvenile fishes [See Section 3.14.1.4 (Fish Species Common to Coral Communities)].

3.8.3.2 Existing Commercial, Recreational, or Conservation Uses of Coral Communities

Recreational boating, snorkeling, SCUBA diving, and fishing are the primary activities which occur in the coral communities of the Florida Keys. As previously noted, the FKNMS encompasses all of the submerged lands and waters of the Florida Keys extending from the mean high water mark to the offshore FKNMS boundary. This lies at the approximate 300-foot depth contour line (Public Law 101-965). Excluded areas include Everglades National Park, Biscayne National Park, and Fort Jefferson National Monument. All coral communities within these designated FKNMS boundaries are protected and subject to management through the FKNMS Management Plan and the FKNMS Water Quality Protection Program [see Section 3.5.4.2 (FKNMS Water Quality Protection Program)]. Marine resources presently under State management on State-owned lands are also be subject to these future management programs through memoranda of agreement between NOAA, USEPA, FDEP, SFWMD and the County. Management of State sovereignty submerged lands has been retained by the State of Florida (within the boundaries of the FKNMS):

- John Pennekamp Coral Reef State Park;
- Lignumvitae Key State Aquatic Preserve;
- Biscayne Bay-Card Sound Aquatic Preserve;
- Coupon Bight State Aquatic Preserve;
- Great White Heron National Wildlife Refuge;
- Key West National Wildlife Refuge;
- Looe Key National Marine Sanctuary; and
- Key Largo National Marine Sanctuary.

3.8.3.3 Known Pollution Problems and/or Issues Related to Coral Communities

Coral reefs in Florida exist at their environmental extremes due to their high latitude and proximity to the continent. Numerous studies have documented or suggested the threats which currently exist to coral communities in the Florida Keys from natural and man-made causes (Precht and Robbart, 2006; Andrews et. al., 2008; Somerfield et al., 2008). While

there is a consensus that the reefs are declining, there is considerable disagreement among researchers, regulators, and resource managers as to the causes of this decline. In addition, there is no consensus on how coral reef protection can be accomplished (Precht and Robbart, 2006; Somerfield et al., 2008).

The Florida Keys are susceptible to multiple natural disturbances such as hurricanes, El Nino southern oscillation (ENSO) events, winter cold fronts, bleaching episodes, and algal blooms. Hurricanes contributed to declines in coral cover on many Caribbean reefs in the 1980s, but other stressors now appear to be more important in driving overall declines in coral cover in the region. A number of environmental effects have been attributed to the decline of coral reefs in the Florida Keys. Increased rainfall from hurricanes and ENSO events leads to more runoff, potentially moving nutrients, toxic substances, microbes, and metals from terrestrial and freshwater systems into the marine system. Regional-scale agricultural runoff from the Everglades and sewage discharges from the Florida Keys are nitrogen sources supporting eutrophication and algal blooms in coral reef communities in the Lower Florida Keys. Increases in nutrients can affect reefs by increasing the growth of benthic algae, which can grow over the reefs, decrease water transparency by promoting plankton blooms, and increase competition from other benthic plants and animals. Environmental changes can cause physiological stresses that can lead to coral diseases (reviewed in Somerfield et al., 2008). Whatever the underlying cause(s), coral diseases contributed to declines of *Acropora* spp. throughout the Caribbean and western Atlantic, resulting in the listing of *A. cervicornis* and *A. palmata* as threatened species on the Endangered Species List in May 2006 [see Section 3.13.5 (Corals)]. Somerfield et al. (2008) believe that the lack of recovery seen among offshore reefs implies that they are already suffering from some underlying stress.

Non-native (exotic) fishes have been increasingly documented in Florida coral reef environments. These species have the potential to disrupt natural coral reef communities due to increased predation of natural species, increased competition for available space, and potential introduction of diseases. More than 18 species of non-native marine fish have been documented from Miami-Dade, Broward, and Palm Beach counties in Southeast Florida (REEF database, 2006). Lionfish (*Pterois volitans* and *P. miles*) have become established in the Florida Keys since about 2009. These venomous fish have voracious feeding habits, unique reproduction, and few predators. Sightings and removal efforts are being tracked through the REEF Volunteer Fish Survey Project in partnership with federal and State agencies.

There is currently no oil or gas drilling occurring in State waters. The Florida Keys National Marine Sanctuary Act prohibits oil and gas exploration in the FKNMS. Florida law prohibits future leasing or drilling of the seabed within the State's Territorial Sea for purposes of oil and gas exploration and development. Holders of any offshore drilling leases that were granted by the State prior to the enactment of the current law must obtain permits under State environmental laws and regulations prior to conducting any drilling activities. No leases exist in Florida areas where coral reef tracts are located (Donahue et al., 2008). However, proposals for offshore drilling in State waters, outside the FKNMS, are

often evaluated by the State and federal government and the potential for future drilling and oil spills exists.

Through the FKNMS Water Quality Protection Plan monitoring program, it is now well known that coral reefs are highly variable, and are subject to frequent biological and physical disturbances. However, the temporal and spatial scales of the disturbances are often large and difficult to study (Somerfield et al., 2008). The Atlantic and Gulf Rapid Reef Assessment (AGRRA) program is another region-wide monitoring program, which monitors a group of smaller-scale studies (including coral cover). This study showed that significant bleaching and disease-induced mortality associated with the 1998 ENSO event were most apparent in the western Caribbean and Bahamas subregions (Kramer, 2003). The analysis did not include data from Florida, but it seems likely that the event impacted the Florida Keys in a similar way.

The Florida Fish and Wildlife Research Institute collects annual data on the status of coral habitats in the Florida reef tract through the Coral Reef Evaluation and Monitoring Project (CREMP). In 1996, data collection began at 40 sites in the Florida Keys. The project was expanded in 1999 to include three sites in the Dry Tortugas. In 2003, ten additional sites were selected at reefs along Florida's southeast coast and have been monitored annually under the Southeast Florida CREMP (SECREMP) project.

CREMP sites encompass four reef habitat categories: hardbottom, patch reef, and offshore deep and shallow reefs. The number of stony coral species declined across all habitat types between 1996 and 1999. Between 2005 and 2006, the data show a greater decline in the number of species at deep offshore and hardbottom sites than at shallow offshore or patch reef sties in the FKNMS. Some of the smaller or less common species have declined in distribution. The percent cover of stony corals in the FKNMS declined between 1996 and 1999, but was relatively stable from 1999 to 2005. Additionally, between 2005 and 2006, there was a consistent loss of stony coral cover in all regions and habitats sampled in the FKNMS, with the deep offshore reefs showing the greatest decline. This observed decline is likely attributable to loss of cover of the boulder star coral, *Montastraea annularis*. This framework builder has been the dominant species in terms of percent cover and occurrence throughout the sites sampled in the Florida Keys reef system, and has been in decline throughout the duration of the CREMP monitoring project. The combination of hurricanes and severe bleaching in 2004/2005 is likely primarily responsible for the observed decrease in stony coral species richness and percent cover at the CREMP monitoring sites in 2006. However, the offshore deep sites, which might be expected to be buffered by the effects of hurricanes and bleaching, showed the greatest loss between 2004 and 2006. Since 2002, disease has generally decreased within the CREMP stations within the FKNMS (Donahue et al., 2008).

Coral reefs have always experienced acute (and sometimes catastrophic) events such as anomalous bleaching and hurricanes. Between these events, healthy reefs begin to recover, albeit slowly. However, since monitoring began, the CREMP has not documented significant increases in coral cover at any of the study sites. This lack of recovery could be attributed to chronic environmental changes, from cumulative effects of hurricanes, severe

bleaching, and disease outbreaks, or a synergy of both chronic and acute impacts. Distance from human habitation has been considered a buffer from the affects of man-made impacts; however, globally there are many examples of reefs that are remote from civilization that are similarly in decline (Donahue et al., 2008; Miller and Szmant, 2008). Sea level rise increases water depths and threatens coral reefs.

3.8.3.4 Potential for Conservation, Use, or Protection of Coral Communities

Monitoring of Florida Keys reefs began in the late 1970s in Biscayne and Dry Tortugas National Parks through the 1980s. Three large ship groundings in 1989 was the major impetus for the creation of the FKNMS. The FKNMS Water Quality Protection Plan monitoring program was established to evaluate the status and trends of the coral communities throughout the FKNMS. It was finalized following technical meetings in 1994.

Through these and other monitoring programs, it has been learned that a large amount of coral cover has been lost in the Florida Keys. Monitoring programs have shown an overall decline in hard coral cover of 44 percent at quantitatively surveyed stations. Proportionally, the major framework building corals seem to have been most affected (73 percent loss for *Acropora palmata*, and 37 percent loss for *Montastraea annularis*) (Andrews et al., 2008; Donahue et al., 2008). Many of the causes of local coral decline originate beyond the jurisdiction of the County. For example, algal blooms in the Florida Keys are influenced by nutrients and water flows from the Everglades and southwest Florida. Also, warming ocean temperatures associated with global climate change are a major factor in coral bleaching. Implementing solutions that will preserve the Florida Keys coral reef system will require action on local, regional, and global scales.

3.9 **Wetlands** [Rule 9J-5.013(1)(a)1. and (b), F.A.C.]

The biological communities of the Florida Keys include five wetland types which provide important storm protection, water quality protection, and wildlife habitat functions. These wetland communities include:

- mangrove forests along the shorelines of the Keys;
- transitional wetlands (salt marsh and buttonwood wetlands) lying landward of the mangrove fringe and oceanward of upland communities;
- salt ponds occupying shallow enclosed basins having very restricted tidal influence;
- beaches[5]; and
- freshwater wetlands and freshwater ponds in areas of freshwater lenses in the Lower Keys.

[5] Beaches are not considered to be traditional wetlands under State and federal definitions since they are located in the high wave energy zone; thus, they do not have wetland soil features nor are they vegetated (although mud flats would meet State and federal definitions of wetlands). However, beaches (as part of the beach/berm community) are protected by the Comprehensive Plan and the LDRs and by State and federal regulations when they are below the mean high water line. Thus, beaches are mentioned in this section. Beaches are more fully described in Section 3.10 (Beach/Berm Communities).

"Disturbed wetlands" occur throughout the Keys. In the Keys, disturbed wetlands are generally wetlands which were originally characterized as one of the other five wetland categories.

The methods used to inventory wetland habitats are described in Section 3.8 (Living Marine Resources). **Map Series 3.3** depicts the wetlands within the Upper, Middle, and Lower Keys and selected offshore islands, which are characterized by mangrove forests, salt marsh, buttonwood wetlands, salt ponds, and freshwater wetlands (disturbed wetlands are not mapped).

3.9.1 Wetlands Permitting and Wetlands Protection Planning in Monroe County

Wetlands in the Florida Keys are regulated by federal and State agencies, and by the County Comprehensive Plan and the LDRs. A permit is required for certain activities within wetlands, as defined by these agencies. The primary federal jurisdiction for the USACE over wetlands is derived from Section 404 of the Clean Water Act, 33 U.S.C. 1344, 1972, as amended in 1977, 1981, and 1987, with the Water Quality Act. Other programs are Section 10 the Rivers and Harbors Acts of 1899, which regulates construction, excavation, or fill in navigable waters; the National Environmental Policy Act of 1969; and the Endangered Species Act (ESA) of 1973. The federal regulations are contained in 33 CFR 320-330 and have evolved over time to reflect added authorities and developing case law. The Clean Water Act Section 404(b)(1) Guidelines (40 CFR, Part 230), USACE Regulations (33 CFR Part 332), and associated guidance require that project effects to waters of the United States, including wetlands, be addressed through a sequence of avoidance, minimization and then compensation for unavoidable impacts. In 2008, the USACE Rules 33 CFR Parts 325 and 332 and USEPA Rules 40 CFR Part 230 were finalized accounting for "Compensatory Mitigation for Losses of Aquatic Resources." This sequence is also followed by State agencies prior to permit issuance [Rule 40E-4.091 (1)(a) F.A.C. (Basis of Review)]. Under the Marine Protection, Research, and Sanctuaries Act, a permit is required for the transportation of dredged material that is to be deposited in the ocean. Disposal sites are selected with criteria developed by USEPA and the USACE.

Both FDEP and SFWMD have permitting authority over impacts to wetlands under State law. A memorandum of agreement between the two agencies divides the types of projects applying for permits between the two agencies. Most relevant to private-sector development, all residential projects in excess of four units and all commercial projects receive permits from the SFWMD, and smaller residential projects receive permits from FDEP. Transportation projects (road and air) also fall under SFWMD permitting authority, whereas FDEP permits projects limited to beach and shoreline impacts with no associated upland residential or commercial development.

SFWMD also regulates the management and storage of surface waters, including dredging or filling in wetlands, by requiring Environmental Resource Permits (ERP). Any proposed surface water management system involving a project site 100 acres or more in size or

with more than 1 acre of wetland impacts would require an Individual Permit. In most cases, project sites less than 100 acres in size with less than 1 acre of wetland impacts qualify for a Standard General, Noticed General, or No Notice General Permit.

FDEP also oversees activities in wetlands that are:

- located on Florida's natural sandy beaches facing the Atlantic Ocean, the Gulf of Mexico, the Straits of Florida or associated inlets;
- activities that extend seaward of the mean high water (MHW) line (the SFWMD oversees activities landward of the MHW);
- activities that extend into sovereign submerged lands; and
- activities that are likely to affect the distribution of sand along a beach.

FDEP also regulates activities including beach restoration or nourishment; construction of erosion control structures such as groins and breakwaters; public fishing piers; maintenance of inlets and inlet-related structures; and dredging of navigation channels that include disposal of dredged material onto the beach or in the nearshore area.

Prior to the permitting process, a wetland Jurisdictional Determination (JD) is required. Wetland boundaries are determined by:

- The USACE *Interim Regional Supplement to the 1987 Wetland Delineation Manual: Atlantic and Coastal Plain Region* (*Federal Manual*); and
- Chapter 62-340 F.A.C., "Delineation of the Landward Extent of Wetlands and Surface Waters".

The *Federal Manual* is the current accepted methodology developed jointly by the USACE, the USEPA, USFWS, and the USDA NRCS. Wetland boundaries are verified by the regulatory agencies and then the boundaries are usually instrument surveyed. The permit application is a joint application to the State agencies (SFWMD and FDEP) and the USACE. The State ERP authorizes all activities permitted by SFWMD and FDEP; the USACE would issue its own permit.

In general, wetlands in the County are protected by the LDRs and by the Comprehensive Plan policies as "environmentally sensitive lands." However, this term is not defined in the LDRs or in the Comprehensive Plan. For example, Section 114-3 (Surface Water Management Criteria) of the LDRs establishes procedures to assist in the protection of the water resources, including the reservoir of freshwater on Big Pine Key and the nearshore waters. These include existing and proposed water management systems. Stormwater management systems are coordinated with SFWMD and FDEP. Another example is contained in Section 118-4 (Wetland Open Space Requirements) which states that no development activities, with some exceptions, are permitted in mangroves, freshwater wetlands and in undisturbed saltmarsh and buttonwood wetlands. The open space requirement in these habitats is 100 percent (no clearing is allowed). Undisturbed freshwater wetlands, salt marsh and/or buttonwood association wetlands are considered

to be habitats with the highest sensitivity and development under the LDRs requires clustering in areas with lowest sensitivity [Section 118-7 (General Environmental Design Criteria)]. Sec. 118-10 (Environmental Design for Specific Habitat Types) specifies design criteria for mangroves, wetlands, and submerged lands.

In practice, all proposed developments are required to obtain State and federal permits for activities that would alter jurisdictional wetlands. The State of Florida mandates that all State agencies and local governments use the Uniform Mitigation and Assessment Method (UMAM) for evaluation of all wetland impacts and mitigation measures (Section 373.414(18), F.S. and Chapter 62-345, F.A.C). Wetlands are evaluated for existing conditions and mitigation requirements are determined for the proposed impacts by using UMAM. In the Florida Keys, a specific wetlands evaluation procedure was developed called the Keys Wetland Evaluation Procedure (KEYWEP). It was developed as part of the Advanced Identification of Wetlands [see Section 3.9.2 (Monroe County Advance Identification of Wetlands (ADID) Program)]. The LDRs mandate the use of KEYWEP only for lands classified as disturbed with salt marsh and buttonwood association [Section 118-10 (Environmental Design For Specific Habitat Types)]. Because disturbed salt marsh and buttonwood wetlands are the only land use that is developable under current LDRs, this is the only situation where KEYWEP is mandated for use in the Florida Keys. However, certain salt marsh and buttonwood wetlands that are determined by KEYWEP to have moderate or low functional capacity (KEYWEP index of 7.0 or less) are "suitable for filling with appropriate mitigation," if also authorized by FDEP and USACE permits. KEYWEP should continue to be used to determine if a proposed wetland impact is permittable. If a proposed impact is permittable, mitigation would be determined in accordance with UMAM. Prior to the mandated use of UMAM in Florida, KEYWEP (under the federal ADID program) was used by the USACE but only for those projects that proposed to use the Keys Environmental Restoration Fund (KERF) as mitigation for mangrove, saltmarsh, and buttonwood wetland impacts and for seagrass impacts. Currently, KERF is a USACE "in-lieu fee" program within the County and all functional losses and mitigation requirements will be determined by using UMAM; KEYWEP will no longer be used to determine mitigation requirements.

KERF is a program of National Audubon Society, Inc. of Florida. The primary activity of KERF is restoring and enhancing wetland and upland habitats on public lands throughout the Florida Keys. It also conducts management activities that are aimed toward producing and enabling direct habitat restoration and enhancement results. Presently, the USACE and FDEP allow payment into the fund in lieu of creating and implementing an individual mitigation plan. Currently, the SFWMD is reviewing the KERF program and how it will be incorporated into its ERP program.

Wetlands are also protected under the Comprehensive Plan and the LDRs by setbacks and buffers adjacent to existing or proposed development. In general, setbacks are determined by State and federal permits. Under the LDRs, the buffer between a wetland and the proposed development is generally 50 feet with some exceptions that allow a buffer of 25 feet [(Section 118-10(4)(g)]. The point from which the setback is applied is not specified in the LDRs.

The Comprehensive Plan and the LDRs should be revised to:

- Provide a definition of wetlands that is consistent with the State definition and/or federal definition and provide a definition of wetland boundaries to be the same as those established through wetland jurisdictional determinations;
- Specify setbacks from the jurisdictional wetland boundary line established during the wetland delineation process; and
- Reflect a review and evaluation of the Keys Wetland Evaluation Procedure (KEYWEP), which is used to determine mitigation requirements. The KEYWEP evaluation method, while highly useful to evaluate wetlands in the Keys, is not used elsewhere in Florida.

The County should determine when and how KERF should be used for wetland mitigation. The Comprehensive Plan and the LDRs should be revised to reflect this policy. The County should provide a definition of "environmentally sensitive land" so that wetlands can be adequately included in the ROGO/NROGO and Tier Overlay Ordinance.

3.9.2 Monroe County Advance Identification of Wetlands (ADID) Program

The Florida Keys Advance Identification of Wetlands (ADID) Program was a joint effort of the USEPA, USACE, and the County. The ADID program was designed to facilitate the permitting process under Section 404 of the Clean Water Act of 1973 by providing comprehensive wetlands mapping and assessment information. The scope of the ADID Program included the entire Florida Keys, prioritized as follows:

- Privately-owned lands with development potential on the islands connected by U.S. 1;
- Publicly-owned lands on the islands connected by U.S. 1; and
- Offshore islands.

The Florida Keys ADID project included mapping of marine and freshwater wetlands throughout the Keys. Wetlands were mapped at the seasonal high water line, although this boundary was based on the interpretation of aerial photographs. A field-based wetland functional assessment methodology specific to the Florida Keys was developed (KEYWEP). The KEYWEP methodology is presented in "Technical Summary Document for the Advance Identification of Wetlands of the Florida Keys" (Kalla, 2000). The ADID project mapped approximately 65,000 acres of marine and freshwater wetlands and conducted a functional evaluation of these wetlands. The evaluation separated those wetlands that were "generally unsuitable" for the placement of fill and those wetlands that were "generally suitable with appropriate mitigation" for the placement of fill (Kalla, 2000). The ADID maps produced are available in the County Office of Planning and Environmental Resources.

As described in Section 3.8 (Living Marine Resources), the map series produced for the ADID program were produced on hand-drawn maps that were then digitized. The analysis of the data for the inventory of natual habitats for this Technical Document revealed that

the ADID data did not correspond to the other databases (i.e., the maps did not line up exactly). The ADID data can be useful for an individual parcel to determine if it contains a wetland with a KEYWEP score but, because of the mapping limitations, the ADID data could not be used on a County-wide basis. The County should reconcile the ADID mapping with parcel-based mapping so that this information can be captured for land use analyses.

3.9.3 Mangrove Communities

Mangrove wetland communities are addressed above in Section 3.8.1 (Mangroves). Included are discussions of the following:

- Flora of mangrove communities;
- Existing commercial, recreational and conservation uses of mangrove communities;
- Known pollution problems and/or issues related to mangrove communities; and
- Potential for conservation, use, or protection of mangrove communities.

3.9.4 Salt Marsh and Buttonwood Wetlands

Saltmarsh and buttonwood wetlands are tidally influenced transitional wetlands which lie landward of the mangrove fringe and seaward of the upland community. Two basic wetland communities occur in the transition zone in the Florida Keys. Salt marshes are the lower transitional wetlands. They exist at the interface of land and marine waters, wherever wave energy is sufficiently low to allow their development and where mangrove trees are not dense enough to shade out the characteristic vegetation (Montague and Wiegert, 2001). Buttonwood (*Conocarpus erectus*) associations are generally higher transitional wetlands, occurring between the salt marshes and the high upland habitats.

The type of transitional association that develops in the Keys is a function of tide and topography. In the Lower Keys, where the slope of the intertidal zone is very slight, the broadest expanse of transitional zones occurs. On Sugarloaf, Cudjoe, Big Torch, Little Torch, and on a number of other keys, transitional zones occupy areas hundreds of feet in width. On these keys, much of the eroded oolitic caprock is exposed, creating a karst-like substrate with disjunct, shallow depressions containing marl soils. Most of these areas are wetted only by the highest normal tides and by storm tides. By comparison, in the Middle and Upper Keys, there is a relatively steep slope to the high ground. In these areas the transitional zone is quite narrow, with hammock often found within a short horizontal distance from the high water mark.

Table 3.7 shows the inventory of salt marsh wetlands within the County with a total of 2,552.7 acres. Most are located in the Lower Keys (94 percent) and 18 percent are privately owned. **Table 3.8** shows the inventory of buttonwood wetlands with at total of 3,323.1 acres within the County and like salt marshes, most (72.5 percent) are located in the Lower Keys. Of that total, 21.7 percent are privately owned.

3.9.4.1 Flora of Salt Marsh and Buttonwood Wetlands

3.9.4.1.1 Flora of Undisturbed Salt Marsh and Buttonwood Wetlands

Several environmental factors control species distribution in transitional wetlands. These are functions of elevation and tidal influence and are linearly related to distance from mean high water. They include duration of tidal submergence; duration of exposure; and frequency of submergence. Because of the low tidal amplitude (3 feet) in the Keys, the inundation of the transition zone may be affected by several other factors, including wind direction and velocity, shoreline exposure, slope, elevation and microrelief. As a result, the position of an individual plant population within the transitional zone reflects an adaptive response to a complex set of environmental gradients.

The transitional habitats of the Keys contain species representative of both the adjacent mangrove and upland communities. In the most seaward subzone of transitional areas scrub mangrove communities typically occur. These are dominated by small red and black mangroves with an understory of Glasswort (*Salicornia bigelovii*), salt grass (*Distichilis spicata*), and key grass (*Monanthochloe littoralis*). Moving upland, there is a change to a more diverse plant community with fewer mangroves. Depending on drainage and soil conditions, this association can be either buttonwood or salt marsh.

Salt marshes are dominated by salt-tolerant herbs, shrubs, and grasses. Some salt marshes are mixtures of fleshy halophytes, including glasswort (*Salicornia bigelovii*), purslane (*Sesuvium portulacastrum*), and saltwort (*Batis maritima*). Other marshes are dominated by grasses, including salt grass, key grass, and dropseed, and occasional marsh fimbry (*Fimbristylis spadicea*), sea daisy, saltwort, buttonwood and small mangroves. These grasses and herbs occur as small, disjunct populations forming a mosaic. In some cases, a single population will occupy an area of about a half acre, whereas in others, the same species might be represented by only a few individuals. This distributional variability probably reflects the area's microrelief, which determines drainage and soil salinity.

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Table 3.7 - Inventory of Salt Marsh Wetlands

Site Name [1]	Total[3]	Ownership[4]							
		Federal	State	County	Non Profit	Cities	Utilities	Private	Species Recorded[5]
Lower Keys									
Bahia Honda State Park			18.4						KD, MR
Florida Keys Wildlife and Environmental Area[2]			280.8	0.1				1.2	KD, MR, SR
Great White Heron National Wildlife Refuge		360.7	20.9	1.5				5.0	KD, MR, SR
John J. Pescatello Torchwood Hammock Preserve					37.2				KD, MR
Monroe County Managed Areas			1.9						KD, MR, SR
National Key Deer Refuge		759.8	32.9						KD, MR, SR
Naval Air Station		248.4							MR, SR
Saddle Bunch Keys					12.6				KD, MR, SR
Outside of Parks/Refuges		14.2	62.1	102.8	11.3			436.4	KD, MR, SR
Lower Keys Total	2,408.2	1,383.1	417.0	104.4	61.1	0	0	442.6	
Middle Keys									
Lignumvitae Key Botanical State Park			2.8						
Long Key State Park			13.7						
Outside of Parks/Refuges			1.4					21.0	
Middle Keys Total	38.9	0	17.9	0	0	0	0	21.0	
Upper Keys									
Crocodile Lake National Wildlife Refuge		0.6							
Cross Key					0.1				
Dagney Johnson Key Largo Hammock Botanical State Park			48.6						SS, IS, WR, CM

Table 3.7 - Inventory of Salt Marsh Wetlands (continued)

Site Name [1]	Total[3]	Ownership[4]							
		Federal	State	County	Non Profit	Cities	Utilities	Private	Species Recorded[5]
Everglades National Park[6]		4.5							
Florida Keys Wildlife and Environmental Area[2]			4.7						
John Pennecamp Coral Reef State Park			37.9					0.2	
Monroe County Managed Areas			0.2						
Tarpon Basin					0.9				
Outside of Parks/Refuges			4.1	0.9				2.9	
Upper Keys Total	105.6	5.1	95.5	0.9	1.0	0	0	3.1	
Total County	**2,552.7**	**1,388.2**	**530.4**	**105.3**	**62.1**	**0**	**0**	**466.7**	

Unincorporated areas only.

[1] Site names are from the FNAI GIS database.

[2] Florida Keys Wildlife and Environmental Areas are managed by the FFWCC for the preservation of listed species that inhabit mangroves, tropical hardwood hammocks, and salt marshes.

[3] Total in acres.

[4] Ownership information is from the Monroe County Property Appraiser.

[5] Species recorded are those threatened and endangered species recorded by the USFWS for a particular parcel; a blank cell does not necessarily indicate an absence of protected species on that parcel(s).
SS = Schaus Swallowtail Butterfly; TS = Tree Snail; IS = Eastern Indigo Snake; WR = Key Largo Woodrat; CM = Key Largo Cottonmouse; SR = Silver Rice Rat; KD = Key Deer; TC = Tree Cactus

[6] Portion of the Everglades National Park that extends into Florida Bay; acreage does not necessarily include Mainland habitats.

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Table 3.8 - Inventory of Buttonwood Wetlands

Site Name [1]	Total[3]	Ownership[4]							
		Federal	State	County	Non Profit	Cities	Utilities	Private	Species Recorded [5]
Lower Keys									
Bahia Honda State Park			30.9						KD, MR
Florida Keys Wildlife and Environmental Area[2]			323.2	0.8	0.1			8.4	KD, MR, SR
Great White Heron National Wildlife Refuge		6.4	14.3		0.1			12.3	KD, MR, SR
John J. Pescatello Torchwood Hammock Preserve					16.1				KD, MR
Monroe County Managed Areas			9.6						KD, MR, SR
National Key Deer Refuge		828.6	92.5					0.1	KD, MR, SR
Naval Air Station		272.6	0.1					0.1	MR, SR
Saddle Bunch Keys					0.5				KD, MR, SR
Outside of Parks/Refuges		7.2	34.9	136.8	27.9	1.0		586.3	KD, MR, SR
Lower Keys Total	2,410.8	1,114.8	505.5	137.6	44.7	1.0	0	607.2	
Middle Keys									
Lignumvitae Key Botanical State Park			17.0						
Long Key State Park			54.1					0.4	
Outside of Parks/Refuges			5.4	7.2				37.2	
Middle Keys Total	121.3	0	76.5	7.2	0	0	0	37.6	

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Table 3.8 - Inventory of Buttonwood Wetlands (continued)

Site Name [1]	Total[3]	Ownership[4]							
		Federal	State	County	Non Profit	Cities	Utilities	Private	Species Recorded[5]
Upper Keys									
Crocodile Lake National Wildlife Refuge		94.1	0.7	0.3					
Crocodile Lake Sanctuary		0.7			0.3				
Dagney Johnson Key Largo Hammock Botanical State Park		2.1	259.8						SS, TS, IS, CM, WR, TC
Florida Keys Wildlife and Environmental Area[2]			37.7					0.6	TS, IS, TC
John Pennecamp Coral Reef State Park			248.7					0.2	TS, IS, TC
Monroe County Managed Areas			4.0	0.1				0.2	TS, IS, TC
Naval Air Station		1.7							
Tarpon Basin					2.8				TS, TC
Outside of Parks/Refuges		3.0	40.0	18.6	0.1			78.3	TS, IS, TC
Upper Keys Total	794.0	101.6	590.9	19.0	3.2	0	0	79.3	
Total County	**3,326.1**	**1,216.4**	**1,172.9**	**163.8**	**47.9**	**1**	**0**	**724.1**	

Footnotes are the same as for Table 3.7.

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The buttonwood wetland is a transitional wetland that is usually more landward than the salt marsh and may intermix with more upland communities. Buttonwood becomes abundant and is generally associated with an understory of sea daisy, dropseed, sea oxeye (*Borrichia arborescens*), cordgrass, chestnut sedge, christmas berry (*Lycium carolinanum*) and other small shrubs, herbs and graminoids. The open aspect of the association, resulting from the branching habit of the buttonwoods, allows sunlight to reach the ground and generates abundant vegetation beneath the trees, where there is typically soil accumulation. The wild allamanda (*Urechites lutea*) and rubber vine (*Rhabdadenia biflora*) are also often found on buttonwoods

Moving upland, the transitional zone grades into tropical hardwood hammock. The landward extent of the tides is marked by the accumulation of litter on the forest floor and generally corresponds to the hammock boundary. Often, there are small areas of hammock species within the transitional zone vegetated by small, salt tolerant trees and shrubs.

3.9.4.1.2 Flora of Disturbed Salt Marsh and Buttonwood Wetlands

Vegetation of disturbed salt marsh and buttonwood communities may be either a remnant of what existed prior to the disturbance or what has colonized the site after the disturbance. Areas of disturbance which are wetted by spring or storm tides, but do not contain poorly drained saturated soils, are often vegetated by dense stands of small buttonwoods with an understory of sea daisy and salt tolerant grasses. Individual trees remain small relative to the stature of buttonwoods growing in undisturbed conditions. Disturbed areas which are only partially vegetated by buttonwood, but still contain open zones, are highly susceptible for colonization by invasive plants, such as Brazilian pepper (*Schinus terebinthefolius*) and Australian pine (*Casuarina equisetifolia*).

3.9.4.1.3 Fauna of Salt Marsh and Buttonwood Wetlands

The wildlife found in Salt Marsh and Buttonwood Wetlands are discussed in Section 3.12.1.2 (Wildlife Typically Inhabiting Salt Marsh and Buttonwood Wetland Communities).

3.9.4.2 Existing Commercial, Recreational, or Conservation Uses of Salt Marsh and Buttonwood Wetlands

No development activities are permitted in undisturbed saltmarsh and buttonwood wetlands; the open space requirement is 100 percent (no clearing is allowed). These habitats are considered one of the most sensitive habitats, and if present on a development site, clustering is required. Development is only allowed in lands classified as disturbed with salt marsh and buttonwood association [Section 118-10 (Environmental Design for Specific Habitat Types)]. Only those salt marsh and buttonwood wetlands that are determined by KEYWEP to have moderate or low functional capacity are suitable for filling with appropriate mitigation, but must also be authorized by FDEP and USACE permits.

Most of the undisturbed salt marsh and buttonwood wetlands are owned by State and federal agencies and presumably will not be disturbed. Conservation lands [see Section 3.18.3 (Conservation Lands)] in the Florida Keys which encompass large tracts of undisturbed salt marsh and buttonwood wetlands include:

- National Key Deer Refuge;
- John Pennekamp Coral Reef State Park;
- Lignumvitae Key Aquatic Preserve;
- Biscayne Bay Aquatic Preserve;
- Coupon Bight Aquatic Preserve;
- Florida Keys National Marine Sanctuary; and
- Everglades National Park.

3.9.4.3 Known Pollution Problems and/or Issues Related to Salt Marsh and Buttonwood Wetlands

Placement of fill for residential development, accessory structures, and accessways is the primary source of pollution in salt marsh and buttonwood wetlands in the Keys. Placement of fill disrupts the local natural drainage pattern, thereby affecting adjacent wetland areas outside of the immediate area of filling. Homeowners typically introduce non-native plant material in residential landscaping and, with time, expand the area of disturbance further into adjacent wetlands. OSTDS serving development sites in salt marsh and buttonwood wetlands are likely to function improperly due to soil wetness and flooding. Malfunctioning systems release nutrients and other contaminants into the substrate and the highly permeable underlying limestone. From there the contaminants move laterally in groundwater to adjacent wetlands and nearshore waters.

Other pollution problems and concerns related to salt marsh and buttonwood wetlands include:

- illegal dumping;
- damage from off-road vehicles;
- disruptive activities at the fringe of salt ponds caused by the proximity to developed land uses;
- altered hydrology due to mosquito ditches, canals, and roads; and
- sea level rise.

3.9.4.4 Potential for Conservation, Use, or Protection of Salt Marsh and Buttonwood Wetlands

The current Comprehensive Plan and the LDRs specify setbacks and the ROGO/NROGO provides restrictions on the development of undisturbed salt marsh and buttonwood wetlands. Off-road vehicle trespassing onto salt marsh and buttonwood wetlands could be reduced through improved posting of private lands and by stepped-up enforcement of

trespass laws and illegal use of public lands. Protection against illegal dumping could be improved by increased enforcement of existing dumping regulations.

3.9.5 Beaches

Beaches are addressed below in Section 3.10 (Beach/Berm Communities). Included are discussions of the following:

- beaches of the Florida Keys;
- flora of beach communities;
- existing commercial, recreational and conservation uses of beaches;
- known pollution problems and/or issues related to beaches;
- past trends in beach erosion and accretion;
- effects of coastal or shore protection structures on beaches;
- existing and potential beach renourishment areas; and
- potential for conservation, use or protection of beaches.

3.9.6 Salt Ponds

Salt ponds are remnants of former open water areas that have been cut off from tidal connection by storm-built berms or man-made structures. The result is a shallow impoundment, which receives saltwater during intense storm events and rainwater on a regular, seasonal basis. They range in size from less than one acre to tens of acres. The best known salt pond system is located along the southeastern shoreline of Key West landward of South Roosevelt Boulevard (State Route A1A). This series of ponds supported a salt production industry in Key West from 1830 through the 1860s. Other salt ponds are located on Boca Grande Key, Cudjoe Key, Little Torch Key, Fat Deer Key (Cocoplum Beach), Ohio Key, and Long Key. Salt ponds are tidal habitats but they are flushed only by the highest of tides, often just once a year in the fall. For much of the year they can become highly saline environments (Kalla, 2000). Seasonally variable water depths range from 2 feet to occasionally dry in the late spring. Salinity of pond waters can range from 5 parts per thousand during heavy rains to as high as 50-100 parts per thousand at the end of the dry season. Standing water can disappear from all or part of a pond during the dry season leaving salt deposits on the sediment surface (Kalla, 2000). Because of the typically small volume of water contained in these ponds, water temperatures approach those of the ambient air, ranging from 69.4 to 84.9 degrees F (monthly mean, Key West). In the smaller ponds, and in the large ponds during periods of dry-down, daily water temperature fluctuations are probably more extreme, with peak summer values in excess of 90 degrees F.

Salt pond sediments are generally a mixture of organic mud marl and coarser-grained, calcareous skeletal materials derived from marine organisms. These sediments often have a reddish color. Their composition reflects a history of both in situ deposition and storm deposition. In some ponds, there is only a thin (1 to 2 inch) marl layer over the caprock, whereas in others, sediment depths exceed a foot and are often anaerobic. Although salt

pond systems are subject to harsh extremes in temperature and salinity, they support a flora and fauna, which are adapted to these extremes and, as a result of the extremes, can be continually changing.

Salt ponds are mapped together with freshwater ponds. Thus, they are included in Section 3.9.7 (Freshwater Wetlands).

3.9.6.1 Flora of Salt Ponds

Submerged vegetation is either absent or sparse or it can be seasonal. Dominant salt pond plants include green algae (*Batophora oerstedii*) and *Acetabularia crenulata* on coarse substrates; and widgeon grass (*Ruppia maritima*), algae (*Batophora oerstedii*) tolerant of salinity fluctuations, spike rush (*Eleocharis cellulosa*), and shoal grass (*Halodule wrightii*) rooted in the sediments. Occasional black mangrove (*Avicennia germinans*) and, less frequently, red mangrove (*Rhizophora mangle*) are found along the pond banks. The smaller ponds often contain little or no macroscopic vegetation. In larger ponds the spike rush and occasional mangroves are restricted to the pond margins, while the central area usually contains no emergent vegetation.

Probably the best adapted biotic component of the salt ponds is the periphyton, an association of microalgae (primarily blue-greens) that form mat-like structures composed of fine algal filaments. In wetland areas which periodically dry out, these mats appear as black crusts on the surface of the caprock or sediment.

3.9.6.2 Fauna of Salt Ponds

The wildlife found in Salt Ponds are discussed in Section 3.12.1.3 (Wildlife Typically Inhabiting Salt Pond Communities).

3.9.6.3 Existing Commercial, Recreational, or Conservation Uses of Salt Ponds

Historically, salt ponds were used for the evaporation of salt for commercial uses. This practice ended in the 1860s but some of the diversion ditches and berms remain to remind us of their historic uses. Flooding occurs during the highest tides through culverts, shallow creeks, broad transitional wetlands or a temporary natural break in the land barrier (e.g., Cocoplum Beach; Kalla, 2000). Currently, salt ponds on Cudjoe Key and Little Torch Key are located within the limits of the National Key Deer Refuge. Several salt ponds are located within the Key West National Wildlife Refuge, most notably the historic ponds on Duck Key. Salt ponds are now well-known tourist (and local) destinations for bird enthusiasts.

3.9.6.4 Known Pollution Problems and/or Issues Related to Salt Ponds

Until around 1985, salt ponds in the Florida Keys were filled to provide land for development. The current Comprehensive Plan and the LDRs (see above) prohibit these activities and State and federal permits would be needed to fill, drain, or alter salt ponds.

Pollution problems and other concerns related to salt ponds include illegal dumping and disruptive activities at the edges of salt ponds caused by the proximity to developed land uses. Illegal dumping is a problem along the perimeter of salt ponds, particularly where there is vehicular access. Proximity of developed land uses to salt ponds tends to adversely affect perimeter areas of the wetland. These impacts are typically direct physical effects caused by landowner dumping of yard debris at the perimeter of residential lots and the cumulative impacts of homeowners through the years caused by yard improvements, such as perimeter clearing, minor spot filling, and planting of non-native plant materials. Disturbance along the edges of salt ponds can cause the colonization of invasive plants, especially lather leaf (*Colubrina asiatica*) and Brazilian pepper (*Schinus terebinthifolius*). Sea level rise also threatens the hydrology of salt ponds.

3.9.6.5 Potential for Conservation, Use, or Protection of Salt Ponds

The Comprehensive Plan policies and Section 118-4 of the LDRs prohibits development activities in mangroves, freshwater wetlands and in undisturbed saltmarsh and buttonwood wetlands. The LDRs should be amended to include salt ponds in this prohibition. However, filling or alteration of salt ponds would be subject to permit authorization by the SFWMD and/or FDEP and the USACE. Open space buffers are specified for all wetlands, which would include salt ponds.

Control of exotics should be a priority for the conservation of wildlife functions of salt ponds. Several restoration projects in salt ponds have been completed by the KERF.

3.9.7 Freshwater Wetlands

A freshwater lens is a small scale aquifer where a shallow pool of water is perched upon underlying salt water (see *Chapter 12.0 Natural Groundwater Aquifer Recharge Element*). Seasonal high mean sea level in the fall "pushes" the lens above the ground surface in many areas (Kalla, 2000). The size of these lenses is controlled by rainfall, freshwater discharge (seepage, pumpage, runoff, and evapotranspiration), response to tidal fluctuations, proximity to saltwater bodies, permeability of the subsurface materials, and elevation of the island above sea level (Klein, 1970; Hanson, 1980; Kalla, 2000). Discharge from these freshwater lenses is to lower topographic areas. Some groundwater discharge occurs to mosquito control ditches, where freshwater wetlands dominated by Cattail (*Typha* spp.) typically develop.

Permanent freshwater lenses occur on the larger keys, specifically Key West and Big Pine Key. The largest and best known of the surface freshwater ponds on Big Pine Key is Blue

Hole, a one acre former limestone quarry within the boundaries of the National Key Deer Wildlife Refuge. Ephemeral or brackish lenses are present on the smaller keys, including Sugarloaf Key, Little Torch Key, Cudjoe Key, No Name Key, Little Pine Key, and Ramrod Key. The Lower Keys are more likely to have lenses because of their geometry and geology. By comparison to those on Big Pine Key, the freshwater lenses on the other keys are much smaller in size and generally do not have adequate year-round groundwater discharges to sustain large permanent freshwater pools or wetlands.

Freshwater wetlands were mapped for the Advance Identification of Wetlands (ADID). However, the current County GIS database was used for this inventory. The inventory of freshwater wetlands is shown in **Table 3.9**. A total of 961.1 acres of freshwater wetlands are in the County. All but 0.5 acres are found in the Lower Keys; none were observed in the Middle Keys. Of the total amount, 12.3 percent are privately owned. The inventory of freshwater ponds and salt ponds is shown in Table **3.10**. Most open water ponds are located in the Middle and Lower Keys. Of the total pond area, 15 percent are privately owned.

3.9.7.1 Flora of Freshwater Wetlands

3.9.7.1.1 Flora of Sawgrass Marshes

The most extensive freshwater wetlands in the Keys are the sawgrass (*Cladium jamaicense*) marshes of Big Pine Key and adjoining smaller keys. These sawgrass marshes occur along the edges of the slash pinelands, at slightly lower elevations. The occurrence of the sawgrass marshes, as well as the pinelands conforms quite closely with the outline of the two freshwater lenses beneath Big Pine Key (Ross, 1989). The freshwater wetlands include large, natural, and impounded sloughs in the central portion of Big Pine Key and numerous smaller interior basins scattered throughout Big Pine Key. The sloughs are important discharge areas that receive drainage from the freshwater lenses during periods of high water and, because of their size and extensive ditching, typically contain most of the surface freshwater on Big Pine Key at any one time (Jackson, 1989). In contrast, the smaller, interior basins are recharge areas that retain water until it can be absorbed into the ground and surrounding uplands (Kalla, 2000).

The Sawgrass Marshes are dominated by sawgrass (*Cladium jamaicensis*). Other freshwater marsh species include saw sedge (*Cyperus ligularis*), white-top sedge (*Rhynchospora floridensis*), giant leather fern (*Acrostichum damaeifolium*), false foxglove (*Agalinis* spp.), perennial saltmarsh aster (*Symphyotrichum tenuifolius*), broom sedge (*Andropogon glomeratus*), and buttonwood (*Concocarpus erectus*). Two vines, mangrove rubber vine (*Rhabdadenia biflora*) and wild allamanda (*Pentalinom lutea*), and a variety of bromeliads, occasionally occur on the buttonwoods.

Sawgrass occurs ubiquitously in both fresh and brackish wetlands. In areas that contain brackish water or slightly saline soils, the association often includes other salt tolerant species including gulf coast spikerush (*Eleocharis cellulosa*), hurricanegrass (*Fimbristylis cymosa*), and seashore dropseed (*Sporobolus virginicus*). In these areas, buttonwood and

mangroves also frequently occur. In small, shallow solution depression on Big Pine, No Name, Cudjoe, and Sugarloaf Keys, dense stands of saw palmetto (*Serenoa repens*) are found closely associated with sawgrass.

While less diverse than the pinelands with which they are typically associated, the sawgrass marshes contain several State-protected plants, including pride-of-Big-Pine (*Strumpfia maritima*), joewood (*Jacquinia keyensis*), and bromeliads (*Tillandsia* spp.).

3.9.7.1.2 Flora of Cattail Marshes

Cattail (*Typha* spp.) marshes occur less extensively than the Sawgrass marsh on Knockemdown, Big Pine, Little Torch, Middle Torch, Sugarloaf, and Cudjoe keys. Because cattail marshes naturally occur well within the confines of hammocks protected from the xeric atmospheric conditions characteristic of more open areas, they are probably subjected to saline influences only during hurricanes or tropical storms.

Where organic soils are deeper, these marshes are characterized by almost pure stands of Cattail. In some, gulf coast spikerush (*Eleocharis cellulosa*) often occurs in pure stands just a few inches below the sawgrass. Buttonwoods and occasional mangroves are present on the borders, supporting mixed populations of bromeliads (*Tillandsia* spp.) and butterfly orchid (*Encyclia tampensis*).

In addition to natural cattail marshes, narrow linear freshwater wetlands dominated by Cattail occur along mosquito ditches throughout the Keys. These ditches are flooded by freshwater during the wet season and, due to the high water-holding capacity of the deep organic layer, contain wet to moist soils throughout the year.

3.9.7.2 Fauna of Freshwater Wetlands

Wildlife found in Freshwater Wetlands is discussed in Section 3.12.1.4 (Wildlife Typically Inhabiting Freshwater Wetland Communities)

3.9.7.3 Existing Commercial, Recreational, or Conservation Uses of Freshwater Wetlands

The Comprehensive Plan policies and Section 118-4 of the LDRs prohibits development activities in freshwater wetlands and the open space requirement is 100 percent. Open space buffers are specified for all wetlands. Most freshwater wetlands are protected by the Tier Overlay Ordinance and ROGO/NROGO. In addition, filling or alteration of freshwater wetlands would be subject to permit authorization by the SFWMD and/or FDEP and the USACE.

The largest freshwater wetlands on Big Pine Key are included in the National Key Deer Refuge. Outside of Big Pine Key, freshwater wetlands are found on Cudjoe Key, No Name

Key, Ramrod Key, and Sugarloaf Key. Approximately 117 acres remain in private ownership.

Table 3.9 - Inventory of Freshwater Wetlands

Site Name [1]	Total[3]	Ownership[4]							
		Federal	State	County	Non Profit	Cities	Utilities	Private	Species Recorded[5]
Lower Keys									
Florida Keys Wildlife and Environmental Area[2]			57.3	1.1	0.1			0.8	KD, MR, SR
Great White Heron National Wildlife Refuge				0.4					KD, MR
Monroe County Managed Areas			2.2						KD, MR, SR
National Key Deer Refuge		363.4	255.1	0.1				0.1	KD, MR, SR
Naval Air Station		27.0							MR
Saddle Bunch Keys					2.3				KD, MR, SR
Terrestris Preserve					13.8				KD, MR
Outside of Parks/Refuges		13.4	18.0	78.4	11.0			116.6	KD, MR, SR
Lower Keys Total	961.1	403.8	332.6	80.0	27.2	0	0	117.5	
Middle Keys									
Middle Keys Total	0	0	0	0	0	0	0	0	
Upper Keys									
Outside of Parks/Refuges								0.5	
Upper Keys Total	0.5	0	0	0	0	0	0	0.5	
Total County	**961.6**	**403.8**	**332.6**	**80.0**	**27.2**	**0**	**0**	**118.0**	

Unincorporated areas only.

[1] Site names are from the FNAI GIS database.

[2] Florida Keys Wildlife and Environmental Areas are managed by the FFWCC for the preservation of listed species that inhabit mangroves, tropical hardwood hammocks, and salt marshes.

[3] Total in acres.

[4] Ownership information is from the Monroe County Property Appraiser.

[5] Species recorded are those threatened and endangered species recorded by the USFWS for a particular parcel; a blank cell does not necessarily indicate an absence of protected species on that parcel(s).
SS = Schaus Swallowtail Butterfly; TS = Tree Snail; IS = Eastern Indigo Snake; WR = Key Largo Woodrat; CM = Key Largo Cottonmouse; SR = Silver Rice Rat; KD = Key Deer; TC = Tree Cactus

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Table 3.10 - Inventory of Freshwater Ponds and Salt Ponds

Site Name [1]	Total[3]	Ownership[4]							
		Federal	State	County	Non Profit	Cities	Utilities	Private	Species Recorded[5]
Lower Keys									
Bahia Honda State Park			9.2						KD
Florida Keys Wildlife and Environmental Area[2]			61.1					0.6	KD, MR, SR
Great White Heron National Wildlife Refuge		82.3	2.3					12.9	KD, MR, SR
John J. Pescatello Torchwood Hammock Preserve					20.3				KD
Monroe County Managed Areas			12.9						KD, SR
National Key Deer Refuge		313.3	50.8					6.5	KD, MR, SR
Naval Air Station		241.5						0.1	KD, MR, SR
Saddle Bunch Keys					0.5				SR
Outside of Parks/Refuges		71.0	86.8	26.5	6.6			426.5	KD, MR, SR
Lower Keys Total	1,431.7	708.1	223.1	26.5	27.4	0	0	446.6	
Middle Keys									
Lignumvitae Key Botanical State Park			22.0						
Long Key State Park			15.7	0.2					
Outside of Parks/Refuges			0.7	1.8				14.0	
Middle Keys Total	1,470.6	1,416.2	38.4	2.0	0	0	0	14.0	
Upper Keys									
Crocodile Lake National Wildlife Refuge		359.6	0.7	0.1	0.2			0.1	
Crocodile Lake Sanctuary		2.0			3.7				
Cross Key					1.3				

Table 3.10 - Inventory of Freshwater Ponds and Salt Ponds (continued)

Site Name [1]	Total[3]	Ownership[4]							
		Federal	State	County	Non Profit	Cities	Utilities	Private	Species Recorded[5]
Dagney Johnson Key Largo Hammock Botanical State Park			28.2					0.1	
Everglades National Park[6]		279.8							
Florida Keys Wildlife and Environmental Area[2]			58.3					0.1	
John Pennecamp Coral Reef State Park			9.5					0.1	
Monroe County Managed Areas			6.5						
Tarpon Basin		6.8	1.1		43.7				
Outside of Parks/Refuges		1.9	1.8	3.0	0.1		1.0[6]	117.0	
Upper Keys Total	926.7	650.1	106.1	3.1	49	0	1.0	117.4	
Total County	**3,829.0**	**2,774.4**	**367.6**	**31.6**	**76.4**	**0**	**1.0**	**578.0**	

Footnotes 1-5 are the same as in Table 3.9.

[6] Florida Keys Mosquito Control District

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3.9.7.4 Known Pollution Problems and/or Issues Related to Freshwater Wetlands

Freshwater wetlands, ponds, and pools are above-ground expressions of freshwater lenses. The Big Pine Key lens system is probably the most studied and the best mapped. The effects of urbanization were documented on both the horizontal and vertical extent of the lenses, especially the southern lens (Kalla, 2000). Areas of saltwater intrusion were documented due to freshwater withdrawals. Seasonal changes have also been documented. Seasonal high tides and heavy rains during the wet season develop strong outflows.

Until 1986, when the County adopted the Florida Keys Comprehensive Plan, freshwater wetlands in the Florida Keys were filled routinely for purposes of providing dry land for development. Some were used as borrow pits or for limestone mining. In 1986, the County adopted its current LDRs, which effectively stopped such activities in the Keys.

Pollution problems and other concerns related to freshwater wetlands which remain today include:

- illegal dumping;
- disturbance at the fringe of freshwater wetlands caused by the proximity to developed land uses;
- colonization by invasive plant species;
- groundwater withdrawals from irrigation wells;
- injection wells for storage of stormwater volumes;
- mosquito ditches and seawater canals; and
- sea level rise.

Illegal dumping is a problem along the perimeter of freshwater wetlands, particularly where there is vehicular access. This is of special concern due to the potential dumping of uncontained hazardous wastes which can leach into the soil and enter groundwater.

Some freshwater wetlands are disturbed by off-road vehicles. Wetland plants are very susceptible to compaction. Where they are killed by repeated vehicular use, soil conditions are usually unfavorable for their recolonization. Once formed, tracks usually remain bare or are revegetated by invasive plant species. Colonization by invasive exotic plant species is a problem at the edges and within freshwater systems.

Proximity of developed land uses to freshwater wetlands tends to adversely affect perimeter areas of the wetland. These impacts are typically direct physical effects caused by landowner dumping of yard debris at the perimeter of residential lots and the cumulative impacts of homeowners through the years caused by yard improvements, such as perimeter clearing, minor spot filling, and planting of non-native plant materials.

Horizontal flow of groundwater contaminated with nutrients is the major source of nonpoint source nutrient transport to surface freshwater resources. On Big Pine Key, nutrient pollution of groundwater results primarily from inadequate treatment of wastewater by OSTDS, with secondary contamination from discharges or drainfields (Lapointe, 1989; Lapointe et al., 1999). Other less significant contaminant sources include cesspits and fertilizers.

Nutrient-polluted groundwater in the freshwater lenses flows down-gradient into surface waters as a function of "wet-dry" seasonality (Lapointe et al., 1999). Nutrient concentrations of surface waters are highest in the spring-summer-fall wet season when there is greater release of contaminated water from the subsurface freshwater lenses. During this period there are greater man-made loading rates to groundwater (due to increased transient residential populations) and greater hydraulic head due to increased rainfall (recharge).

Historically, wells were installed in freshwater lenses. Many of these were installed by private landowners for domestic water supply for the house and/or landscaping, but there were also some commercial uses such as irrigation for nurseries. The amount of water withdrawn from wells is unknown, but anecdotal evidence suggests that withdrawals have declined due to closure of several plant nurseries and due to closure of individual private wells for domestic use. When homes connect to the public water supply, the FKAA requires that homeowners abandon (backfill) their well so that lens water can no longer be withdrawn. Hanson's study (1980) of the fresh water on Big Pine Key found that continued pumping from shallow wells would probably not damage the system. However, he projected that future increased withdrawals from new residences and new or enlarged plant nurseries would "increase the stress on the freshwater lens which can only supply moderate amounts without detrimental effects during most years". Indeed, subsequent investigation showed that the effects of urbanization were being exhibited by the freshwater lens (Stewart et al, 1989). The southeast lens on the Key has decreased in lateral extent and maximum depth and is clearly affected by saltwater intrusion due to pumping and canal dredging activities. A modeled simulation of pre-development and current conditions on Big Pine Key showed that the total volume of the lens has decreased by 20 percent in response to dredging of canals (Langevin et al., 1998).

The potential effects of sea level rise on freshwater lenses include the decrease in size of freshwater lens, either on a permanent or seasonal basis. Other factors include a potential increase in hurricane intensity, which could mean more severe storm surges. Ross et al. (1994) concluded that sea level rise and associated salinization of groundwater and soil water is a major factor in the reduction of pine forests of Sugarloaf Key. Ross et al. (1994) also concluded that as sea level continues to rise, the Florida Keys will experience a decline in both landscape and species diversity, as species-rich upland communities are replaced by simpler mangrove communities.

3.9.7.5 Potential for Conservation, Use, or Protection of Freshwater Wetlands

Continued government acquisition of freshwater wetlands in the Lower Keys offers the greatest opportunity for conservation of these critical resource areas. Acquisition efforts should continue to focus on freshwater wetlands, freshwater ponds, buffer areas, and the critical recharge areas of the groundwater lenses which sustain freshwater flows into the wetland habitat areas.

KERF has completed a number of freshwater restoration projects, with other projects in various stages of planning and phased restoration. The Fund has removed fill from 35 acres and has removed 4 miles of abandoned roadbed, and the restored water flows have assumed benefits to approximately 1000 acres of wetland or nearshore waters (Audubon of Florida website[6]).

3.9.8 Disturbed Wetlands

3.9.8.1 General Characteristics of Disturbed Wetlands

Disturbed land is defined as follows in the Monroe County LDRs:

> "Disturbed land means land that manifests signs of environmental disturbance which has had an observable effect on the structure and function of the natural community which existed on the site prior to the disturbance."

The current land use maps do not include a separate category for disturbed wetlands. Instead, most disturbed wetlands are included in the Undeveloped Land category, although some disturbed wetlands are mapped as mangrove, buttonwood, or other wetland habitats. According to the land use cover class maps, undeveloped lands are defined as,

> "… open, scarified, or disturbed lands which tend to have uncertain land uses and may contain native species."

Although this category contains mostly upland disturbed habitats, it may also contain disturbed wetlands.

Consistent with these definitions, disturbed wetland communities show obvious signs of environmental disturbance which has had an observable effect on the original wetland community. The current Comprehensive Plan and the LDRs allow filling only in Disturbed Salt Marsh and Buttonwood Wetlands with appropriate mitigation; all other wetland categories have open space requirements of 100 percent. Further, only those disturbed Salt Marsh and Buttonwood Wetlands that have a KEYWEP score below 7.0 (or are assigned a green flag) are suitable for filling with appropriate mitigation, as determined by

[6] http://www.audubonofflorida.org/specialplaces_FloridaKeys.html, accessed June 2, 2010.

the FDEP and the USACE. All projects shall require documentation that all aspects of FDEP and USACE mitigation have been satisfied prior to issuance of a county building permit. According to the LDRs, this is the only wetland community that is still assessed using KEYWEP.

In the Keys, a number of human activities have created disturbed wetlands, including:

- placement of fill or dredge spoils on wetlands,
- clearing of vegetation,
- removal of topsoil,
- impoundment of wetlands,
- drainage of surface waters,
- blockage of surface drainage,
- restriction of tidal circulation,
- introduction of exotic vegetation, and
- excavation or dredging of uplands or wetlands.

These activities have re-directed or delayed primary succession and have caused "secondary succession" to take place. Secondary succession occurs on sites where the natural community has been removed, resulting in a bare area open to invasion by colonizing plants and animals. The degree to which wetlands have been altered will have an effect on the functional value of the wetland.

Disturbed wetlands were mapped and evaluated as part of the ADID program [see Section 3.9.2 (Monroe County Advance Identification of Wetlands (ADID) Program)]. The ADID program recommended a functional definition for disturbed wetlands, which was incorporated into the LDRs. Vegetation typical of disturbed salt marsh and buttonwood wetlands is described in Section 3.9.4.1.2 (Flora of Disturbed Salt Marsh and Buttonwood Wetlands).

3.9.8.2 Existing Commercial, Recreational, or Conservation Uses of Disturbed Wetlands

Section 3.9.4.2 (Existing Commercial, Recreational, Or Conservation Uses of Salt Marsh and Buttonwood Wetlands) contains further discussion of existing uses and regulatory procedures applicable to disturbed salt marsh and buttonwood wetlands).

3.9.8.3 Known Pollution Problems and/or Issues Related to Disturbed Wetlands

Based upon the present County, State and federal policies and regulations, permits would only be issued for projects in Disturbed Salt Marsh and Buttonwood Wetlands subject to mitigation requirements. As noted in Section 3.9.1 (Wetlands Permitting and Wetlands Protection Planning in Monroe County), mitigation takes the form of compensation and/or compliance with environmental design criteria as outlined in the Comprehensive Plan and

the LDRs, or, in the case of larger residential or commercial projects, design and implementation of individual environmental creation or restoration projects.

Disturbed Salt Marsh and Buttonwood Wetlands are one of the habitat types that are commonly colonized by invasive exotic vegetation. Disturbed habitats are often the focus of projects undertaken by the County Land Steward and the Florida Keys Invasive Exotic Task Force. Sea level rise also threatens disturbed wetlands.

3.9.8.4 Potential for Conservation, Use, or Protection of Disturbed Wetlands

In general, development is directed to disturbed sites, including disturbed wetlands through ROGO/NROGO and the Tier Overlay maps. Projects undertaken by KERF, the Florida Keys Invasive Exotic Task Force, and the County Land Steward routinely include disturbed wetlands as well as other disturbed habitat types. In addition, mitigation projects implemented as part of larger residential or commercial projects have also restored areas of privately-owned disturbed wetlands throughout the Florida Keys. The restoration of Disturbed Salt Marsh and Buttonwood Wetlands may be desirable in areas where they are adjacent to other high quality habitats. If practical and desired, restoration of these wetlands should be undertaken to restore biological functions.

Currently in the regulations, disturbed wetlands that are suitable for filling have a KEYWEP score below 7.0 (or are assigned a green flag). However, based on the Technical Summary Document for the Advance Identification of Wetlands of the Florida Keys (Kalla, 2000), the County should consider revising that criterion to those wetlands that receive a KEYWEP total functional index of 5.5 or less (Kalla, 2000).

3.9.9 Exotic Vegetation

The exotic vegetation land use category includes only vacant lands that are dominated by extensive stands of invasive exotic plants, primarily Australian pine (*Casuarina equisetifolia*) and Brazilian pepper (*Schinus terebinthifolius*). These species can form dense stands that can be discerned on aerial photographs. A list of Florida's exotic plant species is maintained by the Florida Exotic Pest Plant Council (2009) and locally by the Keys Exotics Task Force. The inventory of exotic-dominated lands is shown in **Table 3.11**. Most of the exotic vegetation cover is located on privately-owned lands (61.8 percent). Of the lands that are publicly-owned, most of exotic dominated lands are located on Naval Air Station lands.

Numerous efforts are underway in the Florida Keys to control the proliferation of exotic plants and animals in the Florida Keys. Since 2005, the Monroe County Land Steward has undertaken numerous exotic plant removal projects in County-owned parcels, using annual grant funding from the Florida Fish and Wildlife Conservation Commission Invasive Plant Management Section. The Land Steward is a partner with the Florida Keys Invasive Exotics Task Force (Task Force). Task Force partners include the County, State and federal agencies, non-profits and public utilities. The Task Force coordinates efforts to eliminate invasive, non-native plant and animal species. The County should continue this partnering with the Task Force.

3.10 Beach/Berm Communities [Rule 9J-5.012(2)(f), F.A.C.]

3.10.1 Beach/Berm Communities of the Florida Keys

Beach/berm communities in the Florida Keys are relatively uncommon and are not directly comparable to the broad coastal strand communities in other areas of the State (Florida DNR, 1989; USFWS, 2009). The discontinuous beaches of the Florida Keys and the islands west of Key West are formed primarily of shell fragments rather than quartz sands. The most significant dune system is located in the Cape Sable area (USFWS, 1999). Extensive beach development outside the mainland is precluded by the offshore coral reefs and gently sloping bottom of Hawk Channel which dispense oceanic wave energy. Where beaches and wetlands are not present, the shoreline is characterized by exposed, pitted, and pinnacled limestone.

The typical beach system in the Keys is comprised of a beach and an associated berm. The most seaward component is the "beach" which is usually calcium carbonate sand, with varying percentages of shell fragments, that extends from the upper berm to the low water mark (Clark, 1977; Johnson and Barbour, 2001). In the Keys, beaches are typically 15 to 25 feet in width, reaching a maximum width of 60 feet in a few areas, such as on Bahia Honda Key.

The berm is a mound or ridge of unconsolidated sand that is immediately landward of, and usually parallel to, the shoreline and beach. The berm is higher in elevation than both the beach and the area landward of the berm, ranging from slightly above mean high water to more than 7 feet above mean sea level. Berms in the Keys vary in width from 20 to 200 feet. In some locations berms occur without a beach along the shoreline. Instead, there is a narrow band of fringing mangroves along the waterward edge of the berm.

FNAI has completed an inventory of the beaches of the Florida Keys (Johnson and Gullege, 2005). Findings of the inventory of beach/berm communities indicate that they are not common in the Keys (see **Table 3.12**). In general, beach frequency increases to the southwest, with the largest percentage of land mass composed of beach found on Bahia Honda Key, the outer islands west of Key West (Sand Keys), the Marquesas Keys, and the Dry Tortugas.

A total of 82.7 acres of beach/berm habitat is found in the Florida Keys. Of that total, most is found in the Lower Keys (81 percent) and 39 percent are owned by the State. Approximately 20 percent of the beaches are privately-owned. Numerous other natural beaches occur on the mainland and on the islands west of Key West (Sand Keys, Marquesas Keys, and Dry Tortugas). There are no natural beaches in the Upper Keys, north of Upper Matecumbe Key.

The methods used to inventory beach/berm habitats are described in Section 3.8 (Living Marine Resources). **Map Series 3.3** depicts the beach/berm habitats within the Upper, Middle, and Lower Keys.

Table 3.11 - Inventory of Exotic Vegetation Habitats

Site Name [1]	Total[3]	Ownership[4]							
		Federal	State	County	Non Profit	Cities	Utilities	Private	Species Recorded[5]
Lower Keys									
Florida Keys Wildlife and Environmental Area[2]			0.1						KD
Great White Heron National Wildlife Refuge		3.5	1.2					0.2	KD, SR
Monroe County Managed Areas			3.3						KD, SR
National Key Deer Refuge		5.7	0.8	0.1					KD, MR, SR
Naval Air Station		43.8	0.1					0.2	MR
Outside of Parks/Refuges		6.7	2.1	9.9	2.1	0.9		96.8	KD, MR, SR
Lower Keys Total	177.5	59.7	7.6	10.0	2.1	0.9	0	97.2	
Middle Keys									
Lignumvitae Key Botanical State Park								0.9	
Outside of Parks/Refuges				0.4				14.3	
Middle Keys Total	15.6	0	0	0.4	0	0	0	15.2	
Upper Keys									
Dagney Johnson Key Largo Hammock Botanical State Park			3.5						
John Pennecamp Coral Reef State Park			0.9						
Outside of Parks/Refuges			0.2	1.2				27.4	
Upper Keys Total	33.2	0	4.6	1.2	0	0	0	27.4	
Total County	**226.3**	**59.7**	**12.2**	**11.6**	**2.1**	**0.9**	**0**	**139.8**	

Unincorporated areas only.
Footnotes 1-5 are the same as in Table 3.9.

Table 3.12 - Inventory of Beach/Berm Habitats

Site Name [1]	Total[3]	Ownership[4]							
		Federal	State	County	Non Profit	Cities	Utilities	Private	Species Recorded[5]
Lower Keys									
Bahia Honda State Park			19.8						KD
John J. Pescatello Torchwood Hammock Preserve					3.1				KD, MR
National Key Deer Refuge		7.8						0.1	KD, MR
Naval Air Station		2.2							MR
Outside of Parks/Refuges		1.2	1.8	7.5	11.6			12.0	KD, MR, SR
Lower Keys Total	67.1	11.2	21.6	7.5	14.7	0	0	12.1	
Middle Keys									
Long Key State Park			8.0						
Outside of Parks/Refuges			1.2					2.5	
Middle Keys Total	11.7	0	9.2	0	0	0	0	2.5	
Upper Keys									
John Pennecamp Coral Reef State Park			1.3						
Outside of Parks/Refuges			0.5	0.2				1.9	
Upper Keys Total	3.9	0	1.8	0.2	0	0	0	1.9	
Total County	**82.7**	**11.2**	**32.6**	**7.7**	**14.7**	**0**	**0**	**16.5**	

Unincorporated areas only.
Footnotes 1-5 are the same as in Table 3.9.

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3.10.2 Flora of Beach/Berm Communities

The County categorizes the Beach/Berm Community whereas FNAI recognizes five subtypes of coastal upland communities in the County. Moving landward from the shoreline, these include:

- Beach Dune;
- Coastal Berm;
- Coastal Strand;
- Rock Barren; and
- Maritime Hammock.

This generalized zonation scheme (exclusive of the coastal rock barren) is typically found only on the most highly developed beach systems, such as on the keys between Key West and the Dry Tortugas and on Cape Sable. On the remaining keys, this distinct zonation, with some variation, occurs on Bahia Honda, Lower Sugarloaf, Big Pine, Newfound Harbor Keys, and Content Keys. On other keys, this zonation complex is not as well developed.

The Beach Dune association is dominated by plants that are salt tolerant, root quickly, germinate from seed rapidly, and can withstand wave wash and shifting sand. Commonly found species include the sea purslane (*Sesuvium portulacastrum*), railroad vine (*Ipomoea pes-caprae*), beach grass (*Panicum amarum*), sea oats (*Uniola paniculata*), sea lavender (*Argusia gnapholodes*), coastal ragweed (*Ambrosia hispida*), bay cedar (*Suriana maritima*), sand spur (*Cenchrus* spp.), and sand dune spurge (*Chamaesyce bombensis*). On most beaches this association occurs only at the base of the berm since the beach is very narrow.

The Coastal Berm association begins with a steep and distinct increase in slope upward from the beach. The foreslope of the berm is vegetated primarily by species found in the Beach Dune association. Proceeding landward, these pioneer species are joined by others, such as chaff flower (*Alternanthera maritima*), sea daisy (*Borrichia frutescens*), cordgrass (*Spartina patens*), beach orach (*Atriplex arenaris*), spider lily (*Hymenocallis latifolia*), and sea rocket (*Cakile lanceolata*). On a number of beaches, Australian pines (*Casuarina equisetifolia*) have become established in this zone. Another exotic, lather leaf (*Colubrina asiatica*), has also become established, forming dense thickets in the seaward portion of the berm.

The Coastal Strand association is generally considered a transition zone between the Coastal Berm and hammock forests. Shrubs and occasional trees occur more frequently and become more abundant moving landward. Species often found include seagrape (*Coccoloba uvifera*), wild sage (*Lantana involucrata*), seven-year apple (*Genipa clusiifolia*), blolly (*Guapira discolor*), yellow nicker (*Caesalpina crista*), blackbead (*Pithecellobium guadalupense*), nightshade (*Solanum bahamense*), and the erect prickly pear (*Opuntia sticta*). Occasional larger trees include buttonwood, seagrape, blolly, gumbo limbo (*Bursera simaruba*), and Jamaica dogwood (*Piscidia piscipula*). Vegetation occurring as an understory or in open areas includes many of the above mentioned graminoids and herbs,

as well as rose natal grass (*Rhynchelytrum repens*), spanish needles (*Bidens alba*) and yellowtop (*Flaveria linearis*).

Coastal rock barren is known from four sites in the Florida Keys (USFWS, 1999; Johnson and Gulledge, 2005). It is an ecotonal community occurring as tiny patches along rocky shorelines in the Keys. It occurs on Key Largo limestone and is inhabited by spiny species including triangle cactus (*Acanthocereus tetragonus*), erect pricklypear, and false sisal (*Agave decipiens*) and a variety of weedy herbs and shrubs. It appears to develop after disturbance, either man-made or natural and probably would not be recognized as a separate community except for the presence of several rare plants, notably garber's spurge (*Chamaesyce garberi*), spanish lady (*Opuntia triacanthos*), and Florida Keys indigo (*Indigofera trita*) (USFWS, 1999).

The most landward zone on the berm is occupied by Maritime Hammocks, which is only found in the well-developed beach dune system of Cape Sable (USFWS, 1999). It has a low-diversity canopy of live oak (*Quercus virginiana*), cabbage palm (*Sabal palmetto*), and sweet bay (*Persea borbonia*) with a variety of small trees and shrubs, such as black bead (*Pithecellobium keyense*) and the stoppers (e.g., *Eugenia axillaris*). In the Florida Keys, this habitat is replaced by tropical hardwood hammocks, which have a limestone substrate (see Tropical Hardwood Hammocks Section 3.11.1 [Tropical Hardwood Hammocks) below].

3.10.3 Existing Commercial, Recreational, or Conservation Uses of Beach/Berm Communities

Developed uses on natural beaches in the Keys are generally limited to single family homes and condominiums. In some locations, most notably at Holiday Isle and Islamorada, hotel owners have built beaches which are used for tourist commercial uses.

Several beaches are protected through public ownership and are available for public recreation purposes (see **Table 3.12**). A total of 16.5 acres of beach/berm habitat remains in private ownership. An additional 14.7 acres is owned by non-profits organizations (Boy Scouts, Girl Scouts, Seacamp).

3.10.4 Known Pollution Problems and/or Issues Related to Beach/Berm Communities

Pollution problems and disturbances related to beach/berm communities in the Keys include the following:

- general loss of beach/berm habitat to developed land uses;
- clearing of berm vegetation for land development;
- establishment of exotic vegetation;
- beach erosion due to human use and off-road vehicles;
- natural beach erosion; and
- sea level rise.

Because most beaches in the Keys are narrow, the shoreline setback effectively restricts development activities on beaches. However, development is permitted on berms, subject to environmental design criteria which limit clearing, impervious surfaces, lighting, excavations, fill, and landscaping. Section 118-10(3) of the LDR specifies that all structures be elevated on pilings or other supports within a beach berm habitat. The LDRs also regulates excavation, filling, and clearing of beach berm vegetation. State and federal regulations also regulate these types of activities. Section 118-12 also specifies setback requirements for the placement of structures and accessory buildings within or near the beach berm habitat. Native vegetation must be preserved to the maximum extent. Seawalls, bulkheads, riprap or other shoreline hardening structures are prohibited on or waterward of any portion of any beach berm complex that is known to be or is potential nesting area for marine turtles.

In general, widespread establishment of exotic vegetation has placed Keys beach communities under stress. The most invasive species are Australian pine (*Casuarina equisetifoli*a), beach naupaka (*Scaevola taccada*), and latherleaf (*Colubrina asiatica*), all of which are very competitive with native plants. Brazilian pepper (*Schinus terebinthefolius*) may also be a problem in some areas, but is not nearly as widespread on beaches in the Keys.

Beach erosion is typically due to natural causes, exacerbated by human activities (walking, off-road vehicles, and disturbances associated with adjacent development), which have disturbed natural beach vegetation, facilitated colonization by invasive plants, and weakened the sandy beach substrate.

3.10.5 Past Trends in Beach Erosion and Accretion

Past trends in beach erosion and accretion in the Florida Keys have been documented by the FDEP (2009). There are five critically eroded beach areas (4.6 miles) and one noncritically eroded beach areas (1.0 mile) within the unincorporated portion of the County (**Table 3.13**). Trends at the Sand Keys west of Key West (including Woman Key, Boca Grande Key, the Marquesas Keys, and the Tortugas Keys) and Cape Sable are not available because of insufficient historic data (FDEP, 2002). However, Cape Sable beaches sustained severe erosion conditions due to Hurricane Wilma in 2005 and are currently being monitored (FDEP, 2009).

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Table 3.13 –Monroe County Critically and Non-critically Eroded Beaches

Beach Location	Critical Length (miles)	Non critical Length (miles)	Recommendations for Beach Restoration
Long Key (Long Key State Park)	1.0		Updated surveys and park management decisions are currently needed to determine environmentally acceptable erosion control alternatives.
Little Crawl Key (Curry Hammock State Park)	0.1		No current recommendations; recent restoration project
Little Duck Key	0.2		No current recommendations; recent restoration project
Bahia Honda Key (Bahia Honda State Park)	2.0		No current recommendations; recent restoration project
Big Pine Key (Long Beach)		1.0	No current recommendations
Boca Chica Key	1.3		No current recommendations; recent restoration project
Total	**4.6**	**1.0**	
Source: FDEP 2008 and FDEP 2009			

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3.10.5.1 General Beach Accretion Trends

In general, beach formation in the Keys is limited by reduced wave action in the Straits of Florida coupled with a lack of sand available for transport. The southward net transport of sand along the Atlantic barrier beaches of Florida, which builds and renourishes the beaches of South Florida north of the Keys, diminishes substantially at the southern end of Miami-Dade County. While quartz sand deposits do exist in shoals south of Key Biscayne, there is little southward sand transport from there to Soldier Key. There are a number of physical reasons for the lack of sand transport between the barrier islands and the Florida Keys. Little Bahama Back and Great Bahama Bank provide substantial protection to the shoreline from Atlantic Ocean swell. As a result, wave action needed to transport sand to the shore is greatly diminished in the Straits of Florida. Furthermore, in offshore areas any sand which may exist is influenced by the strong northward current of the Gulf Stream which blocks southward sediment transport (Florida DNR, 1989).

As a result of these conditions, the narrow beaches characteristic of the Keys are created by an interaction of low wave energy and coarse sand. The berms or sand ridges result from storm waves which transport sand from the shallow submerged bottoms and beach zones landward. The sands that form the beaches and berms of the Keys are of carbonate origin derived from the erosion of limestone, from aragonite particles precipitated from seawater, and from the fragmented remains of corals, cast-off shells, and calcareous algae. These fragmentary particles are generally coarse and angular, in contrast to the fine particles of silica that form the sands of Panhandle beaches. This coarse fraction of sediments is sorted from the fine by the action of waves and currents. Coarse material is deposited in the higher energy areas such as beaches and slope tops of channels, whereas the fine muds end up in quiescent areas such as mud banks, shallow embayments, and mangrove fringes.

Subsequent to deposition of this material on the beach, it is either carried upward to the berm by storm waves or transported offshore by nearshore currents. Because of its relatively large size and angularity, this sand is not readily transported by the wind as are the siliceous sands of mainland beaches. This explains the absence in the Keys of the shifting or high dunes characteristic of beaches on the middle Atlantic shore. FDEP does not report beach accretion trends and this may be due to the lack of appreciable longshore drift in the Florida Keys (FDEP, 2002; FDEP, 2009).

3.10.5.2 Beach Erosion Trends

In 1986, pursuant to Sections 161.101 and 161.161, Florida Statutes, the Florida Department of Natural Resources, Division of Beaches and Shores (now the Florida Department of Environmental Protection, Bureau of Beaches and Coastal Systems) was directed to identify critically eroding beaches and to develop and maintain a comprehensive long-term management plan for their restoration. This inventory was updated in 2009 (FDEP, 2009).

Erosion in the Florida Keys is attributed to tropical storms and hurricanes and to natural erosion caused by the pattern of littoral transport of sediments in this area. However, natural shoreline changes are exaggerated by sediment transport with seawalls and revetments. The most erosive storms in recent years were Hurricane Andrew (1992; Upper Keys), Hurricane Georges (1998), which caused extensive property damage throughout the Keys and significant beach erosion at many locations, Hurricane Irene (1999; Middle and Lower Keys), and Hurricanes Rita and Wilma (2005; throughout the keys including the Sand Keys) (FDEP, 2008). The critically eroded beaches, as defined by FDEP, are listed in **Table 3.13.**

3.10.5.2.1 Long Key State Park

Long Key State Park has a 1.0 mile segment of critically eroded beach. Park officials have estimated shoreline recession to be as much as three feet per year since the park was opened in 1970. A rock revetment was constructed along a limited segment of shoreline in 1976; however, erosion end effects are most apparent adjacent to the structure. The park was severely impacted by Hurricanes Georges and Irene in 1998 and 1999. Beach and dune restoration was considered necessary after these storms, and a feasibility study was initiated by the FDEP. In 2005, Hurricanes Rita and Wilma combined to severely impact the park and destroyed all the waterfront campsites and infrastructure.

3.10.5.2.2 Curry Hammock State Park, Little Crawl Key

Curry Hammock State Park has a 0.1 mile segment of critically eroded beach where recreational interests are threatened. In 2005, Hurricanes Rita and Wilma combined to severely impact the park. In 2005, a feasibility study was completed to investigate sand sources for state parks in the Keys, including Curry Hammock State Park. The Curry Hammock State Park Beach Restoration Project was constructed via truck with removal of inappropriate fill and 14,450 cubic yards of sand in April 2008.

3.10.5.2.3 Little Duck Key

Little Duck Key has a 0.2 mile segment of critically eroded beach and is the site of Veteran's Memorial Park. Hurricane Wilma (2005) caused moderate beach and dune erosion and destroyed all the park facilities. In April 2006, this segment was designated as critically eroded threatening recreational interests at the county park. The FDEP assisted in the park recovery by bringing sand from approved upland borrow sites, placed in an alongshore berm configuration above mean high water, and stabilized with plantings of native vegetation.

3.10.5.2.4 Bahia Honda State Park

Bahia Honda Key has three erosional areas. Within Bahia Honda State Park, Calusa Beach (between the bridges), Loggerhead Beach (a western segment) fronting on the Straits of Florida, and a stretch of Sandspur Beach at the east end have a total of 2.0 miles of critically

eroded beaches. The most significant carbonate beaches and dunes of the lower Keys are on Bahia Honda Key, which is part of Bahia Honda State Park. The estimated annual longshore transport of more than 2,000 cubic yards of sediment is to the southwest. Several attempts have been made to armor, build groins, and fill the eroding areas since the early 1970s. In 1989, a 100-foot long groin and restoration was constructed at Calusa Beach, the 600 foot long recreation beach between the Flagler Bridge and the U.S. 1 bridge. The western 3,500 feet of Loggerhead Beach fronting the Straits of Florida, also designated critically eroded, receded about 5 feet between 1971 and 1986. Erosion control efforts have included the placement of concrete bridge piles near the west end, riprap along the 400 to 500 feet of threatened roadway in the early 1970s, the 1988/89 construction of a 1,200 foot long limerock revetment, and substantial sea oats planting during the 1980s and 1990s. Hurricane Georges (1998) caused major beach and dune erosion and severely damaged the park facilities, roadway, and bridge. Hurricane Rita (2005) inflicted minor beach and dune erosion at Calusa Beach and Sandspur Beach, and minor to moderate beach and dune erosion at Loggerhead Beach. Hurricane Wilma (2005) caused moderate to major beach and dune erosion at Calusa Beach and Loggerhead Beach, and minor dune erosion with beach accretion within the critically eroded portion of Sandspur Beach. Wilma also caused severe damage to the park's recreation facilities at the public beaches. During post-storm recovery operations, overwash sediments were returned to the beaches. In 2005, a feasibility study was completed to investigate sand sources for State Parks in the Keys, including Bahia Honda State Park. FDEP assisted in the recovery of storm erosion impacts to public beaches above mean high water by trucking sand from approved upland borrow sites and placed it in a berm configuration, and stabilized with plantings of native vegetation.

3.10.5.2.5 Big Pine Key

Big Pine Key has a 1.0-mile segment of critically eroded beach. FDEP did not evaluate this beach in their 2009 report. No current recommendations have been provided (FDEP 2009).

3.10.5.2.6 Boca Chica Key

Boca Chica Key has 1.3 mile segment of critically eroded beach and a County park. Hurricanes Georges (1998) and Irene (1999) caused moderate to major beach and dune erosion and road damage in this area. In 2005, Hurricane Rita caused minor beach and dune erosion and Hurricane Wilma caused moderate to major beach and dune erosion. Rita caused overwash deposits onto Boca Chica Beach Road and Wilma destroyed much of the road. FDEP assisted in the recovery of storm erosion impacts to public beaches above mean high water by trucking sand from approved upland borrow sites and placed it in a berm configuration, and stabilized with plantings of native vegetation.

3.10.6 Effects of Coastal or Shore Protection Structures on Beach/Berm Communities

Coastal protection structures have been used throughout the Keys for purposes of reducing shoreline erosion, including erosion on beaches. Groins and other erosion measures have been used at Bahia Honda State Park (FDEP, 2009). The FDEP has not specifically identified any instances of adverse impacts on beaches associated with shoreline protection structures, such as groins, breakwaters, riprap and bulkheads (FDEP, 2008).

3.10.7 Existing and Potential Beach Renourishment Areas

Beach renourishment projects (discussed above) have occurred at several beaches in unincorporated Monroe County, including beaches at Little Duck Key, Bahia Honda State Park, and Boca Chica Key. In addition, FDEP has evaluated beach and dune restoration options at Long Key State Park. These beach restoration projects have primarily been for post-storm recovery.

The County and the USACE are eligible governmental entities under the beach erosion control assistance program. The County and the City of Key West have participated with the FDEP as the local sponsors of beach management projects. In addition, the Florida Division of Recreation and Parks manages state parks on Long Key, Little Crawl Key, Indian Key, Lignumvitae Key, Bahia Honda, and Key West, and is responsible for environmental resource management of all the wet sandy beaches of the keys under the FKNMS program. Project cost estimates and schedules may be found in the Florida Beach Management Funding Assistance Program - Long Range Budget Plan.

3.10.8 Potential for Conservation, Use, or Protection of Beach/Berm Communities

The FDEP has completed several beach restoration projects in response to recent hurricanes (**Table 3.13**). With the exception of unspecified needs to address beach erosion on Long Key, FDEP has no current recommendations.

Acquisition is the most direct means of preserving remaining undisturbed beach/berm habitat areas in the Keys. This can be accomplished for some high priority beaches, particularly those which are suitable for recreation use. The County permits a limited number of uses in beach/berm areas. The Tier Overlay Ordinance establishes open space requirements based on the tier [see Section 3.19 (Effects of Future Land Use on Natural Resources)].

3.11 Upland Vegetation [Rule 9J-5.013(1)(a) and (b), F.A.C.]

There are two native upland biological communities in the Florida Keys. These are:

- tropical hardwood hammocks, the climax terrestrial community, and
- pinelands, a fire-climax system.

Many upland areas in the Keys have experienced disturbance of some kind which has interfered with natural succession in upland communities. These uplands are referred to collectively as "disturbed lands."

The methods used to inventory upland habitats are described in Section 3.8 (Living Marine Resources). **Map Series 3.3** depicts the Tropical Hardwood Hammock and Pinelands habitats within the Upper, Middle, and Lower Keys.

3.11.1 Tropical Hardwood Hammocks

Tropical hardwood hammocks constitute the climax terrestrial community of South Florida and the Keys. This community is probably the richest in diversity, with approximately 100 species of wide tropical occurrence, present in the Keys and nowhere else in the continental United States. They are also called Rockland Hardwood Hammock or Rockland Hammock in recent texts because of their location in outcroppings of limestone. The soil of these hammocks consists mostly of a thin layer of partially decomposed organic matter resting directly on a porous limestone substrate. This humus layer allows increased soil moisture relative to other communities in the Keys. Many of the hammock trees generate the leaf litter layer themselves, thus preparing the substrate for other species. The closed canopy of hammocks is insulative, moderating thermal extremes (Olmstead and Loope, 1984; Taylor, 1998; USFWS, 1999) and reducing the loss of soil moisture. The inventory of tropical hardwood hammocks within the Florida Keys is shown in **Table 3.14**. There is a total of 7,283.8 acres of hammock in the Florida Keys (incorporated areas and mainland hammocks are not included) and they are found in approximate equal proportions in the Upper, Middle, and Lower Keys. Of the total acreage, 75 percent are protected by federal and State ownership and 20 percent are privately-owned.

The structure and composition of tropical hardwood hammocks in the Florida Keys are variable and are influenced by several factors, including fire and hurricane disturbances, local gradients of saltwater influence, surrounding vegetation types, and the elevation and character of the limestone substrate (Snyder et al., 1990). Species composition differs between the Upper, Middle, and Lower Keys (USFWS, 1999; Ross et al., 1992). Because trees are shallow-rooted, hurricanes can seriously damage a hammock by uprooting or breaking the limbs of large trees.

3.11.1.1 Flora of Tropical Hardwood Hammocks

Hammock communities occur as isolated stands of hardwoods or "tree islands". These distinct tree islands consist of broadleaved evergreen hardwood species mainly of a West Indian distribution and are typically surrounded by pinelands or wetland vegetative communities which occur in wetter soils (Tomlinson, 1980; Snyder et al., 1990; Taylor, 1998; USFWS, 1999). They are closely associated with tropical pinelands on the larger keys, most notably on Big Pine Key. The island-like character is most evident on mainland Monroe County, where raised areas among the pinelands and freshwater wetlands harbor hammock forests. In the Keys, the natural topographic configuration of the islands, especially in the Upper Keys, has favored development of large stands of hardwoods (Snyder et al., 1990; Ross et al., 1992).

Table 3.14 – Inventory of Tropical Hardwood Hammock Habitats

Site Name [1]	Total[3]	Ownership[4]							
		Federal	State	County	Non Profit	Cities	Utilities	Private	Species Recorded[5]
Lower Keys									
Bahia Honda State Park			21.5						TS, KD, MR, TC
Florida Keys Wildlife and Environmental Area[2]		0.4	504.4	0.8				12.1	TS, IS, KD, MR, SR, TC
Great White Heron National Wildlife Refuge		216.3	3.5	1.4				3.7	TS, IS, KD, MR, SR, TC
John J. Pescatello Torchwood Hammock Preserve					32.6				TS, IS, KD, MR, TC
Monroe County Managed Areas		0.2	20.0	0.1				0.2	TS, IS, KD, MR, SR, TC
National Key Deer Refuge		1,523.2	155.3	0.5				0.6	TS, IS, KD, MR, SR, TC
Naval Air Station		79.2							TS, IS, MR, SR, TC
Saddle Bunch Keys					2.9				TS, IS, KD, MR, SR, TC
Outside of Parks/Refuges		50.8	126.3	161.3	24.5	1.7		801.0	TS, IS, KD, MR, SR, TC
Lower Keys Total	3,744.5	1,870.1	831.6	164.1	60.00	1.7	0	817.6	
Middle Keys									
Lignumvitae Key Botanical State Park			157.3						TS, IS, TC
Long Key State Park			77.8					0.7	TS, IS, TC
Outside of Parks/Refuges			1.3	2.0				9.6	TS, IS, TC
Middle Keys Total	248.7	0	236.4	2	0	0	0	10.3	

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Table 3.14 – Inventory of Tropical Hardwood Hammock Habitats (continued)

Site Name [1]	Total[3]	Ownership[4]							
		Federal	State	County	Non Profit	Cities	Utilities	Private	Species Recorded[5]
Upper Keys									
Crocodile Lake National Wildlife Refuge		527.6	74.0	1.1				0.9	SS, TS, IS, CM, WR, TC
Crocodile Lake Sanctuary					0.2				SS, TS, IS, CM, WR, TC
Dagney Johnson Key Largo Hammock Botanical State Park		23.5	1,273.7			0.1		1.5	SS, TS, IS, CM, WR, TC
Florida Keys Wildlife and Environmental Area[2]			130.9	0.1				2.6	TS, IS, TC
John Pennecamp Coral Reef State Park			255.2	6.8			0.3[6]	2.2	
Curry Hammock State Park					2.1			2.7	TS, TC
Monroe County Managed Areas			12.9	0.2				0.5	TS, IS, TC
Naval Air Station		18.5	3.4						SS, TS, IS, CM, WR, TC
Tarpon Basin					9.7			0.1	TS, IS, TC
Outside of Parks/Refuges		45.4	161.0	110.7	2.1	1.2		619.4	TS, IS, TC
Upper Keys Total	3,290.6	615.0	1,911.1	118.9	14.1	1.3	0.3	629.9	
Total County	**7,283.8**	**2,485.1**	**2.979.1**	**285.0**	**74.1**	**3.0**	**0.3**	**1,457.8**	

Unincorporated areas only; does not include mainland hammocks.
Footnotes 1-5 are the same as in Table 3.9.
[6] Key Largo Wastewater Treatment

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The drier climate and well-drained soils of the Keys relative to the mainland also allow establishment of well-developed stands of tropical hardwoods, to the virtual exclusion of temperate species. Hammock vegetation on the Keys may include a higher proportion of species which are rare on the mainland, such as milkbark (*Drypetes diversifolia*); lignumvitae (*Guaiacum sanctum*); and princewood (*Exostema caribaeum*). Hammock vegetation may also include many tropical species that are restricted to the Keys, such as pisonia (*Pisonia rotundata*), maidenbush, (*Savia bahamensis*); and cinnecord (*Acacia choriophylla*) (Tomlinson, 1980; Scurlock, 1996).

Early researchers categorized hammocks as "high" and "low" hammocks due to slight differences in their elevations. Recent researchers no longer separate these hammock types due to the high degree of variability among them and their location at the transition between other habitat types (e.g., Pinelands). Many of the species normally occurring in Tropical Hardwood Hammocks are:

Common Name	**Scientific Name**
Torchwood	*Amyris elemifera*
Marlberry	*Ardisia escallanioides*
Crabwood	*Ateramnus lucidus*
Saffon Plum	*Bumelia celastrina*
Willow Bustic	*Bumelia salicifolia*
Gumbo Limbo	*Bursera simaruba*
Locustberry	*Brysonima cuneata*
Spicewood	*Calyptranthes pallens*
Wild Cinnamon	*Canella winterana*
Limber Caper	*Capparis flexuosa*
Snowberry	*Chiococca alba*
Pigeon Plum	*Coccoloba diversifolia*
Buttonwood	*Conocarpus erectus*
Milkbark	*Drypetes diversifolia*
Black Torch	*Erithalis fruticosa*
White Stopper	*Eugenia axillaris*
Spanish Stopper	*Eugenia foetida*
Everglades Velvetseed	*Guettarda elliptica*
Black Ironwood	*Krugiodendron ferreum*
Wild Lantana	*Lantana involucrata*
Wild Tamarind	*Lysiloma latisiliquum*
Wild Dilly	*Manilkara bahamensis*
Poisonwood	*Metopium toxiferum*
Myrsine	*Myrsine floridana*
Lancewood	*Nectandrea coriacea*
Jamaican Dogwood	*Piscidia piscipula*
Cockspur	*Pisonia rotundata*
Black Bead	*Pithecellobium guadalupense*

Common Name	Scientific Name
Long Stalked Stopper	*Psidium longipes*
Wild Coffee	*Psychotria nervosa*
Indigo Berry	*Randia aculeata*
Darling Plum	*Reynosia septentrionalis*
Maidenbush	*Savia bahamensis*
Bahama Nightshade	*Solanum bahamense*
Mahogany	*Swietenia mahogoni*
Tallowwood	*Ximenia americana*
Wild Lime	*Zanthoxylum fagara*

Sources: Snyder et al., 1990 and USFWS, 1999

Many plant species of Tropical Hardwood Hammocks in the County are dominated by species of tropical origin. Many are bird dispersed and only a few (e.g., mahogany) are wind dispersed, which explains their West Indian and Caribbean origins. Many of these species are extremely rare and are listed as threatened or endangered by the State of Florida; few are federally listed, although over 170 species are federally listed as species of concern (USFWS, 1999).

Tropical Hardwood Hammocks on the Florida Keys tend to be drier than those on the mainland because of increased ocean breezes and lowered rainfall. They also have a higher percentage of tropical species in part because many temperate species, such as live oak (*Quercus virginiania*), swamp bay (*Persea palustris*), and sugarberry (*Celtis laevigata*) reach their southern limits on the mainland or in the northern Keys. Many tropical tree species within Florida, such as rough strongbark (*Bourreria radula*) and lignum-vitae (*Guaicum sanctum*) only occur in rockland hammocks of the Keys (FNAI, 2009).

In the Keys, there is a structural difference between the rockland hammocks north and south of Big Pine Key. This is at least partially due to differences in geology, groundwater salinity and rainfall. The surface rock in the northern keys from Soldier Key to Big Pine Key is Key Largo Limestone; the south portion from Big Pine Key to Key West is Miami Oolite. The Key Largo limestone is more permeable than the Miami Oolite and therefore hammocks in the Upper Keys tend to have higher groundwater salinities. Rainfall also decreases from the northern to southern Keys (FNAI, 2009). Much taller, more developed tree canopies (near 35 feet tall) occur in the northern section, while the hammocks in the southern section are a more scrubby, xeric form of rockland hammock which average less than 20 feet tall (Snyder et al., 1990). These often impenetrable hammocks in the southern keys have previously been referred to as "low hammock" or "Keys hammock thicket" (Snyder et al., 1990).

Thorn scrub is one variant of Tropical Hardwood Hammocks that occurs along the ecotone of hammocks with Keys tidal rock barren or Keys cactus barren or within openings in rockland hammock. Thorn scrub is a low-statured scrubby hammock dominated by spiny species such as saffron plum (*Sideroxylon celastrinum*), blackbead (*Pithecellobium*

guadalupense), hog plum (*Ximenia americana*), and other rockland hammock species (Ross et al., 1992; FNAI, 2009).

3.11.1.2 Existing Commercial, Recreational, or Conservation Uses of Tropical Hardwood Hammocks

Since the 1950s, development in coastal uplands of the Keys has resulted in the loss of considerable acreage of tropical hardwood hammocks. This development has occurred throughout the Upper, Middle and Lower Keys and has involved all types of residential, commercial, institutional and government uses.

Most (75 percent) of the remaining tracts of tropical hardwood hammocks in the County (excluding incorporated areas and the mainland) are protected through public or non-profit ownership for conservation purposes (**Table 3.14**). Land acquisition efforts have focused in recent years on the higher quality hammocks. Conservation lands [see Section 3.18 (Areas of Special Concern to Local Government)] with significant tropical hardwood hammock communities are located in:

- Crocodile Lake National Wildlife Refuge;
- Dagney Johnson Key Largo Hammock Botanical State Park;
- Lignumvitae Key State Botanical Site;
- National Key Deer Refuge;
- John Pennekamp Coral Reef State Park;
- Bahia Honda State Park;
- Long Key State Recreation Area;
- Great White Heron National Wildlife Refuge;
- The Nature Conservancy;
- Everglades National Park;
- Florida Keys Land and Sea Trust's Crane Point Hammock; and
- Curry Hammock State Park.

3.11.1.3 Known Pollution Problems and/or Issues Related to Tropical Hardwood Hammocks

Historically, settlers to the Keys in the 1800s and early 1900s lived in and around hardwood hammocks, clearing areas for houses and farming. The majority of hammocks in the Upper Keys were cleared during this time for agriculture, including a large pineapple industry. A hiatus of settlement in the Keys occurred following the 1926 hurricane, which caused great destruction and loss of life, and much of the forest grew back prior to development pressures increased again after World War II.

Man's impact to coastal uplands in the Keys has taken many forms, with both long-term and short-term impacts (Kruer, 1991). Tropical hardwood hammock occurs on prime development property and has become globally imperiled (FNAI, 2009). Disruptive land uses have historically included hardwood and buttonwood logging (for charcoal), and

clearing for railroad beds, roads, agriculture, commercial and residential development and public facilities (Kruer, 1991). Other impacts have resulted from rock pit excavation, dredging of canals, mosquito ditches, plant theft, dumping (especially piles of vegetative and organic debris), mosquito spraying, and regular thinning or mowing of native groundcovers, shrubs and trees (Kruer, 1991).

Large-scale loss and alteration of hammocks has generally occurred on a larger scale in the Upper Keys (Kruer, 1991). Several hundred acres are estimated to have been lost since 1980 in the Upper Keys, including some of the most mature high hammock in North Key Largo (Kruer, 1991). Many parcels that have been protected through land acquisition programs occur as islands within developed and developing lands. This poses management problems in terms of edge effects (e.g., trash dumping, exotic plant infestation, exotic and feral animal control) and loss of the natural ecotone that forms between the tropical hardwood hammocks and the adjacent community. Some plants and animals of hammocks (e.g., tree snails, orchids, and bromeliads) are susceptible to collection pressures and must be protected from collectors. Some of these species have been extirpated from the Florida Keys due to over-collection. Exotic plant species infestations are an ongoing problem in hammocks. Species such as Brazilian pepper (*Schinus terebinthifolius*), lead tree (*Leucaena leucocephala*), seaside mahoe (*Thespesia populnea*), latherleaf (*Colubrina asiatica*), and sapodilla (*Manilkara zapota*) invade and displace native species. Dumping of yard waste can lead to the invasion of species such as bowstring hemp (*Sansevieria hyacinthoides*) and golden pothos (*Epipremnum pinnatum*) (FNAI, 2009).

Tropical hardwood hammocks can be the advanced successional stage of pine rockland, especially in cases where the hammock is adjacent to pine rocklands where hardwood seed rain is high. In such cases, when fire is excluded from pine rocklands for 15 to 25 years, it can succeed to tropical hardwood hammock vegetation that can retain a relict overstory of pine (Snyder et al., 1990). Historically, tropical hardwood hammocks in South Florida evolved with fire in the landscape, which does not proceed into the hammock because of its moist microclimate and litter layer, or a natural moat that can form around hammocks in the Everglades caused by the dissolution of limestone. However, tropical hardwood hammocks are susceptible to damage from fire during extreme drought or when the water table is lowered. In these cases, fire can cause tree mortality and can consume the organic soil layer. Although tropical hardwood hammocks can reestablish within 25 years after fire, maximum development of structure and diversity probably requires more than 100 fire-free years. The ecotone between tropical hardwood hammocks and pine rockland is abrupt when regular fire is present in the adjacent pine rockland. However, when fire is removed, the ecotone becomes more gradual as hardwoods from the hammock push out into the pinelands (FNAI, 2009).

Tropical hardwood hammocks are also sensitive to the strong winds and storm surge associated with hurricanes. Canopy damage often occurs, which causes a change in the microclimate of the hammock. Decreased relative humidity and drier soils can leave tropical hardwood hammocks more susceptible to fire. Fragmentation of hammocks can cause wind turbulence resulting in downed trees. Storm surge associated with Hurricane

Georges overwashed the Cactus Hammock on Big Pine Key, resulting in the loss of the hammock's understory (USFWS, 1999). Sea level rise also threatens hammocks.

3.11.1.4 Potential for Conservation, Use, or Protection of Tropical Hardwood Hammocks

In the Florida Keys, significant areas of tropical hardwood hammocks have been acquired. However, large areas of hammock remain privately owned. Tropical hardwood hammocks are protected by ROGO/NROGO and the Tier Overlay Districts. In addition to these regulations, the LDRs include a requirement to prepare an Existing Conditions Report and require a Conservation Easement on the required open space portions of the property.

Significant work on exotic plant control in tropical hardwood hammocks (as well as other habitats in the Florida Keys) has been completed by the County Land Steward and the Florida Keys Invasive Exotics Task Force. The Task Force is composed of federal, State, and local agencies; non-profits; and public utilities.

Tropical hardwood hammocks can be restored. A large majority of the existing hammocks in the Florida Keys are secondary growth following the abandonment of agriculture and early settlements (Elliott and Rhodes Keys) (USFWS, 1999). However, with the establishment of exotic species, regeneration of hammocks on disturbed lands would need to be accompanied by an aggressive exotic control program.

3.11.2 Pinelands

Pinelands are fire-climax systems dominated by pine trees. Although pinelands formerly existed in the Upper Keys (Alexander, 1953), their occurrence in the County is presently limited to the Lower Keys, primarily on Little Pine Key, Big Pine Key, No Name Key, Cudjoe Key, Sugarloaf Key and on neighboring keys. Because slash pines (*Pinus elliottii* var. densa) do not tolerate high salinities, Ross et al. (1994) found that sea level rise over the last 70 years has caused a reduction in the areal extent of pinelands. More than 50 percent of the ground surface in pinelands is exposed rock. The low rainfall of this area compared to the mainland imposes more xeric conditions but they bay be flooded by saltwater for brief periods (one to three days) when hurricanes pass over the islands (Snyder et al., 1990). This community is often found in association with tropical hardwood hammocks and short hydroperiod freshwater wetland communities. The inventory of pinelands in the Florida Keys is shown in **Table 3.15**. All pinelands are found in the Lower Keys and comprise an area of 1,668.1 acres. Most of the pine lands (72.2 percent) are owned by the federal government in the National Key Deer Refuge. Of the total pinelands, 9.2 percent are privately owned.

Table 3.15 – Inventory of Pineland Habitats

Site Name [1]	Total[3]	Ownership[4]							
		Federal	State	County	Non Profit	Cities	Utilities	Private	Species Recorded[5]
Lower Keys									
Great White Heron National Wildlife Refuge		62.6		0.2					IS, KD, MR, SR
Monroe County Managed Areas			1.3						IS, KD, SR
National Key Deer Refuge		1,128.9	230.5	1.5					IS, KD, MR, SR
Terrestris					8.5				IS, KD
Outside of Parks/Refuges		12.6	2.8	60.8	3.0	1.2[6]		154.2	IS, KD, MR, SR
Lower Keys Total	1,668.1	1,204.1	234.6	62.5	11.5	1.2	0	154.2	
Total County	**1,668.1**	**1,204.1**	**234.6**	**62.5**	**11.5**	**1.2**	**0**	**154.2**	

Unincorporated areas only.

[1] Site names are from the FNAI GIS database.

[2] Florida Keys Wildlife and Environmental Areas are managed by the FFWCC for the preservation of listed species that inhabit mangroves, tropical hardwood hammocks, and salt marshes.

[3] Total in acres.

[4] Ownership information is from the Monroe County Property Appraiser.

[5] Species recorded are those threatened and endangered species recorded by the USFWS for a particular parcel; a blank cell does not necessarily indicate an absence of protected species on that parcel(s).
SS = Schaus Swallowtail Butterfly; TS = Tree Snail; IS = Eastern Indigo Snake; WR = Key Largo Woodrat; CM = Key Largo Cottonmouse; SR = Silver Rice Rat; KD = Key Deer; TC = Tree Cactus

[6] Cities of Marathon and Islamorada

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3.11.2.1 Flora of Pinelands

The most extensive and best developed areas of pinelands remaining in the Keys occur on Big Pine Key. On Big Pine Key, pinelands occupy most of the relatively high elevations on the interior of the island. They are comprised of a north and south section, the occurrence of which conforms quite closely to the outline of two underground freshwater lenses (Stewart, 1989; Ross et al., 1992; Ross et al., 1994). Although mature slash pine (*Pinus elliottii* var. *densa*) stems are able to survive at a mean groundwater salinity of 11 percent, salinities in the most extensive pinelands are 2 to 3 percent (Ross et al., 1992).

Pinelands are several systems that are less easily characterized biotically than climax hardwood hammock. Slash Pine is the canopy dominant and silverpalm (*Coccothrinax argentata*), black-bead (*Pithecellobium keyense*) and the keys thatch palm (*Thrinax morrisii*) are the primary midstory forms. Species composition of the understory is less easily characterized since it changes depending on its fire history (Ross et al., 1992). Understory plants of rather general occurrence in pinelands are saw palmetto (*Serenoa repens*), long-stalked stopper (*Psidium longipes*), pisonia (*Pisonia rotundata*), and locustberry (*Byrsonima lucida*). The ground cover consists of a large number of species including golden creeper (*Ernodea littonalis*), sand flax (*Linum arenicola*), pine pink (*Bletia purpurea*), pine fern (*Anemia adiantifolia*), star rush (*Dichromena floridensis*), and broomsedge bluestem (*Andropogon virginicus*). Several endemic plant species of South Florida are found in the pinelands of the Keys:

Species	**Habitat**	**Range**
Argythamnia blodgettii	Pinelands	Keys and mainland
Cassia keyensis	Pinelands	Endemic to Keys
Chamaesyce deltoidea var. *serpyllum*	Pinelands	Endemic to Keys
Chamaesyce garberi	Pinelands, hammocks, sand dunes	Keys and mainland
Chamaesyce porteriana var. *keyensis*	Pinelands, sand dunes	Endemic to Keys
Chamaesyce porteriana var. *scoparia*	Pinelands	Keys, possibly Big Cypress
Croton arenicola	Pinelands, sand dunes	Keys and mainland
Evolvulus sericeus var. *averyi*	Pinelands	Keys and mainland
Gerardia keyensis (Agalinis)	Pinelands	Endemic to Keys
Linum arenicola	Pinelands	Keys and mainland
Melanthera parvifolia	Pinelands	Keys and mainland
Phyllanthus pentaphyllys var. *floridanus*	Pinelands	Keys and mainland
Schizachyrium sericatum	Pinelands	Endemic to Keys
Tragia saxicola	Pinelands	Keys and mainland

Source: Avery and Loope, 1980

In the absence of fire, pineland understories tend to develop a subcanopy of hardwood species that eventually expands to replace the pine canopy. Ultimately pinelands succeed into hardwood hammocks - a process that may require about 30 to 50 years (Alexander and Dickson, 1972; Ross et al., 1992). This requires a build up of a wet humus layer that will not burn (Tomlinson, 1980). Hardwood hammock species which are early pioneers in

the pinelands include species such as Jamaica dogwood (*Piscidia piscipula*) and poisonwood (*Metopium toxiferum*).

3.11.2.2 Existing Commercial, Recreational or Conservation Uses of Pinelands

Since the 1950s, development in coastal uplands of the Keys has resulted in the loss of considerable acreage of pinelands. On Big Pine Key alone losses are estimated at 50 percent in the last 50 years (Ross, 1989). Development in pinelands has involved all types of residential, commercial, institutional, and government uses. Today, there are approximately 1,668 acres of undisturbed pineland remaining in the Keys. Of these, approximately 72 percent are protected through public ownership for conservation purposes. Most protected pinelands are located within the National Key Deer Refuge.

3.11.2.3 Known Pollution Problems and/or Issues Related to Pinelands

Impacts that affect pinelands are varied and include natural events such as hurricanes and altered fire regime. Man-induced impacts include activities such as land clearing, dredging, ditching, filling, and the introduction of exotic plants. The nature of these impacts depends on the integrity and size of the pineland. Recovery from the impacts depends on the condition, size, and amount of surrounding pinelands, and the type of development on adjacent land.

Pinelands have adapted to hurricanes and fire, the principal natural disturbances in the Keys. If undisturbed, pinelands typically fully recover from such events. Fires are essential to the maintenance of pinelands (USFWS, 2009). Consequently, fire exclusion in pinelands eventually generates a proliferation of hardwood species that culminates in a tropical hardwood hammock climax. Since humans discourage fire in the vicinity of habitations, development tends to reduce the extent of pinelands that receive periodic burning. In the absence of fire, a pineland in the Lower Keys may be replaced by hammock after about 50 years (Alexander and Dickson, 1972; Ross et al., 1992).

The most damaging human impacts on pinelands occur when they are destroyed by clearing. Once cleared, pinelands are unlikely to become reestablished on a development site. It is estimated that approximately one-half of the pinelands present on Big Pine Key in 1935 have been lost to development (Ross, 1989).

Indirect effects associated with drainage alterations and groundwater withdrawals may similarly damage pinelands. Impoundments within pinelands can drastically change the local soil moisture regime and cause the suffocation of roots and the corresponding dieback of plants. The occurrence of pinelands on Big Pine Key, and probably on other Keys, conforms quite closely with the outline of underlying freshwater lenses (Ross, 1989; Ross et al., 1992). Research in the Keys supports the hypothesis that the survival of the pinelands and associated freshwater marshes on Big Pine Key is dependent on maintaining the integrity of the freshwater resource (Ross et al., 1992). Wells penetrate the freshwater lenses on some keys, withdrawing water for domestic and irrigation purposes. These

withdrawals, combined with reductions in recharge brought about by accelerated surface drainage via canals and mosquito control ditches, serve to diminish the freshwater lenses and accelerate saltwater intrusion into them. Sea level rise has been an historic and future concern for the long-term persistence of pinelands in the Keys (USFWS, 1999; USFWS, 2009).

The introduction of invasive exotic plants is a serious problem in pineland communities, as it is in tropical hardwood hammocks [see Section 3.11.1.3 (Known Pollution Problems and/or Issues Related to Tropical Hardwood Hammocks)]. Exotic animals, including feral cats, are another concern for pinelands and their wildlife. Exotic plant control in pinelands has been undertaken by the County Land Steward and the Florida Keys Invasive Exotics Task Force.

3.11.2.4 Potential for Conservation, Use, or Protection of Pinelands

Government acquisition of pinelands has preserved significant areas of the remaining pinelands in the Lower Keys, although some areas of pinelands remain privately owned, especially in Big Pine Key. As discussed for tropical hardwood hammocks and other habitats, undeveloped pinelands are protected by ROGO/NROGO and the Tier Overlay Districts tier lands [see Section 3.19.2.2 (Tier Overlay Ordinance in Big Pine Key and No Name Key)]. The Tier Overlay Ordinance is also used as part of the County's 20-year land acquisition program. In addition to these regulations, the LDR includes a requirement to prepare and Existing Conditions Report and requires a Conservation Easement on uncleared portions of the property.

3.12 **Wildlife** [Rule 9J-5.013(1)(a)5. and (b), F.A.C.]

The Florida Keys encompass a variety of ecologically unique biological communities providing habitat to diverse wildlife populations, including many species endemic to the Keys; several are globally rare and endangered. This section describes the wildlife generally above the mean water line; fauna found in seagrass beds and coral communities are discussed in Sections 3.8.2 (Seagrass Beds) and 3.8.3 (Coral Communities). The biological communities of the Keys include:

Living Marine Resources

- Mangrove forests along the shorelines of the Keys
- Seagrass beds on both sides of the Keys and extending offshore to the Florida Reef Tract (fauna of seagrass beds are discussed in Section 3.8.2.2 (Fauna of Seagrass Beds)
- Coral and hard bottom communities of nearshore and offshore waters, including the Florida Reef Tract (fauna of coral and hardbottom communities are discussed in Section 3.8.3.1.5 (Macrofauna of Coral Communities)

Wetlands

- Transitional wetlands landward of the mangrove fringe and seaward of upland communities

- Beaches (as part of the Beach/Berm Community)
- Salt ponds occupying shallow enclosed basins having restricted tidal influence
- Small freshwater wetlands in freshwater lenses in the Lower Keys

Uplands

- Tropical hardwood hammocks, the climax terrestrial community
- Pinelands, a fire-climax system

3.12.1 Wildlife of the Biological Communities of the Florida Keys

3.12.1.1 Wildlife Typically Inhabiting Mangrove Communities

The mangrove communities of the Keys provide food, cover, spawning, nesting, and resting habitat for many species of mammals, birds, reptiles, amphibians, fish and invertebrates. Many of these species are dependent upon these communities during all or part of their life cycle.

A number of food webs are based on primary production of the mangroves and their associated epiflora and epifauna. Energy flows stemming from mangrove-derived carbon begin their movement through these food webs as detritus, dissolved organic compounds, or as the products of direct grazing. Other pathways involve bacteria, fungi, macroalgae, and phytoplankton associated with mangroves.

A variety of insects and gastropods graze directly upon arboreal leaf material. Simberloff and Wilson (1969) list 200 species of insects that are associated with mangrove communities. Snails (*Littorina* sp., *Cerithidea* sp. and *Melampus* sp.), isopods (*Ligea* spp.), and fiddler crabs (*Uca* spp.) are especially plentiful on the forest floor (Odum and McIvor, 1990).

Mangrove communities also provide feeding, nesting and roosting habitat for numerous wading and fish eating birds. Odum et al. (1982) provides a list of 181 species of birds that use mangroves in South Florida. Among these, the following species are a major component of the avifauna of the Keys:

Common Name	**Scientific name**
Great Egret	*Casmerodius albus*
Snowy Egret	*Egreta thula*
Great White Heron	*Ardea herodias occidentalis*
Great Blue Heron	*Ardea herodias*
Reddish Egret	*Dichromanassa rufescens*
Tricolored Heron	*Hydranassa tricolor*
Green Heron	*Butorides striatus*
Black-crowned Night Heron	*Nycticorax nycticorax*
Yellow-crowned Night Heron	*Nycticorax violcea*
White Ibis	*Eudocimus alba*
Roseate Spoonbill	*Ajaia ajaja*
Double-crested Cormorant	*Pyalacrocorax auritus*

Common Name	Scientific name
Magnificent Frigatebird	*Fregata magnificens*
Osprey	*Paudion haliaetus*
Mangrove Cuckoo	*Coccyzus minor*
Kingbirds	*Tyranus* spp.
Black-whiskered Vireo	*Vireo altiloquus*
Warblers	*Dendroica* spp.
White-crowned Pigeon	*Patagioenas leucocephala*

All of these species nest in mangroves, usually on overwash islands.

A number of terrestrial and aquatic reptiles, amphibians and mammals utilize mangrove habitat. Of the several species of marine turtles that inhabit mangroves, the Atlantic loggerhead (*Caretta*) is relatively common and may use mangroves as nursery areas (Odum et al., 1982). The Atlantic hawksbill (*Eretmochelvs imbricata*) and the Atlantic green turtle (*Chelonia mydas*) are known to feed upon mangrove roots and leaves (Ernst and Barbour, 1972; Carr and Goin, 1955). Other reptiles include several species of snakes and anoles, and the mangrove terrapin. Of the snakes, only one, the mangrove water snake (*Nerodia fasciata compressicauda*), is entirely dependent upon mangrove areas (Florida DNR, 1991a). Amphibians which inhabit mangroves include those which are suitably adapted to reproduce during brief rainy periods and/or which can use brackish pools for reproduction. Two introduced species, the giant toad (*Bufo marinus*) and the Cuban treefrog (*Hyla septentrionalis*), have expanded their range considerably in mangrove areas in the last several decades (King and Krakauer, 1966; King and Krakauer 1968; and Krakauer, 1970).

Mammals which most commonly inhabit mangrove association include the Virginia opossum (*Didelphis virginiana*) and the raccoon (*Procyon lotor*). Generally the opossum is confined to small populations in proximity to human habitations. Both species are extremely versatile omnivores and are known to forage mangrove habitats (Layne, 1974). Other naturally occurring and introduced mammals which may frequent mangroves include the marsh rabbit (*Sylvilagus palustis paludicola*) and several species of rodents.

The most diverse group of organisms inhabiting the mangrove association are the marine organisms. Detritus and plankton are primary food sources for a large number of invertebrate fauna that attach themselves to prop roots, live in adjacent muds, or swim in the water (Odum and McIvor, 1990).

3.12.1.2 Wildlife Typically Inhabiting Salt Marsh and Buttonwood Wetland Communities

Transitional wetlands support a fauna somewhat different from that of mangrove systems, although a number of animals feed in both tidal areas. The most frequently observed invertebrates are various species of insects, mollusks, and crustaceans. Fiddler crabs (*Uca* spp.) are often found where there is adequate soil for burrowing. The grey peanut-snail

(*Cerion incanum*) is often found in large numbers on the marsh floor or climbing through the low-lying vegetation. Hornsnails (*Cerithidea* spp.) are also very common in the marsh.

A number of reptiles and mammals rely on transitional wetlands habitat. Of these, several are designated as rare, endangered or of special State concern, including:

Common Name	***Scientific Name***
Key Deer	*Odocoilius virginianus clavium*
Silver Rice Rat	*Oryzomys argentatus*
Lower Keys Marsh Rabbit	*Sylvilagus palustris hefneri*
Red Rat Snake	*Elapha guttata guttata*

The importance of the Keys' transitional wetlands to wading bird populations has long been recognized by wildlife biologists. Virtually every wading bird species resident in the Keys forages in tidal wetlands. These birds rely on the shallow water areas of the transitional wetlands for feeding during periods of the year when they are unable to feed in their usual feeding areas because the water is too deep for wading. During these periods, the undisturbed transitional wetlands are critical to the survival of many bird species. Among the most common wading birds that feed in transitional wetlands are:

Common Name	**Scientific name**
Roseate Spoonbill	*Ajaia ajaja*
Great White Heron[7]	*Ardea heriodias occidentalis*
Great Egret	*Casmerodius albus*
Little Blue Heron	*Egretta caerulea*
Snowy Egret	*Egretta thula*
Reddish Egret	*Egretta rufescens*
Tricolored Heron	*Egretta tricolor*
Green Heron	*Butorides virescens*
White Ibis	*Eudocimus albus*
Black-crowned Night Heron	*Nycticorax nycticorax*
Yellow-crowned Night Heron	*Nycticorax violacea*
Glossy Ibis	*Plegadis falcinellus*

3.12.1.3 Wildlife Typically Inhabiting Salt Pond Communities

Birdlife is a striking component of salt ponds. Because the water levels in salt ponds can vary throughout the year, euryhaline fish, crustaceans, and benthic fauna tend to concentrate during low water periods. This submerged community provides important

[7] The great white heron was originally described as a distinct species, *Ardea occidentalis*, but is currently known as *A. herodias occidentalis*. It is considered to be the white morph (variation) of the polymorphic great blue heron subspecies, The great white heron contains individuals with all white plumage. Unlike the great blue heron, which is widely distributed throughout North America, the great white heron is restricted to south Florida and parts of the Caribbean. The largest known breeding population (approximately 850 breeding pairs) occurs in the Florida Keys (McGuire, 2002).

foraging for wading birds, shorebirds, and waterfowl, such as wood stork (*Mycteria americana*), great white heron (*Ardea herodias*), reddish egret (*Egretta rufescens*), plovers (*Charadrius* spp.), and roseate spoonbill (*Ajaia ajaja*). The ponds are an important stop for migrating waterfowl such as mergansers (*Mergus serrator*) and blue-winged teal (*Anas discors*), which feed on the seasonal abundance of widgeon grass. Several species are at least partly dependent on salt ponds in the Florida Keys, including the reddish egret and black-necked stilt (*Himantopus mexicanus*) (Kalla, 2000). See Section 3.14 (Fisheries) for a list of fish species common to salt pond communities.

Birds known to use salt ponds as feeding habitat include:

Common Name	**Scientific Name**
Roseate Spoonbill	*Ajaia ajaja*
Blue-winged Teal	*Anas discors*
Great White Heron	*Ardea herodias*
Great Blue Heron	*Ardea herodias occidentalis*
Green Heron	*Butorides virescens*
Dunlin	*Calidris alpina*
Western Sandpiper	*Calidris mauri*
Great Egret	*Casmerodius albus*
Willet	*Catoptrophorus semipalmatus*
Semipalmated Plover	*Charadrius semipalmatus*
Little Blue Heron	*Egretta tricolor*
Tricolored Heron	*Egretta tricolor*
Reddish Egret	*Egretta rufescens*
Snowy Egret	*Egretta thula*
White Ibis	*Eudocimus albus*
Herring Gull (winter only)	*Larus argentatus*
Laughing Gull	*Larus atricilla*
Ring-billed Gull (winter only)	*Larus delawarensis*
Short-billed Dowitcher	*Limnodromus griseus*
Wood Stork	*Butorides virescens*
Yellow-crowned Night Heron	*Nycticorax violacea*
Brown Pelican	*Pelecanus occidentalis*
Black-bellied Plover	*Pluvialis squatarola*
Forster's Tern (winter only)	Sterna*ternaterna forsteri*
Common Tern	*Sterna hirundo*
Royal Tern	*Sterna maxima*
Greater Yellowlegs	*Triga melanoleucus*
Lesser Yellowlegs	*Triga flavipes*

Several species of migratory waterfowl are also known to utilize salt ponds seasonally. Species of *Fundulus*, *Cyprinodon*, and *Poecilia* are the primary food fishes of the rare roseate spoonbill and the white ibis (Kushlan, 1979). Similarly, the rare reddish egret is reported to feed primarily on killifish.

3.12.1.4 Wildlife Typically Inhabiting Freshwater Wetland Communities

Freshwater marshes normally support a highly diverse and abundant fauna that includes fish, invertebrates, amphibians, reptiles, mammals, and birds. Many of these species (common elsewhere in Florida) are relatively rare in the Keys, largely because of the limited number and locations of freshwater resources. During the dry season these marshes are the only natural sources of water for wildlife in the area. They are particularly critical to the reproductive success of animal populations that bear young during the dry season.

Many of the vertebrate and invertebrate fauna listed are locally adapted forms that are biologically distinct and geographically restricted. A partial list of vertebrates (excluding birds) associated with freshwater and non-tidal wetlands on Big Pine Key include:

Common Name	**Species name**
Mammals	
Lower Keys cotton rat [1]	*Sigmodon hispidus exsputus*
Lower Keys rabbit [1]	*Sylvilagus palustris hefneri*
Lower Keys racoon	*Procyon lotor incautus*
Key deer	*Odocoileus virginianus clavium*
Reptiles	
American alligator [1]	*Alligator mississippiensis*
Striped mud turtle [1 2]	*Kinosternon baurii*
Florida box turtle	*Terrapene carolina bauri*
Peninsular cooter [3]	*Pseudemys floridana peninsularis*
Chicken turtle [3]	*Deirochelys reticularia*
Florida softshell turtle [3]	*Trionyx ferox*
Common snapping turtle	*Chelydra serpentina*
Black racer	*Coluber constrictor*
Eastern indigo snake [1]	*Drymarchon corais couperi*
Florida brown snake [1 2]	*Storeria dekayi victa*
Rough green snake	*Opheodrys aestivus carinatus*
Key ringneck snake [1]	*Diadophis punctatus acricus*
Mangrove salt marsh snake	*Nerodia clarkii compressicauda*
Red rat snake [1 2]	*Etaphe guttata guttata*
Penninsula ribbon snake [1 2]	*Thamnophis sauritus sackenii*
Eastern diamondback rattlesnake	*Crotalus adamanteus*
Amphibians	
Oak toad	*Bufo quercicus*
Southern toad	*Bufo terrestris*
Green treefrog	*Hyla cinerea*
Squirrel treefrog	*Hyla squirella*
Little grass frog	*Limnaoedus ocularis*
Cuban treefrog [3]	*Osteopilus septentrionalis*
Narrow-mouthed toad	*Gastrophryne carolinensis*
Southern leopard frog	*Rana utricularia*
Greenhouse frog [3]	*Eleutherodactylus planirostris*

Common Name	Species name
Fishes	
Southern Gulf killifish	*Fundulus grandis saguanus*
Bluegill	*Lepomis macrochirus*
Cichlid [3]	*Cichlasoma cyanoguttatum*
Diamond killifish	*Adinia xenica*
Mosquitofish	*Gambusis holbrokii*
Rainwater killifish	*Lucania parva*
Sailfin molly	*Poecilia latipinna*
Sheepshead minnow	*Cyprinodon variegatus*

[1] Species designated rare, endangered, or of special State concern
[2] Listings and statuses refer to distinctive Lower Keys populations
[3] Species not native to Big Pine Key (i.e., introduced)

An abundant and varied bird population utilizes the freshwater wetlands. In addition to wetland species that are resident in the Keys, a diverse population of migratory bird species utilizes the wetlands and adjacent uplands on a seasonal basis. Sixty-seven species of birds are known to utilize habitat in the freshwater marshes of Big Pine Key (Jackson, 1989). Of these, 43 species are typically resident populations, and 24 species are migratory populations usually present only during winter months. Nine bird species ranked as endangered, threatened or species of special concern occur, including six species found commonly in the marshes and three which are typically rarely present, as follows:

Common Name	Scientific Name
Glossy Ibis	*Plegadis falcinellus*
Roseate Spoonbill	*Ajaia ajaja*
Reddish Egret	*Egretta rufescens*
Snowy Egret	*Egretta thula*
Tricolored Heron	*Egretta tricolor*
Least Tern	*Sterna albifrons*
Caspian Tern	*Hydroprogne caspia*
Bald Eagle	*Haliaeetus leucocephalus*
White crowned Pigeon	*Columba leucocephala*

3.12.1.5 Wildlife Typically Inhabiting Beach/Berm Communities

A variety of terrestrial wildlife is associated with the beach and berm community. Beaches provide nesting areas for a variety of shorebirds, primarily terns, as well as important feeding areas for a variety of shorebirds. Invertebrates, such as insects, amphipods, isopods, crabs, mollusks and worms, which are food for shorebirds, utilize accumulated seaweed and other organic beach debris as habitat. Sea turtles have always been associated with the Florida Keys, particularly with the beaches of the Dry Tortugas.

3.12.1.6 Wildlife Typically Inhabiting Tropical Hardwood Hammock Communities

The environment provided by the flora of tropical hardwood hammocks is a major determinant of the assemblage of animal species that inhabit these communities. Because of their uniqueness and restricted occurrence, tropical hardwood hammocks provide habitat for many endemic or very restricted species, including several species listed as rare, endangered or of special concern.

While amphibians are not abundant in Keys hammocks, many reptiles may be found. These include the Florida box turtle (*Terrapene carolina bauri*), striped mud turtle (*Kinosternon bauri*), the endemic keys mole skink (*Eumeces egregius*), coral snake (*Micrurus fluvius*), eastern diamondback rattlesnake (*Crotalus adamanteus*), key ringneck snake (*Diadophis punctatus acricus*), eastern indigo snake (*Drymarchon corais couperi*), Florida brown snake (*Storeria dekayi victa*), rim-rock crowned snake (*Tantilla oolitica*), the Florida ribbon snake (*Thamnophis sauritus sackeni*) and the red rat snake (*Elaphe guttata*). While some of these reptiles apparently occur throughout the Keys, others are restricted to only a few Keys, such as the coral snake which is limited to the Upper and Middle Keys.

Many species of birds use tropical hardwood hammocks. They are important stopover areas for neotropical migratory birds, especially during inclement weather. Many fuit-eating birds, particularly the white-crowned pigeon depend on tropical hardwood hammocks (USFWS, 2009). Those known to nest in Keys hammocks are:

Common Name	**Scientific Name**
Red-shouldered Hawk	*Buteo lineatus*
Osprey	*Pandion haliaetus*
Mourning Dove	*Zenaidura macroura*
Ground Dove	*Columbigallina passerina*
Mangrove Cuckoo	*Coccyzus minor*
Yellow-billed Cuckoo	*Coccyzus americanus*
Eastern Screech Owl	*Megascops asio*
Chuck Will's Widow	*Caprimulgus carolinensis*
Pileated Woodpecker	*Dryocopus pileatus*
Northern Flicker	*Colaptes auratus*
Red-bellied Woodpecker	*Centurus carolinus*
Gray Kingbird	*Tyrannus dominicensis*
Great-crested Flycatcher	*Myiarchus crinitus*
Carolina Wren	*Thryothorus ludavicianus*
Northern Mockingbird	*Mimus polyglottus*
Brown Thrasher	*Toxostoma rufum*
White-eyed Vireo	*Vireo griseus*
Black-whiskered Vireo	*Vireo altiloguus*
Red-winged Blackbird	*Agelaius phoenicius*
Common Grackle	*Quiscalus quiscula*
Cardinal	*Richmondena cardinalis*

Within the Keys, the range of some of these bird species is quite limited. The pileated woodpecker and Carolina wren, for instance, are known only from Key Largo.

Mammals that use Keys' tropical hardwood hammocks include the following:

Common Name	**Scientific Name**
Opossum	*Didelphis marsupialis*
Gray Squirrel	*Sciurus carolinensis matecumbei*
Racoon	*Procyon lotor*
Lower Keys Marsh Rabbit	*Sylvilagus palustris hefneri*
Hispid Cotton Rat	*Sigmodon hispidus*
Least Shrew	*Cryptotis parva*
Bobcat	*Felis rufus*
Key Largo Wood Rat	*Neotoma floridana smalli*
Key Largo Cotton Mouse	*Peromyscus gossypinus allapaticola*
Key Vaca Raccoon	*Procyon lotor auspicatus*
Key Deer	*Odocoileus virginianus clavium*

3.12.1.7 Wildlife Typically Inhabiting Pineland Communities

Pinelands are utilized as habitat of many animal species, including several forms endemic to the Keys. Endemic reptiles that use the pinelands include:

Common Name	**Scientific Name**
Key Mole Skink	*Eumeces egregius*
Key Ringneck Snake	*Diadophis punctatus acricus*
Florida Brown Snake	*Storeria dekayi victa*
Florida Ribbon Snake	*Thamnophis sauritus sackeni*

The American alligator (*Alligator mississippiensis*) uses pinelands as corridors between freshwater holes. Most of the Key Deer habitat includes pinelands.

3.12.1.8 Offshore Island Bird Rookeries

The backcountry area of Florida Bay contains a large number of bird rookeries, mostly on isolated mangrove islands. These islands are used by a variety of wading birds, shorebirds and marine turtles, including several species designated by the State and/or USFWS as threatened, endangered or of special concern.

The Great White Heron National Wildlife Refuge and the Key West National Wildlife Refuge were established to protect many of these islands, recognizing their wildlife habitat. Approximately 60 islands, not connected by U.S. 1, in the Keys remain in private ownership. These range in size from one acre to several hundred acres. An additional unknown number of offshore islands in Keys' waters are sovereignty lands owned by the State of Florida. A partial inventory of offshore island bird rookeries contained in these refuges is

mapped on the Protected Animal Species Map. Offshore islands which are designated as known habitat for any of the endangered or threatened nesting birds are also identified as rookeries. Many of the islands in the Florida Keys are zoned for protection of the nesting birds by both the National Park Service and the National Wildlife Refuges.

3.12.2 Existing Commercial, Recreational, and Conservation Uses of Florida Keys Biological Communities

Existing uses in each of the biological communities in the Keys are generally discussed in preceding sections of the Conservation and Coastal Management Element, as follows:

Section 3.8.1.3	Mangroves
Section 3.8.2.3	Seagrass Beds
Section 3.8.3.2	Coral Communities
Section 3.9.4.2	Salt Marsh and Buttonwood Wetlands
Section 3.9.6.3	Salt Ponds
Section 3.9.7.3	Freshwater Wetlands
Section 3.10.3	Beach/Berms
Section 3.11.1.2	Tropical Hardwood Hammocks
Section 3.11.2.2	Pinelands
Section 3.12.1.8	Offshore Islands Bird Rookeries

In addition, biological communities support important economic and cultural aspects of the Keys including fishing and ecotourism (including but not limited to birdwatching, diving, and wildlife observation).

3.12.3 Known Pollution Problems and/or Issues Related to Wildlife Communities

Problems and issues related to wildlife in the Keys can be categorized as follows:

- destruction or modification of habitat;
- predation and/or destruction of native wildlife populations;
- direct and indirect disturbances caused by human activities which alter the distribution and behavior of native wildlife populations;
- habitat fragmentation that can result in the physical and reproductive isolation of populations and reduced population viability; and
- introduction of invasive exotic animals

Destruction and modification of habitat has occurred in every biological community in the Keys. The known pollution problems and/or issues related to each community are discussed in preceding sections of the Conservation and Coastal Management Element, as follows:

Section 3.8.1.4	Mangroves
Section 3.8.2.4	Seagrass Beds

Section 3.8.3.3	Coral Communities
Section 3.9.4.3	Salt Marsh and Buttonwood Wetlands
Section 3.9.6.4	Salt Ponds
Section 3.9.7.4	Freshwater Wetlands
Section 3.10.4	Beach/Berms
Section 3.11.1.3	Tropical Hardwood Hammocks
Section 3.11.2.3	Pinelands
Section 3.12.1.8	Offshore Islands Bird Rookeries

In general, habitat losses and degradation include the following:

- loss of wetland and upland habitats to development;
- degradation of nearshore water environments due to dredge and fill, water pollution, and recreational boating activities;
- habitat contamination due to widespread aerial application of mosquito control chemicals;
- fire suppression or infrequent fires;
- habitat fragmentation; and
- sea level rise.

Predation and/or destruction of native wildlife occur as a result of a variety of factors, many of which are common to all habitat types. These include:

- Natural Destruction
  - Hurricanes
  - Wildfires
- Predation by Native Populations
  - Nesting site predation, particularly by raccoons
  - Hatchling predation, particularly by raccoons
  - Adult predation
- Predation by Non-Native Wildlife Populations
  - Nest destruction by free-roaming pets and non-native animals
  - Destruction of young and adults by free-roaming pets and non-native animals
- Predation by Humans
  - Egg collection
  - Deliberate nest destruction
  - Deliberate human persecution (shooting/trapping/vandalism)
  - Commercial exploitation for the pet trade
  - Overcollection
  - Poaching
- Accidental Death
  - Boat collisions
  - Incidental catch
  - Entanglement in fishing gear

  - Highway mortality, particularly along the "eighteen mile stretch" segment of U.S. 1, Card Sound Road and in Big Pine Key
  - Accidental drowning in artificial waterbodies (canals and mosquito control ditches)
- Activities Altering Distribution and Behavior
  - Hand feeding resulting in loss of fear for man and vehicles
  - Human disturbances during courtship and nesting periods
  - Installation of fencing
  - General human harassment on land (by residents and visitors) and on the water (by divers, boaters, swimmers, fishermen and snorkelers)

3.12.4 Potential for Conservation, Use, or Protection of Wildlife Communities

The potential for conservation, use, or protection of habitat in each of the biological communities in the Keys are discussed in preceding sections of the Conservation and Coastal Management Element, as follows:

Section 3.8.1.5	Mangroves
Section 3.8.2.5	Seagrass Beds
Section 3.8.3.4	Coral Communities
Section 3.9.4.4	Salt Marsh and Buttonwood Wetlands
Section 3.9.6.5	Salt Ponds
Section 3.9.7.5	Freshwater Wetlands
Section 3.10.8	Beach/Berms
Section 3.11.1.4	Tropical Hardwood Hammocks
Section 3.11.2.4	Pinelands
Section 3.12.1.8	Offshore Islands Bird Rookeries

Other actions which could be taken by the County to generally protect its wildlife populations include the following:

- Adoption of a requirement for an environmental impact assessment for all major development proposals [see Section 3.13.2.3 (Revisions to the Land Development Regulations to Protect Designated Species)];
- Stepped-up enforcement of animal control laws [see Section 3.13.2.6 (Protection from Free-Roaming Domestic Pets)];
- Stepped-up enforcement of animal feeding laws [see Section 3.13.2.7 (Protection from Deliberate and Inadvertent Feeding)];
- Adoption of an exotic wildlife species ordinance [see Section 3.13.2.8 (Protection from Exotic Plant and Animal Species)];
- Increased acquisition of undisturbed habitats, especially those properties that could create wildlife corridors, reverse fragmentation, and/or create larger preserves;
- Creation of new or additional wildlife corridors; and
- Development and implementation of a sea level rise adaptation plan for at-risk species.

3.13 Threatened and Endangered Species [Rule 9J-5.013(1)(a)5. and (b), F.A.C.]

3.13.1 Occurrences of Threatened and Endangered Species

Biological communities in the Florida Keys have evolved in response to unique island environmental conditions characterized by salt water, hot sun, dry seasons and hurricanes. Extreme environmental conditions combined with the isolation of the island archipelago have supported colonization and evolution of highly specialized plants and animals. Today, many are endemic to the Keys; others are limited to a relatively small geographic area on this continent. Populations of species in the Keys have evolved to the point of representing unique races or subspecies, existing nowhere else in the world (Ross, 1989; Lazell, 1989; Myers and Ewel, 1990).

Vertebrates of the Florida Keys largely represent a subset of those species that occur in temperate mainland North America, particularly the Florida Peninsula (Ross, 1989). In contrast, the plants of the Florida Keys exhibit a substantial floral component derived from the tropics (Lazell, 1984; Myers and Ewel, 1990; Lodge 2005).

Two major focal points exist for the unique forms of vertebrates and plants in the Florida Keys: Key Largo and Big Pine Key. These are the two largest keys, possessing the greatest diversity and habitat area. Big Pine Key also is characterized by the only extensive perennial freshwater resources for wildlife (Ross, 1989; USFWS, 2006).

The occurrence of threatened and endangered species was provided by the USFWS and is recorded in a GIS database. The methods used to inventory threatened and endangered species within the Florida Keys are described in Section 3.8 (Living Marine Resources). **Table 3.16** presents a list of species designated as endangered, threatened or of special concern by the following organizations: FFWCC, FDACS, and USFWS.

Table 3.16 identifies the types of habitat typically used by each animal species for feeding, resting, and nesting, as well as the approximate range for each species within the Keys. Habitats for plant species are from Chapin (2000). A summary of the endangered and threatened species recorded in the County is shown in **Table 3.17**.

Map Series 3.5 depicts documented sightings, total known range, and/or concentrated range within the Upper, Middle and Lower Keys, for the primary State or federally-designated listed species. Information was obtained from the USFWS, updated in April 2010. For the remaining threatened or endangered vertebrates and invertebrates, habitat data from the land use cover maps can adequately predict potential habitat for listed species. Plant occurrences are not mapped to protect the species from disturbance. However, the land use maps adequately identify suitable habitat for these species. Most protected plant species are known from pinelands and tropical hardwood hammock.

Table 3.16 - List of Threatened and Endangered Species in Monroe County[1]

Common Name	Species Name	Designated Status[2]			Habitat[6]									Keys Range
		FFW CC[3]	USFWS [4]	FDA CS[5]	P	H	W	M	S/B	FW	SG	B/B	CR	
Insects														
Schaus' swallowtail butterfly	*Heraclides anstodemus ponceanus*	E	E		BFR									North Key Largo
Mollusks														
Stock Island tree snail	Orthalicus reses reses		T			BFR								Stock Islalnd (other populations introduced)
Fish														
Gulf sturgeon	*Acipenser oxyrinchus desotoi*	SSC					F							Florida Bay in cold winters
Key silverside	*Menidia conchorum*	T					FR				BFR			Big Pine Key, Cudjoe Key, Key West
Smalltooth sawfish	*Pristis pectinata*		E											Florida Bay
Key blenny	*Starksia starcki*	SSC											BFR	Looe Key, south of Big Pine Key
Amphibians and Reptiles														
American alligator	*Alligator mississippiensis*	SSC	T(S/A)			B	F	F		BF				Little Pine Key to Boca Chica Key (inclusive)
Atlantic loggerhead	*Caretta caretta caretta*	T	T				FR	F			F	B	F	Lower Matecumbe to Lower Keys (nesting); all marine waters
Atlantic green turtle	*Chelonia mydas mydas*	E	E				FR				F	B		All marine waters
American crocodile	*Corcodylus acutus*	E	T			B	FR	F	F			BR		Key Largo, Plantation Key, Florida Bay, Little Pine to Big Torch Keys (inclusive), Johnstown Key, Sugarloaf Key
Leatherback turtle	*Dermochelys coriacea*	E	E				FR							All marine waters
Key ringneck snake	*Diadophis punctatus acricus*	T			BFR	BFR				BFR				No Name Key to Sugarloaf Key (inclusive)
Eastern indigo snake	*Drymachron corais couperi*	T	T		BFR	BFR	BFR	F	F	F	F	BFR		Key Largo, Plantation Key, No Name Key to Sugarloaf Key (inclusive)
Red rat snake	*Elaphe guttata guttata*	SSC[7]			BFR	BFR		FR						Lower Keys
Atlantic hawksbill turtle	*Eretmochelys imbricate*	E	E				FR				F	B	F	All marine waters
Florida mole skink	*Eumeces egregius egregius*	SSC			BFR	BFR								Key Largo to Key West
Striped mud turtle	*Kinosternon baurii baurii*	E			BFR	BFR			FR	BFR				Seven Mile Bridge to Key West (northern populations not protected)
Kemp's ridley turtle	*Lepidochelys kempii*	E	E				FR				FR			All marine waters
Florida brown snake	*Storeria dekayi victa*	T[7]			BFR					BFR				Long Key, No Name Key to Sugarloaf Key (inclusive)
Rim rock crowned snake	*Tantilla oolitica*	T			BFR	BFR								Key Largo to Grassy Key (inclusive)
Peninsula ribbon snake	*Thamnophis sauritus sackenii*	T[7]			FR	FR		FR	FR	BFR				No Name Key to Sugarloaf Key (inclusive)
Birds														
Roseate spoonbill	*Ajaia ajaja*	SSC				R		BFR	RF					Breeds in Florida Bay; otherwise universally present throughout the Keys
Cape Sable seaside sparrow	*Ammodramus maritimus mirabilis*	E	E							BFR				Everglades National Park and Big Cypress National Preserve; Cape Sable marshes
Limpkin	*Aramus guarauna*	SSC					FR	FR		FR				Universally throughout the County
Burrowing owl	*Athene cunicularia*	SSC			BFR	BFR								Patchy distribution; open grassy areas
Snowy plover	*Charadrius alexandrinus*	T										FR		Middle Keys; Big Pine Key; Florida Bay
Piping plover	*Charadrius melodus*	T	T									FR		Key Largo; Florida Bay
White-crowned pigeon	*Columba leucocephala*	T			FR	FR		BR		FR				Universally throughout the County
Little blue heron	*Egretta caerulea*	SSC				FR				FR				Universally throughout the Keys
Reddish egret	*Egretta rufescens*	SSC				FR				FR				Universally throughout the Keys
Snowy egret	*Egretta thula*	SSC				FR				FR				Universally throughout the Keys
Tricolored heron	*Egretta tricolor*	SSC				FR				FR				Universally throughout the Keys
White ibis	*Eudocimus albus*	SSC					FR	FR		FR				Universally throughout the County
Southeastern American kestrel	*Falco sparverius paulus*	T			FR	FR		FR	FR	FR		FR		Universally throughout the Keys
Florida sandhill crane	*Grus Canadensis pratensis*	T								FR				Mainland
American oystercatcher	*Haematopus palliates*	SSC					F					BFR		Universally throughout the County
Wood stork	*Mycteria americana*	E	E			FR	FR	FR	FR	FR				Key Largo, Florida Bay, Pig Pine Key, Long Key
Osprey	*Pandion haliaetus*	SSC[8]					F			BFR	R			Universally throughout the Keys
Brown pelican	*Pelecanus occidentalis*	SSC					F	BR						Universally throughout the Keys
Red-cockaded woodpecker	*Picoides borealis*	T	E		BFR									Mainland

Table 3.16 - List of Threatened and Endangered Species in Monroe County[1] (continued)

Common Name	Species Name	Designated Status[2]			Habitat[6]									Keys Range
		FFWCC[3]	USFWS[4]	FDACS[5]	P	H	W	M	S/B	FW	SG	B/B	CR	
Black skimmer	*Rynchops niger*	SSC					F	R	R		F	R		Universally throughout the Keys and mainland (winter migrant)
Least tern	*Sterna antillarum*	T					F				F	BR		Universally throughout the Keys
Roseate tern	*Sterna dougallii*	T	T				F					BR		Universally throughout the Keys
Bachman's warbler	*Vermivora bachmanii*	E	E											May be extinct
Mammals														
Key Largo wood rat	*Neotoma floridana smalli*	E	E			BFR								North Key Largo, Lignumvitae Key (introduced)
Key deer	*Odocoileus virginianus clavium*	E	E		FR	BFR		FR	F	F		FR		Spanish Harbor Bridge to Boca Chica (inclusive)
Silver rice rat	*Orysomys argentus*	E	E					BFR	BFR	BFR		BFR		Little Pine Key to Saddlebunch Key (inclusive)
Key Largo cotton mouse	*Peromyscus gossypinus allapaticola*	E	E			BFR								North Key Largo, Lignumvitae Key (introduced)
Florida panther	*Puma concolor coryi*	E	E		BFR									Everglades National Park and Big Cypress National Preserve
Lower Keys marsh rabbit	*Sylvilagus palustris hefneri*	E	E						BFR	FR				Big Pine Key to Boca Chica (inclusive)
Florida manatee	*Trichechus manatus*	E	E				BFR				BFR			All marine waters
Florida black bear	*Ursus americanus floridanus*				BFR									Everglades National Park and Big Cypress National Preserve
Corals														
Staghorn coral	*Acropora cervicornis*		T										BF	Florida Keys National Marine Sanctuary
Elkhorn coral	*Acropora palmata*		T										BF	Florida Keys National Marine Sanctuary
Pillar coral	*Dendrogyra cylindrus*	E	E										BF	John Pennecamp Coral Reef State Park (Florida Keys National Marine Sanctuary)
Plants[9]														
Meadow jointvetch	*Aeschynomene pratensis*			E						X				Marl prairie and cypress domes on mainland
Blodgett's wild mercury	*Argythamnia blodgettii*		C	E	X	X								Pine rockland and rockland hammock
Pineland strongbark	*Bourreria cassinifolia*			E	X	X								Pine rockland and rockland hammock
Fewflower holdback	*Caesalpinia pauciflora*			E	X									Pine rockland
Myrtle-of-the-river	*Calyptranthes zuzygium*			E		X						X		Rockland hammock and coastal berm
Small-flowered lilythorn	*Catesbaea parviflora*			E	X							X		Pine rockland and coastal strand
Big Pine partridge pea	*Chamaecrista lineata var. keyensis*		C	E	X									Pine rockland
Deltoid spurge	*Chamaesyce deltoidea*		E	E	X									Pine rockland
Garber's spurge	*Chamaesyce garberi*			T	X	X						X		Pine rockland, hammock edges, coastal rock barrens, grass prairies, beach ridges and swales
Key's Tree Cactus	*Pilosocereus robinii*			E										
Porter's sandmat	*Chamaesyce porteriana*		C	E	X	X						X		Pine rockland, rockland hammock, coastal rock barrens, marl prairie
Yucatan flymallow	*Cienfuegosia yucatanensis*			E		X			X			X		Coastal rock barrens, coastal hammocks, salt marsh
Cuban shakebark	*Colubrina cubensis*			E	X	X								Rockland hammock and pine rockland
Florida cupania	*Cupania glabra*			E		X								Tropical hardwood hammock of lower keys
Florida prairie-clover	*Dalea carthagenensis*			E	X	X								Pine rockland and rockland hammock
Small-fruited varnishleaf	*Dodonaea elaeagnoides*			E	X	X								Pine rockland and rockland hammock
Coker's beach creeper	*Ernodea cokeri*			E	X									Pine rockland
Red stopper	*Eugenia rhombea*			E		X								Rockland hammock
Cape Sable thoroughwort	*Eupatorium frustratum*			E	X	X						X		Pine rockland, rockland hammock, coastal rock barrens
Grisebach's bindweed	*Evolvulus grisebachii*			E	X									Pine rockland
Princewood	*Exostema caribaeum*			E	X									Pine rockland
Lignum vitae	*Guaiacum sanctum*			E	X									Pine rockland
False boxwood	*Gyminda latifolia*			E		X								Tropical hardwood hammock of middle keys
Manchineel	*Hippomane mancinella*			E		X						X		Coastal berms and hommocks inland of mangrove zone
White ironwood	*Hypelate trifoliate*			E		X								Pine rockland
Florida Keys indigo	*Indigofera mucronata var keyensis*			E		X						X		Coastal berm, coastal rock barrens, rockland hammock edges
Skyblue clustervine	*Jacquimontia pentanthos*			E	X	X						X		Pine rockland, rockland hammock edges, coastal rock barren

Table 3.16 - List of Threatened and Endangered Species in Monroe County[1] (continued)

Common Name	Species Name	Designated Status[2]			Habitat[6]									Keys Range
		FFWCC[3]	USFWS[4]	FDACS[5]	P	H	W	M	S/B	FW	SG	B/B	CR	
Sand flax	*Linum arenicola*		C	E	X				X					Pine rockland, marl prairie
Semaphore cactus	*Opuntia corallicola*		C	E					X					Buttonwood zone between rockland hammock and coastal swamp
White-flowered passionvine	*Passiflora multiflora*			E		X								Tropical hardwood hammock
Pale passionflower	*Passiflora pallens*			E		X						X		Rockland hammock, coastal berm
Low peperomia	*Peperomia humilis*			E		X						X		Shell mounds and limestone outcrops in mesic hammocks, coastal berms, and cypress swamps
Florida peperomia	*Peperomia obtusifolia*			E	X	X								Rockland hammock and tropical hardwood hammock
Key tree cactus	*Pilocereus robinii*		E	E		X								Openings in tropical hardwood hammock, cactus hammock, and thorn scrub
Smooth devil's-claw	*Pisonia rotundata*			E	X	X								Pine rockland and rockland hammock
Long-stalked stopper	*Psidium longipes*			T	X	X								Pine rockland and rockland hammock
Bahama wold coffee	*Psychotria ligustrifolia*			E		X								Pine rockland hammock
Mistletoe cactus	*Rhipsalis baccifera*			E		X		X						Branches of trees in rockland hammock and mangrove
Bahama maidenbush	*Savia bahamensis*			E	X	X								Pine rockland and rockland hammock
Pride-of-Big-Pine	*Strumpfia maritime*			E	X							X		Pine rockland edges, upper dunes
Everglades pencil-flower	*Stylosanthes calcicola*			E	X							X		Transition between pine rockland and marl prairie
Pearl berry	*Vallesia antillana*			E		X						X		Rockland hammock and coastal berm
American bird's nest fern	*Asplenium serratum*			E		X								Tropical hardwood hammock and cypress swamps (mainland)
Narrow strap fern	*Campyloneurum angustifolium*			E		X								Tropical hardwood hammock and cypress swamps (mainland)
Wedgelet fern	*Odontosoria clavata*			E	X									Pine rockland
Carters' orchid	*Basiphyllaea corallicola*			E	X	X								Pine rockland and rockland hammock
Many-flowered catopsis	*Catopsis floribunda*			E	X									Tropical hardwood hammock and cypress swamps (mainland)
Cowhorn orchid	*Cyrtopodium punctatum*			E	X				X					Buttonwood wetlands, cypress swamps (mainland), occasionally pine rocklands
Dollar orchid	*Encyclia boothiana*			E		X			X					Rockland hammock and buttonwood forests
Clamshell orchid	*Encyclia cochleata*			E		X			X					Rockland hammock and buttonwood forests
Night-scented orchid	*Epidendrum nocturnum*			E		X								Tropical hardwood hammock
Fuchs' bromeliad	*Guzmania monostachia*			E		X								Tropical hardwood hammock and cypress swamps (mainland)
Dancing-lady orchid	*Oncidium undulatum*			E		X			X					Tropical hardwood hammock, buttonwood forests, and cypress swamps (mainland)
Southern ladies'-tresses	*Spiranthes torta*			E	X	X								Pine rockland, rockland hammock, and marl prairie
Wormvine orchid	*Vanilla barbellata*			E	X	X		X						Pine rockland, rockland hammock, and cypress swamp (mainland)

1 Including mainland areas of Monroe County
2 E = Endangered; T = Threatened; T(S/A) – Threatened due to similarity of appearance; SSC = Species of Special Concern; C = Candidate Species
3 Florida Fish and Wildlife Conservation Commission
4 U.S. Fish and Wildlife Service
5 Florida Department of Agriculture and Consumer Services
6 Habitat Notes:

P = Pineland	M = Mangroves	SG = Seagrass Beds
H = Tropical Hardwood Hammock	S/B = Salt Marsh and Buttonwood	B/B = Beach Berm
W = Open Water (freshwater and salt ponds)	FW = Freshwater Wetlands	CR = Coral Reef
X = Occurrence		
B = Breeding	F = Feeding	R = Resting/Roosting

7 Applicable to Lower Florida Keys only
8 Applicable to Monroe County only
9 Habitat information from Chafin, 2000.

Table 3.17 Summary of Threatened and Endangered Fauna and Flora in Monroe County

Status Designation [1]	Inverte brates	Fish	Amphibians and Reptiles	Birds	Mammals	Plants	Total
USFWS							
Endangered	2	1	4	4	7	2	20
Threatened	3	1	3	2	0	0	9
Threatened (S/A)	0	0	1	0	0	0	1
Total	5	2	8	6	7	2	30
FFWCC							
Endangered	3	0	6	3	7	-	19
Threatened	0	1	5	8	0	-	14
Species of Special Concern	0	2	3	12	0	-	17
Total	5	3	14	19	7		50
FDACS							
Endangered	-	-	-	-	-	53	53
Threatened	-	-	-	-	-	2	2
Commercially Exploited	-	-	-	-	-	0	0
Total						55	55

[1] Designations same as in Table 3.9

3.13.2 General Recommended Conservation Actions for Protection of Threatened and Endangered Species

3.13.2.1 Mapping and Data Collection for Designated Species

For species that have received local attention, such as key deer, the County's database and reference materials are fairly extensive. Data for designated species have been entered into the GIS database. Occurrence data is plotted on specific parcels for which occurrences have been recorded, particularly for plants. This assists in evaluation of wildlife impacts associated with development proposals on specific properties.

3.13.2.2 Coordination with Federal and State Agencies

State agencies responsible for protection of State-designated species include FFWCC and FDACS. The USFWS is the primary federal agency responsible for protection of federally-designated terrestrial species, including preparation of recovery plans. The NMFS is responsible for the protection of marine species that are not regulated by FFWCC. The FKNMS Management Plan and the Habitat Conservation Plan (HCP) at Big Pine Key and No Name Key are examples of cooperation among federal, State, and county agencies to protect endangered and threatened species.

The County should continue to work cooperatively with USFWS, FFWCC, and FDACS to promote the recovery of designated wildlife species. The County should cooperate with these agencies to locate potential introduction sites for designated species, particularly for those which are federally- or State-listed. The County should assist, to the extent that it is able, with acquisition of reintroduction sites and sites having known populations of designated species. The County Biologist should participate in development of new

recovery plans and revisions to old recovery plans for federally-designated species. When State or federal agencies undertake specific recovery actions in the County, the County should support these activities as appropriate through public education, law enforcement, and data collection.

3.13.2.3 Revisions to the Land Development Regulations to Protect Designated Species

The County adopted comprehensive plan amendments in early 2005, which established the development regulation strategy for the Tier Overlay Ordinance. The Tier Overlay Ordinance is a method of directing growth away from protected species habitats. This approach eliminates the previous Habitat Evaluation Index[8] system, which was used to determine upland habitat quality.

3.13.2.4 Management Guidelines for Landowners

Many recovery plans for federally-designated species identify the need for public education regarding activities detrimental to habitat and populations of these species. Education is typically needed to inform local residents in critical habitat areas regarding applicable federal and/or State law as well as design and management guidelines for land development and property management.

The County should develop brief information brochures for use by developers and landowners within critical habitat areas to inform them regarding activities disruptive or harmful to specific wildlife species. As appropriate for each species, the guidelines should address items such as feeding, free-roaming domestic pets, noise, traffic, fencing, pesticide applications, invasive exotic species, and other threats. Existing laws and penalties for their violation should be identified. Guidelines should be made available to the general public.

3.13.2.5 Protection from Free-Roaming Domestic Pets

Dog- and cat-related deaths of protected populations are serious threats to the recovery of many designated species. This is typically the most frequent cause of man-induced mortality for some species, particularly small mammals. The problem is exacerbated as residential development increases in proximity to habitats of designated species. Presently in the County there is inadequate funding to support animal protection efforts at the level required to adequately safeguard these populations throughout the Keys.

[8] The Habitat Evaluation Index (HEI) added points for habitat presumed to provide refuge for listed animal species. However, the HEI was found to be flawed since it did not always completely reflect the role of a parcel within an overall system. Subsequently, the Tier Overlay Ordinance was developed to examine lands as an ecosystem, and the HEI is no longer used to assess habitat value under ROGO/NROGO.

To address this problem, the County Biologist should work cooperatively with the Animal Control Department to develop and implement an animal control plan. This plan should identify areas within the County where priority should be placed in enforcing animal control laws so as to protect native wildlife populations, particularly listed species. These priorities should be reviewed periodically. The Animal Control Department should be responsible for addressing the long-term staffing, facility and financial requirements to support implementation of the plan.

3.13.2.6 Protection from Deliberate and Inadvertent Feeding

In addition to natural foods, some species forage on materials provided by humans. This can be deliberate feeding such as when humans provide hand-outs to wildlife, or inadvertent feeding such as when wildlife rummage through garbage cans and litter.

Deliberate or inadvertent feeding of wildlife is harmful for many reasons, but primarily because it lessens their fear of humans. Key Deer can be found foraging in yards and on the sides of most roads where they eagerly approach people and slow moving vehicles for hand-outs. Illegal roadside feeding contributes to road kills which account for 70 percent of the annual mortality of Key Deer. Illegal feeding also causes a concentration of wildlife, facilitating the spread of parasites and disease (http://myfwc.com/ WILDLIFEHABITATS/ SpeciesInfo_KeyDeer.htm). Public feeding is usually centered in areas of high human concentrations such as subdivisions. These developments expose the wildlife to human-related accidents such as entanglement in wire or other debris, accidental drowning in canals, and harassment and attacks by dogs. Also, supplementing the natural diet with unnatural foods may have adverse effects on the health of the animals (http://www.fws.gov/ southeast/pubs/nkdgen1.pdf).

A major source of inadvertent feeding is when wildlife rummage through garbage cans. Not only does this directly impact protected species that feed on the trash, but it increases the population of free-roaming domestic and feral pets (cats and dogs) and raccoons that prey on protected species such as the lower keys marsh rabbit and the silver rice rat.

State regulations implemented by the FFWCC make feeding Key Deer a misdemeanor offense. Federal law prohibits the feeding of wildlife on the Florida Keys National Wildlife Refuges (http://www.fws.gov/southeast/pubs/nkdgen1.pdf).

3.13.2.7 Protection from Exotic Plant and Animal Species

Escape of non-native plant and animal species into the general environment can have devastating impacts on naturally native plant and animal species. In the extreme, the proliferation of invasive plants such as Australian pine (*Casuarina equisetifolia*) and Brazilian pepper (*Schinus terebinthifolius*) shows of the extent to which non-native plant material can invade and degrade natural biological communities.

The County prohibits the planting of some highly invasive exotic plants throughout the County and should continue in its efforts to educate the public of the need to remove invasive plant materials from existing developed areas. The LDRs requires that all areas of disturbance be managed to avoid the introduction and/or establishment of invasive exotic plant species. In addition, certain invasive exotic plant species are required to be removed from development parcels (Section 118-7(4)(5). The definition should be expanded to include additional species of invasive plants that have become a problem in the Keys.

The spread of the Burmese python and the red lionfish (among others) into the Florida Keys demonstrates the need to address the introduction of exotic wildlife. The County Biologist is a partner with the Florida Keys Invasive Exotics Task Force. The County should consider adoption of an invasive exotic wildlife ordinance which shall prohibit and/or restrict the sale and handling of listed undesirable exotic species.

3.13.2.8 Recovery Activities which could be Implemented by Monroe County for Protection of Federally-Designated Threatened and Endangered Species

Many recovery activities could be implemented by the County to prohibit the destruction of federally-designated threatened and endangered species and to protect their habitat. Sections 3.13.3 through 3.13.25 below generally describe the status, distribution and habitat of the federally-designated plants and animal. Also included are a summary of the reasons for decline of these species in the County and a list of recovery activities that could be implemented for each species by the County. Many of these are adapted from USFWS (1999).

3.13.2.9 Recovery Activities which could be Implemented by Monroe County for Protection of State-Designated and Locally Rare Species

In addition to the federally-designated species, the Florida Keys provide habitat to plant and animal species designated by the State as threatened or endangered, commercially exploited plants, and species of special concern. There are many plant and animal species in the Florida Keys which while not designated as threatened or endangered at the State or federal level are considered locally rare. The County, in conjunction with federal and State agencies, FNAI, and the Institute for Regional Conservation, has developed lists of locally rare plant and animal species.

3.13.2.10 Actions to Protect Designated Plants, Locally Rare Plants, Champion Trees, Specimen Trees and Mature Native Trees

Section 118-8 of the LDRs does not allow disturbances to champion trees, specimen trees or plants listed by the FDACS as threatened or endangered. Specimen trees are defined as those having a diameter at breast height (dbh) that is greater than seventy-five percent of the record tree of the same species for the State of Florida.

Current county policy requires that development be sited to minimize impacts on species designated by FDACS (**Table 3.16**), and native trees with dbh of four inches or greater. Similar protection is needed for species which are designated as locally rare [see Section 3.13.2.10 (Recovery Activities which could be Implemented by Monroe County for Protection of State-Designated and Locally Rare Species)]. In those instances where an applicant can demonstrate that avoidance of such species or trees is not possible by clustering or by an alternate design approach, then such species and trees must be relocated or replaced with nursery stock of the same species or equally rare species suitable to the site pursuant to a transplantation plan approved in accordance with Section 118-8 (transplantation plan). The removal of any listed threatened, endangered, commercially exploited, and regionally important native plant species and all native trees with a dbh greater than four inches requires payment to the Monroe County Environmental Land Management and Restoration Fund in an amount sufficient to replace each removed plant or tree on a 2:1 basis. The number, species, and sizes of trees and plants to be mitigated is identified in an existing conditions report approved by the County biologist in accordance with the minimum size requirements set forth in Section 114-101.

3.13.3 Schaus' Swallowtail Butterfly (Heraclides aristodemus ponceanus)

3.13.3.1 Status, Distribution, and Habitat Description

The Schaus' swallowtail butterfly is endemic to southeastern Florida and the Florida Keys. Historically, the Schaus' swallowtail was collected from mainland areas around what is now Miami to Lower Matecumbe Key. Its present range is believed to be restricted to undisturbed tropical hardwood hammocks in Miami-Dade County and northern Key Largo to Elliott Key (USFWS, 2006).

Tropical hardwood hammocks are the exclusive habitat of the Schaus' swallowtail butterfly. The eggs are laid almost exclusively on the host plant torchwood (*Amyris elemifera*), although oviposition has been observed on wild lime (*Zanthoxylum fagara*) (Baggett, 1982; Loftus and Kushlan, 1982). Tropical hardwood hammocks and torchwood are found in the Lower Keys and other areas and have been occasionally observed (USFWS, 1999).

The adult butterflies usually emerge between late April and early June for the flight period that lasts about three weeks (Baggett, 1982). The rarity and short flight period of the Schaus' swallowtail mean that comprehensive surveys or potential habitat are logistically impractical. As a result, population estimates remain uncertain. However, it is clear that the range of the species has shrunk, within historic periods, from its previous coverage to Upper Key Largo and various keys within Biscayne National Park. The actual numbers have always been very low, with year to year fluctuations (USFWS, 1999). From 1973 to 1984, the Schaus' swallowtail was in dramatic decline, with individuals located on three keys in Biscayne National Park and one individual on north Key Largo (Emmel, 1986). In 1985 the population began to reestablish itself. In 1986, the Elliott Key population was

between 750 and 1,000 adults, with small populations of 50 to 80 adults and immatures on each of Old Rhodes, Totten, and Adams Keys (Emmel, 1986).

3.13.3.2 Reasons for Decline and Recovery Activities for the Schaus' Swallowtail Butterfly

Several factors have contributed to the decline in populations of the Schaus' swallowtail butterfly (USFWS, 1999). Reasons for decline in the Florida Keys are summarized as follows:

- Destruction or modification of habitat
  - Disruption and destruction of tropical hardwood hammock habitat
- Predation and/or destruction
  - Widespread aerial application of insecticides by the Florida Keys Mosquito Control District
  - Overcollecting
  - Natural factors (weather, predation, parasitism, etc.)

The most important Schaus' swallowtail butterfly habitat is protected within the Key Largo Hammock Botanical Site. The County's LDR and ROGO/NROGO protects the habitat, which is generally located in lands protected by the Tier Overlay System. Because of these efforts, the threat of occupied habitat loss from development and mosquito spraying on North Key Largo is low. The population is distributed throughout North Key Largo and is apparently viable (USFWS, 2006).

3.13.4 Stock Island Tree Snail (Orthalicus reses reses)

3.13.4.1 Status, Distribution, and Habitat Description

Historically, Stock Island tree snails occurred only on Stock Island and Key West. Today, populations of snails occur throughout the Keys in hardwood hammocks. The majority of suitable habitat is now unoccupied. The USFWS has current records of 28 populations in the Florida Keys, many believed to be populations distributed by collectors. The Stock Island tree snail was listed as threatened by the USFWS in July 1978 because of population declines, habitat destruction and modification, pesticide use, and over-collecting. Since its original listing, this threatened snail was thought to have been eliminated from its historic range on Stock Island by habitat destruction; however, snails were observed there in the botanical garden (USFWS, 2006). The Stock Island tree snail is found only in tropical hardwood hammocks. It feeds on algae and lichens on the trunks and limbs of native and non-native trees in hammocks. Foraging occurs at night during the rainy season from June through December (USFWS, 1999; USFWS, 2006). During other times of year it is in aestivation, attached to trees by a hard mucous seal. The snails are hermaphroditic but crossbreeding between individuals is required for successful reproduction. The snails do not reproduce until 2 to 3 years of age. Eggs are laid in cavities burrowed at the base of trees.

3.13.4.2 Reasons for Decline and Recovery Activities for the Stock Island Tree Snail

Several factors have contributed to the decline in populations of the Stock Island tree snail (USFWS, 1999). These are summarized as follows:

- Destruction or modification of habitat
  - Disruption and destruction of hammock habitat
- Predation and/or Destruction
  - Widespread aerial application of insecticides
  - Overcollecting
  - Natural factors (weather, predation/parasitism, etc.)

The greatest threat to the Stock Island tree snail is the loss and modification of its habitat, although natural disasters such as hurricanes and drought can have a significant effect. Loss of habitat from development has been a factor thought to have potentially affected the Stock Island tree snail, although much suitable habitat is currently unoccupied. The current range of the Stock Island tree snail includes tropical hardwood hammocks throughout the Keys where collectors and conservationists have relocated the species. Sites at John Pennekamp Coral Reef State Park, Key Largo Hammock State Botanical Site, and the Everglades National Park are publically owned. Other areas are privately owned and are subject to human disturbance.

The County's LDR and ROGO/NROGO protects the tropical hardwood habitat for the Stock Island tree snail. Its habitat located on privately-owned hammock parcels is protected by the Tier Overlay System.

3.13.5 Corals

3.13.5.1 Status, Distribution, and Habitat Description

Three species of the branching corals *Acropora* spp. exist in the Florida Keys: staghorn coral (*Acropora cervicornis)*, elkhorn coral (*A. palmata)*, and fused staghorn coral (*A. prolifera)*, a hybrid of the two. They are branching corals and are important reef building species. They are found typically in shallow water in high-energy zones with a lot of wave action. Too much wave action (major storms) can cause branching corals to break. However, fragmentation via branch breakage is one method of reproduction. They have a relatively high growth rates for corals and exhibit branching morphologies that provide important habitat for other reef organisms. They can tolerate salinity extremes but thrive in normal salinities (33 to 37 parts per thousand). They are typically found in water temperatures from 66°F to 86°F. Some degree of stress is experienced at water temperatures greater than 2 to 3°F cooler or warmer than normal for an extended period.

Pillar coral (*Dendrogyra cylindrus*) form colonies of cylindrical pillars without secondary branching to approximately 3 feet tall. They are one of the few types of hard coral whose

polyps can commonly be seen feeding during the day. They are found in shallow depths (6 to 60 feet deep) on flat to gently sloping areas in warm, clear, nutrient-poor marine waters along the Continental Shelf. They are found from Miami to the Marquesas Keys although their occurrence is rare (Hipes et al., 2001).

3.13.5.2 Reasons for Decline and Recovery Activities for Corals

Many stresses can affect corals, both natural and human induced:

- land based sources of pollution, such as runoff;
- sewage discharge;
- dredging and coastal development can increase nutrient levels;
- sediment loading;
- turbidity;
- high and low temperatures; and
- damage from boats, anchors, divers, and fishing gear.

Runoff can also reduce oxygen levels and possibly introduce pathogens. Excess nutrients allow large fleshy algae (macroalgae) to proliferate and overgrow corals. Pathogens may cause diseases in corals such as white-band disease and white pox/patchy necrosis, which are thought to be two of the most significant causes of mortality to Atlantic acroporids. Climate change, associated with increased water temperature, may cause coral bleaching. Ocean acidification is reducing coral growth rates. Overfishing has caused a reduction in number of important predatory fishes such as groupers; reduction in number of predatory fishes can possibly lead to an increase in organisms that prey on acroporids, such as the short coral snail, fireworm, and damselfish. Furthermore, without a healthy herbivorous fish population, macroalgae growth limits the recovery of stressed corals and the settlement of new baby corals to replace those that have been lost from disease, bleaching, predation, and overgrowth.

In May 2006, the United States listed elkhorn coral and staghorn coral as threatened under the Endangered Species Act due to their widespread decline throughout their Caribbean range. Although numerous factors such as habitat degradation, storm and anchor damage, coral bleaching and competition have contributed to the *Acropora* decline, coral disease was identified as the major cause of coral loss throughout the region. The widespread decline changed many reefs from three-dimensional dense thickets to flat rubble areas. Pillar coral is State listed as endangered because of its extreme rarity.

The FKNMS, the largest coral reef management entity in the region, has developed a management plan for the Sanctuary's corals that includes protective activities, such as water quality monitoring, zoning, channel markings, and restoration efforts [see Section 3.8.3.4 (Potential for Conservation, Use, or Protection of Coral Communities)]. Restoration activities have included efforts to re-attach *Acropora* fragments generated by ship groundings and hurricane events; these efforts have had mixed success. Other restoration efforts have included attempts to culture and settle coral larvae with very limited success.

New techniques for restoring *Acropora* are currently being pursued. Such new techniques involve enhancing sexual recruitment, reestablishing ecological roles within reef systems (e.g., herbivorous urchins), and other methods for controlling predators and disease. Protection of pillar coral is the continued enforcement of the ban on collection of coral.

3.13.6 Smalltooth Sawfish (Pristis pectinata)

3.13.6.1 Status, Distribution, and Habitat Description

The smalltooth sawfish is found between the Caloosahatchee River and the Florida Keys. Juvenile smalltooth sawfish generally inhabit the shallow coastal waters of bays, banks, estuaries, and river mouths, particularly shallow mud banks and mangrove habitats. Larger animals can be found in the same habitat, but are also found offshore. Florida Bay has been designated as part of its critical habitat. Little is known about the life history of these animals, but they may live up to 25 to 30 years, maturing after about 10 years. However, large individuals (greater than 79 inches) have been collected near the Marquesas Keys (NMFS, 2006).

3.13.6.2 Reasons for Decline and Recovery Activities for Smalltooth Sawfish

The primary reason for the decline of the smalltooth sawfish population has been commercial and recreational fisheries bycatch. The secondary reason is habitat loss and degradation. Other threats to the species include entanglement in marine debris, injury from saw removal, pollution, and disturbance of natural behavior by divers and other marine activities (NMFS, 2006).

Research on smalltooth sawfish is contributing to the development of conservation measures and the increased knowledge is being used to formulate management actions. Research efforts are focused within the National Marine Fisheries Service, Everglades National Park, Mote Marine Laboratory, FFWCC's Fish and Wildlife Research Institute, and the Rookery Bay National Estuarine Research Reserve. Habitat within the Florida Keys for the smalltooth sawfish is protected within the FKNMS and the State aquatic preserves.

3.13.7 Marine Turtles

3.13.7.1 Status, Distribution, and Habitat Description

Marine turtle nesting season in the Florida Keys generally lasts from April through October. Turtles will use most sandy beach areas. While five species of turtles are found in marine waters off the Keys, the Atlantic loggerhead is the most common turtle which uses the beaches of the Keys for nesting.

3.13.7.1.1 Atlantic Loggerhead (Caretta caretta caretta)

The loggerhead turtle is a marine species found world-wide in temperate and subtropical waters. It nests in the United States on sandy beaches from Florida to North Carolina. The loggerhead is highly migratory. Adult females return to the same beach to re-nest in several years and tagged animals have been recaptured up to 1,500 miles from the site of trapping (USFWS, 1999; Hipes et al., 2001). The loggerhead is an omnivorous species consuming both plant and animal material. Its primary foods include mollusks, crustaceans, and other marine animals. In the Keys, loggerheads can be expected in all waters and marine habitats. The loggerhead is the only species of marine turtle which regularly utilizes Florida Keys beaches for nesting and egg laying. In recent years nesting has been documented on Lower Matecumbe Key, Long Key, Coco Plum Beach, Bahia Honda Beach, Big Munson Key, Sawyer Key, and Lower Sugarloaf Key.

3.13.7.1.2 Atlantic Green Turtle (Chelonia mydas)

The green turtle is a marine species that occurs throughout the Caribbean Sea, the Gulf of Mexico and the South Atlantic waters of the Bahamas and the islands of the West Indies. The green turtle is highly migratory. Adults of both sexes travel to waters off nesting beaches where mating occurs, and the females then come ashore to lay eggs. The hatchlings then return to the sea and eventually travel to the feeding grounds which may be quite distant from the nesting beaches (USFWS, 1999). The green turtle is primarily herbivorous, its main food being turtle grass (*Thalassia testudium*). The extensive seagrass beds in County waters represent important feeding habitat for this species (Zieman, 1982). Green turtles nest regularly on beaches in the Keys (Lazell, 1989).

3.13.7.1.3 Leatherback Turtle (Dermochelys coriacea)

The leatherback turtle is the most pelagic of the marine turtle species. It is a worldwide species with nesting beaches in the tropics and sub-tropics, but it is often observed in more northern waters. The leatherback is a carnivorous species whose primary food is jellyfish. It nests on sandy beaches from April to August when the females lay eggs. After 55 to 74 days the eggs hatch and the young return to the sea (USFWS, 1999). In recent years nests have been observed on beaches from Miami to Flagler County on the Atlantic coast of Florida (Lund, 1978). Today, leatherbacks are scarce in Keys' waters (Lazell, 1989). There are no recent records of nestings on beaches of the Florida Keys.

3.13.7.1.4 Atlantic Hawksbill Turtle (Eretmochelys imbricata)

The hawksbill turtle is a marine species that occurs in tropical oceans worldwide. It nests on beaches scattered throughout its range, and spends most of its life in coastal waters. The hawksbill is considered omnivorous, feeding on mollusks, crustaceans and marine algae (Lund, 1978). In Florida, the hawksbill is most often observed near coral reefs (Lund, 1978). Nesting is infrequent (1 to 4 per year) but recorded from Volusia County to the Marquesas. Some small island nesting beaches are on federal lands, especially the Key West National Wildlife Refuge (Hipes et al., 2001).

3.13.7.1.5 Kemp's Ridley Turtle (Lepidochelys kempi)

The Kemp's ridley turtle is a marine species that primarily inhabits the Gulf of Mexico but is also found in the Caribbean Sea and the Atlantic Ocean. Nesting is restricted to the beaches of northern Mexico and southernmost Texas; there are no records of nesting in Florida. The ridley turtle is omnivorous, feeding on invertebrates, fish, and marine plants. In the Florida Keys, it would be found in nearshore waters, mangrove creeks, and bays.

3.13.7.2 Reasons for Decline and Recovery Activities for Marine Turtles

Several factors have contributed to the decline in populations of marine turtles (Lazell, 1989; Myers and Ewel, 1990; Hipes et al., 2001; U.S. Department of Commerce, 2007). Reasons for decline in the Florida Keys are summarized as follows:

Destruction or Modification of Habitat

- Beach nesting site disturbances
  - Invasive plants (impenetrable root structures)
  - Artificial lighting (from adjacent development)
  - Mechanical beach cleaning
- Water quality degradation
  - Nearshore water pollution
  - Marine litter
  - Dredge and fill
- Seagrass bed destruction
- Damage from recreational boating

Predation and/or Destruction

- Nesting site predation
  - Native wildlife populations
  - Free-roaming domestic pets
- Human disturbance (egg collecting/nest destruction)
- Recreational boating
- Incidental catch

Section 118-12(k)(6) of the LDRs prohibits seawalls, bulkheads, riprap or other shoreline hardening structures waterward of any portion of any beach berm complex which is known to be or is potential nesting area for marine turtles, as determined by the county biologist, the State, and/or other appropriate agencies.

Recovery activities which could be implemented by the County to prohibit the destruction of marine turtles and to protect their habitat include:

- Acquisition of undisturbed beach/berm areas regularly used as marine turtle nesting sites;

- Restoration of publicly-owned beaches. The county LDRs state that restoration of lawfully altered beach berms may be undertaken in cooperation of the FDEP to restore turtle nesting habitat. Restoration is required for beaches altered without authorization ;
- Continuation of LDRs applicable to existing and new development;
  - Prohibit activities disruptive to marine turtles and to their nesting habitat
  - Restrict artificial lighting
  - Restrict mechanical beach cleaning
  - Protect marine turtles from predation by human activities and free-roaming pets
- Continuation of LDRs, applicable to new development;
  - Restrict new beachfront lighting
  - Require setbacks from turtle nesting sites
  - Require restoration of beaches
  - Restrict shoreline hardening activities
- Adoption of speed controls in nearshore waters and/or creation of a boating restricted or boating protection zone;
- Support for establishment of an oil response team for the Florida Keys;
- Coordination with USFWS and FDEP to determine additional protection measures which could be implemented by the County;
- Enforcement of existing State regulations prohibiting the molesting or harming of endangered species (Chapter 39, F.A.C.); and
- Implementation of management strategies for water quality protection consistent with the FKNMS Water Quality Protection Plan.

3.13.8 American Crocodile (Crocodylus acutus)

3.13.8.1 Status, Distribution, and Habitat Description

The American crocodile is found in several areas of tropical coastal swamps throughout the Caribbean basin and the Pacific coast of Central and South America. In the U.S., it occurs from Biscayne Bay on the east coast of Florida to the Ten Thousand Islands on the west coast, although the breeding habitat is much more restricted. Crocodiles are primarily found within Everglades National Park, on mangrove islands in Florida Bay, and at Turkey Point in Biscayne Bay (Hipes et al., 2001). The Florida Keys are located within the critical habitat for the American crocodile. Critical habitat for the species includes all of Florida Bay, extending from Turkey Point on the north to Long Key on the south.

The American crocodile inhabits coastal waters, with a preference for protected bays and sounds, and adjacent mangrove swamps. It utilizes man-made bodies of water such as canals and borrow pits, if conditions are suitable. It requires loose soils above the elevations of tides for its nest sites where the females lay eggs. Natural nesting sites are usually located on beaches or the waterward areas of tropical hardwood hammocks. Deep water access for the adult female close to a potential nest site appears to be a requirement for nesting (Ogden, 1978a). It may utilize dredge spoil for nesting sites, if conditions are favorable. Nesting activity begins in April when the females re-work nest sites or establish

new ones. The females lay 20 to 80 eggs in late April or early May; the young hatch in late July or early August and are dug out by an adult, presumably the female (Ogden, 1978b).

The bay side of Upper Key Largo is crocodile habitat because there are suitable nesting sites close to extensive areas of undisturbed habitat. In contrast, the mainland side of Barnes Sound and other areas have sufficient feeding habitat but no suitable nesting sites (Ogden, 1978a). The distribution during the non-nesting period can vary among years because adults can disperse great distances. However, the majority are observed in the vicinity of core nesting areas near Biscayne and Florida Bays (USFWS, 1999).

3.13.8.2 Reasons for Decline and Recovery Activities for the American Crocodile

Several factors have contributed to the decline in populations of the American crocodile (USFWS, 1999). Reasons for decline in the Florida Keys are summarized as follows:

Destruction or Modification of Habitat:
- Habitat loss of mangrove and nearshore habitat
- Water quality degradation
- Nearshore water pollution
- Marine litter
- Dredge and fill

Predation and/or Destruction:
- Habitat alteration and/or destruction
- Nesting site predation
    - Native wildlife populations
    - Human disturbance (egg collecting/nest destruction)
    - Hatchling predation by native wildlife populations, particularly raccoons
- Highway mortality along the "Eighteen Mile Stretch" segment of U.S. 1 and along Card Sound Road
- Commercial and net fishing in Florida Bay
- Historic commercial harvesting

Indirect Disturbances:
- Human disturbances during courtship and nesting periods
- Stochastic events such as cold temperatures, tropical storms, and hurricanes
- Salinity changes

Recovery activities which could be implemented by the County to prohibit the destruction of the American crocodile and to protect its habitat include:

- Coordination with USFWS and FFWCC to determine additional protection measures which could be implemented by the County
- Public education concerning human disturbances during courtship and nesting periods

- Adoption of speed controls in nearshore waters and/or creation of a boating restricted or boating protection zone
- Support for establishment of an oil response team for the Florida Keys
- Implementation of management strategies for water quality protection consistent with the FKNMS Water Quality Protection Plan.

Most lands that are inhabited by the American crocodile are located in Tier I lands. This habitat is generally protected by the County's LDR and ROGO/NROGO Tier Overlay System [see Section 3.19.8 (Protection of Threatened and Endangered Species, including the Habitat Conservation Plan (HCP) for Big Pine Key and No Name Key)].

3.13.9 American Alligator (Alligator mississippiensis)

3.13.9.1 Status, Distribution, and Habitat Description

The American alligator occurs throughout Florida and the southeastern United States from Texas to North Carolina, and up the Mississippi basin as far as Arkansas and Oklahoma. Alligators are reproductively active in the Florida Keys (Jacobsen, 1983). Current population counts for the Keys are not known but population numbers have increased since protections began in the 1960s.

Alligators have been sighted in recent years on Cudjoe Key, Middle Torch Key, Big Pine Key, and Little Pine Key. The primary habitats of alligators are freshwater wetlands and fresh waterbodies. In the Keys, the most extensive freshwater wetlands occur on Big Pine Key, where habitat has actually been enhanced for alligators by the excavation of approximately 100 miles of mosquito-control ditches. These ditches provide connections for alligators to move between freshwater areas, as well as increased food supplies (Jacobsen, 1983). The greatest population occurs on Big Pine Key in the vicinity of the Blue Hole in the National Key Deer Refuge (Weiner, 1979; Jacobsen, 1983; Lazell, 1989; U.S. Department of Commerce, 2007). Nests are typically constructed of vegetation piled above the reach of water. Alligators in the Lower Keys have also been observed in marine habitats (Jacobsen, 1983).

3.13.9.2 Reasons for Decline and Recovery Activities for the American Alligator

Several factors have contributed to the decline in populations of the American alligator. Reasons for decline in the Florida Keys are summarized as follows:

Destruction or Modification of Habitat:
- historic loss of freshwater wetland habitat

Predation and/or Destruction:
- nesting site predation
  - native wildlife populations
  - human disturbance (egg collecting/nest destruction)
  - hatchling predation by native wildlife populations, particularly raccoons

- historic commercial harvesting.

A number of activities have contributed to the recovery of the American alligator. Because the greatest concentrations are on Big Pine Key, alligator holes and ponds may be important refuges for other animals during periods of drought and the maintenance of these ponds plays an important role in preserving the health of the area's wetlands. However, the species remains threatened by the loss of freshwater and wetland habitats and human interactions (poaching, road kills, and removals) (U.S. Department of Commerce, 2007).

3.13.10 Eastern Indigo Snake (Drymachron corais couperi)

3.13.10.1 Status, Distribution, and Habitat Description

The eastern indigo snake is found throughout Florida and southeast Georgia. Disjunct populations may be present in South Carolina, Alabama and Mississippi (USFWS 1999; USFWS, 2006). In the Keys, eastern indigo snakes have been collected from Big Pine and Middle Torch Keys and are reliably reported from Big Torch, Little Torch, Summerland, Cudjoe, Sugarloaf, and Boca Chica Keys (Lazell, 1989). Since surveys have not been conducted in the Keys, the eastern indigo snake may occur on other keys as well (USFWS, 2006). No critical habitat has been designated for the eastern indigo snake.

The indigo snake is a generalized predator and will eat any vertebrate small enough to be overpowered, such as small mammals, birds, lizards, frogs and other snakes, including venomous species (Kochman, 1978; Lazell, 1989; USFWS, 2006).

In the Keys and south Florida the indigo snake utilizes a number of habitats including tropical hardwood hammocks, slash pinelands, beach/berm systems, freshwater wetlands, tidal mangroves, transitional habitats and disturbed lands recolonized by non-native vegetation (Kochman, 1978; Steiner et al., 1983; Hipes et al., 2001). It appears to prefer the more upland habitats, but it also has been observed swimming in both fresh and saltwater. It is not found in developed lands, mangroves, salt marsh, and deep-water areas (Steiner et al., 1983).

No population estimates exist for south Florida, but anecdotal accounts from field researchers indicate that observations of the eastern indigo snake are rare. The average range of the eastern indigo snake is 11.9 acres during the winter (December-April), 106.0 acres during late spring early summer (May-July), and 240.7 acres during late summer and fall (August- November). Adult male eastern indigo snakes have larger home ranges than adult females and juveniles; their ranges may encompass as much as 553 acres and 390 acres in the summer (USFWS, 2006).

3.13.10.2 Reasons for Decline and Recovery Activities for the Eastern Indigo Snake

Several factors have contributed to the decline in populations of the eastern indigo snake (USFWS, 1999). Reasons for decline in the Florida Keys are summarized as follows (Lazell, 1989):

- Destruction or modification of habitat
  - loss of habitat to development
  - degradation of habitat due to human disturbance and interference with natural burn cycles and natural succession
  - decline of gopher tortoise populations
- Predation and/or destruction
  - commercial exploitation for the pet trade
  - highway mortality
  - deliberate human persecution

It appears that the eastern indigo snake has always been rare in the Keys and that their preferred habitat lies further north on the mainland. At the time of its listing as a threatened species, the main factor in the decline of the eastern indigo snake was attributed to exploitation for the pet trade. Because of effective law enforcement, the pressure from the collectors has declined, but remains a concern. In the Keys, the primary threat to the eastern indigo snake is habitat loss and fragmentation due to development. Residential housing is also a threat because it increases the likelihood of snakes being killed by property owners and free-roaming pets (USFWS, 2006)

The eastern indigo snake is one of the protected species included under HCP for Big Pine Key and No Name Key. Activities to prohibit the destruction of the eastern indigo snake and to protect its habitat have been addressed in this plan. However, indigo snakes have not been documented on Big Pine Key in recent years despite the presence of suitable habitat (USFWS, 2006). Elsewhere in the Keys, undeveloped eastern indigo snake habitat is generally protected by the County's LDR and ROGO/NROGO Tier Overlay System [see Section 3.19.8 (Protection of Threatened and Endangered Species, including the Habitat Conservation Plan for Big Pine Key and No Name Key)].

3.13.11 Southern Bald Eagle (Haliaeetus leucocephalus)

3.13.11.1 Status, Distribution, and Habitat Description

The bald eagle has been federally and State delisted. However, the species continues to be protected under the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act. In Florida, it continues to be protected under the State's newly enacted bald eagle rule, F.A.C. 68A-16.002 Bald Eagle (*Haliaeetus leucocephalus*). The Florida bald eagle rule is very similar to the federal Bald and Golden Eagle Protection Act.

It is a water-dependent species and is found near coastal areas, bays, rivers, lakes, or other bodies of water that provide concentrations of food sources. Nesting and breeding activities occur year round. Eagles often nest in tall trees such as pines. In the Keys they

will also nest in mangroves, particularly on overwash mangrove islands. Eggs are normally laid in winter. Eleven nests are known from the County; two are located near Big Cypress Swamp on the mainland. The other nine are located in the Lower Keys (http://www.myfwc.com/eagle/eaglenests/nestlocator.aspx). Exact nest locations are known but have not been mapped to discourage disturbance.

3.13.11.2 Reasons for Decline and Recovery Activities for the Southern Bald Eagle

The federal and State protection measures will help ensure that Florida's eagle population either remains stable or increases throughout the State. The County's LDR and ROGO/NROGO adequately protects eagle habitat, which is generally located in lands protected by the Tier Overlay System.

3.13.12 Wood Stork (Mycteria americana)

3.13.12.1 Status, Distribution, and Habitat Description

The wood stork is a tropical and sub-tropical wading bird that occurs in Mexico, Central America, South America, and the southern United States. Historically there were breeding colonies from Texas to South Carolina, but the range has shrunk to Florida and southeastern Georgia (Ogden, 1978c; Hipes et al., 2001; USFWS, 1999).

The wood stork inhabits freshwater and brackish coastal wetlands. It nests in cypress or mangrove trees. Nesting colonies form in November through January, and the offspring fledge before seasonal rains begin in June (Ogden, 1978c). There are several large rookeries in Everglades National Park, including Madeira Rookery (Ogden et al., 1978), which is approximately 15 miles from the nearest point on Key Largo.

The wood stork feeds on small fish captured in shallow water (6 to 10 inches deep) by a specialized behavior known as tacto-location (Ogden, 1978c). The wood stork is dependent, to a much greater degree than other wading birds, on a highly concentrated supply of fish for food, especially during the November-May nesting period (Kushlan et al., 1975). The main food species include sailfish mollies (*Poecillia latipinna*) and marsh killifish (*Cypridon veriegatus*) which are common species in the mangrove swamps of the mainland and the Keys (Ogden et al., 1978).

The wood stork is only an occasional visitor to the Florida Keys. Its primary habitat is on the Florida mainland. There are no nesting colonies in the Keys. The mangrove areas of Key Largo are utilized as feeding habitat only rarely by wood storks, which appear to favor mainland areas. However, wood storks have been observed to fly 80 miles from their nests to feeding grounds (Ogden et al., 1978), making it possible for them to utilize mangrove areas on Key Largo. Therefore, loss of Key Largo mangrove areas could cause a loss of wood stork feeding habitat within range of a known nesting site.

The wood stork populations have declined drastically in Florida (and throughout its range). This is due to water management practices that limit foraging habitat, especially during the breeding season. Prognosis of the wood stork population is partially dependent on the success of the overall South Florida ecosystem restoration effort to restore the quantity, quality, timing, and distribution of freshwater flows in Everglades wetlands so that the prey base will be recovered in the estuarine and freshwater systems (USFWS, 1999).

3.13.12.2 Reasons for Decline and Recovery Activities for the Wood Stork

The generally accepted explanation for the decline of the wood stork is the reduction in the food base attributed to the loss of wetland habitat and changes in hydroperiod in the interior wetlands of south Florida (USFWS, 1999). Although Wood Stork does range into the Florida Keys for foraging and roosting, rookeries are not present. No management actions have been identified as County recovery action for the Wood Stork in the Florida Keys.

3.13.13 Bachman's Warbler (Vermivora bachmanii)

3.13.13.1 Status, Distribution, and Habitat Description

The Bachman's warbler is the rarest of all American warblers. The last sighting in Florida was reported in 1977 and it is not reported to breed in Florida (USFWS, 1999). Historically these warblers nested in the interior United States from Missouri to Virginia and migrated, passing through the Florida Keys, to their wintering habitat in Cuba. If any Bachman's warblers remain, they would be found in the mangroves and hardwood hammocks, primarily in the Lower Keys, during from July through September (Lazell, 1989).

3.13.13.2 Reasons for Decline and Recovery Activities for the Bachman's Warbler

Shooting for its plumage has been the suggested cause of the decline of the Bachman's warbler (Lazell, 1989; USFWS, 1999). The USFWS has prepared a recovery plan for the Bachman's warbler. The County has not identified any recovery actions. In the unlikely event that any Bachman's warblers survive, existing County ROGO/NROGO regulations prohibiting development in mangroves and current acquisition programs for hardwood hammocks would serve to protect habitat in the Keys used by this species during its early spring and late summer migration.

3.13.14 Piping Plover (Charadrius melodus)

3.13.14.1 Status, Distribution, and Habitat Description

The piping plover is a small shorebird. There are three populations in the United States, including those on sandy beaches of the east coast of North America, in the Great Lakes region, and riverine systems in the Northern Great Plains. The east coast population breeds on sandy beaches from Newfoundland to South Carolina.

Piping plovers do not nest in the Florida Keys but individuals from the three breeding populations winter from North Carolina to Key West. In the Florida Keys, the stretch from the Seven Mile Bridge to Bahia Honda is utilized as wintering grounds (USFWS, 1999). A major wintering ground is the wetlands system on Ohio Key, which has been acquired by the USFWS. Available data suggest that the entire Atlantic Coast population has been decreasing since 1955 or earlier (USFWS, 1999).

3.13.14.2 Reasons for Decline and Recovery Activities for the Piping Plover

Several factors have contributed to the decline in populations of the piping plover (USFWS, 1999). Specific studies of wintering grounds in the Keys have not been undertaken. Nevertheless, it has been suggested that the factors affecting the population in its wintering grounds are as follows (USFWS, 1999):

Destruction or Modification of Habitat:
- loss of habitat to development, shoreline stabilization structures, and dredging

Predation and/or Destruction:
- human disturbance in wintering habitats

Piping plovers in the Florida Keys congregate on wintering grounds on Ohio Key. The County has designated this wintering ground as an Area of Critical County Concern (ACCC), explicitly for purposes of protecting the piping plover habitat. Section 106-9 of the LDRs explicitly limits future uses on Ohio Key to 20 recreational vehicle parking spaces or campsites. This land is now under public ownership although the County should retain existing LDR restrictions, which limit land uses and establish wildlife habitat protection measures for the piping plover on the Atlantic-side portion of Ohio Key.

3.13.15 Roseate Tern (Sterna dougallii)

3.13.15.1 Status, Distribution, and Habitat Description

The roseate tern is a nearshore bird that occurs on both sides of the Atlantic. Other subspecies occur in the tropical Indian Ocean and western Pacific. Along the Atlantic coast of North America nesting occurs from Nova Scotia to Virginia, in the Florida Keys and in the West Indies (Robertson, 1978).

The roseate tern is piscivorous, plunge-diving for small fish up to four inches in length in nearshore waters (Robertson, 1978). Nesting occurs on the bare shell/sand of beaches, broken coral heaps, and eroded open limestone in open unvegetated areas (U.S. Department of Commerce, 2007). Nesting usually begins in late May or early June. Keys' nests usually contain two eggs. The incubation period is 21 days. Fledging occurs about one month after hatching and the young may be fed by adults for several more months (Robertson, 1978). The birds at the largest nesting colony in the Keys and the Dry Tortugas leave by early September (Robertson, 1978).

Over the past two decades, roseate terns have been reported to nest at various locations in the Keys, including the Dry Tortugas, Coco Plum Beach, islands off the Seven Mile Bridge, spoil islands in Key West Harbor, and the Molasses Reef Dry Rocks (Roberston, 1978; U.S. Department of Commerce, 2007).

3.13.15.2 Reasons for Decline and Recovery Activities for the Roseate Tern

The USFWS has not completed nor scheduled completion of a recovery plan for the southeastern population of the Roseate Tern (northeastern population has been completed; USFWS, 1999).

Recovery activities which could be implemented by the County to prohibit the destruction of the roseate tern and to protect its habitat include:

- Identification of historic nesting sites in the Upper, Middle, and Lower Keys;
- Acquisition of parcels having historic nesting sites;
- Prohibition of development on offshore islands used as nesting sites;
- Direction of growth away from active nesting sites;
- Preparation of management guidelines for landowners whose properties contain or are in proximity to nesting sites [see Section 3.13.2.5 (Management Guidelines for Landowners)];
- Enforcement of existing State regulations prohibiting the molesting or harming of endangered species (Chapter 39, F.A.C.); and
- Coordination with USFWS and FFWCC to determine additional protection measures which could be implemented by the County.

The County's LDR and ROGO/NROGO protects roseate tern habitat, which is generally located in lands protected by the Tier Overlay System [see Section 3.19.8 (Protection of Threatened and Endangered Species, including the Habitat Conservation Plan (HCP) for Big Pine Key and No Name Key)].

3.13.16 Cape Sable Seaside Sparrow (Ammodramus maritimus mirabilis)

3.13.16.1 Status, Distribution, and Habitat Description

Cape Sable seaside sparrows are medium-sized sparrows restricted to the Florida peninsula. They occur only in the Everglades region of Miami-Dade and Monroe counties in South Florida. They are non-migratory and isolated from other breeding populations of seaside sparrows. Presently, the known distribution of the sparrow is restricted to two areas of marl prairies east and west of Shark River Slough, and flanking Taylor Slough (USFWS, 1999).

3.13.16.2 Reasons for Decline and Recovery Activities for the Cape Sable Seaside Sparrow

The Cape Sable seaside sparrow was listed as an endangered species in 1967 because of its limited distribution and threats to its habitat posed by large-scale conversion of land in South Florida to agricultural uses. Its habitat periodically experiences extensive flooding, fires, and hurricanes, which may alter habitat suitability by changing vegetative composition and structure. Biologists studying the sparrow have documented that high water levels, due in large part to managed water releases, in western Shark River Slough have caused the decline of the western subpopulation and continue to contribute to the absence of a population rebound. Competition and predation also threaten the Cape Sable seaside sparrow. Raccoons, snakes, rice rats, and hawks may be the chief predators. Increasing water levels are associated with significant increases in predation rates (USFWS, 1999).

Recovery efforts include the monitoring of hydrology, vegetation and sparrow populations as new hydrological schedules are implemented (e.g., Comprehensive Everglades Restoration Plan) to ensure that unexpected adverse effects to the Cape Sable seaside sparrow do not occur. With careful monitoring and continued close coordination with the USFWS and other natural resource professionals, the habitat restoration in the Everglades has the potential to provide significant progress towards recovery for this species.

3.13.17 Key Largo Wood Rat (Neotoma floridana smallii)

3.13.17.1 Status, Distribution, and Habitat Description

The Key Largo wood rat is an endemic subspecies that exclusively inhabits tropical hardwood hammocks on Key Largo and does not utilize any other vegetation community. The range of the wood rat formerly extended to southern Key Largo. At present, the natural range of the wood rat is limited to hammocks in Upper Key Largo (Barbour and Humphrey, 1982; Hipes et al., 2001). The experimental population established on Lignumvitae Key, where it was introduced in 1970, has not survived (due to unknown causes) (Hipes et al., 2001; USFWS, 1999). Wood rats usually utilize only hammocks that are sufficiently mature to have a well-defined canopy but also inhabit a variety of microhabitats within tropical hardwood hammocks (USFWS, 1999). The density of nests and animals is positively correlated with the maturity of the hammock (Barbour and Humphrey, 1982).

3.13.17.2 Reasons for Decline and Recovery Activities for the Key Largo Wood Rat

Habitat for the Key Largo wood rat is protected on Key Largo Hammock State Botanical Site. Areas are also protected on other parts of Key Largo and adjacent islands. However, its original range has been reduced to about half of its original range that it may be insufficient to support viable populations (USFWS, 1999).

The USFWS prepared a recovery plan for the Key Largo wood rat (USFWS, 1999). Despite the protected status of this habitat, the status of the Key Largo woodrat remains precarious due to habitat fragementation and the effects of hurricanes. According to the recovery plan for the species (USFWS, 1999), surveys of woodrats on Northern Key Largo in 1997 and 1998 trapped only 6 and 7 animals in 1997 and 1998, respectively, after 1,500 trap nights of effort. McCleery (2003) estimated the current population to be between 26 and 106 individuals. He modeled the populations using demographic parameters and projected a high risk of extinction. Current threats to the Key Largo woodrat include predation by feral and domestic cats, predation by exotic fire ants, and random environmental events such as fires and hurricanes. The County LDRs and ROGO/NROGO protects tropical hardwood habitat, which is generally located in lands protected by the Tier Overlay System [see Section 3.19.8 (Protection of Threatened and Endangered Species, including the Habitat Conservation Plan (HCP) for Big Pine Key and No Name Key)]. These lands are generally the same as those inhabited by the Key Largo wood rat. Because of these protections, the threat of future habitat loss from development on North Key Largo is low.

3.13.18 Key Deer (Odocoileus virginianus clavium)

3.13.18.1 Status, Distribution, and Habitat Description

The key deer is a distinct geographical race of Virginia white-tailed deer that is endemic to the Lower Keys. Historically, the key deer ranged from Key West to Duck Key (Barbour and Allen, 1982, as cited in USFWS, 1999). At present, the permanent population is centered on Big Pine Key and No Name Key with the range extending to Big Torch, Middle Torch, Cudjoe, Howe, Summerland, Little Pine Island, and Sugarloaf Keys.

The key deer utilizes almost all habitats and vegetation communities within its range. It feeds primarily in slash pinelands, mangroves, and transitional habitats. It obtains water from freshwater wetlands and solution holes. It gives birth to fawns in tropical hardwood hammocks. Silvy (1975) found that the deer preferentially utilize slash pinelands and tropical hardwood hammocks compared to other available habitat types, but they use virtually all available habitats in their range (Lopez, 2001). The deer will also feed and travel through open disturbed and moderately developed areas (USFWS, 1999; Monroe County et al., 2006).

The geographic distribution of the key deer is closely tied to the availability and suitability of habitat. At present, approximately two-thirds of the population is concentrated in the Big Pine Key/No Name Key area. The remaining one-third of the population, which is also reproductively active, lives outside the area of concentration (Monroe County et al., 2006). Two habitat requirements account for this distribution. First, key deer require a year-round supply of fresh drinking water, which is a critical factor in their distribution (Monroe County et al., 2006). Big Pine Key and No Name Key have relatively abundant freshwater wetlands and solution holes that are fresh year-round. Second, key deer show a marked preference to feed in freshly burned slash pinelands, where there are abundant foodstuffs at a level they can reach (USFWS, 1999). Big Pine Key and No Name Key again provide the

greatest acreage of slash pineland habitat. Key Deer swim between islands, and there is evidence that the Big Pine/No Name Key population migrates to various smaller, outlying islands to feed during the wet season when rainwater has collected, returning to the large islands during the dry season.

The population trends of the key deer reflect their vulnerability to human impacts. The natural reproductive rate of key deer is low (USFWS, 1999; Monroe County et al., 2006; USFWS, 2006), meaning that any population recovery following a decline would be slow. Lopez (2001) studied the ecology and population dynamics of the key deer for three years. He followed the movement, habitat utilization, and fate of over 200 deer using radio-telemetry and census procedures. The study produced a Population Viability Analysis model to evaluate the impacts of development scenarios on the key deer population. The model is a tool to evaluate the likelihood that the species will persist for a given time into the future under different scenarios. The unit of impact in the model was termed "H" and can be applied to any type of development activity.

3.13.18.2 Reasons for Decline and Recovery Activities for the Key Deer

Several factors have contributed to the decline in populations of the key deer (USFWS, 1999). These include the following:

- Destruction or modification of habitat
  - loss and restriction of habitat caused by development, primarily on Big Pine Key
  - installation of fencing on private property
- Predation and/destruction
  - highway mortality (particularly along U.S. 1 and Key Deer Boulevard)
  - free-roaming domestic pets, especially domestic cats on young deer
  - poaching
  - accidental drowning of fawns in mosquito control ditches
  - entanglement in fencing
- Activities altering distribution and behavior
  - hand feeding resulting in loss of fear for man and vehicles
- Potential modification of habitat
  - reduction in availability and/or contamination of freshwater resources

The USFWS (1999) has identified three primary objectives for recovery of the key deer:

- to prevent extinction or irreversible decline of the species in the foreseeable future;
- to prevent significant negative impacts short of extinction; and
- to provide for full recovery of the species.

Both the "Key Deer Recovery Plan" (USFWS, 1999) and the "Habitat Conservation Plan for Florida Key Deer" (Monroe County et al., 2006) identify land acquisition as the single most important management strategy that would significantly contribute to the successful maintenance of the key deer in its natural environment. Approximately 69 percent of the

land on Big Pine Key and No Name Key is in public ownership of which 66 percent is managed for conservation. The main landowner is the Federal government with 55 percent, all of which is within the National Key Deer Refuge. The National Key Deer Refuge was established on August 22, 1957 to protect and conserve key deer and other wildlife resources. It comprises nearly 8,983 acres of land on several islands within the refuge, as well as additional parcels located outside the boundary administered by the refuge. The USFWS owns 52 percent of Big Pine Key and 71 percent of No Name Key. The State of Florida purchases land under the Florida Forever program, which is administered by FDEP. State-owned lands within the project area include the Coupon Bight Aquatic Preserve and Preserve Buffer Lands and lands within the Coupon Bight/Key Deer CARL project area. The Monroe County Land Authority (MCLA) purchases a wide variety of vacant lands as directed in the Monroe County Comprehensive Plan (Monroe County et al., 2006).

The USFWS prepared a management plan for the Lower Florida Keys National Wildlife Refuges: National Key Deer Refuge; Key West National Wildlife Refuge; and Great White Heron National Wildlife Refuge (USFWS, 2008). The refuge complex is managed as a whole with administrative headquarters at National Key Deer Refuge on Big Pine Key. The FDEP Office of Coastal and Aquatic Managed Areas manages State-owned lands within the Coupon Bight Aquatic Preserve and Preserve Buffer, whereas the USFWS manages State-owned lands within the Coupon Bight/Key Deer CARL project area under an existing lease agreement. State-owned lands (purchased by the State with Florida Forever funds) outside of the USFWS and FDEP management boundaries are managed by the County Land Steward. The Land Steward also manages County-owned conservation lands which were acquired through ROGO dedications or purchased by the MCLA. Habitat management of County lands started Keys-wide during FY 2002-2003.

The HCP for Big Pine Key and No Name Key was implemented to address the "incidental take" of key deer based on a population viability model. An Incidental Take Permit (No. TE083411-0) was issued by USFWS in conjunction with the completion of the HCP. The HCP was developed with a measurable goal to ensure development does not take place in prime key deer habitat. The conservation program focuses on avoidance and minimization strategies and habitat mitigation based on replacing lost habitat value and protection and management of acquired habitat.

The key deer herd has increased substantially over the past 40 years, due principally to a ban on hunting and from protection and management of habitat within the National Key Deer Refuge. The population is at or near historical highs and has remained stable since 2003. Road mortality represents the largest known source of documented key deer mortality (Lopez, 2001), and a crossing constructed by FDOT along U.S. 1 has reduced road mortalities. Braden et al. (2008) found that key deer-vehicle collisions were reduced by 94 percent inside the fenced segment.

3.13.19 Silver Rice Rat (Oryzomys argentatus)

3.13.19.1 Status, Distribution, and Habitat Description

The silver rice rat is an endemic species of the Lower Keys discovered in the 1970s (Spitzer et al., 1978). The silver rice rat occurs on twelve islands in the Lower Keys: Big Pine, Little Pine, Howe, Water, Middle Torch, Big Torch, Summerland, Raccoon, Johnston, Cudjoe, Upper Sugarloaf, and Saddlebunch Keys. Based on the availability of suitable habitat and proximity to existing populations, the silver rice rat may also occur on several other islands in the Lower Keys, including but not limited to, Little Torch and Ramrod. Critical habitat for the silver rice rat includes Little Pine Key; Water Keys; Big Torch Key; Middle Torch Key; Summerland Key north of U.S. 1; Johnston Key; Raccoon Key; and Lower Saddlebunch Keys south of U.S. 1, but not including lands in Township 67S, Range 27E, section 8 and the northern 1/5 of section 17. All lands and waters above mean low tide are included in this designation (50 CFR 17.95; USFWS, 2006). The major constituents of this critical habitat that require special management considerations or protection are:

- Mangrove swamps containing Red Mangrove (*Rhizophora mangle*), Black Mangrove (*Avicennia germinans*), White Mangrove (*Laguncularia racemosa*), and Buttonwood (*Conocarpus erectus*);
- Salt marshes, swales, and adjacent transitional wetlands containing Saltwort (*Batis maritima*), Glasswort (*Salicornia virginica*), Saltgrass (*Distichlis spicata*), Sea Ox-eye Daisy (*Borrichia frutescens*), Key Grass (*Monanthochloe littoralis*), and Smutgrass (*Sporobolus virginicus*); and
- Freshwater marshes containing Cattails (*Typha domingensis*), Sawgrass (*Cladium jamaicense*), and Cordgrass (*Spartina* spp.; USFWS, 2006).

The silver rice rat is a wetland-dependent species. It was first discovered in a freshwater marsh on Cudjoe Key in 1973 (USFWS, 2006). The other known populations are all in saltwater wetlands that include mangroves and saltmarsh and buttonwood wetlands. It has never been found in areas of exclusive mangroves (Spitzer, 1983). The rice rat feeds in all these zones and nests in the saltmarsh and buttonwood zones in tussocks of *Sporobolus/Distichilis* (Spitzer, 1983). It may obtain freshwater by entering crab holes in the highest buttonwood zone which penetrate the underlying fresh/brackish water lens (Spitzer, 1983). Thus, most of the known populations are dependent upon wetland habitat containing the typical gradient from intertidal red mangrove to the saltmarsh and buttonwood wetlands.

The silver rice rat utilizes a large home range compared to that of other rodents (Spitzer, 1983). It is unlikely that the species or its habitat was ever abundant in the Lower Keys due to its habitat specificity and low population densities (USFWS, 1999). The silver rice rat population has apparently remained stable throughout its range in recent years. The best available species population size is 5,000-20,000 individuals (USFWS, 2006). Of the 8,645 acres of critical habitat, 6,712 acres are in public ownership (77.6 percent). Ninety-

seven percent of critical habitat and its constituent components remain intact (USFWS, 2006).

3.13.19.2 Reasons for Decline and Recovery Activities for the Silver Rice Rat

The USFWS has completed a recovery plan for the silver rice rat (USFWS, 1999). The main threat to the species is residential and commercial activities, habitat loss and the introduction or increase in non-native predators. Other threats include habitat fragmentation and an increase in the densities of black rats and domestic cats.

A large amount of habitat for the silver rice rat is contained in the National Key Deer Refuge. Although the refuge is managed primarily for key deer, the habitat requirements and biological needs of the species do not conflict. The HCP for Big Pine Key and No Name Key was implemented to protect the Florida key deer as well as other rare species. The County's LDR and ROGO/NROGO protects the habitat for the silver rice rat, which is generally located in lands protected by the Tier Overlay System [see Section 3.19.8 (Protection of Threatened and Endangered Species, including the Habitat Conservation Plan (HCP) for Big Pine Key and No Name Key)]. Permits issued by the USACE that may affect the silver rice rat or areas within silver rice rat critical habitat require Endangered Species Action Section 7 consultation with the USFWS. Avoidance and minimization measures would be required prior to permit issuance by the SFWMD and/or the FDEP.

3.13.20 Key Largo Cotton Mouse (Peromyscus gossypinus allapaticola)

3.13.20.1 Status, Distribution, and Habitat Description

The Key Largo cotton mouse is an endemic subspecies of cotton mouse that inhabits Key Largo. Historically, it occurred within hardwood hammock forests throughout Key Largo. Today it is restricted to the northern portion of the island (Brown, 1978; Barbour and Humphrey, 1982; USFWS, 1999). A few cotton mice were introduced onto Lignumvitae Key in 1970, but there have been no studies to determine if the animal is still present (Brown, 1978). Information on its current status is unavailable (USFWS, 2006). The Key Largo cotton mouse inhabits only tropical hardwood hammocks, to the exclusion of all other vegetation communities and is dependent upon mature tropical hardwood hammocks (Brown 1978; Barbour and Humphrey, 1982). The range of the cotton mouse on Key Largo is not completely known due to its nocturnal habits, small size, and lack of conspicuous nests.

3.13.20.2 Reasons for Decline and Recovery Activities for the Key Largo Cotton Mouse

The status of the cotton mouse is not known with certainty because no recent detailed survey information is available. Threats by domestic and feral cats are a concern for long-term viability. Other threats include predation by exotic fire ants, and random environmental events such as fires and hurricanes. The USFWS has prepared a recovery

plan for the Key Largo cotton mouse (USFWS, 1999). The Key Largo cotton mouse shares habitat with the endangered Key Largo woodrat and the same threats are causes of concern for both species. Much more is known about the Key Largo woodrat and, given its precarious condition; it is possible the overall condition of Key Largo cotton mouse may have deteriorated as well (USFWS, 2006).

The remaining population for the Key Largo Cotton Mouse is protected in the Key Largo Hammock State Botanical Site, which is managed for conservation. The County's LDR and ROGO/NROGO protects the habitat for the Key Largo Cotton Mouse, which is generally located in lands protected by the Tier Overlay System [see Section 3.19.8 (Protection of Threatened and Endangered Species, including the Habitat Conservation Plan (HCP) for Big Pine Key and No Name Key)]. For the long term, the threat of occupied habitat loss from development on North Key Largo is low.

3.13.21 Lower Keys Marsh Rabbit (Sylvilagus palustris hefneri)

3.13.21.1 Status, Distribution, and Habitat Description

The lower keys rabbit is a subspecies of the marsh rabbit (*Sylvilagus palustris hefneri*) and differs from the upper keys subspecies (*Sylvilagus palustris paludicola*). lower keys marsh rabbits inhabit tidal, brackish, upland, and freshwater environments. Herbaceous cover is a dominant feature within lower keys marsh rabbit home ranges. This herbaceous cover is a mixture of grasses, sedges, and forbs. Such ground cover provides shelter as well as critical foods and nesting sites.

The majority of suitable habitat area lies in a transitional zone between marine environments and uplands. Cover types that provide habitat include salt marsh, coastal prairie, coastal beach berms, buttonwood (*Conocarpus erectus*) woodlands, and salt marsh-buttonwood transition areas. They also use freshwater wetlands. Lower keys marsh rabbits often include areas of mangrove [red mangrove, black mangrove, and white mangrove (*Laguncularia racemosa*)] woodlands within their home ranges, and regularly pass through mangrove when traveling between the other habitats. Similarly, data from recent studies suggests that the species may range into the edges of pinelands and other upland habitats (USFWS, 2006). Freshwater marshes are limited in the lower keys, since mangroves occupy many coastal areas, and interior freshwater habitat is scarce.

3.13.21.2 Reasons for Decline and Recovery Activities for the Lower Keys Marsh Rabbit

The USFWS has prepared a recovery plan for the lower keys marsh rabbit (USFWS, 1999). The lower keys marsh rabbit occurs in many of the larger Lower Keys, including Sugarloaf, Saddlebunch, Boca Chica, and Big Pine Keys, as well as in the small islands near these keys. It probably occurred on all of the Lower Keys that supported suitable habitat but did not occur east of the Seven-Mile Bridge, where it is replaced by *Sylvilagus palustris paludicola*. Known localities for the rabbit are on privately owned land, State-owned land, and federal

land within the National Key Deer Refuge and Key West Naval Air Station. Suitable habitat for this species is highly fragmented across all of the Lower Keys (USFWS, 2006). No critical habitat has been designated for this species.

The greatest threats to the continued existence of the lower keys marsh rabbit are predation by cats, habitat loss and degradation, and hurricanes. Other threats include contaminants, dumping and trash accumulation, poaching, fire ants, and exotic vegetation. These threats not only directly affect the viability of local subpopulations, but also reduce the probability of successful dispersal among the increasingly fragmented habitats. Connectivity among suitable habitat patches is necessary for lower keys marsh rabbit dispersal among patches (USFWS, 2006).

To address habitat loss and indirect effects (e.g., cat predation) associated with development on Big Pine and No Name Keys, the USFWS issued an Incidental Take Permit to the County, FDOT, and DCA. The take of these species will be incidental to land clearing for development and recreational improvements. The HCP for Big Pine Key and No Name Key was implemented to protect the Florida key deer as well as other protected species under the plan, including the lower keys marsh rabbit. The County's LDR and ROGO/NROGO protects privately-owned lands that contain the rabbit's habitat, which is generally located in lands protected by the Tier Overlay System [see Section 3.19.8 (Protection of Threatened and Endangered Species, including the Habitat Conservation Plan (HCP) for Big Pine Key and No Name Key)].

3.13.22 Florida Manatee (Trichechus manatus latirostris)

3.13.22.1 Status, Distribution, and Habitat Description

The manatee inhabits coastal and riverine waters. It is found in Florida and occasionally in Georgia and along the Caribbean coasts of Central and South America. The manatee is herbivorous. In the Keys its primary food sources are seagrasses (*Thalassia testudinum*, *Syringodium filiforme*, and *Halodule wrightii*). Manatees live along both coasts of Florida, along the St. Johns and other rivers, and occasionally in Lake Okeechobee and the waterways leading to it from the Gulf and Atlantic (Hartman, 1978). Populations are concentrated in the warmer waters of south Florida during the winter months of October to April (Hartman, 1978). Warm water refuges have been identified throughout Florida where manatee populations concentrate and these are located at outfalls from power plants and natural warm-water springs; none are in the Florida Keys. Manatees are occasionally found as far south as Key West.

3.13.22.2 Reasons for Decline and Recovery Activities for the Florida Manatee

Several factors have contributed to the decline in populations of the Florida manatee (USFWS, 1999). Reasons for decline in the Florida Keys are summarized as follows:

- Destruction or modification of habitat
  - Water quality degradation
  - Dredge and fill
  - Nearshore water pollution
  - Seagrass bed destruction
  - Damage from recreation and boating
- Predation and/or destruction
  - Boat collisions
  - Entanglement in fishing gear
  - Poaching and vandalism
  - Death of dependent calves to unknown causes
- Activities altering distribution and behavior
  - Human harassment by divers, boaters, swimmers, fishermen, and snorkelers

Recovery activities identified by USFWS (1999) include:

- Continue speed controls in nearshore waters
- Continue boating restricted or boating protection zone
- Coordination with USFWS and FDEP to determine additional protection measures that could be implemented by the county
- Enforcement of existing State regulations prohibiting the molesting or harming of endangered species (Chapter 39, F.A.C.)
- Implement management strategies for water quality protection consistent with the FKNMS Water Quality Protection Plan, including habitat protection strategies

3.13.23 Key Tree-Cactus (Cereus robinii)

3.13.23.1 Status, Distribution, and Habitat Description

The Key tree-cactus (*Cereus robinii*) is a large, tree-like cactus with erect columnar stems, reaching 33 feet in height. At maturity, the plants are either much-branched (in variation *robinii*), or few-branched (in variation *deeringii*) and occur on Lower Matecumbe Key (USFWS, 1999).

3.13.23.2 Reasons for Decline and Recovery Activities for the Key Tree-Cactus

Several factors have contributed to the decline in populations of the Key tree-cactus (USFWS, 1999). These are summarized as follows:

- disturbance and destruction of hardwood hammocks
- hurricanes
- fires
- overcollection

Two self-sustaining sites are located in Big Pine Key within the National Key Deer Refuge. The main threat to the continued existence of the two unprotected populations is habitat loss from development at the two remaining sites in private ownership. In addition, the remaining populations generally are in decline, which may stem, in part, from the effects of recent hurricanes. Survival and recovery of the Key tree-cactus depends on protecting the remaining tropical hammock areas throughout the Keys. The County LDRs and ROGO/NROGO protects the habitat, which is generally located in lands protected by the Tier Overlay System [see Section 3.19.8 (Protection of Threatened and Endangered Species, including the Habitat Conservation Plan (HCP) for Big Pine Key and No Name Key)].

3.13.24 Small's Milkpea (Galactia smallii)

3.13.24.1 Status, Distribution, and Habitat Description

Small's milkpea is an endemic plant restricted to pine rockland of the south Florida peninsula. The reduction of this habitat type in south Florida and the Keys, combined with the exclusion of fire, has caused many species characteristic of pine rocklands, such as Small's milkpea, to be threatened with extinction (USFWS, 1999).

3.13.24.2 Reasons for Decline and Recovery Activities for Small's Milkpea

Small's milkpea has declined due to disruption and destruction of rockland habitat combined with the exclusion of fire from these habitats (USFWS, 1999). It is not known to occur in the Florida Keys although pine rockland habitat is present in the Lower Keys. The County's LDR and ROGO/NROGO adequately protects pine rockland habitat, which is generally located in lands protected by the Tier Overlay System [see Section 3.19.8 (Protection of Threatened and Endangered Species, including the Habitat Conservation Plan (HCP) for Big Pine Key and No Name Key)].

3.13.25 Garber's Spurge (Chamaesyce garberi)

3.13.25.1 Status, Distribution, and Habitat Description

Garber's spurge is an endemic plant restricted to areas of the south Florida peninsula. In the Keys, it grows on semi-exposed limestone shores, open calcareous sale flats, pine rocklands, calcareous sands of beach ridges, and along disturbed roadsides (USFWS, 1999), It is known to exist only on government protected lands on Big Pine Key and No Name Key (Monroe County et al., 2006). In pine rocklands, it is found growing in crevices in oolitic limestone.

3.13.25.2 Reasons for Decline and Recovery Activities for Garber's Spurge

Garber's spurge has declined due to disruption and destruction of habitat (USFWS, 1999). Pine rocklands are protected as Tier I lands and nearly all remaining pinelands are targeted for acquisition. The County's LDR and ROGO/NROGO adequately protects pine rockland

habitat, which is generally located in lands protected by the Tier Overlay System [see Section 3.19.8 (Protection of Threatened and Endangered Species, including the Habitat Conservation Plan (HCP) for Big Pine Key and No Name Key)]. Thus, the remaining habitat for this species is likely to remain protected.

3.14 Fisheries [Rule 9J-5.013(1)(a)5. and (b), F.A.C.]

3.14.1 Fisheries of the Florida Keys

3.14.1.1 Fish Species Common to Mangrove Communities

Many species of fish complete their life cycle within the mangrove community. Others are dependent upon mangroves during juvenile states and migrate to grassbeds and/or coral reefs when mature. Others are seasonally or locally abundant. Many of the invertebrates and fishes are important to the region's recreational and commercial fisheries, including: pink shrimp (*Penaeus duorarum*), stone crab (*Menippe mercenaria*), spiny lobster (*Panulirus argus*), jacks (family Caranigadae), goliath grouper (*Epinepelus itajara*), grunts (family Pomadasyidae), groupers (*Epinephelus* spp. and *Mycteroperca* spp.), seabass (family Serranidae), snapper (*Lutjanus* spp.), mullet (family Mugilidae), red drum (*Sciaenops ocellata*), ladyfish (*Elops saurus*), spotted sea trout (*Cynoscion nebulsus*), tarpon (*Magalops atlanticus*), snook (*Centropomus undecimalis*), and menhaden (*Brevoortia patronus*; Florida DNR, 1991a; Heald and Odum, 1970; Lewis et al., 1985).

3.14.1.2 Fish Species Common to Salt Pond Communities

Fish species frequently reported to occur include the sheepshead minnow (*Cyprinodon variegatus*), killifish (*Fundulus* spp.), rainwater killifish (*Lucania parva*), diamond killifish (*Adenia xenica*), mosquitofish (*Gambusia affinis*), and sailfin molly (*Poecilia latipinna*).

3.14.1.3 Fish Species Common to Seagrass Bed Communities

The seagrass beds are transitional habitats between the coral reef and mangrove habitats. As such, they are important to many species of both ecosystems. They provide abundant food and shelter for a myriad species of fish, sea turtles, and invertebrates. They represent one of the most productive and important habitats in the nearshore marine systems of Florida (Livingston, 1990). They also represent the richest nursery and feeding grounds in South Florida's coastal waterways. In addition to representing a primary resource for grazers, seagrasses provide vast amounts of energy via detritus that may cycle internally or be exported to mangrove or coral reef communities.

Faunal constituents of the marine grassbed community include a diversity of microscopic zooplankton, epiphytic biota, pelagic invertebrates, fishes, and mammals. A large number of birds feed extensively in shallow seagrass meadows.

Conspicuous among the epibenthic invertebrates found is seagrass beds are the queen conch (*Strombus gigas*), the spiny lobster (*Panulirus argus*), the Bahamian starfish (*Oreaster reticulata*), and numerous sea urchins, most notably *Lytechinus variegatus carolinus* and *Tripneustes ventricocsus*. Numerous epiphytic invertebrates glean food from seagrass areas by preying on the algae that grow on the leaves of seagrasses. Principal among these are a variety of gastropods. Many invertebrates, including the Pink Shrimp (*Penaeus duorarum*) and the spiny lobster, utilize seagrass meadows for nurseries.

Diverse and abundant fish faunas also inhabit seagrass communities (Florida DNR, 1991b; Nagelkerken and van der Velde, 2004). While few, if any, of the many permanent residents are of direct commercial value, these seagrass ecosystems are important nurseries and feeding areas for such species. These include sea bream (*Archosargus rhomboides*), sheepshead (*A. probatocephalus*), gag grouper (*Mycteroperca microlepis*), redfish (*Scriaerops oscellata*), gray snapper (*Lutjanus griseus*), lane snapper (*L. synagris*), dog snapper (*L. jocu*), mutton snapper (*L. annalis*), yellowtail snapper (*Ocyurus chrysurus*), and spotted seatrout (*Cynoscion nebulosus*). Other fish that extensively use seagrasses as nursery areas are:

Common Name	**Scientific Name**
Pinfish	*Lagodon rhomboides*
Spot	*Leiostomus xanthurus*
Silver Perch	*Bairdiella chrysura*
Pigfish	*Orthopristi chrysoptera*
White Grunt	*Haemulon plumeri*
Ocean Sturgeon	*Acanthurus bahianus*
Doctorfish	*Acanthurus chirurgus*
Spotted Goatfish	*Pseudupeneus maculatus*
Yellow Goatfish	*Mulloidicthys martinicus*
Bucktooth Parrotfish	*Sparisoma radians*
Redtail Parrotfish	*Sparisoma chrysopterum*
Stoplight Parrotfish	*Sparisoma viride*
Redfin Parrotfish	*Sparisoma rubripine*
Striped Parrotfish	*Scarus croicensis*
Rainbow Parrotfish	*Scarus guacamaia*
Midnight Parrotfish	*Scarus coeruleus*
Emerald Parrotfish	*Nicholsina usta*

Several sportfishing species, most notably tarpon (*Megalops atlanticus*), bonefish (*Albula vulpes*) and permit (*Trachinotus falcatus*), depend upon seagrass systems. In areas where seagrass meadows abut coral reefs, many prominent species of reef fish move into seagrass areas to feed at night. Principal among them are members of the families Pomadasyidae, Lutjanidae, and Holocentridae.

3.14.1.4 Fish Species Common to Coral Communities

Coral reef systems provide protection and shelter for colorful and diverse macrofauna, including small shrimp, crabs, fish and several species of lobsters. Many species, especially

the larger predators, are important species for local fisheries. Hardbottom communities are valuable nursery areas for many invertebrates and fishes of both the patch reef and seagrass communities, providing microhabitats for many juvenile fishes.

Larger predators of reef communities include fishes that prey upon invertebrates and smaller individuals of their own kind. The most frequently observed larger predators on the reef include the barracuda (*Sphyraena barracuda*) and moray eel (*Gymnothorax* spp.) (Florida DNR, 1991a; Florida DNR, 1991b).

3.14.2 Existing Commercial, Recreational, or Conservation Uses of Fisheries

Sportfishing and commercial fishing are major components of the Florida Keys' economy. Commercial fishing is the second-largest industry in the Keys; the commercial fleet supports about 1,200 families, which is nearly five percent of the County's population (http://www.dep.state.fl.us/coastal/sites/keys/info.htm, updated February 25, 2009). Common saltwater sportfishing species (Florida DNR, 1991b) include:

Sailfish	Drum	Spanish Mackerel
Bluefish	Redfish	Tarpon
Sheepshead	Amberjack	Flounder
Sea Trout	Dolphin	Pompano
Grouper	King Mackerel	Snapper

Major commercial fisheries include the spiny lobster, pink shrimp and finfish fisheries. Commercial fishing landings, including shellfish, for the County from 2000 to 2009 are summarized as follows (FFWCC, Marine Fisheries Information System, Annual Landings Summary, available at http://research.myfwc.com/features/view_article.asp?id=19224):

Year	Total Finfish (lbs)	Total Invertebrates (lbs)	Pink Shrimp (lbs)
2009 *	4,305,970	2,121,072	721,426
2008	4,193,452	3,935,569	1,490,511
2007	4,156,794	4,682,411	719,409
2006	5,685,984	5,455,473	1,302,547
2005	6,638,464	4,303,340	2,038,383
2004	5,877,188	6,029,516	2,112,473
2003	6,007,654	5,237,859	2,309,794
2002	5,575,831	5,733,334	1,993,496
2001	5,825,678	4,904,792	2,833,018
2000	5,866,496	7,376,572	1,716,787

* Preliminary data
Invertebrates are primarily spiny lobster and stone crab

3.14.3 Known Problems Related to Fisheries and the Potential for Conservation, Use, and Protection of Fisheries

3.14.3.1 Problems, Trends, and Research Needs

Several federal, State, and local governmental agencies and organizations are responsible for managing individual resources and regulating their uses within the marine environment of the County. These resource management agencies provide a system of comprehensive ecosystem management for the long-term protection of the Keys' diverse natural resources. Faced with increasing environmental threats from human activities, their capacity to perform effectively may deteriorate due to limitations in staffing, equipment, and funding. Because of the differing missions if each agency, coordinated policy development can be difficult. The FKNMS was established in 1993 to address these coordination issues. In the past decade, a number of problems, trends and research needs have been identified.

The Fish and Wildlife Research Institute Stock Assessment Group (The Marine Fisheries Management Division of the FFWCC) produced the 2008 Status and Trends Report (Fish and Wildlife Research Institute, 2009). This report summarized the available 1992-2007 commercial and recreational landings, fishing effort, fishery catch rates, the 1997-2007 fisheries-independent sampling effort, and young-of-the-year and post-young-of-the-year abundance indices for 136 species or groups. The condition of these species or groups was determined using information from recent stock assessments, when available. Otherwise, the condition was assessed using available commercial landings rates, recreational total-catch rates, and fishery independent abundance indices. The status determination and supporting trend-analyses were designed to highlight potential areas of concern about recent substantial changes in Florida's diverse marine fisheries. These analyses were for Florida as a whole but because a large portion of the fisheries catch comes from the nearshore waters of the Florida Keys, these results are pertinent to the viability of the Keys' commercial and recreational fisheries industry.

Most species or groups on the Atlantic coast in 2007 were judged stable (75 species or groups). Seven were increasing, four were decreasing, and 48 were too rarely caught to determine their status. Similarly on the gulfside / bayside, most of the species or groups were stable (100), nine were increasing, one was decreasing, and twenty-two were too rarely caught to determine their status. Valid data for two species were assumed to be available only from the waters along Florida's Atlantic coast: weakfish and American shad. Compared to report prepared in 2007, the numbers of stable or increasing groups this year were higher on the Atlantic coast (five more) and one less on the gulfside / bayside. Although the species or groups changed, the numbers in the three stock trend categories (decreasing, stable, or increasing) remained similar to the numbers from last year. Some species or groups that were judged either increasing or decreasing last year moved into the stable category this year (one on the Atlantic coast and eleven on the gulfside / bayside). Only weakfish and swordfish on the Atlantic coast and gag grouper on the gulfside / bayside have shown consecutive 'decreasing' status the last two years. Assessments for weakfish and gag species find that they are at historically low levels of abundance. Several marine life groups (shrimp, crabs) have persisted recently in the '"increasing" category (Fish and Wildlife Research Institute, 2009).

Partly in response to concerns about fishing pressure, the FKNMS established a series of Sanctuary Preservation Areas in 1997. The FKNMS also created the Tortugas Ecological Reserve in 2001 to protect coral reef ecosystem services in that area and support sustainable reef fisheries. The Tortugas Ecological Reserve protects 150 square nautical miles and prohibits all anchoring, fishing and other extractive activities; it was the largest marine reserve in North America when first implemented. Scientists at the University of Miami and NMFS have studied and reported on responses of coral reef fish populations to this reserve. Based on data collected during more than 4,000 research dives, they compared changes in the Dry Tortugas region between 1999 and 2000 before the reserve was established, and in 2004, three years after the reserve was established. As predicted by marine reserve theory, significant regional increases in abundance for several exploited and non-exploited species were detected. Significantly greater abundance of large fish was found in the Tortugas Ecological Reserve for black grouper, red grouper, and mutton snapper compared to the baseline period. No significant declines were detected for any exploited species in the reserve, while non-exploited species showed both increases and declines. Abundance of exploited species in fished areas on the Tortugas Bank either declined or did not change (Donahue et al., 2008).

On January 19, 2007, the National Park Service established a 46 square mile Research Natural Area within the Dry Tortugas National Preserve. This area is contiguous to the northern portion of the FKNMS Tortugas Ecological Reserve and effectively expanded the marine reserve network since it also prohibited all anchoring and extraction. Research and monitoring are planned to ascertain whether patterns observed in protected areas in the Tortugas are due to influences of marine reserves, confounding effects of recent changes in fishing regulations, hurricane disturbances, or random oceanographic and chance recruitment events.

FFWCC conducts visual censuses between April and October to monitor finfish populations along the Atlantic margin of the Florida Keys in waters of the FKNMS. Overall mean densities (number of fish/100 square meters) have been increasing since 2001, dominated by fish in the grunt family.

A number of human activities have an effect on marine habitats and thus, the fate of commercial and recreational fisheries (Florida DNR, 1991b; U.S. Department of Commerce, 2007). Common fish species of the Keys' coral reefs are:

Common Name	**Species Name**
Outer Reef	
Creole Wrasse	*Clepticus parrai*
Blue Chromis	*Chromis cyanea*
Brown Chromis	*Chromis multilineata*
Rock Beauty	*Holacanthus tricolor*
Parrotfish	*Scarus spp.*
Hogfish	*Lachnolaimus maximus*
Sergeant Major	*Abedefduf saxtilis*

Common Name	Species Name
Bluehead	*Thalassoma bifasciatum*
Striped Grunt	*Haemulon striatum*
Smallmouth Grunt	*Haemulon chrysargyreum*
Bluestriped Grunt	*Haemulon scrius*
French Grunt	*Haemulon flavolineatum*
Spanish Grunt	*Haemulon macrostomum*
Grey Angelfish	*Pomachanthus arcuatus*
Grey Snapper	*Lutjanus griseus*
Glassy Sweeper	*Pempheris schombergki*
Porkfish	*Anisotremus virginicus*
Bicolor Camselfish	*Pomocentrus partitus*
Flamefish	*Apogon maculatus*
Squirrelfish	*Holocentrus ascensionis*
Pearly Razorfish	*Hemipteronotus novacula*
Seminole Goby	*Microgobius carri*
Slendor Mojarra	*Eucinostromus pseudogula*
Eyed Flounder	*Bothus ocellatus*
Ballyhoo	*Hemiramphus brasiliensis*
Scaled Sardine	*Harengula pensacolae*
Lane Snapper	*Lutjanus synagris*
Yellow Stingray	*Urolophus jamaicensus*
Gag Grouper	*Mycteroperca microlepis*
Nassau Grouper	*Epinephelus striatus*
Snowy Grouper	*Epinephelus nireatus*
Goliath Grouper	*Epinephelus itajara*
Yellowtail Snapper	*Ocyurus chrysurus*
Barracuda	*Sphyraena barracuda*
Spanish Hogfish	*Bodianus rufus*
Patch Reef	
Sergeant Major	*Abedefduf saxtilis*
Bluehead	*Thalassoma bifasciatum*
Parrotfish	*Scarus spp.*
French Angelfish	*Pomocanthus paru*
Blue Tang	*Acanthus coeruleus*
Bluestriped Grunt	*Haemulon sciurus*
Black Grouper	*Mycteroperca bonaci*
Gag Grouper	*Mycteroperca microlepis*
Nassau Grouper	*Epinephelus striatus*
Snowy Grouper	*Epinephelus nireatus*
Goliath Grouper	*Epinephelus itajara*
Yellowtail Snapper	*Ocyurus chrysurus*
Baracuda	*Sphyraena barracuda*
Spanish Hogfish	*Bodianus rufus*

3.14.3.2 Human Activities that Affect Fisheries

3.14.3.2.1 Over-Collection and Over-fishing of Reef Fish and Invertebrates

Over-collecting of colorful juvenile grazers for the aquarium trade and by private individuals for aquaria is expected to shift the ecological balance of the reef, either abruptly or gradually, from a community dominated by slow-growing hard corals to a community dominated by fast-growing species such as macroalgae and octocorals. Removal of these organisms also reduces the populations of colorful fish from the reef.

From 1979 through 1998, a total of 263 fish species representing 54 families have been observed within the boundaries of the FKNMS. Over half of all fish observed were from just ten species. Relatively few fish of legal size have been seen, which is consistent with several studies that indicate reef fish in the Florida Keys are highly overexploited. Despite population declines throughout much of the FKNMS, fish numbers in fully protected zones (Sanctuary Preservation Areas, Ecological Reserves, and Special-use and Research-only areas) have increased for several commercially important species since implementation of the zones in 1997. Years of data from one monitoring program show that the numbers of individuals of three exploited species are higher in protected zones than in fished sites. Researchers have also seen an increase in the abundance of snapper species at several sites after the sites were protected. Similar increases in grouper and snapper abundance and size have also been documented in the Tortugas North Ecological Reserve since its implementation in 2001 (U.S. Department of Commerce, 2007).

3.14.3.2.2 Fish Trapping

Fish traps capture indiscriminately and cause mortality of trapped fish. Fish trapping has been made illegal in the Keys. The Florida Legislature banned traps in State waters in 1980, with the exception of traps for small bait and shellfish. The Gulf of Mexico Fishery Management Council banned new traps in 1987 and phased out existing ones over a ten year period. The South Atlantic Fishery Council followed suit in 1988, banning traps in the ocean's federal waters three miles off the coast between North Carolina and Florida. Illegal fish traps are occasionally reported in the Keys.

3.14.3.2.3 Hook and Line Fishing

This type of fishing can impact coral and hardbottom habitats as gear becomes entangled and damages corals and other sessile organisms. Hook and Line fishing have the greatest impact in coral and hardbottom areas, particularly near bridges where fishing activity is concentrated. Sustained netting, trapping and hook and line fishing in combination with declining water quality have resulted in a continuous and cumulative decline in species abundance (U.S. Department of Commerce, 2007).

3.14.3.2.4 Overfishing of Commercial Sponges

Approximately 117 species of sponges inhabit marine waters surrounding the Keys. Sponges and soft corals cover about 10 percent to 20 percent of total marine area. They are highly variable in their extent, depending on the region being surveyed and the time of year (U.S. Department of Commerce, 2007). Overfishing of sponges in the Keys is suspected by biologists. Data are not available to document the reduction of stocks. Sponge fishing by sponge hook allows for a much lower percentage of sponge regeneration than sponge fishing by cutting. Research is underway by Old Dominion University to investigate dynamics of hard-bottom communities, including commercially fished sponge species.

3.14.3.2.5 Decline of Mobile Invertebrates

Queen conch populations have remained low despite a prohibition on their collection since 1985. Individuals in nearshore waters do not reproduce as well as conch aggregations at offshore sites, apparently because of an undetermined environmental effect. Nearshore conch are being transplanted offshore, where they become reproductive and may help rebuild local populations (U.S. Department of Commerce, 2007).

The FFWCC monitors the recovery of the queen conch (*Strombas gigas*) population in the Florida Keys by conducting belt-transects in locations with known conch aggregations, including marine reserves and adjacent reference areas. Since Florida's queen conch fishery was closed in 1986, there have been signs that adult queen conch have begun to recover. By 2003, adult conch density had increased. However, this trend was reversed in 2004 and 2005 as density and overall abundance declined in both years. Because most of the breeding aggregations are in relatively shallow water (less than 16 feet), the active hurricane seasons during these two years may have negatively impacted the aggregations. By 2006, there was a slight rebound in density and overall abundance in 2006 to about 25,500 adults (Donahue et al., 2008).

3.14.3.2.6 Lobster and Stone Crab Trapping

Approximately half a million lobster traps and a million stone crab traps are deployed in FKNMS waters during the fishing seasons for these species, which last eight months and seven months, respectively. The habitat impacts of lowering and raising such a considerable number of traps, as well as additional impacts from derelict fishing gear such as lost or abandoned crab and lobster traps ("ghost traps") and entangled lines, require investigations. Ghost traps capture indiscriminately and cause mortality of trapped species. Lost and discarded lobster, stone crab, and blue crab traps are a common component of marine debris in Florida. Traps and the associated buoys and ropes are commonly lost during both routine fishing operations and when conflicts occur with other fishing gear and boats. Surveys suggest that, of the 500,000 lobster traps currently in the fishery, 20 percent of them are lost annually. No surveys have been conducted that estimate the number of lost stone crab and blue crap traps, but fishers report that they replace 20 percent of the 818,000 stone crab traps used annually, and anecdotal reports

suggest that during 1998, 30-50 percent of the 360,000 blue crab traps were lost. Additional trap losses occur during tropical and severe winter storms. During the Ground Hog Day storm in 1998, approximately 80,000 lobster traps and 22,000 stone crab traps were lost in the Florida Keys. The combined effects of Hurricane Georges and Tropical Storm Mitch later that same year destroyed an estimated 111,000 lobster traps and a few thousand stone crab traps. Research is needed to investigate impacts on habitats of commercial and recreational fishing gear and methods. The NOAA/NOS/NCCOS/Center for Coastal Fisheries and Habitat Research investigated impacts of lobster traps on seagrass habitat and NMFS is investigating coral reef impacts. The study found that traps damage sensitive habitats and are a hazard to navigation. The loss of a trap spells lost income and economic hardship for working lobstermen, wholesalers, and the restaurant industry as well. Researchers also measured the effect of lobster traps on seagrass, finding that the typical length of time that traps are deployed (between 7 to 25 days) does not result in significant damage. However, long-term injuries do occur when traps are lost and remain on top of seagrass for more than six weeks (online report at http://oceanservice.noaa.gov/news/ weeklynews/dec08/ lobstertraps.html).

After the 2008 storm season, the County obtained FEMA funding for a post-disaster marine debris response. The County removed over 60,000 pieces of trap debris (ropes, floats, partial traps, and whole traps) that had washed up into shallow marine areas, including the mangroves.

"Casita" is a term used to describe a particular type of fishing gear used to attract spiny lobsters. Within the FKNMS, casitas are not considered traditional fishing gear, and thus are subject to regulation. It is against FKNMS regulations to place casitas inside FKNMS boundaries and it is illegal to harvest spiny lobster from any artificial structure throughout the State of Florida. Casita placement (and presumably the associated lobster harvest) is common in the backcountry area north of the Lower Keys, and there is concern among wildlife management agencies that there could be detrimental effects to natural habitat and lobster population dynamics as a result. Additionally, there are concerns in the commercial trap fishing industry that this practice is unfairly shifting fishery allocation away from the legal lobster trap fishers. In July 2007, a cooperative effort between State and federal partners was implemented to target and remove casitas in the Lower Keys. Simultaneously, fisheries biologists from the State of Florida began evaluating the effect of casitas on the ecology of the backcountry area and the lobster fishery in response to a request from FFWCC Commissioners (Donahue et al., 2008).

The FFWCC undertook a lobster monitoring program in 1997 to test the hypothesis that no-take zones would sufficiently protect spiny lobster so that their average abundance and size would increase in protected zones compared to similar fished areas. Spiny lobster monitoring in the FKNMS began at the time of reserve establishment. In 1997, mean lobster size was below the legal limit in both reserves and exploited areas. Since protection, mean lobster size in reserves has been larger than legal size, while in exploited areas it remained below the legal limit in most years. In all years, legal-sized lobsters found in Sanctuary Preservation Areas of the FKNMS were as large as or larger than those in fished areas. In most years, abundance declined in both reserves and exploited areas

during the open season, but the decline was less precipitous in reserves. The decline in lobster abundance inside reserves during the fishing season indicates that the reserves are too small to adequately protect lobsters from harvest (Donahue et al., 2008).

3.14.3.2.7 Degradation of Nearshore Habitats

Changes in nearshore habitats, particularly nutrification and siltation, could have adverse consequences for numerous fish and shellfish now common in the Florida Keys. The FKNMS Water Quality Protection Program established comprehensive, long-term monitoring of three components of the ecosystem: water quality, coral reefs and hard-bottom communities, and seagrasses. The Marine Zone Monitoring Program documents effects of 24 fully protected marine zones, including the Tortugas Ecological Reserve, that were implemented in 1997 and 2001. Monitoring projects in this program document trends in ecological processes, reef fishes, spiny lobster, queen conch, other invertebrates, and document trends in benthic community structure within fully protected marine zones and nearby reference areas. Social and economic parameters are also being surveyed. Together, these monitoring programs provide FKNMS managers with basic information about the state of the Florida Keys coral reef ecosystem (U.S. Department of Commerce, 2007).

3.14.3.2.8 Water Quality

Many water-quality parameters have been monitored in the marine waters of the Keys by Florida International University's Southeast Environmental Research Center since 1995 as part of the WQPP. Thus far, results indicate that some parameters (dissolved oxygen, total organic nitrogen, and total organic carbon) are present in higher concentrations in surface waters, while other indicators (salinity, turbidity, nitrite, nitrate, ammonium, and total phosphorus) are higher in bottom waters. Geographic differences in water quality include higher nutrient concentrations in the Middle and Lower Keys and lower nutrient concentrations in the Upper Keys and Dry Tortugas. Also, declining inshore-to-offshore trends across Hawk Channel have been noted for some parameters (nitrate, ammonium, silicate, total organic carbon and nitrogen, and turbidity). Probably the most interesting findings thus far show increases over time in total phosphorus for the Dry Tortugas, Marquesas Keys, Lower Keys, and portions of the Middle and Upper Keys, and increases in nitrate in the Southwest Florida Shelf, Dry Tortugas, Marquesas Keys, and the Lower and Upper Keys. In contrast, total organic nitrogen decreased somewhat, mostly in the Southwest Florida Shelf, the Sluiceway, and the Lower and Upper Keys. These trends may be driven by regional circulation patterns arising from the Loop Current and Florida Current, and have changed as the period of record has increased. Stationary instruments along the reef tract continuously monitor seawater parameters and ocean states as part of a local ocean observing system. The data are analyzed by Florida Institute of Oceanography's SEAKEYS program and periodically transmitted to satellites and made available on the Internet. Additionally, water temperature data are recorded every two hours from a series of thermographs that the FKNMS has maintained for over fifteen years (U.S. Department of Commerce, 2007).

3.14.3.2.9 Catastrophic Declines in Populations of Reef Animals

Research is needed to document the correlation between declines in sea urchin, which are in very low abundances, especially the long-spined urchin. This decline suggests poor recovery of this species in the Keys since its severe Caribbean-wide die-off in 1983. Research efforts by NOAA are exploring means by which populations of this key species may be restored. Research is also needed on the decline of staghorn coral and other corals. Threats may be due to indirect human impacts, which are difficult to identify but are reflected in coral declines and increases in macroalgae and turbidity.

Seasonal and yearly seawater temperature fluctuations, increasing solar radiation and atmospheric changes have affected marine ecosystem. The impacts are seen in coral disease and bleaching, which have increased in frequency, duration and range, coinciding with the ten warmest years on record (U.S. Department of Commerce, 2007). Under normal conditions, corals and reef organisms would be expected to tolerate and recover from sporadic events such as temperature variation. However, additional human-induced stresses are likely affecting the ability of these organisms to adequately recover from climate fluctuations.

3.14.3.2.10 Physical Damage to Benthic Communities

Over three million tourists visit the Keys annually, participating primarily in water-related activities, such as fishing diving, boating, and other ecotourism activities (U.S. Department of Commerce, 2007). Management techniques are needed to mitigate or reduce physical damage to corals and other benthic communities caused by these visitors. The FKNMS Management Plan addressed the number of visitors that a reef can support annually and still be ecologically viable.

3.14.3.2.11 Propeller Damage to Seagrasses

Impacts to seagrasses are due to vessel groundings, anchor damage, and trap fishing. Boat propellers and large ships have damaged over 30,000 acres of seagrasses and more than 20 acres of coral reef habitat in the FKNMS (U.S. Department of Commerce, 2007).

3.14.3.2.12 Artificial Reefs

Artificial reefs generally increase the area of hardbottom, and contribute to the dive industry, but their placement can directly reduce benthic habitats through improper placement. The man-made structures may also be a physical threat to coral reefs under extreme storm conditions (U.S. Department of Commerce, 2007) and may contain pollutants if not properly decontaminated prior to placement.

One example of a major artificial reef is the *Gen. Hoyt S. Vandenberg*, a former military ship approximately 525 feet long. It was deliberately sunk in 2009 in the FKNMS seven miles south of Key West in approximately 150 feet of water. The ship had undergone months of inspections and about 75,000 man-hours worth of cleanup in shipyards in Norfolk Virginia

to remove contaminants that were deemed potential hazards to the marine environment. The cleanup was required by local, State and federal agencies to receive the necessary federal and State permits to sink the ship in the FKNMS. (http://www.fla-keys.com/diving/vandenberg.cfm).

Other examples include the *Thunderbolt* which is a former electrical research vessel sunk in 1986 in 120 feet of water four miles south of Marathon, the *Duane* which is a 327-foot former U.S. Coast Guard cutter sunk in 1987 in 120 feet of water off Key Largo, the 210-foot *Adolphus Busch Sr*. which is former freighter sunk in 1998 about five miles southwest of Big Pine Key, and the *Spiegel Grove* which is a 510-foot former Navy landing ship sunk in 2002 in 130 feet of water about six miles off Key Largo. Originally sunk on its side in 2002, the Spiegel Grove was righted by Hurricane Dennis in 2005, demonstrating the potential for storms to shift artificial reefs (http://www.fla-keys.com/news/news.cfm?sid=1958).

3.14.3.2.13 Invasive Species

At least 123 non-native fish species have been caught in Florida. Of these, 56 are established in freshwater habitats and at least four are established in estuaries (Andrews et al., 2003). Fifteen species of non-native tropical reef fishes, mainly angelfishes (*Pomacanthus* spp.), surgeonfishes (*Zebrasoma* spp.), and a serranid (*Chromileptes altivelis*), have been observed in southeastern Florida reefs but are not known to be established.

The red lionfish (*Pterois volitans*) is the only marine invasive species that appears to have become established in Florida. Six lionfish were freed into Biscayne Bay, Miami-Dade County on August 24, 1992, when Hurricane Andrew destroyed a large marine aquarium. Red lionfish are now found along the seaward edge of reefs and in lagoons, turbid inshore areas, and harbors. They are often found during the day under ledges and crevices but may also hunt small fish, shrimps, and crabs in open water at night. The red lionfish could pose a threat to Florida's fishers, divers, and wildlife inspectors because it is venomous. Furthermore, potential ecological effects include habitat alteration; water quality degradation; and introduction of diseases and parasites, competition, predation, hybridization, and replacement of native species. As introduction of non-native marine fishes is relatively rare, the effects of such introductions are not well documented (Andrews et al., 2003).

Orange cup coral (*Tubastrea coccinea*) is found on vertical steel structures (sunken ships and engineering platforms). Tubes are usually facing in the direction of the current. An example is the sunken vessel U.S. Coast Guard Cutter *Duane* (off Key Largo), which contains southern facing deck structures that are veneered with multiple colonies. The species has also been reported on other wrecks in the Gulf of Mexico (Fenner and Banks, 2004). To date, there are no reports of *T. coccinea* replacing native species and it is only known to settle and grow on steel structures. Monitoring is recommended at selected locations to follow the status and trends in abundance and distribution for *T. coccinea* (Andrews et al., 2003).

While non-native fishes and corals may threaten Florida's coral reef, non-native plants pose the greatest risks. The world-wide spread of the algae *Caulerpa taxifolia* has been well documented. More recently, *Caulerpa brachypus*, native to the Pacific region, has been detected in Florida on nearshore reefs and in the Indian River Lagoon. The species was probably released from saltwater aquaria or from ships' ballast water. In the absence of predators, both species can grow unchecked and can smother corals and seagrass beds rapidly if sufficient nutrients are available. It is believed the rapid spread is enhanced by man-made enrichment (Andrews et al., 2003).

3.14.3.3 Problems and Solutions Specifically Related to the Two-Day Lobster Sport Fishing Season

The Monroe County BOCC and the FFWCC have established regulations for the two-day Sport Lobster Season (the last consecutive Wednesday and Thursday of July). Regulations specify a daily six lobster bag limit, daytime diving only (nighttime diving is allowed during the regular season), and specific prohibited areas have been established. Problems related to the two-day Sport Lobster Season season include the use of illegal gear, diving in prohibited areas or at night, exceeding the bag limit (on a single trip, or by multiple trips), and collection of lobster smaller than the legal limit.

A problem in recent years during the two-day Sport Lobster Season has been conflicts between snorkelers in canals, diving under residential docks and invading the privacy of residents. In unincorporated areas and incorporated areas (e.g., Islamorada, Key Colony Beach, and Marathon), snorkeling/diving ordinances have been adopted to prohibit diving or snorkeling within (1) 300 feet of improved residential or commercial shoreline, (2) any manmade or private canal, and (3) any public or private marina.

3.14.3.4 Comprehensive Fisheries Management and Habitat Preservation through the Florida Keys National Marine Sanctuary Management Plan

To protect the spectacular marine ecosystem of the Florida Keys, the Florida Keys National Marine Sanctuary and Protection Act was enacted by Congress and signed into law on November 16, 1990. The Act created the FKNMS boundaries, encompassing approximately 2900 square nautical miles (2.5 million acres), with jurisdiction up to the mean high tide line. In addition, the Act called for NOAA of the U.S. Department of Commerce to prepare a comprehensive management plan for the FKNMS after consulting with the public and with federal, State, and local government authorities. An Advisory Council was established to act as conduit of public opinion and to assist in the development of the plan. The FKNMS Comprehensive Management Plan was developed and FKNMS regulations went into effect on July 1, 1997. The revised Management Plan went into effect in December 2007.

3.14.4 Essential Fish Habitat

The Essential Fish Habitat (EFH) provisions of the Magnuson-Stevens Fishery Conservation and Management Act (MSA) were made final January 17, 2002 (67 FR 2343). As defined in

that final rule, EFH means those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity. For the purpose of interpreting the definition of EFH, "waters" include aquatic areas and their associated physical, chemical, and biological properties that are used by fish, and may include aquatic areas historically used by fish, where appropriate; "substrate" includes sediment, hard bottom, structures underlying the waters, and associated biological communities; "necessary" means the habitat required to support a sustainable fishery and the managed species' contribution to a healthy ecosystem; and "spawning, breeding, feeding, or growth to maturity" covers a species' full life cycle.

The NMFS and their eight regional fisheries management councils are responsible for the management and protection of fisheries and habitat essential for the survival of managed species. The U.S. Secretary of Commerce, acting through NMFS and the South Atlantic Fisheries Management Council (SAFMC), has been delegated this authority under the provisions of the MSA; Public Law 104-208. The SAFMC is responsible for the management of fish stocks and EFH within the federal 200-mile limit of the Atlantic from North Carolina through the Florida Keys. The MSA, as amended by the Sustainable Fisheries Act of 1996, sets forth a number of mandates for NMFS and the SAFMC to identify and protect important marine and fish.

Habitat Areas of Particular Concern (HAPC) are subsets of EFH that include areas that hold an especially important ecological function, are sensitive to human induced environmental degradation, are particularly vulnerable to development activities, or are particularly rare. The SAFMC designated HAPCs broadly to include both general habitat types (e.g., seagrass beds) and geographic areas of ecological importance (e.g., the Charleston Bump). In general, HAPCs typically include high value intertidal and estuarine habitats, offshore areas of high habitat value or vertical relief, and habitats used for migration, spawning, and rearing of fish and shellfish.

In the Florida Keys, habitats that are considered to be essential for fish species managed in the South Atlantic region are: Estuarine Intertidal Scrub-Shrub Wetland (mangroves); Estuarine Subtidal Open Water; Seagrasses; Vegetated, Non-vegetated, and Live Bottoms; Coral and Artificial Reefs; Oyster Reefs and Shell Banks; Intertidal Flats; Palustrine Emergent Wetland (freshwater marshes); and Palustrine Forested Wetland (freshwater wetlands). Coral Reefs, Mangroves and Seagrasses would be considered HAPCs. Geographically defined HAPCs are:

- The Dry Tortugas National Park;
- Florida Keys National Marine Sanctuary;
- Card Sound;
- Florida Bay;
- Biscayne National Park;
- Marathon Hump; and
- The Wall (Florida Keys)

3.15 Air Quality [Rule 9J-5.013(1)(a)1. and (b), F.A.C.]

3.15.1 Ambient Air Quality Standards and Statewide Air Quality Monitoring Programs

Air pollution is defined as the presence in the atmosphere of a substance or substances added directly or indirectly by a human act, in such amounts to adversely affect humans, animals, vegetation, or materials. The federal Clean Air Act, a legal mandate which was last amended in 1990, requires the USEPA to establish standards for six common air pollutants to protect human health and welfare from air pollution. These "criteria pollutants" for which limits on air quality standards have been set are: particulate matter (PM_{10} and $PM_{2.5}$); sulfur dioxide (SO_2); nitrogen dioxide (NO_2); ozone (O_3); carbon monoxide (CO); and lead (Pb). Two types of national ambient air quality standards (NAAQS) have been established by the USEPA for each criteria pollutant. Primary ambient air quality standards are designed to protect public health with an adequate margin of safety (http://www.epa.gov/air/criteria.html). Secondary standards are designed to protect public welfare-related values including property, materials and plant and animal life (http://www.epa.gov/air/criteria.html). Ambient air is defined as that portion of the atmosphere near ground level and external to buildings or other structures, or more simply, the air we breathe when outside.

USEPA and FDEP have implemented an air quality monitoring program throughout the State, which measures concentrations of major pollutants in the ambient air. This program is designed to provide data regarding compliance with the legal limitations on concentrations of major pollutants in the ambient air established by both USEPA and FDEP. Although FDEP and the County can set more stringent standards than those established by USEPA, they have chosen to utilize the federal NAAQS as their standard as shown in the State and Federal Ambient Air Quality Standards table below (FDEP, 2006).

Pollutant	Averaging Time	Florida Standard	Primary NAAQS	Secondary NAAQS
Carbon Monoxide	8-hour	9 ppm	9 ppm	--
	1-hour	35 ppm	35 ppm	
Lead	Quarterly[b]	1.5µg/m³	1.5µg/m³	1.5µg/m³
Nitrogen Dioxide	Annual[b]	100µg/m³ (0.05 ppm)	0 .053 ppm (100µg/m³)	0.053 ppm (100µg/m³)
Ozone	1-hour[c]	0.12 ppm		
	8-hour[d]	--	0.08 ppm	0.08 ppm
Particulate Matter (PM_{10})	Annual[b]	50µg/m³	50µg/m³	50µg/m³
	24-hour[c]	150µg/m³	150µg/m³	150µg/m³
Particulate Matter ($PM_{2.5}$)	Annual[b]	--	15µg/m³	15µg/m³
	24-hour[c]	--	35µg/m³	35µg/m³
Sulfur Dioxide	Annual[b]	60µg/m³ (0.02 ppm)	0.03 ppm	--
	24-hour[a]	260µg/m³ (0.10 ppm)	0.14 ppm	--
	3-hour[a]	1300µg/m³ (0.5 ppm)	--	0.5 ppm

[a] – Not to be exceeded more than once per year.

[b] – Arithmetic mean.

[c] – Not to be exceeded on more than an average of one day per year over a 3-year period.
[d] – Not to be exceeded by the 3-year average of the 4th highest daily max.

The FDEP maintains two types of ambient air quality monitoring stations throughout the State, each of which is designed to meet different objectives. According to FDEP's 2006 Monitoring Report, ambient air data are collected by 216 monitors located in 34 counties. No monitoring stations were listed for Monroe County. The State/Local Air Monitoring Station (SLAMS) and National Air Monitoring (NAMS) network is typically established in high population areas and/or where there are significant pollutant emission sources or source categories. Data from this network provide an overall view of the State's air quality and are used in the development of statewide control strategies (FDEP, 2006). The Special Purpose Monitoring (SPM) Network is designed to supplement the SLAMS/NAMS network in data sparse areas. Data from these stations are used to develop and refine local control strategies and to verify maintenance of ambient standards in areas outside of the SLAMS/NAMS network (FDEP, 2006).

Based on analyzed monitoring data, all areas within the State are designated with respect to each of the six pollutants as "attainment", "nonattainment", or "unclassifiable". Attainment areas are those within which air quality standards are being met. An area that is found to be in violation of these NAAQS is called a non-attainment area. The purpose of the nonattainment designation is to identify air quality problem areas for which the State and USEPA must seek solutions. Pollution sources contributing to non-attainment areas are subject to tighter restrictions to meet and maintain the standards. Where insufficient data are available to reasonably be classified as either attainment or nonattainment the area is designated as "unclassifiable" (FDEP, 2006).

3.15.2 Monroe County Ambient Air Quality

Air quality in the Florida Keys is generally excellent. Sea breezes, coupled with the lower intensity of development and small number of point sources, result in relatively low pollutant loads which are dispersed by winds. Based upon ambient air quality monitoring, the FDEP has designated Monroe County as an attainment area for all major air contaminants with the exception of Particulate Matter (PM_{10}), which is designated as "unclassifiable" statewide (Chapter 62-204.340, F.A.C.). This indicates that the concentrations of major pollutants in the ambient air within the County fall within the acceptable limits set by both FDEP and USEPA.

3.15.3 Known Sources of Air Pollution in Monroe County

Potential sources of air pollution in the County generally include vehicle emissions, naturally occurring seasalt, airborne dust from disturbed areas, controlled open burning, and point sources (permitted under Chapters 62-4, 62-204, and 62-213, F.A.C.).

Sources of air pollutants with active FDEP Air Operation Permits are listed below. These facilities include six concrete plants, two crematories, two electric plants, one dry cleaner and one facility under construction. All discharges are currently in compliance with

discharge limits [http://www.dep.state.fl.us/air/emission/aces/ACES_r.asp (as of July 2, 2010)].

- Cemex Construction Materials – Marathon
- Cemex Construction Materials – Rockland Key
- Cemex Construction Materials – Tavernier
- Dean-Lopez Crematory, Inc. – Big Pine Key
- Florida Keys Electric Coop Assoc. – Marathon
- Floida Keys Funeral Services LLC – Big Coppitt Key
- J A Larocco Enterprise Inc. – Islamorada
- Keys Energy Services – Stock Island
- LaCross Marina, LLC – Key Largo (under construction)
- Monroe Concrete Products, Inc. – Rockland Key
- Nielsen & Co., Inc. (Keys Cleaners) – Marathon
- Stay Hard, Inc. – Marathon

3.15.4 Potential for Conservation, Use, or Protection of Air Quality in Monroe County

Ambient air quality in the Keys is likely to remain excellent, due to the low intensity of development, sea breezes, and limited number of point sources of pollutants. However, actions can be taken by the local government to reduce the potential for localized concentrations of pollutants, particularly particulates; to support FDEP in regulation of point sources; to support initiatives for statewide programs to reduce vehicle emissions; to inspect permitted sites for compliance; and to take action against unregulated and unpermitted activities.

- Particulates escaping from disturbed areas in the form of fugitive dust can be controlled by on-site dust control measures. Areas exposed during construction can be treated with mulch, spray, grass, water, or other appropriate methods to control dust. Use of these measures can be required as a condition of Development Orders. For construction projects greater than one acre, the FDEP Generic Permit for Stormwater Discharge from Large and Small Construction Activities requires contractors to develop a stormwater pollution prevention plan that would provide control measures for fugitive dust (FDEP Document No. 62-621.300(4)(a) effective February 17, 2009).
- Annual permit renewals for mining activities require the submittal of fugitive dust control plans. The County could require demonstration of compliance with these measures as part of the permit renewal process.
- Open burning will continue to be regulated under Chapter 62-256, F.A.C. Accordingly, open burning is prohibited except for yard, tree, and initial land clearing debris. Authorizations for open burning may be required by the Florida Division of Forestry pursuant to Section 590.125, Florida Statutes.
- Point sources of pollution from generators, incinerators, concrete plants, and other pollutant sources will continue to be regulated under Chapters 62-4, 62-204 and 62-213, F.A.C. These programs are designed to ensure that point source emissions are in compliance with FDEP and USEPA air quality standards.

- In December 2008, Rule 62.285.420, F.A.C., became effective. This rule prohibits heavy-duty diesel engine powered motor vehicles from idling for more than five consecutive minutes.
- In response to Executive Orders 07-126, 07-127, and 07-128, the Florida Legislature passed the Florida Climate Protection Act, Section 403.44, F.S., which authorized FDEP to adopt rules for a regulatory cap-and-trade program to reduce greenhouse gas from the electric utility sector. As of June 2010, the rule-making process is on-going and is tied to the potential passage of Federal legislation on the issue. The specific goals in the Exeuctive Orders are to reduce greenhouse gases to year 2000 levels by 2017, to year 1990 levels by 2025, and to 20 percent of 1990 levels by 2050 (Comparative Study of Selected Offset Protocols for Greenhouse Gas Reduction and Reporting Programs, FDEP, May 21, 2010).
- The Florida Clean Car Emission, Chapter 62-285, F.A.C., became effective on February 15, 2009. The new rule will only apply to future make and model passenger cars, light-duty trucks, and sport utility vehicles. The implementation date will be two model years after both of the following conditions are met: (1) the USEPA grants the State of California a waiver for their automotive greenhouse gas standards, and (2) the Florida Legislature ratifies the rule. USEPA granted the California waiver in June 2009; however, the Florida Legislature had not ratified the rule as of June 2010 (http://www.dep.state.fl.us/air/rules/ghg/california.htm).
- USEPA and the Department of Transportation's National Highway Traffic Safety Administration have finalized a joint rule to establish a national program consisting of new standards for model year 2012 through 2016 for light-duty vehicles to reduce greenhouse gas emissions and improve fuel economy. The new standards apply to new passenger cars, light-duty trucks, and medium-duty passenger vehicles covering model years 2012 through 2016. The USEPA standards require these vehicles to meet an estimated combined average emissions level of 250 grams of carbon dioxide per mile in model year 2016, equivalent to 35.5 miles per gallon if the automotive industry were to meet this carbon dioxide level all through fuel economy improvements (Light-Duty Vehicle Greenhouse Gas Emission Standards and Corporate Average Fuel Economy Standards; Final Rule, 40 CFR Parts 85, 86, and 600; 49 CFR Parts 531, 533, 536, et al.).

3.16 Water Needs and Use [Rule 9J-5.013(1)(c), F.A.C.]

3.16.1 Current (Year 2010) Water Needs and Sources

The current (year 2010) demand for potable water by existing and committed residential and non-residential uses in the Florida Keys is estimated at approximately 20.07 million gallons per day (see *Chapter 8.0 Potable Water Element*).

The primary source of potable water consumed in the Keys is the Biscayne Aquifer in southeastern Miami-Dade County. Water is pumped from the Florida City Wellfield and distributed by the Florida Keys Aqueduct Authority (FKAA). With treatment, water drawn from the Biscayne Aquifer meets all federal and state drinking water standards. Alternative potable and non-potable water supplies in use include private cisterns, private

wells, home desalinization systems, and bottled water. Most users of these alternative sources rely on them only as supplements to the FKAA water. Cistern and well water is typically reserved for irrigation and other non-potable uses. The deeper Floridan Aquifer, which requires desalination treatment before it is suitable for either potable or irrigation use, is locally used for landscape irrigation. Based on the SFWMD ePermitting database (accessed June 4, 2010), there are only three consumers in the County that are using enough Floridan Aquifer water to require an individual SFWMD permit: Ocean Reef Community (golf course and landscaping), Silver Shores Mobile Home Park (landscaping), and Card Sound Golf Course (golf course irrigation) (see *Chapter 8.0 Potable Water Element*).

Potable water is supplied to the Keys by the FKAA according to the terms of the current consumptive use permit (SFWMD Water Use Permit No. 13-00005-W). A complex set of interagency and intergovernmental agreements control the water allocation and distribution. Agencies and governments which are parties to these agreements include FKAA, the SFWMD, the FDEP, the County, and the City of Key West (see *Chapter 8.0 Potable Water Element*).

3.16.2 Projected (Year 2035) Water Needs and Sources

The projected demand (year 2035) for potable water from residential and non-residential uses in the FKAA service area is estimated at 23.8 million gallons per day. This water will continue to be provided by the FKAA. The SFWMD Consumptive Use Permit will continue to be revised to provide for this projected demand. Water will continue to be obtained from the Florida City Wellfield (see *Chapter 8.0 Potable Water Element*).

3.16.3 Water Conservation Strategies

Water conservation strategies in use or under consideration in the Keys focus upon leak detection and repair; metering to detect unaccounted-for water; reuse of wastewater; and reduction of consumption through a conservation-oriented rate structure, water use restrictions, distribution of water conservation kits, adoption of a Florida-Friendly Landscape Ordinance, adoption of plumbing fixture efficiency standards, and reuse of wastewater. The ten-year (2010) water need projection accounts for the FKAA Leak Detection Program, which has a goal of 13 percent unaccounted for water (see *Chapter 8.0 Potable Water Element*).

3.17 Hazardous Wastes and Hazardous Materials [Rule 9J-5.013(1)(b), F.A.C.]

3.17.1 Solid Waste Disposal Sites

Inactive County landfills and abandoned landfill sites are addressed in Section 3.5.3 (Known Existing Point and Non-Point Source Pollution Problems). The discussion includes:

- Identification of inactive County landfills and abandoned dumps in unincorporated Monroe County; and

- General discussion of the potential water quality impacts related to landfill leachate contamination of nearshore waters.

Solid waste disposal sites have environmental issues other than those related to potential pollution. Some solid waste disposal or storage areas, including private storage areas where yard waste or other non-hazardous materials are stored or staged, encroach on natural habitats. Examples include permitted facilities that exceed the permitted acreage, or non-permitted illegal stockpiling.

3.17.2 Hazardous Waste Disposal Sites

The USEPA's Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS) (as of search date of February 11, 2010) include two active, known, alleged, or potential hazardous waste sites in the County, including the incorporated cities. Active CERCLIS sites are sites at which site assessment, removal, remedial, enforcement, cost recovery, or oversight activities are being planned or conducted under the Superfund program. These are:

- NAS Trumbo Point, Palm Avenue Causeway, Key West (USEPA ID FL2170024473), and
- Robbies Drum & Tank, Key West (EPA ID FLN000407546).

The CERCLIS database also indicates several archived sites in the County. The archive designation indicates the site has no further interest under the federal Superfund program based on available information. USEPA may perform a minimal level of assessment work at a site while it is archived if site conditions change and/or new information becomes available. The Archive designation is removed and the site is returned to the CERCLIS inventory if more substantive assessment and/or any cleanup work is necessary under the federal Superfund program. These are as follows:

- Key West Gasification, 726 Catherine Street, Key West (USEPA ID FLD984172189),
- Marathon Key Abandoned Drum, Marathon Key (USEPA ID FLD984170282),
- NAS Key West (Boca Chica), Naval Air Station, Key West (USEPA ID FL6170022952),
- Snapper Lane, Key Largo (USEPA ID FLD984170266), and
- USCG Station Key West, Palm Ave Causeway, Key West (USEPA ID FL1690331300).

3.17.3 Hazardous Waste Generators

Based on the FDEP Hazardous Waste Facilities Handler database (accessed online at http://www.dep.state.fl.us/waste/categories/hwRegulation/default.htm on March 17, 2010) there is one Large Quantity Generator of hazardous waste in the County (the Naval Air Station in unincorporated Boca Chica Key is a Large Quantity Generator, USEPA identification number FL6170022952). Large Quantity Generators generate 1000 kilograms or more of hazardous waste per month or 1 kilogram or more of acute hazardous waste (such as some pesticides, toxins, or arsenic and cyanide compounds) per month.

There are 76 Small Quantity Generators in the County (including incorporated areas). Small Quantity Generators generate 100 to 1000 kilograms of hazardous waste per month. Small Quantity Generators handle small amounts of hazardous wastes and include pharmacies, markets, automotive parts stores, marine supply stores, photography facilities, printing facilities, and many other types of businesses. Of the 76 Small Quantity Generators, 35 have addresses that are not in Islamorada, Plantation Key, Key Colony Beach, Marathon, Layton, or Key West and therefore this number is an approximate number of Small Quantity Generators in unincorporated Monroe County.

3.17.4 Household Hazardous Wastes

Improper handling and disposal of many common household products in trash and septic systems pose threats of ground and surface water contamination, exposure of homeowners to health risks, potential injuries to sanitation workers, and possible damage to packaged treatment plants. The list of household products that are considered hazardous includes a range of household cleaners, automotive products, home maintenance and improvement products, and lawn and garden products used everyday in the home. Many users remain unaware of the hazards associated with the use of these substances despite public education efforts.

County residents may drop off household hazardous wastes, free of charge, on two days each month at the three transfer stations (Cudjoe Key Transfer Station, MM 21.5, Blimp Road; Long Key Transfer Station, MM 68; and Key Largo Recycling Yard, MM 100.3, 300 Magnolia Street). The transfer stations accept household hazardous wastes such as motor oil, car and boat batteries, paints, household and garden chemicals, florescent bulbs, and mercury containing devices. The waste collected at these facilities is transported out of the County for disposal [See *Chapter 9.0 Solid Waste Element*].

3.17.5 Underground and Aboveground Storage Tanks

Most underground storage tank installations in the Florida Keys are costly, difficult, and require floating and ballasting of tanks to anchor them into position (FIMC, 1991). This is due to the high water table, shallow soils, and presence of coral rock typically lying within one to ten feet of the ground surface. Because of these conditions, many storage tank owners prefer aboveground storage tanks to underground storage tanks (FIMC, 1991).

FDEP regulates underground and aboveground storage tanks according to the following rules:

- Chapter 62-761, F.A.C. regulates all underground storage tanks over 110 gallons containing pollutants and CERCLA hazardous substances; and
- Chapter 62-762, F.A.C. regulates all aboveground tanks over 550 gallons containing pollutants.

Both rules require secondary containment for new and existing tanks.

Based on the FDEP Regulated Tanks UST database (available online at http://www.dep.state.fl.us/waste/quick_topics/database_reports/pages/stcm/storagetank_reports.htm, updated March 4, 2010) there are 231 registered petroleum USTs in the County (including incorporated areas). Of the 231 USTs, 117 have addresses that are not in Islamorada, Plantation Key, Key Colony Beach, Marathon, Layton, or Key West and therefore this number is an approximate number of USTs in unincorporated Monroe County. Of the 231 USTs, at least 228 contain gasoline or diesel.

Based on the FDEP Regulated Tanks AST database (available online at http://www.dep.state.fl.us/waste/quick_topics/database_reports/pages/stcm/storagetank_reports.htm, updated March 4, 2010) there are 274 registered ASTs in the County (including incorporated areas). Of the 274 ASTs, 80 have addresses that are not in Islamorada, Plantation Key, Key Colony Beach, Marathon, Layton, or Key West and therefore this number is an approximate number of ASTs in unincorporated Monroe County. Of the 274 USTs, 232 contain gasoline or diesel, 24 contain aviation gas or jet fuel, 10 contain new/lube oil, and 8 contain waste oil.

A discharge is reported when a suspected underground storage tank leak has contaminated the surrounding soils, surface waters immediately adjacent to the tank, or groundwater directly beneath a tank.

Based on the FDEP Contaminated Facilities database (available online at http://www.dep.state.fl.us/waste/quick_topics/database_reports/pages/stcm/stcm_reports.htm, updated March 4, 2010) there are 142 petroleum-contaminated facilities in the County (including incorporated areas). The database includes petroleum-contaminated facilities but does not include discharges that are not required to be remediated under Chapter 62-770 F.A.C. or discharges that have already been cleaned up. Of the 142 facilities, 49 have addresses that are not in Islamorada, Plantation Key, Key Colony Beach, Marathon, Layton, or Key West and therefore this number is an approximate number of petroleum-contaminated facilities in unincorporated Monroe County. Of the 142 facilities, 56 are retail stations, 34 are government-owned facilities, 28 are non-retail facilities, 22 are marine/coastal fuel storage facilities, and 2 are under other categories.

Many of the fuel tanks in the Florida Keys that have had leaking events are included in the State cleanup program and are numerically ranked in regard to likelihood to affect public health and safety. Most if not all of the sites are ranked quite low, and, therefore, would not be subject to State cleanup funding for quite some time, if ever, as the cleanup fund, which has not received legislative budget allocations for the last several years, is only directed to much higher-ranked sites. Therefore, these sites in Monroe County remain unremediated, for the most part.

The State ranking system is weighted toward potential effects on public potable water supply, and, as groundwater in Monroe County does not serve as a public water supply source, this results in a low ranking. The evaluation process does not consider possible

migration of contaminated groundwater into wetlands or nearshore surface waters and the potential effects on the associated biota, so the Statewide ranking system is not effective in protecting Florida Keys marine water quality.

3.17.6 Drycleaning Facilities

Based on the FDEP Drycleaning Solvent Cleanup Program Priority Ranking List for January 2010 (accessed online at http://www.dep.state.fl.us/waste/categories/drycleaning/default.htm), there are no recorded drycleaning facilities in the County that have been remediated or are awaiting funding in the Drycleaning Solvent Cleanup Program. Based on the FDEP 2010 Drycleaning Certificates of Registration Issued database (accessed online at http://www.dep.state.fl.us/waste/categories/drycleaning/default.htm and updated March 16, 2010), there are two facilities in the County that have been issued a FDEP drycleaning Certificate of Registration, but neither is in unincorporated Monroe County.

3.17.7 Brownfields

There is one designated Brownsfield area in the County, based on FDEP's Brownfields Redevelopment Program database (accessed online at http://www.dep.state.fl.us/waste/quick_topics/ database_reports/default.htm, updated March 10, 2010). The Old Baltuff Dump Site Brownfield Area (Area ID BF440701000) is located on Middle Torch Key and comprises 12.81 acres. It was designated as a Brownsfield site in 2007 and is the first Designated Brownfield Area in the County.

3.17.8 Hazardous Material Spills

The FDEP Division of Law Enforcement, Bureau of Emergency Response responds to hazardous materials incidents and oil spills. Under the statewide program, the County is served by an office in Marathon. FDEP provides technical assistance or response, or both, depending upon the severity, location of the incident, and capability of other responders. Most actual handling of materials is done by the fire department or a cleanup contractor. The most common types of hazardous materials are used fuels, oils, paint-related materials, solvents, corrosives and pesticides. Any radioactive incidents would be handled by the Florida Department of Health, Office of Radiation Control. FDEP has adopted the USEPA's Reportable Quantities for hazardous substances, and has a Reportable Quantity of 25 gallons for petroleum products spilled on land, or any amount which causes a sheen on navigable waters.

Incidents that meet certain threshold criteria are entered in the Oil and Hazardous Materials Incident Tracking (OHMIT) database. The database is administered out of FDEP headquarters in Tallahassee. The OHMIT database includes a listing of the 2008 and 2009 coastal incidents for the County. The database includes pollutant names and spill volumes reported. In 2008, there were 57 incidents totaling 975.79 gallons. In 2009, there were 79 incidents totaling 6598.3 gallons. The largest incidents were as follows:

Incident Date	Incident #	Pollutant Name	Source	Volume (gal)
01/30/2009	41959	Scrap metal	Vessel	5000
01/15/2008	38845	Jet fuel	Aircraft	800
04/11/2009	41326	Diesel fuel	Vessel	300
05/20/2009	41480	Diesel fuel	Vessel	300
04/24/2009	41360	Diesel fuel	Vessel	200
05/25/2009	41515	Batteries	Vessel	100
11/04/2009	42556	Food oils	Unknown	100
05/24/2009	41510	Raw sewage	Vessel	100
05/25/2009	41515	Scrap metal	Vessel	100

Information that is reported to the National Response Center is available from the Emergency Response Notification System (ERNS) database: http://www.epa.gov/region4/r4data/erns/index.htm.

3.17.8.1 Hazardous Material Spills in Terrestrial Environments

Data available from FDEP (January 1987 to June 1991) and from the U.S. Coast Guard's National Response Center (October 1984 to March 1990) indicate a total of 93 reported spills in the Florida Keys (CSA, 1991). At least 26 of these spills occurred in the City of Key West (CSA, 1991).

The most frequently spilled hazardous materials have been petroleum products (CSA, 1991). Other spilled substances included chemicals, raw sewage, miscellaneous toxic substances, and unclassified substances (such as soot and ash, foam, garbage, etc.; CSA, 1991). Structural failure and seepage from storage facilities were responsible for the largest percentage of the hazardous material spills (CSA, 1991). Equipment failure and human error accounted for the remaining classified spills reported (CSA, 1991).

FDEP regulatory and inspection programs for storage tank facilities (Chapters 62-761 and 62-762, F.A.C.) are designed to prevent spills from storage facilities due to leakage, overfilling, and structural failures. These programs reduce the number of spills from storage facilities in the future as older facilities are inspected and replaced.

3.17.8.2 Hazardous Material Spills in Marine Environments

There were 355 reported spills of hazardous materials in the waters of the FKNMS in the period between October 1985 and August 1991 (CSA, 1991). Approximately 44 percent of the spills occurred on the Atlantic Coast within 3 nmi from shore; approximately 37 percent occurred on the gulfside/bayside within the same distance of the shore; and the remaining spills were dispersed among nearshore waters (canals and harbors) and Atlantic and Gulf contiguous and offshore waters (more than 3 nmi offshore) (CSA, 1991).

Petroleum products, primarily gas and diesel fuel, were the most commonly spilled substances, with an average discharge per incident of 30.05 gallons (CSA, 1991). Based upon historic spill rates, it is estimated that approximately 1,598 gallons of oil-related products have been released annually between 1985 and 1991 (CSA, 1991).

Given historical spill volumes, marine spills do not represent a significant threat to marine waters in the Keys. The marine communities and habitats of the Keys are relatively resistant to minor amounts of oil floating on the water surface (CSA, 1991). However, a catastrophic spill resulting from a major tanker grounding or any other major accident could have serious environmental consequences. This risk has been reduced, although not eliminated, by federal regulations which have moved tanker traffic further offshore (CSA, 1991). One component of the Florida Keys National Marine Sanctuary and Protection Act (Public Law 101-605) restricts vessel traffic within the FKNMS boundaries. "Areas To Be Avoided" (ATBAs) have been established to reduce the likelihood of groundings. The ATBA boundaries are not based on a single certain distance from shore or a certain depth, but are irregular boundaries defined in 15 CFR 920. Tanker vessels and vessels greater than 50 meters long are prohibited in the ATBAs. As evidenced by the Deepwater Horizon oil drilling platform disaster off the coast of Louisiana in 2010, hazardous material spills from distant marine sources have the potential to impact the County.

3.18 Areas of Special Concern to Local Government [Rule 9J-5.012(2)(b), F.A.C.]

3.18.1 Areas of Critical State Concern

The Florida Legislature in 1972 enacted Section 380.05, F.S., which created the Area of Critical State Concern (ACSC) program. At the time of the program's creation, local governments in many parts of Florida did not have adequate local plans to address future growth. The ACSC program protects resources and public facilities of major statewide significance. Five ACSCs were created during the 1970s through the early 1980s:

- City of Key West (1984)
- Florida Keys (1975)
- City of Apalachicola (Franklin County) (1985)
- The Green Swamp (portions of Polk and Lake Counties) (1974)
- The Big Cypress Swamp (Collier County) (1973)

The Florida Keys are designated as an ACSC under Section 380.0552, F.S. The Florida Keys ACSC does not include the City of Key West, which is separately designated as the Key West ACSC. The particulars of each designation differ, reflecting the unique character, circumstances, and legislative urgency for protection of the areas. In every case, however, the common objective was protection of natural resources of statewide significance through cooperative planning and management. In 1985, the Florida Legislature enacted the Local Government Comprehensive Planning and Land Development Regulation Act ("Growth Management Act"). The Act established minimum requirements for adoption of comprehensive plans to guide a community's future growth while protecting natural

resources and planning for the provision of public facilities and services required supporting population growth and the corresponding development. Local governments within ACSCs are required to comply with requirements of the Growth Management Act, in addition to any additional requirements imposed by their ACSC designation.

The Florida DCA reviews all local development projects within the designated areas and may appeal to the Administration Commission any local development orders that are inconsistent with state guidelines. DCA also is responsible for reviewing and approving amendments to comprehensive plans and land development regulations proposed by local governments within the designated areas.

3.18.1.1 Federal Consistency and Coastal Zone Management

The Coastal Zone Management Act (CZMA) seeks to preserve, protect, develop and, where possible, restore and enhance the resources of the nation's coastal zone. It encourages coastal states to develop and implement comprehensive management programs that would balance the need for coastal resource protection with the need for economic growth and development in the coastal zone. If a management program developed by a coastal state is approved by the U.S. Department of Commerce National Oceanic and Atmospheric Administration (NOAA), the state is authorized to review certain federal activities affecting the land or water uses or natural resources of its coastal zone for consistency with its program. This authority is referred to as "federal consistency" and allows states to review:

- Activities conducted by or on behalf of a federal government agency;
- Activities requiring federal licenses or permits;
- Permits issued under the Outer Continental Shelf Lands Act for offshore minerals exploration or development; and
- Federally funded activities (Federal assistance to state and local governments).

Federal consistency is the requirement that Federal actions that affect any land or water use or natural resource of a state's coastal zone must be consistent with the enforceable policies of the state.

The Florida Coastal Management Program (FCMP) is a series of state regulations designed to preserve, protect, develop and, where possible, to restore and enhance the resources of the coastal zone and was approved by NOAA in 1981 and is codified in Chapter 380, Part II, F.S. The FCMP consists of a network of 24 Florida Statutes (i.e. enforceable policies) administered by nine state agencies and five water management districts.

Federal consistency reviews are integrated into other review processes (for example: Florida State Clearinghouse, environmental resource permits and joint coastal permits) conducted by the state depending on the type of federal action being proposed. Regardless of the process used, the review of federal activities is coordinated with the applicable FCMP member agencies, which includes the Department of Community Affairs (DCA). DCA permit review consists of ensuring that permits for federal activities are consistent with

state statutes and rules. During the DCA review, it coordinates with the state licensing agencies by providing its comments and a determination regarding its findings. Agencies authorized to review and comment on the consistency of federal activities subject to state review under the FCMP are those agencies charged with the implementation of the statutes and rules included in the federally approved program. Each agency is given an opportunity to provide comments on the merits of the proposed action, address concerns, make recommendations, and state whether the project is consistent with its statutory authorities in the FCMP. The Florida Department of Environmental Protection (FDEP), as the designated lead coastal agency for the state, communicates the agencies' comments and the state's final consistency decision to federal agencies and applicants through the approval or denial of a permit.

This framework allows the state to make integrated, balanced decisions that ensure the wise use and protection of the state's water, property, cultural, historic, and biological resources; protect public health; minimize the state's vulnerability to coastal hazards; ensure orderly, managed growth; protect the state's transportation system; and sustain a vital economy.

3.18.2 Areas of Critical County Concern

The County has identified a number of Areas of Critical County Concern (ACCC); these places, which include Big Pine Key, North Key Largo, Windley Key/Holiday Isles, and Ohio Key, were determined to have special planning and regulatory needs. However, the 2004 *Master Plan for Future Development of Big Pine Key and No Name Key* (under the Livable CommuniKeys Program) recommended removing the ACCC land use designation from this planning area and replacing it with applicable land use designations on a parcel basis (per the Comprehensive Plan).

3.18.3 Conservation Lands

Many of the most significant marine and terrestrial biological communities found in the Florida Keys have been protected through acquisition by federal and State governments, ROGO dedications, and MCLA purchases. The Office of the County Land Steward manages approximately 3,100 parcels (1,450 acres) of County-owned land. In addition, the Land Steward manages 495 parcels (169 acres) of State-owned lands purchased under the Florida Forever acquisistion program.

Within the uplands and marine waters of the Florida Keys there are two national parks, one national preserve, four national wildlife refuges, and three national marine sanctuaries. There are also four aquatic preserves, two state botanical sites, one state geological site, one state historic site, and four state park/recreation areas. A few County-owned properties have public facilities (**Table 3.18)**.

3.18.3.1 Federally-Owned Conservation Lands

There are approximately 1.7 million acres of lands or waters under federal jurisdiction in the County (**Table 3.18**). These are mainly large, resource-based conservation areas that include environmentally significant marine, wetland and/or upland habitats. These areas function to protect and preserve resources and habitats and provide passive and active recreation and environmental education opportunities for residents of and visitors to the region. Federally-owned conservation lands in the County are described below.

3.18.3.1.1 Everglades National Park

Everglades National Park encompasses approximately 1.5 million acres in southern Florida, including the entire mainland portion of the County. The Park's borders extend into Florida Bay to include all of the submerged land and offshore island lying north of the Intracoastal Waterway between Cross Key to the east and approximately Long Key to the west.

3.18.3.1.2 Big Cypress National Preserve

Big Cypress National Preserve, located on the mainland, includes portions of Monroe, Collier, and Miami-Dade Counties, and borders Everglades National Park to the north. The Preserve was established in 1974 for the purpose of ensuring the "preservation, conservation and protection of the natural, scenic, hydrologic, floral and faunal, and recreation values of the Big Cypress Watershed" and to "provide for the enhancement and public enjoyment thereof" (U.S. Department of the Interior, National Park Service, 1989).

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Table 3.18 - Inventory of Federal, State, and Other Conservation Lands

Name	Location	Area (acres)		
		Total	Upland[2]	Submerged[2]
National Park Service				
Everglades National Park	Mainland	1.5 million		
Dry Tortugas National Park	Dry Tortugas	64,761	104	64,657
Big Cypress National Preserve	Mainland	126,362	126,362	
US Fish and Wildlife Service				
Crocodile Lake National Wildlife Refuge	North Key Largo	6,800		
Great White Heron National Wildlife Refuge	Big Pine to Key West	7,408		
National Key Deer Refuge	Big Pine to Sugarloaf	9,200		
Key West National Wildlife Refuge	Key West	2,019		
National Oceanic and Atmospheric Administration				
Florida Keys National Marine Sanctuary [1]	Offshore Florida Keys	2.34 million		2,347,500
State Parks and Recreation Areas				
John Pennecamp Coral Reef State Park	Key Largo	56,829	3,169	53,660
Long Key State Recreation Area	Long Key	966	849	117
Bahia Honda State Park	Bahia Honda	325	325	
Fort Zachary Taylor Historic State Park	Key West	54	54	
Curry Hammock State Park	Marathon	970		
State Botanical, Geological, and Historic Sites				
Key Largo Hammock State Botanical Site	North Key Largo	2,344		
Lignumvitae Key State Botanical Site	Lignumvitae Key	587	486	101
Windley Key State Geological Site	Windley Key	29	28.5	0.5
Indian Key State Historic Site	Indian Key	115	17	98
State Aquatic Preserves				
Lignumvitae Key State Aquatic Preserve	Offshore Lignumvitae Key	7,000		7,000

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Table 3.18 - Inventory of Federal, State, and Other Conservation Lands (continued)

Name	Location	Area (acres)		
		Total	Upland[2]	Submerged[2]
Biscayne Bay State Aquatic Preserve	Offshore south to Card Sound	67,000		67,000
San Pedro Archaeologic Aquatic Preserve	Offshore Indian Key	650		650
Coupon Bight State Aquatic Preserve	Offshore Big Pine Key	6,000		6,000
Coupon Bight/Key Deer	Big Pine Key	1,755 ac acquired of 2,830 ac project		
Florida Keys Ecosystem	Key Largo to Boca Chica Key	5,445 ac acquired of 11,863 ac project		
North Key Largo Hammocks	North Key Largo	3,974 ac acquired of 4,621 ac project		
Florida Keys Land and Sea Trust, The Nature Conservancy, and County-owned Parcels [3]				
Crane Point Hammock Museum and Nature Center	Marathon	63	63	
Spoonbill Sound Hammocks	Cudjoe Key	26	26	
Hammock Golf Course	North Key Largo	4	4	
Lower Matecumbe Key	Lower Matecumbe Key	26	26	
Terrrestris Preserve	Big Pine Key	123	123	
John J. Pescatello Torchwood Hammock Preserve	Little Torch Key	132	132	
Total		**4,204,967**		

[1] FKNMS incorporated Looe Key National Marine Sanctuary and Key Largo National Marine Sanctuary.

[2] Separate upland and submerged acres provided only when separated by the source information.

[3] The Florida Keys Land and Sea Trust, The Nature Conservancy, and the County own numerous parcels of various habitat types (e.g., pinelands, tropical hardwood hammock). They are inventoried as the various habitat types under County ownership within this element. The parcels listed here refer to those that are available to the public.

3.18.3.1.3 Dry Tortugas National Park

The Dry Tortugas lie approximately 70 miles to the west of Key West, and represent the last outer islands of the Florida Keys. The Dry Tortugas were discovered by Ponce de Leon in 1513 and were used by pirates as refuge until 1821, when Florida became part of the Union. After the islands gained strategic significance, the U.S. Army started construction of Fort Jefferson. The fort was later used as a prison during the Civil War. A lighthouse was constructed at Garden Key in 1825 to warn incoming vessels of the dangerous reefs and later, a bricktower lighthouse was constructed on Loggerhead Key in 1858 for the same purpose. The Dry Tortugas Research Natural Area is a 46-square-mile no-take and no-anchor ecological preserve established in 2007. It is located in the northwestern part of the park. The Research Natural Area complements the adjacent Tortugas Ecological Reserve in the FKNMS, creating the largest no-take marine reserve in the continental United States.

3.18.3.1.4 Crocodile Lake National Wildlife Refuge

The Crocodile Lake National Wildlife Refuge was established in 1978 and includes 6,800 acres of shoreland mangroves and tropical hardwood hammocks on North Key Largo. The Refuge includes a number of endangered and threatened species, including the American crocodile (*Crocodylus acutus*), the Florida manatee (*Tricheus manatus latirostris*), the Schaus' swallowtail butterfly (*Papilio aristodemus ponceanus*), the Key Largo wood rat (*Neotona floridana smalli*), the Key Largo cotton mouse (*Peromyscus gossypinus allapaticola*), and the eastern indigo snake (*Drymarchon corais couperi*). The Refuge was established to prevent both habitat destruction and human intrusion into an area that is essential to maintaining a self-sustaining crocodile population in the United States.

3.18.3.1.5 Great White Heron National Wildlife Refuge

The Great White Heron National Wildlife Refuge was established in 1938 to protect the nursery and nesting grounds of the Great white heron (*Ardea herodias oxydentalis*). The Refuge encompasses approximately 320 square miles in the Lower Keys, with approximately 7,400 acres currently in public ownership, including most of the offshore islands in the Lower Keys. Management problems associated with these relatively remote islands include propeller scouring of seagrass beds; disturbance of migratory and wading waterfowl habitat and nesting sites and of turtle nests; and destruction of habitat and disposal of garbage by visitors to these islands.

3.18.3.1.6 National Key Deer Refuge

The National Key Deer Refuge was established in 1954 to protect the key deer (*Odocoileus virginianus clavium*) and its habitat. The Refuge includes Big Pine Key and several other Keys and offshore islands, including portions of No Name, Sugarloaf, Cudjoe, Ramrod, and the Torch Keys. The Refuge has an active acquisition program to acquire core habitat areas primarily on No Name Key and northern and central Big Pine Key in addition to key deer movement corridors on Big Pine Key.

3.18.3.1.7 Key West National Wildlife Refuge

The Key West National Wildlife Refuge was the first refuge designated in the County in 1908. It includes approximately 2,019 acres of submerged lands and small islands lying west of Key West and extending to the Marquesas, a grouping of offshore islands southwest of Key West.

3.18.3.1.8 Looe Key National Marine Sanctuary

The Looe Key National Marine Sanctuary was established in 1981 to protect the fragile coral reef which surrounds Looe Key, which is located approximately 6 miles to the south of Big Pine Key. The Sanctuary encourages both commercial and recreational uses as long

as those activities are not in conflict with the health or overall enhancement of the resources of the area. It was incorporated into the FKNMS.

3.18.3.1.9 Key Largo National Marine Sanctuary

The Key Largo National Marine Sanctuary was established in 1975 to protect the Key Largo coral reef system. The sanctuary includes approximately 100 square miles off the southeastern coast of Key Largo. The sanctuary includes a mooring buoy system to provide a convenient means of securing a boat without dropping anchor on the fragile coral formations. It was incorporated into the FKNMS.

3.18.3.2 State-Owned Conservation Lands and Facilities

The State of Florida owns large areas of lands and submerged lands (sovereignty submerged lands) in the County and the surrounding waters of the Atlantic Ocean, Florida Bay, and the Gulf of Mexico (**Table 3.18**). Sovereignty submerged lands include, but are not limited to, tidal lands, islands, sand bars, shallow banks, and lands that are waterward of the ordinary or high water line, beneath navigable fresh or tidally-influenced waters conveyed to the State by virtue of statehood in 1845 (Chapter 18-21, F.A.C.). State-administered facilities include large areas of significant marine or terrestrial habitats. These facilities often contain resource-based recreational opportunities such as camping, fishing, or boating. The State also maintains smaller recreational sites throughout the Keys. Most of these sites promote water-related recreation and contain facilities such as beaches, boat ramps, docks, and picnic facilities. State-owned conservation and recreation lands in the County are described below.

3.18.3.2.1 John Pennekamp Coral Reef State Park

The John Pennekamp Coral Reef State Park includes approximately 3,169 acres of upland and 53,860 acres of submerged lands on North Key Largo. The Park is managed primarily to preserve and maintain a natural setting of exceptional quality, while at the same time permitting a full program of compatible passive and active recreational activities. The Park includes several RV/trailer sites, swimming beaches, picnic areas, dive boat operations and other concessions.

3.18.3.2.2 Long Key State Recreation Area

Long Key State Recreation Area includes approximately 850 acres of uplands and 117 acres of submerged lands on Long Key in the Middle Keys. The Area is managed to meet the more active recreation needs of the public, although certain areas of exceptional natural value have been set aside for special protective management. The Area includes RV/trailer sites, camp sites, and canoe trails and rentals.

3.18.3.2.3 Bahia Honda State Recreation Area

Bahia Honda State Recreation Area consists of approximately 325 acres on Bahia Honda Key. The Recreation Area provides camping, picnicking, sunbathing, snorkeling, swimming, and fishing. The Area also contains significant natural resources which require special protective management, including tropical hardwood hammocks, mangroves, and beach/berms.

3.18.3.2.4 Key Largo Hammock State Botanical Site

The Key Largo Hammock State Botanical Site includes approximately 2,344 acres on the southeast side of State Road 905 on North Key Largo. North Key Largo hammocks are the best example of tropical hardwood hammock that remains in the United States. This rapidly disappearing natural community type supports numerous plant and animal species that have very limited distributions and are considered rare and endangered. The site provides habitat for several endangered species, including the Key Largo wood rat, Key Largo cotton mouse, Schaus' swallowtail butterfly, and the American crocodile. Special environmental concerns include poaching, dumping of garbage, maintaining, and restoring native vegetation, and exotic species control. The FDEP continues to acquire properties to expand this site.

3.18.3.2.5 Lignumvitae Key State Botanical Site

The Lignumvitae Key State Botanical Site includes 485 acres of uplands and 100 acres of submerged lands. The primary purpose of the site is to protect a virtually undisturbed subtropical hardwood hammock. Facilities include a public dock, restrooms, visitors center/historic site, and nature trails. Access to the site is restricted to private boats or tour boats. Special concerns include the effects of increased population and recreational demands and the associated pollution and physical damage to the resources of Lignumvitae Key.

3.18.3.2.6 Windley Key State Geological Site

Windley Key State Geological Site includes approximately 30 acres of significant botanical, geological, and historic resources on Windley Key.

3.18.3.2.7 Indian Key State Historic Site

Indian Key was the site of an active colony for ship salvaging operations in the mid-1820s and was the first county seat for Dade County in the 1830s. It is located one mile east of lower Matecumbe Key and is accessible only by private boat. In 1840, Seminole Indians attacked and killed seven people. The site is listed on the National Register of Historic Places and includes remnants of the original salvaging colony as well as an interpretive/nature trail and docking facilities.

3.18.3.2.8 Curry Hammock State Park

Curry Hammock is located in the Middle Keys, within the City of Marathon, with public access to swimming, a playground, picnic tables, grills, and showers on the ocean side of Little Crawl Key. The hardwood hammocks found on these tropical islands support one of the largest populations of thatch palms in the United States. Mangrove swamps, seagrass beds and wetlands provide vital habitats for tropical wildlife.

3.18.3.2.8 Lignumvitae Key State Aquatic Preserve

Lignumvitae Key Aquatic Preserve is one of the southernmost aquatic preserves. It is located within the boundaries of the FKNMS. The Florida Division of Recreation and Parks handles much of the site management of the preserve as part of the Lignumvitae Key Botanical State Park which is essential part of the preserve. Primary concerns to the Preserve's resources include boating and fishing activities and poorly planned development. Boating related impacts involve prop dredging, siltation and groundings.

3.18.3.2.9 Biscayne Bay State Aquatic Preserve

Biscayne Bay State Aquatic Preserve extends from the Oleta River in Miami-Dade County to the Card Sound Road bridge between the mainland and northern Key Largo (excepting Biscayne National Park). The rich fauna found in Biscayne Bay results from the diverse habitats found in the bay. At least some of this diversity is due to the overlap of the Atlantic and the Caribbean marine provinces. The mangrove and estuarine areas support diverse populations of fish. Seagrass beds serve as a food source for the Florida manatee and as nursery grounds for several important species of fish and invertebrates. Major bird rookeries are located within the preserve.

3.18.3.2.10 San Pedro Archaeologic Aquatic Preserve

The San Pedro Archaeologic Aquatic Preserve is located approximately south of Indian Key. The Preserve includes 72 acres of submerged lands, including the San Pedro shipwreck, and mooring buoys. The San Pedro Underwater Archaeological Preserve consists of the 1733 wreck "San Pedro" surrounded by a ring of sandy substrate and seagrass beds.

3.18.3.2.11 Coupon Bight State Aquatic Preserve

The Coupon Bight State Aquatic Preserve is located to the south of Big Pine Key and includes approximately 6,000 acres of submerged lands in Coupon Bight and the Atlantic Ocean. Coupon Bight is unique within the State system of Aquatic Preserves because it encompasses living coral reef formations. The submerged portions of the preserve encompass seagrass meadows, hard bottom communities, mangrove wetlands, and coral patch reefs that provide nursery and settlement habitat for a wide variety of marine species. Activities within the preserve include boating, snorkeling, diving, commercial

fishing, marine life collecting, charter sport fishing and recreational fishing for finfish and lobster.

3.18.3.2.12 Florida Forever Acquisition Projects

The Florida Forever Program is the State of Florida's current environmental land acquisition program. Three Florida Forever projects are located in the County: Coupon Bight/Key Deer, Florida Keys Ecosystem, and North Key Largo Hammocks. Coupon Bight/Key Deer is located on Big Pine Key, and its main goal is protection of the Florida Key Deer. The Florida Keys Ecosystem is located from Key Largo to Boca Chica Key, and its primary goal is to provide natural habitat for migratory birds. This project is comprised of 41 sites located throughout the Florida Keys, managed by the Florida Division of Recreation and Parks and by the FFWCC. North Key Largo Hammocks is located on the northern end of Key Largo, including the islands up to Broad Creek at the southern tip of Biscayne National Park, and its primary goal is to protect environmentally unique and irreplaceable lands that contain native flora and fauna such as the largest West Indian tropical forest stand in the United States.

Coupon Bight/Key Deer is 2,830 acres in size and as of 2008, 62 percent had been acquired. The Florida Keys Ecosystem is 11,863 acres in size and is 46 percent acquired. The North Key Largo Hammocks is 4,621 acres in size and is 86 percent acquired.

3.18.3.3 County-Owned Conservation Lands

County-owned conservation lands have been acquired over the years through land purchases by the Monroe County Land Authority (MCLA), land purchases by the Board of County Commissioners (BOCC), and the dedication of ROGO lots to the BOCC. These properties are located throughout the Keys, are undeveloped, and generally have parcel sizes of one acre or less. In many cases they are near or adjacent to larger conservation properties owned by the state or federal government. Many of the properties originally acquired by MCLA and the BOCC have been conveyed to the state or federal government. As of September 30, 2010, the inventory of conservation lands titled in either MCLA or the BOCC totaled approximately 1,400 acres.

3.18.3.4 Organization-Owned Conservation Lands

A number of organizations, such as The Nature Conservancy, purchase lands in the County for conservation purposes (**Table 3.18)**.

Other lands are owned by the Boy Scouts, Girl Scouts, and other organizations. These are listed in the land use inventories as non-profit organizations. These lands may not be protected as conservation lands, but their zoning designation or the mission statement of the organization may provide greater conservation potential than lands not owned by such an organization.

3.18.3.5 Measures to Protect Publicly-Owned Conservation Lands

Fee title acquisition by public agencies generally guarantees the permanent protection of conservation lands from development. However, it does not ensure the long-term health and stability of the natural systems present on a property. A primary threat to upland habitats is loss and fragmentation of habitats and the resultant loss of ecosystem function due to residential and commercial development. Canals, mosquito ditches, fill, and roads have altered natural hydrologic processes. Residential development has impacted management capabilities for fire-adapted Pinelands by expanding the wildland-residential edge. This has resulted in the alteration of natural fire processes and a demand for fire suppression. Although many wetland and upland habitats have been restored, continued restoration is needed to help mitigate habitat loss elsewhere.

The County should continue to support the conservation efforts of State and federal agencies by working cooperatively with resource managers at publicly-owned refuges, parks, and special-interests sites to address adjoining lands issues. Prescribed fire is an important tool for effectively managing and restoring Pinelands. Fire can also manage the encroachment of understory vegetation and restore open habitat features of coastal salt marsh and freshwater marsh habitats. The County can continue to support the habitat management strategies of resource agencies to include measures of the effectiveness of prescribed fire treatments. Such monitoring is essential for an adaptive management process to maintain and restore habitat. The County should continue its outreach efforts to increase the public's awareness and understanding of this management technique.

Exotic, invasive, and nuisance species cause habitat loss by disrupting natural communities. They can displace native species and alter ecosystem functions. The most widespread and problematic plant species include Brazilian pepper, Australian pine, latherleaf, seaside mahoe, lead tree, and non-native grasses. Federal and State agencies, as well as the Florida Keys Invasive Exotics Task Force and the County Land Steward, have invested substantial time and money in removing invasive exotic plant and animal species. Continual monitoring and maintenance treatment is required to keep exotics under control, prevent new infestations, and detect new species invasions. Adjacent private lands and roadways can serve as seed sources that may re-infest conservation lands. The use of non-native, invasive plants in landscaping causes the introduction of exotics to conservation lands. Feral and free-roaming domestic cats are a predator of the endangered Lower Keys marsh rabbit, silver rice rat, and native birds and reptiles. Free-roaming dogs can attack and injure or kill key deer. The County should continue to support programs to control exotic, invasive, and nuisance plant and animal species.

Hurricanes and tropical storms and sea level rise have consequences for the management of conservation lands. It is predicted that the Florida Keys will experience changes from global climate change, particularly from changing temperatures in the air and water, rising sea level, and coastal storms. Saltwater intrusion into the freshwater lens from sea level rise and saltwater inundation of surface freshwaters from storm surges can alter Pinelands and Freshwater Marshes resulting in more salt-tolerant plant communities. Species that

are found only in Pinelands may disappear as the pine forests die out. Storm events can cause considerable physical damage to Beach/Berm and coastal habitats. The County should continue to support the resource agencies as they gather scientific data to understand the natural processes and subsequent changes from sea level rise and to assist in the development of adaptive management strategies for future conservation needs.

To protect and manage conservation lands, the County should maintain its land stewardship program and continue its existing partnerships, and develop new ones as needed, with resource agencies, organizations, and individuals. Partnerships can achieve the goals of complex programs and can considerably reduce costs.

3.18.4 Units of the Coastal Barrier Resources System

The Coastal Barrier Resources Act (CBRA) of 1982 established the John H. Chafee Coastal Barrier Resources System (CBRS). The CBRA legislation is specifically designed to restrict federally subsidized development of undeveloped coastal barriers to minimize the loss of human life, reduce the wasteful expenditure of Federal revenue, and reduce damage to fish and wildlife habitat and other valuable natural resources of coastal barriers (U.S. Department of the Interior, 1988). Specifically, the CBRA prohibits within the undeveloped, unprotected coastal barriers of the CBRS, most expenditures of Federal funds which encourage development. The intent of the CBRA is to remove from undeveloped coastal barriers Federal incentives for new development, such as National Flood Insurance, structural stabilization projects, and Federal assistance for construction of airports, highways, and bridges (U.S. Department of the Interior, 1988).

CBRA defines a coastal barrier as a depositional feature that is subject to wave, tidal, and wind energies and that protects landward aquatic habitats from direct wave attack. As such, CBRA extends the definition of an undeveloped coastal barrier to encompass all associated aquatic habitats, including adjacent wetlands, marshes, estuaries, inlets and nearshore waters. This definition reflects the specific conservation purposes of the CBRA to protect the fish, wildlife, and other natural resources of coastal barriers (U.S. Department of the Interior, 1988).

Today, the CBRS is comprised of undeveloped coastal barriers along the Atlantic and Gulf of Mexico coasts, including the coasts of the Florida Keys, Puerto Rico and the Virgin Islands. The CBRS includes 25 units listed in the County:

ID No.	Unit Name
FL-34P	Biscayne Bay *
FL-35	North Key Largo
FL-35	North Key Largo
FL-36P	El Radabob Key
FL-37	Rodriguez Key
FL-39	Tavernier Key
FL-40	Snake Creek

ID No.	Unit Name
FL-41P	Lignumvitae/Shell Keys
FL-42P	Long Key
FL-43	Channel Key
FL-44	Toms Harbor Keys
FL-45	Deer/Long Point Keys
FL-46	Boot Key
FL-47P	Key Deer/White Heron
FL-48P	Bahia Honda Key
FL-50	No Name Key
FL-51	Newfound Harbor Keys
FL-52	Little Knockemdown/Torch Keys Complex
FL-53	Budd Keys
FL-54	Sugarloaf Sound
FL-55	Saddlebunch Keys
FL-57	Cow Key
FL-59P	Fort Taylor
FL-60P	Key West NWR
FL-61P	Tortugas

*Biscayne Bay unit is primarily within Miami-Dade County

The USFWS maintains the official CBRS maps that are periodically amended by Congress in the CBRA and are available at http://www.fws.gov/ habitatconservation/ coastal_barrier.html. The USFWS also advises federal agencies, landowners, and Congress whether properties are in or out of the CBRS, and what kind of federal expenditures are allowed in the CBRS. Most of the CBRS units in the County are largely undeveloped.

In general, future development in the County should be directed to the maximum extent possible away from the undeveloped CBRS units. This should be accomplished through land use policies of the Comprehensive Plan and its implementing LDRs.

Other actions which the County should take to discourage further private investment in undeveloped CBRS units include:

- No new bridges, causeways, paved roads or commercial marinas should be permitted to, or on, CBRS units;
- Shoreline hardening structures should not be permitted along shorelines of CBRS units;
- Public expenditures on CBRS units should be limited to property acquisition, restoration and passive recreation facilities;
- Privately-owned undeveloped land located within the CBRS units should be considered for acquisition by the County; and
- The County should coordinate with FKAA and private providers of electricity and telephone service to assess measures which could be taken to discourage extension of facilities and services to CBRS units.

The Federal policy against subsidizing development of designated coastal barriers has impacted the amount and rate of development of those units. Since the intent and effect of the CBRS has been to discourage development (prohibiting flood insurance and other federal program funds) in the County's designated coastal barriers (without hurting existing communities where serious commitments of time and money have already been made), the County should consider whether to maintain the existing comprehensive plan policies related to the CBRS, or to focus on the development impacts on endangered species and habitat should unsubsidized development still occur.

3.18.5 Historic Resources [Rule 9J-5.012(2)(c), F.A.C.]

The entire County is located within the coastal area. Therefore, the inventory and future trends of historic resources within the coastal area are identical to those identified in *Chapter 2.0 Future Land Use Element* (Historic Resources).

3.19 Effects of Future Land Use on Natural Resources [Rule 9J-5.012(2)(b), F.A.C.]

This section discusses the existing planning and legal framework for managing growth in the County. The future land use analysis is contained in *Chapter 2.0 Future Land Use Element*.

3.19.1 Natural Resource Protection by Reducing Growth Rates: the Rate of Growth Ordinance

The 1990 Monroe County Comprehensive Plan identified concerns associated with the high rates of growth in the Florida Keys. To address concerns regarding public safety (particularly during a mandatory hurricane evacuation) and quality of life issues, the Monroe County Board of Commissioners recommended the development of a dwelling unit allocation system. In 1992, the County adopted and implemented the Rate of Growth Ordinance (ROGO).

The primary purpose of ROGO was to control growth throughout the County so that the population can be evacuated in a timely manner in the event of a hurricane. In 1992, it was determined that 2,550 residential permits could be added and still maintain a 24-hour standard for evacuation clearance time.

Under ROGO, building permits are issued for a new dwelling only if it has received a residential dwelling unit allocation award, or if it is determined to be exempt. The Nonresidential Rate of Growth Ordinance (NROGO) applies to the development of all new and expanded nonresidential floor area developments, except as exempted, for which a building permit or development approval is required.

The process of receiving an allocation is competitive and ROGO and NROGO establish the rules and procedures for that competition. Competition is a point based system that allows applicants for new residential or commercial building permits to compete against each other for the limited number of allocations issued each year. The number of allocations available is determined through the adoption of an administrative rule on the State level. The number of allocations is based on the progress the County has made toward achieving stipulated State goals.

The ROGO allocation system applies only to the unincorporated area of the County and excludes the mainland and Ocean Reef (northern Key Largo). It is divided into three subareas:

- The unincorporated area of the county north of Tavernier Creek and corporate limits of the Village of Islamorada (approximately mile marker 90).
- The unincorporated area of the county from the corporate limits of the Village of Islamorada (approximately mile marker 72) south to the corporate limits of the City of Key West at Cow Key Bridge on U.S. 1 (approximately mile marker 4), excluding Big Pine Key and No Name Key.
- Big Pine Key and No Name Key, which are covered under an approved HCP: the Big Pine Key-No Name Key HCP is separate conservation planning document that operates in conjunction with ROGO and NROGO [see Section 3.19.2.2 (Tier Overlay Ordinance in Big Pine Key and No Name Key)].

Each applicant competes against the other applicants located within the same sub-area. There is one exception to this process: applicants for affordable housing. Affordable housing applicants compete against all applicants for affordable housing permits throughout the keys. Allocations are awarded each quarter in each sub-area. The ROGO system is reviewed quarterly and monitored by the County Department of Planning and Environmental Resources.

3.19.1.1 Point System within ROGO

Points are intended to discourage development in environmentally sensitive areas and to direct and encourage development to appropriate infill areas. Points also recognize that any development can affect the functioning of natural and man-made infrastructure. Points vary depending on whether a proposed development project is located on Big Pine Key or No Name Key or if it is located elsewhere in unincorporated Monroe County. The primary point assignments are[9]:

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[9] Source: Section 138-28. Land Development Regulations for Monroe County.

Primary point assignments under ROGO

Point Assignment	Criteria (see Section 3.19.2 for an explanation of Tiers)
+0	An application which proposes a dwelling unit within an area designated Tier I on Big Pine Key or No Name Key.
+10	An application which proposes a dwelling unit within an area designated Tier I (natural area).
+10	An application which proposes development within an area designated Tier II (transition and sprawl reduction area) on Big Pine Key or No Name Key.
+20	An application which proposes development within an area designated Tier III (infill area) on Big Pine Key or No Name Key.
+20	An application which proposes the clearing of any upland native habitat vegetation that is part of a one acre or larger upland native habitat within an area designated Tier III-A (special protection area).
+30	An application which proposes development within an area designated Tier III (infill area) outside of Big Pine Key or No Name Key.

Points to implement the HCP and the Livable CommuniKeys Community Master Plan for Big Pine Key and No Name Key

Point Assignment	Criteria
- 10	An application which proposes a dwelling unit on No Name Key.
- 10	An application which proposes development in designated Lower Keys Marsh Rabbit habitat or buffer areas as designated in the community master plan.
- 10	An application which proposes development in Key Deer Corridor as designated in the community master plan.

Points to encourage density reductions

Point Assignment	Criteria
+4	An application which aggregates a contiguous vacant, legally platted, vacant, buildable lot, zoned IS, IS-D, URM, URM-L, or CFV, located within a Tier III designated area together with the parcel proposed for development. Each additional vacant, legally platted, buildable lot which is aggregated that meets the above requirements will earn the application the additional points.
+3	On Big Pine Key and No Name Key. An application which aggregates a contiguous vacant, legally platted, vacant, buildable lot, zoned IS, IS-D, URM, URM-L, or CFV, located within a Tier II or Tier III designated area together with the parcel proposed for development. Each additional vacant, legally platted, buildable lot which is aggregated that meets the above requirements will earn the application the additional points.
Additional Requirements: • The proposed development cannot clear upland native vegetation of more than 5,000 square feet or the open space requirements of LDR Section 118-9[10]. • The application shall include, but not be limited to o A legally binding, restrictive covenant limiting the number of dwelling units on the aggregated lot, running in favor of the county and enforceable by the county, subject to the approval of the growth management director and county attorney and recorded in the office of the clerk of the county prior to the issuance of any building permit pursuant to an allocation award.	
• Exception: No points for aggregation are awarded for any application that proposes the clearing of any native upland habitat in a Tier III-A (Special Protection Area) area. No aggregation of lots will be permitted in Tier I.	

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[10] The Department of Community Affairs and the Keys communities evaluated the adopted clearing limits for high and moderate quality tropical hardwood hammocks. The allowable amount of clearing is currently determined by the quality of the hammock and varies by tier designation and community. Recommendations were made to bring parity between incorporated and unicorporated Monroe County, and to strengthen the protection of tropical hardwood hammocks. Proposed recommendations included land clearing limits, which vary according to the tier designation, but cannot exceed 7,500 square feet. It was further recommended that the Comprehensive Plan revise its lot aggregation policies, land development regulations, and Rule 28-20.120(4)(e), F.A.C., to limit clearing of aggregated lots that receive points in the building permit allocation system from 5,000 square feet to a maximum of 7,500 square feet (DCA, 2010).

Points to encourage dedication of lands in Tier I and Tier II (Big Pine Key and No Name Key) areas and to encourage affordable housing in Tier III lands

Point Assignment	Criteria
+4	An application, which includes the dedication to the county of one vacant, legally platted buildable lot, zoned SC, IS, IS-D, URM, URM-L, or CFV, or a legally platted, buildable lot within any CFSD that authorizes dwelling units. Each additional vacant, legally platted, buildable lot which is dedicated that meets the above requirements will earn the application the additional points.
+2	On Big Pine Key and No Name Key, an application, which includes the dedication to the county of one vacant, legally platted buildable lot, zoned SC, IS, IS-D, URM, URM-L, or CFV, or a legally platted, buildable lot within any CFSD that authorizes dwelling units. Each additional vacant, legally platted, buildable lot which is dedicated that meets the above requirements will earn the applicant the additional points.
+1 for each 5,000 square feet of lot area	An application, which includes the dedication to the county of a vacant, legally platted, buildable lot of 5,000 square feet or more within a suburban residential district (SR) or suburban residential-limited district (SR-L) within a designated Tier I area. Each additional vacant, legally platted, buildable lot of 5,000 square feet or more that meets the above requirements will earn points.
+0.5	An application, which includes the dedication to the county of one vacant, legally platted, buildable lot of 5,000 square feet or more within a native area district (NA) or sparsely settled district (SS) in a designated Tier I area. Each additional vacant, legally platted, buildable lot that meets the above requirements will earn the half-point.
+4	An application, which includes the dedication to the county of at least one acre of vacant, unplatted, buildable land located within a designated Tier I area. Each additional one acre of vacant, unplatted, buildable land that meets the above requirements will earn the points.
+2	On Big Pine Key and No Name Key, an application, which includes the dedication to the county of at least one acre of vacant, unplatted, buildable land located within a designated Tier I area. Each additional one acre of vacant, unplatted, buildable land that meets the above requirements will earn the points.

Additional requirements

- The application shall include, but not be limited to
  - A statutory warranty deed that conveys the dedicated property to the county shall be approved by the growth management director and county attorney and recorded in the office of the clerk of the county prior to the issuance of any building permit pursuant to an allocation award.
- Lots or parcels dedicated for positive points under this paragraph shall not be eligible for meeting the mitigation requirements of the Big Pine Key and No Name Key Overlay Zone.
- Lots or parcels donated for points in Big Pine Key or No Name Key must be located within Tier I or Tier II lands in Big Pine Key or No Name Key.

Additional points

Point Assignment	Criteria
+6	An application for market rate housing unit which is part of employee or affordable housing project. The market rate dwelling unit must be part of an approved employee or affordable housing project and meet all the requirements and conditions pursuant to LDR Section 130-161(a) and (f).
- 4	An application which proposes development within a "V" zone on the FEMA flood insurance rate map.
+4	An application for which development is required to be connected to a central wastewater treatment system that meets BAT/AWT standards established by the State legislature.
+1	A point shall be awarded on the anniversary controlling date for each year that the application remains in the ROGO system up to a maximum of four years.
+ 1 to + 2	Proposes payment to the county's land acquisition fund in an amount equal to the monetary value of a ROGO dedication point times the number of points to be purchased, up to a maximum of two points. The monetary value of each point shall be established annually by resolution of the board of county commissioners. The monetary value of each point shall be based upon the average fair market value of privately-owned, buildable, vacant, IS/URM, platted lots in Tier I divided by four. Payment to the county's land acquisition fund shall be prior to the issuance of any building permit pursuant to the allocation award.

3.19.2 Natural Resource Protection by Directing Growth Away from Sensitive Areas: the Tier Overlay Ordinance

On March 21, 2006, the Tier Overlay Ordinance was adopted as a zoning overlay. The Tier Overlay Ordinance is a ranking of land based on environmental characteristics.

3.19.2.1 Tier Overlay Ordinance in Unincorporated Monroe County

Section 130-130 of the LDRs stipulates the Tier Overlay Ordinance as a planning tool and as an overlay district to manage development and conservation of land. The purpose is to designate geographical areas outside of the mainland of the County (excluding the Ocean Reef planned development) into tiers. Each tier:

- assigns points used in the ROGO and NROGO systems;
- determines the permittable amount of clearing of upland native vegetation; and
- prioritizes lands for public acquisition.

The tier boundaries are shown on the Tier Overlay District Maps, which are available from the County Department of Planning and Environmental Resources.

Lands in unincorporated Monroe County (excluding the Ocean Reef planned development) are mapped as Tier I, III, and III-A (Special Protection Area). Lands on Big Pine Key and No Name Key are mapped as Tier I, II, or III. The Tier boundaries were determined using aerial photographs, data from the Florida Keys Carrying Capacity Study, endangered species maps, property and permitting information, and limited field evaluations. Approximately half of the land subject to the Tier Overlay Ordinance is classified as Tier I.

Tier classification system criteria for Unincorporated Monroe County

Tier	Description	Lower Keys - acres	Middle Keys - acres	Upper Keys - acres	Total acres
I	Tier I boundaries were delineated to include one or more of the following criteria: • Vacant lands which can be restored to connect upland native habitat patches and reduce further fragmentation of upland native habitat. • Lands required to provide an undeveloped buffer, up to 500 feet in depth, if indicated as appropriate by special species studies, between natural areas and development to reduce secondary impacts. Canals or roadways, depending on width, may form a boundary that removes the need for the buffer or reduces its depth. • Lands designated for acquisition by public agencies for conservation and natural resource protection. • Known locations of threatened and endangered species, as defined in LDR Section 101-1, identified on the threatened and endangered plant and animal maps or the Florida Keys Carrying Capacity Study maps, or identified in on-site surveys. • Conservation, Native Area, Sparsely Settled, and Offshore Island land use districts. • Areas with minimal existing development and infrastructure.	31,490.0	944.1	16,979.4	49,413.4
II	Pertains only to Big Pine Key / No Name Key. Scattered lots and fragments of environmentally sensitive lands that may be found in platted subdivisions. A large number of these lots are located on canals and are of minimal value to the key deer and other protected species because the canal presents a barrier to dispersal.	278.2	0.0	0.0	278.2

Tier	Description	Lower Keys - acres	Middle Keys - acres	Upper Keys - acres	Total acres
III	Tier III are lands located outside of Big Pine Key and No Name Key that are not designated Tier I or Tier III-A. Tier III represents the majority of developable acreage in the County.	7,190.5	1,606.4	26,134.0	34,930.9
III-A	Tier III-A is designated as a Special Protection Area. It is defined as lands that have one acre or more of native upland habitat.	130.8	0.0	1,204.9	1,335.7
Undesignated	Some properties do not have a tier designation. These undesignated properties are found throughout the Keys but most occur in Ocean Reef, which is exempt from the Tier Overlay Ordinance. Others are rights-of-way, military installations, or properties that were not designated due to mapping discrepancies and, at the time of the preparation of this document, are being evaluated for tier designation.	5,319.1	292.2	8,745.9	14,357.2

Source: Acreages from Monroe County GIS database 10/8/2010.

After adoption of the Tier Maps and ordinances, a legal challenge was filed to the ordinance which resulted in an order from an administrative law judge that recommended striking certain portions of the tier criteria ordinance which was used to classify parcels in the Tier Overlay Ordinance. DCA Secretary Pelham adopted the administrative law judge's recommended order in his Amended Final Order. This Final Order invalidated the tier designations for approximately 3,100 parcels. With the complex permitting system in the County, the de-designation of these parcels, along with several other groupings of parcels where property owners petitioned the County for amendments to their Tier Designation, has caused some parcels/land to be "Tier-less", or "Tier Undesignated", with no ability to score them in ROGO or NROGO. The County is re-evaluating and processing these lands into Tier categories, based upon recommendations made by a Tier Designation Review Committee (TDRC).

3.19.2.2 Tier Overlay Ordinance in Big Pine Key and No Name Key

The Tier Overlay Ordinance in unincorporated Monroe County differs somewhat from the islands of Big Pine Key and No Name Key. The tier boundaries on Big Pine Key and No Name Key were designated using the Big Pine Key and No Name Key HCP (Monroe County et al., 2006) and the adopted community master plan for Big Pine Key and No Name Key. The HCP provides a strategy to protect the habitat of the endangered key deer (*Odocoileus virginianus clavium*), endangered lower keys marsh rabbit (*Sylvilagus palustris hefneri*), and threatened eastern indigo snake (*Drymarchon corais couperi*). The HCP protects the highest quality habitat and directs development to areas that have already been impacted. The HCP was developed in conjunction with an Incidental Take Permit issued by the USFWS on June 9, 2006. Under this permit, landowners obtaining a building permit from

the County may "take[11]" threatened and endangered wildlife and can proceed with construction without any other permits or reviews from the USFWS.

Maps depicting Tier designations are used to overlay onto current zoning maps to determine appropriate use and intensity of future development or redevelopment. Based on the Key Deer studies completed under the HCP and the spatial model that resulted, the County developed a conservation priority classification for private undeveloped lands in the study area.

Tier classification criteria for Big Pine Key and No Name Key

Tier	Description	Area (acres)	
		Big Pine Key	No Name Key
I	Lands where all or a significant portion of the land area is characterized as environmentally sensitive and is important for the continued viability of HCP covered species. These lands are high quality key deer habitat, generally representing large contiguous patches of native vegetation that provide habitat for other protected species.	973.4	217.0
II	Scattered lots and fragments of environmentally sensitive lands that may be found in platted subdivisions. A large number of these lots are located on canals and are of minimal value to the key deer and other protected species because the canal presents a barrier to dispersal.	101.6	0
III	Scattered lots within already heavily developed areas that provide little habitat value to the key deer and other protected species. Some of the undeveloped lots in this Tier are located between existing developed commercial lots within the U.S. 1 corridor or are located on canals.	58.5	0
Total		**1,133.5**	**217.0**

Source: HCP for Florida key deer (*Odocoileus virginianus clavium*) and other protected species on Big Pine Key and No Name Key, Monroe County, Florida. April 2003, revised, April 2006.

Tier I lands are higher-quality key deer habitat (and other protected species considered in the plan) while Tier III lands are the lowest quality. Most of the parcels in Tiers II and III are interspersed among developed parcels and along canals. The tier classification helps to determine the location of potential new development and to prioritize mitigation areas.

[11] "Take" is defined in the Endangered Species Act of 1973, as amended (87 Stat. 884; 16 U.S.C. 1531 et seq.) as harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect any threatened or endangered species. Harm may include significant habitat modification where it actually kills or injures a listed species through impairment of essential behavior (e.g., nesting or reproduction).

Tiers are also used as part of the County's 20-year land acquisition program. Tier I land will receive first priority for acquisition, Tier II land and patches of tropical hardwood hammock or pinelands of one acre or greater in areas within Tier II land will receive second priority for acquisition, and Tier III lands will be third priority for acquisition, except for acquisition of land for affordable housing, which also shall be a first priority. These areas will be set aside for conservation or retirement of development rights of vacant privately-owned, buildable, platted lots within Tier I and Tier II and the acquisition of scarified and disturbed lands for affordable housing within Tier III (Monroe County et al., 2006).

3.19.2.3 Tier Overlay District Map Amendments

According to Section 130-130 of the LDRs, the Tier Overlay District Map may be amended to reflect existing conditions in an area because of drafting errors, data errors, or regrowth of hammock. The Tier Overlay District Map amendments are made according to procedures set in the LDRs for map amendments.

3.19.3 Natural Resource Protection by Prohibiting Development in Wetlands

The Comprehensive Plan prohibits new residential and non-residential development in most wetlands in the Keys. This prohibition applies to the following wetland communities:

- mangroves;
- submerged lands;
- undisturbed salt marsh and buttonwood wetlands;
- beaches (50 feet from all natural shorelines); and
- freshwater wetlands (disturbed and undisturbed).

According to the LDRs, development in disturbed wetlands is allowed, subject to permits from the USACE, FDEP, and the County. The County has a permitting program for activities in disturbed wetlands subject to a policy requiring "no net loss" of functional value. While this will allow some filling of disturbed salt marsh and buttonwood wetlands, it is intended to eliminate any further net loss of wetland function in the Florida Keys.

3.19.4 Natural Resource Protection through Stronger Environmental Design Criteria

When development is permitted under the Comprehensive Plan and ROGO/NROGO, it is subject to revised and strengthened environmental design criteria of the updated LDRs [Section 118-7 (General Environmental Design Criteria)].

3.19.5 Natural Resource Protection through Land Acquisition

Fee title acquisition of real estate is the most effective means of protecting environmentally sensitive lands from direct disturbances by human activities. Components of the

Comprehensive Plan which reduce the rate of growth and direct the allocation of growth discourage development in many undisturbed upland communities and habitat areas of federally-designated species. However, these techniques do not permanently guarantee protection of these sensitive ecological resources. Long-term protection is best accomplished through acquisition for permanent conservation purposes by the federal, State, or local government, or by non-profit conservation organizations. While acquisition is not a realistic solution for most lands in the Keys, it should be pursued for those which are determined by County staff, local scientists, and regulators to be the most ecologically sensitive and the most susceptible to development or environmental threat, despite the protections afforded by the Comprehensive Plan. However, effective management of that land is necessary to ensure it remains in a condition to support the viability of natural systems being protected. Unmanaged public lands tend to become used for unregulated vehicle access, informal camping sites, dumping, and removal of protected species (particularly native orchids and tree snails). Also, areas purchased for conservation often contain exotic vegetation and other disturbances that require restoration activities. The County has a land management program for County-owned conservation lands for mainteneance and restoration activities. In addition the County has established the Monroe County Environmental Land Management and Restoration Fund as a recurring funding source to ensure these public resources retain their habitat functions.

3.19.6 Implementation of Measures to Reduce Pollutant Discharges into Ground and Surface Waters of the Keys

The Comprehensive Plan includes goals, objectives, and policies to reduce pollutant discharges into ground and surface waters from point and non-point sources [see Section 3.5.2 (Ambient Water Quality Conditions)]. This is based upon the most recent State and federal regulations concerning such discharges as discussed herein.

3.19.7 Implementation of the Sanitary Wastewater Master Plan and Stormwater Management Plan for Monroe County

Two important plans to protect the waters of the Florida Keys are the Sanitary Wastewater Master Plan and the Stormwater Management Plan. The Sanitary Wastewater Management Plan makes several recommendations, which have significant effects on man-made nutrient loadings to nearshore waters. The Sanitary Wastewater Management Plan recommends:

- the ultimate type of treatment and effluent disposal system to be utilized by geographic service areas within the County;
- the mandatory levels of treatment for new and replacement systems, including the criteria for attaining the adopted level of treatment;
- recommendations for retrofitting specific existing facility deficiencies found to be causing significant water quality degradation; and
- recommendations for ongoing monitoring programs to assess the effectiveness of sanitary wastewater improvements and amended adopted levels of service on water quality.

The Stormwater Management Plan makes several recommendations designed to reduce pollutant loadings:

- recommendations for retrofitting specific existing facility deficiencies found to not be meeting the adopted levels of service standards, and
- recommendations for ongoing monitoring programs to assess the effectiveness of stormwater management improvements and amended adopted levels of service on water quality.

3.19.8 Protection of Threatened and Endangered Species, including the Habitat Conservation Plan (HCP) for Big Pine Key and No Name Key

The Comprehensive Plan calls for an active protection program for federally and State-listed threatened and endangered plant and animal species. Recovery activities are proposed for each species, aimed at prohibiting its destruction and protecting its habitat. These are dependent upon the type of habitat utilized, the threats to that habitat, and the specific sensitivities of each species. The general types of recovery activities include:

- assignment of negative points in the ROGO System;
- recommended habitat acquisition;
- stepped up enforcement of existing laws pertaining to free-roaming pets, road speeds in critical habitat areas, and molesting or harming of endangered species; and
- increased coordination of preservation efforts among the County, USFWS, FFWCC and FDEP.

Big Pine Key and No Name Key contain particularly sensitive habitat for threatened and endangered species. Since the mid-1980s, the County has recognized that continued growth and development on Big Pine and No Name Keys without proper protective measures would be harmful to key deer (*Odocoileus virginianus clavium*), lower keys marsh rabbit (*Sylvilagus palustris hefneri*), eastern indigo snake (*Drymarchon corais couperi*), and other protected animal and plant species. Beginning in 1995, and lasting nearly ten years, Big Pine Key and No Name Key were under a building moratorium due to the lack of concurrence with the State of Florida transportation requirements. The moratorium placed an undue burden on the community, so the County met with various stakeholders to seek a solution to the problem. A solution to the insufficient level of service was realized through an intersection improvement project, which included an additional lane on the northbound side of U.S. 1. The USFWS agreed to allow the intersection improvement project to proceed on the condition that the County prepare a habitat conservation plan for Big Pine and No Name Keys. The *Habitat Conservation Plan for the Florida Key Deer and other Protected Species on Big Pine Key and No Name Key, Monroe County, Florida* (HCP) was adopted by Monroe County on August 2004 and accepted by the USFWS in June 2006. The HCP defines all allowed development activities within Big Pine Key and No Name Key for the 20 year life of the plan. In conjunction with this process, the County prepared a Livable CommuniKeys Plan (LCP) for Big Pine and No Name Key to serve as a master plan for the

area (adopted by Monroe County on August 18, 2004). Like the HCP, the overall goal of the LCP was to determine the appropriate amount, type, and location of development in the project area that would provide for community needs, while maximizing conservation of the key deer and other covered species through appropriate avoidance, minimization, and mitigation. The LCP serves as an addendum to the Year 2010 Comprehensive Land Use Plan and works in concert with the HCP.

Covering an area of approximately 7,000 acres, the HCP is a conservation strategy that protects the habitat of the key deer, lower keys marsh rabbit, and eastern indigo snake while allowing limited residential development, commercial development and expansion, community and institutional facilities, and transportation improvements on Big Pine Key and No Name Key. In addition to protecting high quality habitat for these species, the HCP directs development toward areas that have already been already impacted and away from prime habitat for the covered species.

The goal of the HCP is to hold impact on the species below the "quasi-extinction" threshold, which was defined as the probability that the number of female deer would fall below 50 at least once over 50 years. The drafters used an assignment of an "H" value for each type and amount of development to keep track of development impacts on key deer and other protected species. "H" represents impact, both primary and secondary, and was based on six factors: distance from U.S. 1, existing housing density, existing habitat quality, proximity to deer movement corridors, existing deer density, and water barriers. A Population Viability Analysis (PVA) was conducted for the Key Deer in association with the HCP and estimates the likelihood that the species will persist for a given time into the future under different scenarios. The PVA indicated that, under the conditions prior to the implementation of the HCP, the key deer would have a 2.2 percent chance of reaching quasi-extinction. Based on this PVA, the drafters determined that risk of quasi-extinction could be raised to no more than 4.2 percent. This equates to the loss of 4.2 deer a year to human-related mortality. With the above goal, an acceptable "H" limit or impact limit for development in Big Pine Key and No Name key is H = 1.1 over 20 years. The drafters agreed to mitigate all H (impact) at a ratio of 3:1. This means that each parcel developed under this plan will be added to the total H allowed over the next 20 years and the County must mitigate that H by three times this amount. If this ratio is not maintained, development activity will be stopped until the mitigation ratio is achieved or exceeded.

To not exceed the H = 1.1 limit, basic development limitations were set. These limitations are outlined in general in the HCP and more specifically defined in the LCP for Big Pine and No Name Keys. These limitations cover everything from residential to light industrial to road widening. The following 20-year limitations are included in the LCP:

- new residential units limited to 200;
- new commercial limited to 47,800 square feet;
- one new major recreational and community center at the County-owned Mariner's Resort, three additional public parks on disturbed uplands, and expansion of the existing library;

- up to seven new pocket parks on disturbed or scarified sites within certain subdivisions;
- expansion of existing community organizations, such as religious institutions and civic clubs, on certain scarified lands;
- certain new or expanded public facilities (such as projects in the Sanitary Wastewater Master Plan, Stormwater Management Master Plan, public office space, and emergency response), all of which are restricted to disturbed and/or scarified areas;
- approximately 250-300 vacant lots allowed to be either be fenced or developed with accessory uses primarily on Tier II and Tier III lands; and
- three-laning of U.S. 1 only.

If at any time during the 20 year period H = 1.1 is met or exceeded, development activity will halt.

While these restrictions on new development help meet the goal, additional restrictions were also required. Most of these restrictions were based on the tier system, which reflects the increased impact based on location and development pattern for the area. These 20-year restrictions are:

- 10 new residential permits in Tier 1 areas;
- no new fences in Tier 1 areas; and
- only residential development is allowed in Tier 1.

A complete listing of restrictions on the allowed level of development is available in the HCP and the LCP. All applications for new residential and commercial development will be required to apply for a ROGO/NROGO allocation.

ROGO/NROGO applications for Big Pine and No Name Key compete against each other as a subarea to the rest of the County's ROGO/NROGO system. Allocations are based on the overall score and date the applicant applied. Applicants are competing for eight market rate and two affordable allocations annually. Prior to allocation issuance, the applicant must mitigate the H value associated with the development of the parcel. This is accomplished through land donation or fund donation to allow the County to purchase property to maintain a 3:1 ratio for impact.

Based on the HCP, finalized in 2006, USFWS issued an Incidental Take Permit (No. TE083411-0, issued June 9, 2006 and expires June 30, 2023) that allows the County to continue to adversely impact endangered species on Big Pine and No Name Key through the issuance of building permits. The development of 200 homes or no more than 168 acres of development over a 20-year period is anticipated on Big Pine Key and No Name Key. The HCP does not specify which properties will be permitted or when. Because the County now has the approved HCP and Incidental Take Permit necessary to protect listed species and their habitats, landowners obtaining a building permit generally do not need any other permits or reviews from the USFWS. Improvements to properties are generally allowed as long as they are consistent with County regulations. However, projects that

remove native vegetation or reduce key deer access to habitat, such as fences, may undergo additional review by the County and the USFWS.

The HCP aides in the recovery of listed species on Big Pine and No Name Keys because it directs development away from the more sensitive habitat and toward areas that have already been impacted. Development is limited to 168 acres (with no more than 7 acres being native habitat) of impact over a 20-year period and mitigation is conducted at a 3:1 ratio. In total, 504 acres will be acquired, restored, and managed for key deer, lower keys marsh rabbit, and eastern indigo snake conservation. In addition, no development will occur in lower keys marsh rabbit habitat within a 1,640-foot buffer to reduce the indirect effects of development (except for about 40 acres that have already been fragmented). All unprotected suitable marsh rabbit habitat on Big Pine and No Name Key will be targeted for acquisition and conservation. The County will also implement a free-roaming pet education program to reduce mortality (predation) on marsh rabbits.

Under the LDRs [Section 9.5-345 (General Environmental Design Criteria)], clustering of development is required to reduce habitat fragmentation and to preserve the largest possible area of contiguous undisturbed habitat (for all natural habitat types). The LDRs also contain restrictions on the amount of land clearing, depending on the tier designation. The County currently requires a coordination letter from the USFWS when development is proposed in known or potential habitat for endangered and threatened species. Under the Tier Overlay Ordinance, lands that serve as habitat for protected species have top priority for land acquisition. Under the current ROGO/NROGO system, development within known habitat of threatened or endangered species receive minus 10 points.

3.19.9 Restoration of Disturbed Habitats

The Comprehensive Plan currently includes three major provisions for the restoration of disrupted marine, beach/berm, and native upland vegetation. The Plan calls for an ongoing restoration program for public lands. The County undertakes projects based on management or maintenance needs or by public request. The County uses a combination of local, State, and federal funds to implement specific projects. Local funding comes from the Monroe County Environmental Land Management and Restoration Fund, which receives monies paid to the County as fines or penalties for environmental crimes, or as payments in lieu of replacement of native vegetation destroyed during the land development process.

The restoration program for private lands is comprised of two components. Mandatory removal of invasive plants from all development sites will be required prior to issuance of a certificate of occupancy. The County will also pursue development of incentives and use of volunteer organizations for purposes of promoting voluntary removal of invasive plants from private property.

3.19.10 Cooperative Planning Efforts to Protect State and Federal Conservation Lands

The Comprehensive Plan commits the County to a cooperative planning program with resource managers at publicly-owned refuges, parks, and sites of particular interest in the Keys [see Section 3.18.3.5 (Measures to Protect Publicly-Owned Conservaton Lands)]. This planning program addresses management issues related to activities on adjoining private lands which may be adversely affecting, or have the potential to adversely affect, the natural resources for which the refuge or park was established to protect. Implementation of this program further ensures the long-term health and stability of the natural systems of conservation lands in the Keys by reducing encroachments and environmental degradation due to activities on adjoining lands which remain in private ownership.

3.20 Existing Land Use in the Coastal Area [Rule 9J-5.012(2)(a), F.A.C.]

The entire County is located within the coastal area. Therefore, the inventory of existing land uses included in *Chapter 2.0 Future Land Use Element* represents the inventory of existing land uses within the coastal area. This section addresses land use along the County's shoreline including:

- Water-dependent and water-related uses;
- Conflicts among shoreline uses; and
- Recommended studies to address the need for water-dependent and water-related uses and other issues related to shoreline development.

3.20.1 Existing Water-Dependent and Water-Related Uses

3.20.1.1 Water-Dependent Uses

According to Rule 9J-5.003 (Definitions), water-dependent uses are "activities which can be carried out only on, in or adjacent to water areas because the use requires access to the water for: waterborne transportation including ports or marinas; recreation; electrical generating facilities; or water supply".

Water-dependent businesses were identified by obtaining a database of business licenses from the Monroe County Tax Collector in November 2010. Businesses with licences in categories related to marine businesses were compiled; these categories included receipt numbers starting with 47140 (Fishing Diving Charter), 47142 (Marinas & Storage), 47143 (Marine Repair), 48210 (Marine Retail Sales), 53110 (Marine Wholesale Sales), and 29240 (Mobile Marine Services). The database provided by the Monroe County Tax Collector included a designation for whether the physical location of the business was in an incorporated city (Key West, Key Colony Beach, Layton, Islamorada, or Marathon) or was in unincorporated Monroe County. Because this Technical Document is for the unincorporated parts of the County (not the incorporated areas), businesses within the incorporated cities were deleted from the database, leaving businesses in unincorporated

Monroe County only. Based on the description of the business and the name of the business provided in the database, each site was assigned a designation of water-dependent, water-related, or neither. Approximately 130 businesses in unincorporated Monroe County were identified as water-dependent. In the County, the majority of water-dependent uses are related to commercial fishing or recreation activities. These include, but are not limited to, businesses that involve boat rentals, marinas, and boat yards. **Table 3.19** lists public and privately owned water-dependent uses in the County. **Map Series 3.6** depicts the locations of the Water-Related and Water-Dependent Uses in the County.

3.20.1.2 Water-Related Uses

According to Rule 9J-5.003 (Definitions), water-related uses are "activities which are not directly dependent upon access to a water body, but which provide goods and services that are directly associated with water-dependent or waterway uses".

Water-related businesses were identified by obtaining the same database of business licenses as described above for water-dependent uses. Based on the description of the business and the name of the business provided in the database, each site was assigned a designation of water-dependent, water-related, or neither. Approximately 540 businesses in unincorporated Monroe County were identified as water-related. **Table 3.19** lists water-related uses in the County. These include, but are not limited to, businesses that involve charters, captains for hire, trailer storage, marine supplies, marine parts, boat dealers, and marine maintenance and repair. **Map Series 3.6** depicts the locations of the Water-Related and Water-Dependent Uses in the County.

3.20.1.3 Water-Enhanced Uses

Some facilities do not require access to the water and may not be water-dependent or water-related, but are enhanced by proximity to water. These are informally referred to as "water-enhanced" uses. This term is not identified in Rule 9J-5. A good example of a "water-enhanced" use in the Keys is a seafood restaurant. The seafood restaurant does not require access to the water, but the dining experience and economy is enhanced if the restaurant is on a waterfront.

3.20.2 Conflicts among Shoreline Uses [Rule 9J-5.012(2)(a), F.A.C.]

3.20.2.1 Competition for Shoreline Development Sites

The diminishing supply of shoreline development sites is a major source of conflict among competing land uses. The demand for waterfront land comes not only from water-dependent and water-related uses described above, but from commercial, residential, and tourism-related uses attracted to waterfront locations by economic or aesthetic reasons rather that by functional necessity. The physical beauty of the waters surrounding the Keys induces an overwhelming preference for shoreline rather than inland locations. The growth and importance of the tourism industry and the rising seasonal and permanent

residential population (see *Chapter 2.0 Future Land Use Element*) has increased the demand for waterfront sites for residential, recreational, and tourist-related commercial development which are not water-dependent. In addition, public agencies have increased efforts to acquire and preserve shoreline areas for recreation and conservation uses. Physical characteristics and more stringent environmental regulations further limit areas suitable for marina and docking facilities.

Despite the extensive shoreline of the Keys, the supply of shoreline development sites cannot satisfy the demand. In this competitive market, water-dependent/water-related uses are often supplanted by more profitable non-water-dependent or water-related uses. Tourism, which continues to dominate the local economy in terms of employment, depends heavily on access to the shoreline for recreational uses. The increasing number of recreational boats has heightened the competition for suitable marina sites between commercial fishing and recreational marina operators.

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Table 3.19 – Inventory of Water-Dependent and Water-Related Uses

Row	Category Name	Occupation Desc.	Business Name	Business Address	WR or WR
1	Fishing Diving Charter		BPK CHARTERS	NE CRNR GERALDINE ST	WR
2	Fishing Diving Charter		DURMER CAPT PETER	17015 OVERSEAS HWY	WR
3	Fishing Diving Charter		FREEDOM CHARTERS	%GILBERTS RESORT 107900 OVERSEAS HWY	WR
4	Fishing Diving Charter		HAILFIRE	5950 PENINSULAR AVE	WR
5	Fishing Diving Charter		HIGH TIDE ADVENTURES	24838 OVERSEAS HWY	WR
6	Fishing Diving Charter		JUS HOOK'UM CHARTERS	107900 OVERSEAS HWY GILBERT'S RESORT	WR
7	Fishing Diving Charter		OVER UNDER ADVENTURES CORP	1313 OCEAN BAY DR SLIP #26	WR
8	Fishing Diving Charter		PLATT TODD S FISHING CHARTER	43 FISHING VILLAGE AVE	WR
9	Fishing Diving Charter		RICOCHET SPORTFISHING INC	1791 BOGIE DR	WR
10	Fishing Diving Charter		TAILING CHARTERS LLC	28530 OVERSEAS HIGHWAY	WR
11	Fishing Diving Charter		WAMBOLT JOHN R	43 OCEAN REEF DR	WR
12	Fishing Diving Charter		WHITE LARRY	SUGARLOAF MARINA MM17	WR
13	Fishing Diving Charter	BACK COUNTRY FISHING	MCCOY JACK CAPT	ALLIED MARINE GROUP	WR
14	Fishing Diving Charter	BACKCOUNTRY FISHING GUIDE	WYSS DAVE CAPT	OCEAN REEF CLUB	WR
15	Fishing Diving Charter	BACKCOUNTRY GUIDE	TAILS UP FISHING CHARTERS	103950 OVERSEAS HWY	WR
16	Fishing Diving Charter	BOAT & JET SKI RENTALS	BLU WATERS	24500 OVERSEAS HWY	WR
17	Fishing Diving Charter	BOAT CAPTAIN	TIRELESS ENTERPRISES	MO CTY	WR
18	Fishing Diving Charter	BOAT CHARTER, SCUBA DIVING	PLEASURE DIVER	99701 OVERSEAS HWY	WR
19	Fishing Diving Charter	BOAT LEASING	TRIPLE CHROME MARINE LLC	98250 OVERSEAS HWY	WR
20	Fishing Diving Charter	BOAT RENTAL	ACTION BOAT RENTAL INC	28530 OVERSEAS HWY	WD
21	Fishing Diving Charter	BOAT RENTAL	OCEAN REEF CLUB	OCEAN REEF CLUB	WD
22	Fishing Diving Charter	BOAT RENTAL	SHARKY'S WATER SPORT RENTAL INC	38801 OVERSEAS HIGHWAY	WD
23	Fishing Diving Charter	BOAT RENTAL	TRANQUIL ADVENTURES	1313 OCEAN BAY DR	WD
24	Fishing Diving Charter	BOAT RENTAL SERV	ALABAMA JACKS INC	CARD SOUND RD 11	WD
25	Fishing Diving Charter	BOAT RENTALS	A-AFFORDABLE BOAT RENTALS LLC	3 N CONCH AVE	WD
26	Fishing Diving Charter	BOAT RENTALS	BIG PINE KEY BOAT RENTALS INC	24326 OVERSEAS HWY	WD
27	Fishing Diving Charter	BOAT RENTALS	BIG PINE KEY BOAT RENTALS INC	33000 OVERSEAS HWY	WD
28	Fishing Diving Charter	BOAT RENTALS	FULL MOON TRUST AKA REEF RENTALS	2 FISHING VILLAGE DR	WD
29	Fishing Diving Charter	BOAT RENTALS	J AND V RENTALS INC	139 SEASIDE AVE	WD
30	Fishing Diving Charter	BOAT RENTALS	KEYS BOAT RENTALS /KEYSBOAT INC	24931 OVERSEAS HWY	WD
31	Fishing Diving Charter	BOAT RENTALS	KEYSBOAT.COM /KEYSBOAT INC	24931 OVERSEAS HWY	WD
32	Fishing Diving Charter	BOAT RENTALS	KYLE FORTNEY'S OUTDOOR ADVENTURES	7001 OLD SHRIMP RD	WD
33	Fishing Diving Charter	BOAT RENTALS	MANDALAY BOAT RENTALS/DIVE IN INCORPORATED	80 E 2ND ST	WD
34	Fishing Diving Charter	BOAT RENTALS	OLD KEYS TAVERN LLC	107690 OVERSEAS HWY	WD
35	Fishing Diving Charter	BOAT RENTALS	PARADISE BOAT RENTALS LLC	5950 PENINSULAR AVE	WD
36	Fishing Diving Charter	BOAT RENTALS	PONTUNES KEY LARGO INC	107690 OVERSEAS HWY	WD
37	Fishing Diving Charter	BOAT RENTALS	PRO GEAR BOAT RENTALS INC	5710 US HWY 1	WD
38	Fishing Diving Charter	BOAT RENTALS	RAPID BOAT RENTALS INC	24838 OVERSEAS HWY	WD
39	Fishing Diving Charter	BOAT RENTALS & REPAIRS	SKEETERS MARINE REPAIR MAR CAYA INC	30641 OVERSEAS HWY	WD
40	Fishing Diving Charter	BOAT TOUR SERVICE	KEY LARGO PRINCESS GLASSBOTTOM BOAT / KLMT INC	99701 OVERSEAS HWY	WD
41	Fishing Diving Charter	BOAT TOURS DOLPHIN	CORAL REEF PARK CO INC	102601 OVERSEAS HWY	WD
42	Fishing Diving Charter	CAHRTER AND BOAT RENTALS	CAPTAIN JACKS BOAT RENTALS AND CHARTERS	16921 DRIFTWOOD LANE	WD
43	Fishing Diving Charter	CAPT FOR HIRE	ATWELL CAPT MICHAEL M	MO CTY	WR
44	Fishing Diving Charter	CAPT FOR HIRE	CAPT GLEN BOHNER	MO CTY	WR
45	Fishing Diving Charter	CAPT FOR HIRE	HANSON CHRIS	MO CTY	WR
46	Fishing Diving Charter	CAPT FOR HIRE	JEHLE RONALD E CAPT	21 GARDEN COVE DR	WR
47	Fishing Diving Charter	CAPT FOR HIRE	ROBERTS RHETT	MO CTY	WR
48	Fishing Diving Charter	CAPTAIN FOR HIRE	ASBURY ANDREW	1127 GRAND ST	WR
49	Fishing Diving Charter	CAPTAIN FOR HIRE	BANKS DANA CAPT	MO CTY	WR
50	Fishing Diving Charter	CAPTAIN FOR HIRE	BARILLAS DAVID H	5130 OVERSEAS HWY	WR
51	Fishing Diving Charter	CAPTAIN FOR HIRE	BEN'S CHARTER SERVICE	MO CTY	WR
52	Fishing Diving Charter	CAPTAIN FOR HIRE	COPELAND THOMAS B CAPT	MO CTY	WR
53	Fishing Diving Charter	CAPTAIN FOR HIRE	DALY CHRISTOPHER	785 GROUPER TRL	WR
54	Fishing Diving Charter	CAPTAIN FOR HIRE	ENDLESS SUMMER MARINE	MO CTY	WR
55	Fishing Diving Charter	CAPTAIN FOR HIRE	FRAYSHER STEPHEN M CAPT	527 CARIBBEAN DR	WR
56	Fishing Diving Charter	CAPTAIN FOR HIRE	HELMS BRIAN	1 FISHING VILLAGE DR	WR
57	Fishing Diving Charter	CAPTAIN FOR HIRE	HOOG CHARLES ROBERT	MO CTY	WR
58	Fishing Diving Charter	CAPTAIN FOR HIRE	MENDEL EDWARD B	OCEAN REEF	WR
59	Fishing Diving Charter	CAPTAIN FOR HIRE	NEALEY MICHAEL E CAPT	MO CTY	WR

Table 3.19 – Inventory of Water-Dependent and Water-Related Uses (Continued)

Row	Category Name	Occupation Desc.	Business Name	Business Address	WR or WR
60	Fishing Diving Charter	CAPTAIN FOR HIRE	STRAHOSKY MELVIN	MO CTY	WR
61	Fishing Diving Charter	CAPTAIN FOR HIRE	T & T CHARTERS	MO CTY	WR
62	Fishing Diving Charter	CHARTER	BOURBON JAMES A	36850 OVERSEAS HWY	WR
63	Fishing Diving Charter	CHARTER	CONCHY JOE CHARTERS	MO CTY	WR
64	Fishing Diving Charter	CHARTER	EGGETT CHARTERS	24838 OVERSEAS HWY	WR
65	Fishing Diving Charter	CHARTER	FISHIN TECHNICIAN	5710 US 1	WR
66	Fishing Diving Charter	CHARTER	HIGH STAKES CHARTERS	5950 PENINSULAR AVE SLIP 657	WR
67	Fishing Diving Charter	CHARTER	KEY WEST TIKI CHARTERS, INC	5130 OVERSEAS HWY	WR
68	Fishing Diving Charter	CHARTER	MORNING STAR	477 DROST LANE	WR
69	Fishing Diving Charter	CHARTER	PAULSON ANDREA	17015 OVERSEAS HWY	WR
70	Fishing Diving Charter	CHARTER	PETTIT JOE	5001 5TH AVE	WR
71	Fishing Diving Charter	CHARTER	RESEARCH VESSEL TIBURON INC	6810 FRONT ST	WR
72	Fishing Diving Charter	CHARTER	SEARCY JEFF	5710 US 1	WR
73	Fishing Diving Charter	CHARTER	WHITE CAPS CHARTER	SUGARLOAF MARINA	WR
74	Fishing Diving Charter	CHARTER	WILLIAMS KEITH	25348 2ND ST	WR
75	Fishing Diving Charter	CHARTER & SAILING EXCURSIONS	MORTAIL CHARTERS LLC	80 E 2ND ST	WR
76	Fishing Diving Charter	CHARTER BACKCOUNTRY & OFFSHORE	MYERS RICHARD L II CAPT	31 OCEAN REEF DR	WR
77	Fishing Diving Charter	CHARTER BOAT	BELL MIKE CAPT	1149 GREENBRIAR RD	WR
78	Fishing Diving Charter	CHARTER BOAT	BIG PINE KAYAK ADV INC	OLD WOODEN BRIDGE	WR
79	Fishing Diving Charter	CHARTER BOAT	BONECHANCE CHARTERS	104500 OVERSEAS HWY	WR
80	Fishing Diving Charter	CHARTER BOAT	BOSUN	6810 FRONT ST	WR
81	Fishing Diving Charter	CHARTER BOAT	CAPT JIMS CHARTERS	5710 US 1	WR
82	Fishing Diving Charter	CHARTER BOAT	CARIBBEAN JET SKI INC DBA CARIBBEAN WATERSPORTS	97000 OVERSEAS HWY	WR
83	Fishing Diving Charter	CHARTER BOAT	CONCH KEY CAT CHARTERS	1149 GREENBRIAR RD.	WR
84	Fishing Diving Charter	CHARTER BOAT	CRISTAL CLEAR CHARTERS	39 FISHING VILLAGE DR	WR
85	Fishing Diving Charter	CHARTER BOAT	CRITERION INTERNATIONAL INC	5710 US 1	WR
86	Fishing Diving Charter	CHARTER BOAT	CURTIS FRED W JR CAPT	EVERGLADES NATIONAL PARK	WR
87	Fishing Diving Charter	CHARTER BOAT	DRAKE GILBERT N	5710 US HWY 1	WR
88	Fishing Diving Charter	CHARTER BOAT	FANCY FREE CHARTERS FANCY FREE CHARTERS LLC	25000 OVERSEAS HWY	WR
89	Fishing Diving Charter	CHARTER BOAT	FAR OUT CHARTERS	5710 US HWY 1	WR
90	Fishing Diving Charter	CHARTER BOAT	FINATIC CHARTERS	477 DROST DR	WR
91	Fishing Diving Charter	CHARTER BOAT	HARRELSON JOHN G	139 SEASIDE AVE	WR
92	Fishing Diving Charter	CHARTER BOAT	ISLAND TIME CHARTERS	5130 OVERSEAS HWY	WR
93	Fishing Diving Charter	CHARTER BOAT	KAHL CHARLES D III	477 DROST DR	WR
94	Fishing Diving Charter	CHARTER BOAT	KATAMY INC	ISLAND STYLE WATERSP	WR
95	Fishing Diving Charter	CHARTER BOAT	KEY LARGO FISHING ADVENTURES LLC	103900 OVERSEAS HWY	WR
96	Fishing Diving Charter	CHARTER BOAT	KEY WEST AND BEYOND CHARTERS LLC	6000 PENINSULAR AVE	WR
97	Fishing Diving Charter	CHARTER BOAT	KEY WEST KAYAK FISHING	5 GEIGER	WR
98	Fishing Diving Charter	CHARTER BOAT	KEY WEST LUXURY YACHT CHARTERS INC	6810 FRONT ST	WR
99	Fishing Diving Charter	CHARTER BOAT	MOORE CLINT	5001 5TH AVE	WR
100	Fishing Diving Charter	CHARTER BOAT	OUTPOST MARINE INC	6810 FRONT ST	WR
101	Fishing Diving Charter	CHARTER BOAT	PIRATE ISLAND DIVERS INC	103800 OVERSEAS HWY	WR
102	Fishing Diving Charter	CHARTER BOAT	RAINBOW REEF DIVE CENTER /EAGLE RAY DIVERS LLC	99725 OVERSEAS HWY	WR
103	Fishing Diving Charter	CHARTER BOAT	RAMOS JORGE	24838 O/S HWY	WR
104	Fishing Diving Charter	CHARTER BOAT	RAVELO MANUEL	5130 OVERSEAS HWY	WR
105	Fishing Diving Charter	CHARTER BOAT	REEL ADVENTURE	5710 US HWY 1	WR
106	Fishing Diving Charter	CHARTER BOAT	SAFE HARBOUR CHARTERS	6810 FRONT ST	WR
107	Fishing Diving Charter	CHARTER BOAT	SECOND GENERATION /FISHING GENERATION INC	5710 US HIGHWAY 1	WR
108	Fishing Diving Charter	CHARTER BOAT	SHADOW INC	5950 PENINSULAR AVE 632	WR
109	Fishing Diving Charter	CHARTER BOAT	SNOW LEOPARD	400 OCEAN DR	WR
110	Fishing Diving Charter	CHARTER BOAT	STEM TO STERN YACHT SERVICES INC	21 GARDEN COVE DR	WR
111	Fishing Diving Charter	CHARTER BOAT	STRIPSET CHARTERS LLC	5001 5TH AVE	WR
112	Fishing Diving Charter	CHARTER BOAT	SUN N FUN REEF TRIPS	24500 US 1 MM 24 1/2 SUMME	WR
113	Fishing Diving Charter	CHARTER BOAT	SWEET RELIEF	14 CARD SOUND RD	WR
114	Fishing Diving Charter	CHARTER BOAT	TALBOT SUE	5710 OVERSEAS HWY	WR
115	Fishing Diving Charter	CHARTER BOAT	TED LUND'S LADY NORINNE SPORT FISHING	5130 US HWY 1	WR
116	Fishing Diving Charter	CHARTER BOAT	YANKEE CAPTS OFFSHORE FISHING INC	5950 PENINSULAR AVE	WR
117	Fishing Diving Charter	CHARTER BOAT	YOUNG GUNZ SPORTFISHING	31 OCEAN REEF	WR

Table 3.19 – Inventory of Water-Dependent and Water-Related Uses (Continued)

Row	Category Name	Occupation Desc.	Business Name	Business Address	WR or WR
118	Fishing Diving Charter	CHARTER BOAT LEASING	HUMPHREYS CHARLES J JR	5950 PENINSULAR AVE	WR
119	Fishing Diving Charter	CHARTER BOAT ( )	STEVE HARRIS BAYBREEZE CRUISES	103900 OVERSEAS HWY	WR
120	Fishing Diving Charter	CHARTER BOAT (DO1118934)	GAME CHANGER LLC	31 OCEAN REEF DR	WR
121	Fishing Diving Charter	CHARTER BOAT (DO910299)	PRIZEFIGHTHER CHARTERS LLC	1 FISHING VILLAGE LN	WR
122	Fishing Diving Charter	CHARTER BOAT (DO918349)	LYONS MICHAEL C	29675 OVERSEAS HWY	WR
123	Fishing Diving Charter	CHARTER BOAT (FL2203JP)	LAPOINTE LOUIS G III	1149 GREENBRIAR RD	WR
124	Fishing Diving Charter	CHARTER BOAT (FL2670GY)	WET DOG CHARTERS	104500 OVERSEAS HWY	WR
125	Fishing Diving Charter	CHARTER BOAT (FL5095GE)	SEA DUCER BACK COUNTRY CHARTER	104500 OVERSEAS HWY	WR
126	Fishing Diving Charter	CHARTER BOAT (FL5565MM)	DIRTY WATERS CHARTERS INC	104450 OVERSEAS HWY	WR
127	Fishing Diving Charter	CHARTER BOAT (FL5706BH)	SCHWICKER BILL CAPT	LITTLE PALM ISLAND	WR
128	Fishing Diving Charter	CHARTER BOAT (FL7431SG)	DYKES MICHAEL	201 OCEAN REEF DR	WR
129	Fishing Diving Charter	CHARTER BOAT (FL8065MN)	RANDY STALLINGS CHARTERS	21 GARDEN COVE DR	WR
130	Fishing Diving Charter	CHARTER BOAT (MISS CHIEF)	HACKNEY BOBBY	43 OCEAN REEF DRIVE	WR
131	Fishing Diving Charter	CHARTER BOAT 6210SG	OUTCAST CHARTERS	SEACENTER DIVE SHOP	WR
132	Fishing Diving Charter	CHARTER BOAT CAPTAIN	THOMAS SEEVER CHARTERS	80 EAST 2ND STREET	WR
133	Fishing Diving Charter	CHARTER BOAT DO 939680	STRIKE ZONE CHARTERS INC	29675 OVERSEAS HWY	WR
134	Fishing Diving Charter	CHARTER BOAT DO1122986	KEY LARGO FISHING ADVENTURES LLC	103900 OVERSEAS HWY	WR
135	Fishing Diving Charter	CHARTER BOAT DO590150	GARDEN COVE DIVERS	21 GARDEN COVE DR	WR
136	Fishing Diving Charter	CHARTER BOAT DO609690	FISH QUEST CHARTERS LP	7007 SHRIMP RD	WR
137	Fishing Diving Charter	CHARTER BOAT DO920113	ANDY GRIFFITHS CHARTERS /CAPT ANDY GRIFFITHS INC	6810 FRONT ST STOCK ISLAND	WR
138	Fishing Diving Charter	CHARTER BOAT FL 3306 EE	FUN YET CHARTERS	RICKS MARINE SERVICE	WR
139	Fishing Diving Charter	CHARTER BOAT FL 4221LD	SPANISH FLY	5710 US HWY 1	WR
140	Fishing Diving Charter	CHARTER BOAT FL 4293JM	WICKERS WILLIAM	5710 OVERSEAS HWY	WR
141	Fishing Diving Charter	CHARTER BOAT FL 5000JR	BOEHM ALEX	477 DROST DR	WR
142	Fishing Diving Charter	CHARTER BOAT FL 6053FR	REGAN HERBERT ALEXANDER JR	36850 OVERSEAS HWY	WR
143	Fishing Diving Charter	CHARTER BOAT FL0707JY	JEANNIE II	5 GEIGER RD	WR
144	Fishing Diving Charter	CHARTER BOAT FL0763DL	WARD CAPT RON	17000 US HWY 1	WR
145	Fishing Diving Charter	CHARTER BOAT FL2164KK	RICHARD HOOG GOODLIFE CHARTERS	35 OCEAN REEF DR	WR
146	Fishing Diving Charter	CHARTER BOAT FL2846BH	WARD RON CAPT	SUGARLOAF MARINA	WR
147	Fishing Diving Charter	CHARTER BOAT FL3205LK	VARNBERG ROBERT N	21 GARDEN COVE DR	WR
148	Fishing Diving Charter	CHARTER BOAT FL3516GL	STRIKE ZONE CHARTERS INC	29675 OVERSEAS HWY	WR
149	Fishing Diving Charter	CHARTER BOAT FL4000MT	MAGIC CAT CHARTERS	38801 OVERSEAS HWY	WR
150	Fishing Diving Charter	CHARTER BOAT FL4073LH	FLORIDA KEYS ANGLERS LLC	104450 OVERSEAS HWY	WR
151	Fishing Diving Charter	CHARTER BOAT FL4092LE	FORECAST ALMOST THERE CHARTERS	5110 OVERSEAS HWY	WR
152	Fishing Diving Charter	CHARTER BOAT FL4387MX	SPEAR IT CHARTER	5710 US HWY 1	WR
153	Fishing Diving Charter	CHARTER BOAT FL4456NR	T & T CHARTERS INC	MO CTY	WR
154	Fishing Diving Charter	CHARTER BOAT FL4631JR	NOVIK BRETT L	5710 US HWY 1	WR
155	Fishing Diving Charter	CHARTER BOAT FL5061LY	GRAZIANO MIKE	5710 US HWY 1	WR
156	Fishing Diving Charter	CHARTER BOAT FL5121MC	LOGAN RYON S	5130 OVERSEAS HWY	WR
157	Fishing Diving Charter	CHARTER BOAT FL5276HK	SCHMIDT MARK T	5710 US HWY 1	WR
158	Fishing Diving Charter	CHARTER BOAT FL5524GE	SUNDANCE EXPEDITIONS INC	DOLPHIN MARINA	WR
159	Fishing Diving Charter	CHARTER BOAT FL5697EY	FLYING THIEF CHARTERS	28530 OVERSEAS HWY	WR
160	Fishing Diving Charter	CHARTER BOAT FL6051MN	GARDEN COVE CHARTERS GARDEN COVE DIVERS LLC	21 GARDEN COVE DR	WR
161	Fishing Diving Charter	CHARTER BOAT FL6136LF	ELUSIVE ENDEAVORS /KOLPIN INC	1521 CORAL CT	WR
162	Fishing Diving Charter	CHARTER BOAT FL6327MC	NOAHS FISHING CHARTERS	28530 OVERSEAS HWY	WR
163	Fishing Diving Charter	CHARTER BOAT FL6447JX	SHALLOW MINDED ALMOST THERE CHARTERS	5110 OVERSEAS HWY	WR
164	Fishing Diving Charter	CHARTER BOAT FL6668NF	SCHMIDT MARK T	5710 US 1	WR
165	Fishing Diving Charter	CHARTER BOAT FL6713MH	WILLIAM STORY BENSON INC	17216 BONITA LN E	WR
166	Fishing Diving Charter	CHARTER BOAT FL6733LU	MANNETTI CHARTERS	5130 OVERSEAS HWY STE 2	WR
167	Fishing Diving Charter	CHARTER BOAT FL6790LD	CAPT BRAD NOWICKI INC OFF THE ROCK CHARTERS	17000 US HWY 1	WR
168	Fishing Diving Charter	CHARTER BOAT FL7108AV	DAYDREAMS CHARTERS	24500 OVERSEAS HWY	WR
169	Fishing Diving Charter	CHARTER BOAT FL8172JH	RTPD 11 INC	OCEAN REEF	WR

Table 3.19 – Inventory of Water-Dependent and Water-Related Uses (Continued)

Row	Category Name	Occupation Desc.	Business Name	Business Address	WR or WR
170	Fishing Diving Charter	CHARTER BOAT FL8181LD	SUPERFISHAL ALMOST THERE CHARTERS	5110 OVERSEAS HWY	WR
171	Fishing Diving Charter	CHARTER BOAT FL8360LV	THOMAS MATTHEW R CAPTAIN	28230 OVERSEAS HWY	WR
172	Fishing Diving Charter	CHARTER BOAT FL8870JP	FLATS BUSTED	5110 OVERSEAS HWY	WR
173	Fishing Diving Charter	CHARTER BOAT FL9025MJ	GIGGLING TARPON CHARTERS	6000 PENINSULAR BLVD	WR
174	Fishing Diving Charter	CHARTER BOAT FL9472MB	FR BRAUN INC	DOLPHIN MARINA	WR
175	Fishing Diving Charter	CHARTER BOAT FLATS FISHING	RBS MARINE CONSULTING INC	17000 US HWY 1	WR
176	Fishing Diving Charter	CHARTER BOAT FLEET FL8062JX	FUNYET CHARTERS	RICKS MARINE	WR
177	Fishing Diving Charter	CHARTER BOAT GOOD LIFE	CARD SOUND CHARTERS INC	OCEAN REEF	WR
178	Fishing Diving Charter	CHARTER BOAT SERVICE	ACKERMAN MIKE CAPT	CARYSFORT YACHT CLUB	WR
179	Fishing Diving Charter	CHARTER BOAT SERVICE	DREAM BAY MARINA LLC	1 WOODWARD WAY	WR
180	Fishing Diving Charter	CHARTER BOAT SERVICE	FISH HUNTERS 2	5130 OVERSEAS HWY	WR
181	Fishing Diving Charter	CHARTER BOAT SERVICE	SIMON SAYS INC @SUGARLOAF MARINA	17015 OVERSEAS HWY	WR
182	Fishing Diving Charter	CHARTER BOAT SERVICE	STING REA CHARTERS	5710 OVERSEAS HWY	WR
183	Fishing Diving Charter	CHARTER BOAT TOUR	SKINNY WATER ANGLING LLC	DOLPHIN MARINA 28530 OVERSEAS HWY	WR
184	Fishing Diving Charter	CHARTER BT FL7755CE	DUSTIN HUFF BACKCOUNTRY CHARTERS	1149 DUCK KEY	WR
185	Fishing Diving Charter	CHARTER CAPTAIN	AYALA DAVID S	215 S BAY HARBOR DR	WR
186	Fishing Diving Charter	CHARTER CAPTAIN	BRADY JOHN C	MO CTY	WR
187	Fishing Diving Charter	CHARTER CAPTAIN	CAPT BRETT GRECO	147 SEASIDE AVE	WR
188	Fishing Diving Charter	CHARTER CAPTAIN	CAPT GREG POLAND INC	104500 OVERSEAS HWY	WR
189	Fishing Diving Charter	CHARTER CAPTAIN	CAPT SHANNON ATTALES	MO CTY	WR
190	Fishing Diving Charter	CHARTER CAPTAIN	CAPTAIN MICHAEL RAIFSNIDER	MO CTY	WR
191	Fishing Diving Charter	CHARTER CAPTAIN	LAST CAST CHARTERS	251 STATE RD 939	WR
192	Fishing Diving Charter	CHARTER CAPTAIN	LORA LEE CARPENTER CHARTERS	101640 OVERSEAS HWY	WR
193	Fishing Diving Charter	CHARTER CAPTAIN	RECREATIONAL MARINE SERVICES	MO CTY	WR
194	Fishing Diving Charter	CHARTER CAPTAIN	TAKIN IT K'EASY CHARTERS /TMR OCEAN LLC	PILOT HOUSE MARINA 13 SEAGATE BLVD	WR
195	Fishing Diving Charter	CHARTER CAPTAIN	TROSSET CHRISTOPHER	5130 US HWY 1 STE #2	WR
196	Fishing Diving Charter	CHARTER CAPTAIN	VERES ROBERT A	38801 OVERSEAS HWY	WR
197	Fishing Diving Charter	CHARTER CAPTAIN FL2926FG	DOOP DERREN E	24834 OVERSEAS HWY	WR
198	Fishing Diving Charter	CHARTER CAPTAIN FOR HIRE ONLY	SAHAGIAN CAPT JOHN D	MOBILE MONROE COUNTY	WR
199	Fishing Diving Charter	CHARTER DO929003	PARADISE DIVERS INC	38801 OVERSEAS HWY	WR
200	Fishing Diving Charter	CHARTER DO970828 & SHIPS WAY	STRIKE ZONE CHARTERS INC	29675 OVERSEAS HWY	WR
201	Fishing Diving Charter	CHARTER FISH FL9038HK	THER-E-IS FISHING CHARTERS	477 DROST DRIVE	WR
202	Fishing Diving Charter	CHARTER FISH FL9216LZ	BIG FISH CHARTER	28530 OVERSEAS HWY	WR
203	Fishing Diving Charter	CHARTER FISHING	A C CHARTERS & TACKLE INC	43 FISHING VILLAGE DR	WR
204	Fishing Diving Charter	CHARTER FISHING	BOW'D UP CHARTERS	6000 PENINSULAR AVE	WR
205	Fishing Diving Charter	CHARTER FISHING	CAPT ROGER MAYER BONEFIDE CHARTERS	35 OCEAN REEF DR	WR
206	Fishing Diving Charter	CHARTER FISHING	CAPTAIN RAPPS, LLC	1595 NARCISSUS AVE	WR
207	Fishing Diving Charter	CHARTER FISHING	CHIEF CHARTERS	13 SEAGATE BLVD	WR
208	Fishing Diving Charter	CHARTER FISHING	COCHRAN JOHN	OCEAN REEF	WR
209	Fishing Diving Charter	CHARTER FISHING	DOUBLEHAUL CHARTERS	1791 BOGIE DR	WR
210	Fishing Diving Charter	CHARTER FISHING	FANTASTIC CHARTERS	HOLIDAY HARBOR	WR
211	Fishing Diving Charter	CHARTER FISHING	FINS & FEATHERS CHARTERS MIAMIKEY FISHING CORP	99701 OVERSEAS HWY	WR
212	Fishing Diving Charter	CHARTER FISHING	GLENN CLYATT INC	PERDUE DEAN	WR
213	Fishing Diving Charter	CHARTER FISHING	GULFSTREAM ADVENTURES INC	OCEAN BAY MARINA	WR
214	Fishing Diving Charter	CHARTER FISHING	J T PARTNERS OF THE FLORIDA KEYS LLC	100 OCEAN DR	WR
215	Fishing Diving Charter	CHARTER FISHING	JACKPOT FISHING INC	1313 OCEAN BAY DR	WR
216	Fishing Diving Charter	CHARTER FISHING	KELLER JOHN W	80 E SECOND ST	WR
217	Fishing Diving Charter	CHARTER FISHING	KEY INGREDIENT CHARTERS	SNAPPERS	WR
218	Fishing Diving Charter	CHARTER FISHING	LYIN HAWAIIAN CHARTERS INC	103800 OVERSEAS HWY	WR
219	Fishing Diving Charter	CHARTER FISHING	MYSTERY FISH	30750 WATSON BLVD	WR
220	Fishing Diving Charter	CHARTER FISHING	PARKER DARRICK CAPT	OCEAN REEF	WR
221	Fishing Diving Charter	CHARTER FISHING	ROBERT FERNICOLA CHARTERS	94500 OVERSEAS HWY	WR
222	Fishing Diving Charter	CHARTER FISHING	RODEO FISHING CHARTERS INC	104450 OVERSEAS HWY	WR
223	Fishing Diving Charter	CHARTER FISHING	RUBEN LEE CAPT	104450 OVERSEAS HWY	WR
224	Fishing Diving Charter	CHARTER FISHING	SEEKER CHARTERS	1313 OCEAN BAY DR	WR
225	Fishing Diving Charter	CHARTER FISHING	SKAWSKI BRYAN CHARTERS	80 EAST 2ND ST	WR
226	Fishing Diving Charter	CHARTER FISHING	SULLIVAN JEREMIAH	97951 OVERSEAS HWY	WR

Table 3.19 – Inventory of Water-Dependent and Water-Related Uses (Continued)

Row	Category Name	Occupation Desc.	Business Name	Business Address	WR or WR
227	Fishing Diving Charter	CHARTER FISHING	SUTTON DAVID J CAPT	OCEAN REEF	WR
228	Fishing Diving Charter	CHARTER FISHING	T C CHARTERS	100 OCEAN DR	WR
229	Fishing Diving Charter	CHARTER FISHING	UNDERSEA RECOVERY INC	KEY LARGO HARBOR	WR
230	Fishing Diving Charter	CHARTER FISHING	VAUGHN ROBERT	150 STERLING DR	WR
231	Fishing Diving Charter	CHARTER FISHING	WILSON DAVID B	13 SEAGATE BLVD	WR
232	Fishing Diving Charter	CHARTER FISHING	YETTER SCOTT	28530 OVERSEAS HWY	WR
233	Fishing Diving Charter	CHARTER FISHING	YODER DAVID M	35 OCEAN REEF DR	WR
234	Fishing Diving Charter	CHARTER FISHING & DIVING	COFFIN JOHN	NE CRNR GERALDINE ST	WR
235	Fishing Diving Charter	CHARTER FISHING (DO555908)	FLYING-FIGHTING LADY CHARTERS & OUTFITTERS LLC	316 EAST SEAVIEW DR	WR
236	Fishing Diving Charter	CHARTER FISHING (FL1699NT)	CONCHUBINE FISHING INC	5130 US HWY 1 STE 2	WR
237	Fishing Diving Charter	CHARTER FISHING (FL9880LF)	SNOOKIN AROUND	103900 OVERSEAS HWY	WR
238	Fishing Diving Charter	CHARTER FISHING / BACKCOUNTRY	JOHNSON MARK D CAPT	99340 OVERSEAS HWY	WR
239	Fishing Diving Charter	CHARTER FISHING / DO587470	CHARTER MASTER	99701 OVERSEAS HWY	WR
240	Fishing Diving Charter	CHARTER FISHING / FL7629JF	CLARK GEORGE D JR	97000 OVERSEAS HWY	WR
241	Fishing Diving Charter	CHARTER FISHING BOAT	FLORIDA KEYS ANGLERS LLC	13 SEAGATE BLVD	WR
242	Fishing Diving Charter	CHARTER FISHING BOAT FL1180MU	LEAVE IT TO BEAVER CHARTERS	527 CARIBBEAN DR	WR
243	Fishing Diving Charter	CHARTER FISHING BOAT FL1978EM	C W MARINE SERVICES INC	149 SEASIDE AVE	WR
244	Fishing Diving Charter	CHARTER FISHING BOAT FL5522MT	DEBRUIN ADAM	400 OCEAN DR	WR
245	Fishing Diving Charter	CHARTER FISHING BOAT FL5743GE	BURSON MYRON RICHARD	104450 OVERSEAS HWY	WR
246	Fishing Diving Charter	CHARTER FISHING BOAT FL9085DD	FIN OMINAL FISHING CHARTERS INC	104450 OVERSEAS HWY	WR
247	Fishing Diving Charter	CHARTER FISHING DO1063234	JOHNSON DON CAPTAIN	28500 OVERSEAS HWY	WR
248	Fishing Diving Charter	CHARTER FISHING DO1210261	J R & R LLC	35 OCEAN REEF DR HS2	WR
249	Fishing Diving Charter	CHARTER FISHING DO986310	SINGLETON JOHN M	MANDALAY MARINA	WR
250	Fishing Diving Charter	CHARTER FISHING FL 7035NJ	LYIN HAWAIIAN CHARTER INC	103800 OVERSEAS HWY	WR
251	Fishing Diving Charter	CHARTER FISHING FL0645RY	ALMOST THERE CHARTERS INC	5001 5TH AVE	WR
252	Fishing Diving Charter	CHARTER FISHING FL2110HK	NEW MYSTERY	28500 OVERSEAS HWY	WR
253	Fishing Diving Charter	CHARTER FISHING FL5386NH	INCOGNITO	5710 US HWY 1	WR
254	Fishing Diving Charter	CHARTER FISHING FL6330NB	KOCH JAMES CAPT	201 OCEAN REEF DR	WR
255	Fishing Diving Charter	CHARTER FISHING FL9671FG	BARON NEIL	EVERGLADES NAT'L PK	WR
256	Fishing Diving Charter	CHARTER FISHING GUIDE	CAPT DENNIS ROBINSONS FLATS & BACKCOUNTRY CHARTER	200 FLORIDA AVE	WR
257	Fishing Diving Charter	CHARTER FISHING/GUIDE FL9011LM	KIDWELL ROBERT N & KIDWELL STACIE N	1149 GREENBRIAR RD	WR
258	Fishing Diving Charter	CHARTER FL	SEA N SKI CHARTERS	29467 GERALDINE ST	WR
259	Fishing Diving Charter	CHARTER FL 1922LS	GOT TA GO EXCURSIONS	477 DROST DR	WR
260	Fishing Diving Charter	CHARTER FL 4225HG	MACKO ED	565 BARRY AVE	WR
261	Fishing Diving Charter	CHARTER FL 5525MT	RIGHT HOOK CHARTERS	24838 OVERSEAS HWY	WR
262	Fishing Diving Charter	CHARTER FL 6058 HV	SMITH CLYDE E JR CAPT	WATSON BLVD & BOGIE	WR
263	Fishing Diving Charter	CHARTER FL 6592HK	PARADISE DIVERS INC	38801 OVERSEAS HWY	WR
264	Fishing Diving Charter	CHARTER FL 7283 HK	REEL THERAPY CHARTERS	28530 OVERSEAS HWY	WR
265	Fishing Diving Charter	CHARTER FL 7771JK	REEL THERAPY CHARTERS	28530 OVERSEAS HWY	WR
266	Fishing Diving Charter	CHARTER FL FL 8807 HK	HERRICK JOHN	BAHIA HONDA STATE PK	WR
267	Fishing Diving Charter	CHARTER FL0266HK	C-HAWK	5710 US HWY 1	WR
268	Fishing Diving Charter	CHARTER FL3512MD	SPANISH FLY ENTERPRISES INC	5710 US HWY 1	WR
269	Fishing Diving Charter	CHARTER FL3648KA	FLYSCOUTS CHARTERS	17000 OVERSEAS HWY	WR
270	Fishing Diving Charter	CHARTER FL5782MR	JERKWATER CHARTERS LLC	5130 OVERSEAS HWY	WR
271	Fishing Diving Charter	CHARTER FL6190MA	LAWLOR TRAVIS	251 STATE RD 939	WR
272	Fishing Diving Charter	CHARTER FL6329JX	DAN URBAN CHARTERS	17000 OVERSEAS HWY	WR
273	Fishing Diving Charter	CHARTER FL6677LY	SOUTH POLE CHARTERS	5130 OVERSEAS HWY	WR

Table 3.19 – Inventory of Water-Dependent and Water-Related Uses (Continued)

Row	Category Name	Occupation Desc.	Business Name	Business Address	WR or WR
274	Fishing Diving Charter	CHARTER FL8118JX	HAPPY FISHERMAN CHARTERS AND MARINE TOWING	28500 OVERSEAS HWY	WR
275	Fishing Diving Charter	CHARTER FL8291JX	BONE CAY CHARTERS	5130 OVERSEAS HWY	WR
276	Fishing Diving Charter	CHARTER GUIDE FL0532JU	PERKINS DAVID CAPT	147 SEASIDE AVE	WR
277	Fishing Diving Charter	CHARTER SERVICE	BENTLEY SHELBY CAPTAIN	28530 OVERSEAS HWY	WR
278	Fishing Diving Charter	CHARTER SERVICE	BIG KAHUNA CHARTERS	CUDJOE GARDEN MARINA	WR
279	Fishing Diving Charter	CHARTER SERVICE	CARLILE TIMOTHY L	17000 OVERSEAS HWY	WR
280	Fishing Diving Charter	CHARTER SERVICE	LITTLE PALM ISLAND	28500 OVERSEAS HWY	WR
281	Fishing Diving Charter	CHARTER SERVICE (DO627486)	LAST CHANCE CHARTERS INC	6810 FRONT ST 32	WR
282	Fishing Diving Charter	CHARTER SERVICE FL3199SH	CAPT VICKI'S ENT INC	5710 US HWY 1	WR
283	Fishing Diving Charter	CHARTER SNORKLE & SAIL	QUICKSILVER DOUBLE CROWN LLC	99701 OVERSEAS HWY	WR
284	Fishing Diving Charter	CHARTER SNORKLE & SAIL DO98647	REEF ROAMER DOUBLE CROWN LLC	99701 OVERSEAS HWY	WR
285	Fishing Diving Charter	CHARTER SPORTFISHING	KEY LARGO SPORTFISHING CHARTERS	103100 OVERSEAS HWY STE 42	WR
286	Fishing Diving Charter	CHARTER SREVICE	BRACHER HAROLD PAT	CUDJOE GARDEN MARINA	WR
287	Fishing Diving Charter	CHARTER/ BOAT	SUNDAY INC	201 OCEAN DR	WR
288	Fishing Diving Charter	CHARTERBOAT	CAPT RYAN H ERICKSON	28530 OVERSEAS HWY	WR
289	Fishing Diving Charter	CHARTERS	FL KEYS KAYAKS & CANOES BY SCARLET IBIS /K SEAGULL PRODUCTION INC	SUMMERLAND COVE MARINA MM 24.5	WR
290	Fishing Diving Charter	CHARTERS	FLAT BROKE CHARTRES LLC	15 SEAVIEW AVE	WR
291	Fishing Diving Charter	CHARTERS	KESSLER STEVEN	6000 PENNISULAR AVE	WR
292	Fishing Diving Charter	CHARTERS	KEY FLAT	17015 OVERSEAS HWY	WR
293	Fishing Diving Charter	CHARTERS	LIVELY CHARTERS INC	29675 OVERSEAS HWY	WR
294	Fishing Diving Charter	CHARTERS & TOURS FL4482GE	ADVENTURE CHARTERS & TOURS INC	6810 FRONT ST	WR
295	Fishing Diving Charter	CHARTERS BOAT-FL1087LV	KEY WEST RUNNER /ALMOST THERE CHARTERS INC	5001 FIFTH AVE	WR
296	Fishing Diving Charter	CHARTERS FL0253HK	CRYSTAL CLEAR CHARTERS	477 DROST DR	WR
297	Fishing Diving Charter	CHARTERS FL8404JX	TRIPLE DIVE LLC	30344 OVERSEAS HWY	WR
298	Fishing Diving Charter	CHARTERS FL9533JH	THIRD GENERATION CHARTERS INC	28530 OVERSEAS HWY	WR
299	Fishing Diving Charter	CHATER BOAT DO921525	FISH QUEST CHARTERS LP	7007 SHRIMP RD	WR
300	Fishing Diving Charter	CHATER BOAT FL5180BF	TRAPP DANIEL	5950 PENINSULAR AVE	WR
301	Fishing Diving Charter	CHATER BOAT FL7239NK	INSTIGATOR /DREAM CATCHER CHARTERS INC	5710 US HWY 1	WR
302	Fishing Diving Charter	CHATER CAPTIAN	NYBLAD GABRIEL J	477 DROST DR	WR
303	Fishing Diving Charter	COMM FISHING BOAT DO665551	WHIPS N FINS LLC	6580 FRONT ST	WR
304	Fishing Diving Charter	COMMERCIAL CHARTER	CAPT BRAD NOWICKI INC OFF THE ROCK CHARTERS	MM17 US1 HWY	WR
305	Fishing Diving Charter	COMMERCIAL CHARTER	NITKA JOHN S	5001 5TH AVE	WR
306	Fishing Diving Charter	COMMERCIAL CHARTERS	STRAW HAT CHARTERS	5950 PENINSULAR	WR
307	Fishing Diving Charter	DIVE & TACKLE RENTALS & SERVIC	UNDERSEAS INC	LOTS 3&4 ROGER SUB	WR
308	Fishing Diving Charter	DIVE / SNORKEL TRIPS	DOLPHIN COVE RESEARCH & EDUCATION CENTER INC	101900 OVERSEAS HWY	WR
309	Fishing Diving Charter	DIVE BOAT	FRED D DIVE BOAT	604 PORTIA CIRCLE	WR
310	Fishing Diving Charter	DIVE BOAT (DO600553)	CAPT SLATES ATLANTIS DIVE CENT DIVE PROFESSIONAL INC	51 GARDEN COVE	WR
311	Fishing Diving Charter	DIVE BOAT CHARTERS 45FT.	ATLANTIC BAY RESORT /VAUGHN LLC	160 STERLING RD	WR
312	Fishing Diving Charter	DIVE BOAT DO1122543	REEF ADVENTURES INC	PENNEKAMP STATE PARK	WR
313	Fishing Diving Charter	DIVE BOAT(OCEAN DIVER)	OCEAN DIVERS INC	522 CARIBBEAN DR	WR
314	Fishing Diving Charter	DIVE BOAT(SANTANA)	OCEAN DIVERS INC	522 CARIBBEAN DR	WR
315	Fishing Diving Charter	DIVE CHARTER	AMY SLATES AMORAY DIVE CENTER	104250 OVERSEAS HWY	WR
316	Fishing Diving Charter	DIVE CHARTER	RAINBOW REEF DIVE CENTER /EAGLE RAY DIVERS LLC	99725 OVERSEAS HWY	WR
317	Fishing Diving Charter	DIVE CHARTER	SILENT WORLD DIVE CENTER /SILENT WORLD SCUBA LLC	105952 OVERSEAS HWY	WR
318	Fishing Diving Charter	DIVE CHARTER & EQUIP RENTAL	LOOE KEY REEF RESORT & DIVE CENTER LLC	27340 OVERSEAS HWY	WR
319	Fishing Diving Charter	DIVE CHARTER BOAT	PARTIAL PRESSURE DIVING COMPANY INC	527 CARIBBEAN DR	WR
320	Fishing Diving Charter	DIVE CHARTER BOAT	SCUBA-DO INC	522 CARIBBEAN DR 6	WR
321	Fishing Diving Charter	DIVE CHARTER BOAT 1	QUIESCENCE DIVING SERVICES INC	103680 OVERSEAS HWY	WR
322	Fishing Diving Charter	DIVE CHARTER BOAT 111/EQUIP RENTALS & REPAIRS	QUIESCENCE DIVING SERVICES INC	103680 OVERSEAS HWY	WR

Table 3.19 – Inventory of Water-Dependent and Water-Related Uses (Continued)

Row	Category Name	Occupation Desc.	Business Name	Business Address	WR or WR
323	Fishing Diving Charter	DIVE CHARTER BOAT 2	QUIESCENCE DIVING SERVICES INC	103680 OVERSEAS HWY	WR
324	Fishing Diving Charter	DIVE CHARTER FL 2529 MZ	MARTINEZ MIKE CHARTERS	527 CARIBBEAN DR	WR
325	Fishing Diving Charter	DIVE CHARTERS	SEA DWELLERS DIVE CENTER INC	99850 OVERSEAS HWY	WR
326	Fishing Diving Charter	DIVE CHARTERS & EQUIP RENTALS & REPAIRS	HMS MINNOW DIVE CHARTERS INC	99701 OVERSEAS HWY	WR
327	Fishing Diving Charter	DIVE CHARTERS 28FT.	ATLANTIC BAY RESORT /VAUGHN LLC	160 STERLING RD	WR
328	Fishing Diving Charter	DIVE CHARTERS DO1203809	HORIZON DIVERS /HORIZON DIVE ADVENTURES INC	100 OCEAN DR	WR
329	Fishing Diving Charter	DIVE CHARTERS DO953097	HORIZON DIVERS /HORIZON DIVE ADVENTURES INC	100 OCEAN DR 1	WR
330	Fishing Diving Charter	DIVE DHARTER FL8331HV	CAPTAIN SONNYS DIVE CHARTER LLC	15 CENTER LANE	WR
331	Fishing Diving Charter	DIVE/FISHING CHARTER BOAT	DIVE IN INCORPORATED	80 EAST 2ND ST	WR
332	Fishing Diving Charter	DIVE/SNORKEL CHARTER DO960593	BLUEWATER DIVERS OF KEY LARGO/C&E ADVENTURES LLC	99701 OVERSEAS HWY	WR
333	Fishing Diving Charter	DIVING	HELIDIVING AIR & SEA	178 BUTTONWOOD AVE	WR
334	Fishing Diving Charter	DIVING / TOURISM	CORAL REEF PARK CO INC	36850 OVERSEAS HWY	WR
335	Fishing Diving Charter	DIVING CHARTER	CLUBFRED DIVERS	5950 PENINSULAR AVE	WR
336	Fishing Diving Charter	DO 1225366 DIVING	CORAL REEF PARK CO INC	102601 OVERSEAS HWY	WR
337	Fishing Diving Charter	DO 952669	FIN RAZER SPORTFISHING / KEY LARGO FISHING ADVENTURES LLC	99701 OVERSEAS HWY	WR
338	Fishing Diving Charter	DO1126123 CHARTERS	X-RAY MANIA CHARTERS	28530 OVERSEAS HWY	WR
339	Fishing Diving Charter	DO1184748	HIT EM HARD CHARTERS	5130 US HWY 1 STE 2	WR
340	Fishing Diving Charter	DO597430	WORLD ARMS RESOURCES INC	1313 OCEAN BAY DR	WR
341	Fishing Diving Charter	DO942934 FISH DIVE ECOTOUR	GALEFORCE CHARTER GALEFORE INC DBA	29467 GERALDINE ST	WR
342	Fishing Diving Charter	ECO TOURS	FLORIDA KEYS BACKCOUNTRY PADDLING CO	25163 OVERSEAS HWY	WR
343	Fishing Diving Charter	FERRY SERVICE & BOAT RENTALS	LITTLE PALM ISLAND	28500 OVERSEAS HWY	WR
344	Fishing Diving Charter	FISH & DIVING SERVICE FL3445BH	HAWAIIAN SPIRIT CHARTERS	MM 25 SUMMERLAND YACHT HAR	WR
345	Fishing Diving Charter	FISHFUL THINKING FL6412JX	FISHFILL THINKING ALMOST THERE CHARTERS	5110 OVERSEAS HWY	WR
346	Fishing Diving Charter	FISHING & DIVING FL 8936 SH	HAWAIIAN SPIRIT CHARTERS	MM25 SUMMERLAND YACHT HAR	WR
347	Fishing Diving Charter	FISHING CHARTER	ALBURY FISHING CHARTERS INC	1313 OCEAN BAY DR	WR
348	Fishing Diving Charter	FISHING CHARTER	CUSTOM CHARTERS LLC	5710 US HIGHWAY 1 MURRAYS MARINA	WR
349	Fishing Diving Charter	FISHING CHARTER	LETS GO FISHING CHARTERS LLC	6000 PENISULAR AVE	WR
350	Fishing Diving Charter	FISHING CHARTER	PISCIVOROUS CHARTERS	5130 OVERSEAS HWY 2	WR
351	Fishing Diving Charter	FISHING CHARTER	SALTY CRACKER ENTERPRISES INC	EVERGLADES NATIONAL PARK	WR
352	Fishing Diving Charter	FISHING CHARTER	SCALES 2 TALES CHARTERS	SUNSET COVE MOTEL 99360 OVERSEAS HWY	WR
353	Fishing Diving Charter	FISHING CHARTER (FL2506GE)	BLACKFOOT CHARTERS LLC	35 FISHING VILLAGE DR	WR
354	Fishing Diving Charter	FISHING CHARTER BOAT	EXCALIBUR CHARTER	527 CARIBBEAN DR	WR
355	Fishing Diving Charter	FISHING CHARTER SERVICE	CAPT KENT DOMINEY CHARTERS	28500 OVERSEAS HWY	WR
356	Fishing Diving Charter	FISHING CHARTERS	SHALLOW WATER CHARTERS	477 DROST DR	WR
357	Fishing Diving Charter	FISHING CHARTERS AND GUIDE SERVICE	ROUND UP FISHING CHARTERS /CHARTER FT LAUDERDALE INC	7 N END ROAD	WR
358	Fishing Diving Charter	FISHING GUIDE	BRUCE MILLER PHOTOGRAPHY INC	50 CLUB HOUSE DR	WR
359	Fishing Diving Charter	FISHING GUIDE	CLAUDE M BULLOCK INC	80 E 2ND ST	WR
360	Fishing Diving Charter	FISHING GUIDE	FECHER RAY CAPTAIN	1791 BOGIE DR	WR
361	Fishing Diving Charter	FISHING GUIDE SERVICE FL5901CV	DOUBLE O CHARTERS LLC	MO CTY	WR
362	Fishing Diving Charter	FISHING GUIDE-BACKCOUNTRY	REEL DREAM CHARTERS	5710 US HWY 1	WR
363	Fishing Diving Charter	FISHNG CHARTER AND TOUR	KENNEDY STERLING CAPT	51 GARDENS COVE	WR
364	Fishing Diving Charter	FL 5512 LU	KEY LARGO BAREFOOT ADVENTURES LLC	43 FISHING VILLAGE AVE	WR
365	Fishing Diving Charter	FL 6779 MG CHARTER	KOKENGE TOM CAPT	2645 PINE AVE	WR
366	Fishing Diving Charter	FL-1261-RZ SNAPPER	TURNBULL WILLIAM	1149 GREENBRIAR RD	WR
367	Fishing Diving Charter	FL1402ML	KEY LARGO BAREFOOT ADVENTURES LLC	43 FISHING VILLAGE AVE	WR
368	Fishing Diving Charter	FL3022FG	K SEAGULL PRODUCTION INC	1791 BOGIE DR	WR
369	Fishing Diving Charter	FL3173MX	COOL SEAS FISHING	5950 PENINSULAR AVE	WR
370	Fishing Diving Charter	FL5397GM	DADDY O TOO	5 GEIGER KEY RD	WR
371	Fishing Diving Charter	FL5897LR	KEY LARGO ADVENTURES	139 SEASIDE AVE	WR

Table 3.19 – Inventory of Water-Dependent and Water-Related Uses (Continued)

Row	Category Name	Occupation Desc.	Business Name	Business Address	WR or WR
372	Fishing Diving Charter	FL6541JM CHARTER BOAT	REEL THERAPY CHARTERS	28530 OVERSEAS HWY	WR
373	Fishing Diving Charter	FL8556JX	CALM WATER ADVENTURE /REEF ADVENTURES INC	102601 OVERSEAS HWY	WR
374	Fishing Diving Charter	JET SKI & BOAT RENTALS	A AFFORDABLE JET SKI RENTALS LLC	3 NORTH CONCH AVE	WR
375	Fishing Diving Charter	JET SKI RENTALS	FURY MANAGEMENT INC	6631 MALONEY AVE	WR
376	Fishing Diving Charter	JET SKI RENTALS	KEYS SKIS /AAA ISLAMORADA LLC	201 OCEAN DR	WR
377	Fishing Diving Charter	KAYAK & BOAT RENTALS	REFLECTIONS NATURE TOURS	1791 BOGIE DR	WR
378	Fishing Diving Charter	KAYAK RENTAL	SEE THE SEA RENTALS	183 BARRY AVE	WR
379	Fishing Diving Charter	KAYAK RENTALS	OCEAN POINT SUITES PROVIDENT ATLANTIC RESORTS INC	500 BURTON DR	WR
380	Fishing Diving Charter	KAYAK TOURS	FLORIDA KEYS ADVENTURE TOURS INC	29545 CANAL ST	WR
381	Fishing Diving Charter	KAYAK TOURS & CONCIERGE	LAZY DOG ISLAND OUTFITTERS & OUTDOOR ADVENTURE CO LLC	5114 OVERSEAS HWY	WR
382	Fishing Diving Charter	KAYAK/CANOE RENTALS & NATURE TOURS	BIG PINE KAYAK ADVENTURES INC	25000 OVERSEAS HWY	WR
383	Fishing Diving Charter	KAYAK/CANOE/BOAT RENTALS & NATURE TOURS	BIG PINE KAYAK ADVENTURES INC	1791 BOGIE DR	WR
384	Fishing Diving Charter	KAYAKING TOURS	COASTAL KAYAKING	99850 OVERSEAS HWY	WR
385	Fishing Diving Charter	PADDLE BOARD RENTALS & TOURS	PADDLING ADVENTURERS	5168 US HIGHWAY 1	WR
386	Fishing Diving Charter	PARASAIL BOAT	CARIBBEAN WATERSPORTS DBA CARIBBEAN JET SKI INC	97000 OVERSEAS HWY	WR
387	Fishing Diving Charter	PARASAIL/WATERSPORTS RENTALS	KEY LARGO PARASAIL ISLAND WAVES INC	103900 OVERSEAS HWY	WR
388	Fishing Diving Charter	PARTY FISHING BOAT	SAILORS CHOICE PARTY BOAT	527 CARIBBEAN DR	WR
389	Fishing Diving Charter	PLEASURE FISHING CHARTERS	DOUBLE J CHARTERS	21000 CUDJOE GARDEN MARINA	WR
390	Fishing Diving Charter	PUBLIC CHARTER BOAT	PERRY JACOB	5710 US 1	WR
391	Fishing Diving Charter	PUBLIC SERVICE	POE STEVE CAPT	16 MERIDIAN AVE	WR
392	Fishing Diving Charter	PUBLIC SERVICE	REEL EASY CHARTERS	17000 US 1	WR
393	Fishing Diving Charter	PUBLIC SERVICE	ROBINSON ALAN CAPT	MO CTY	WR
394	Fishing Diving Charter	PUBLIC SERVICE CHARTER	COIMIMEADH LLC	6810 FRONT ST	WR
395	Fishing Diving Charter	PUBLIC SERVICE CHARTER	MCKILLIP JAMES B /WINDKNOT	5710 US HWY 1	WR
396	Fishing Diving Charter	PUBLIC SERVICE CHARTER	RODGER STEVEN A	5710 US 1 MURRAY MARINE	WR
397	Fishing Diving Charter	PUBLIC SERVICE CHARTER BOAT	EDDIE'S FISH CHARTERING INC	7007 SHRIMP ROAD	WR
398	Fishing Diving Charter	PUBLIC SERVICE CHARTER BOAT	PAULSON ROBERT L II	802 DROST DR	WR
399	Fishing Diving Charter	PUBLIC SERVICE FISHING CHARTER	TRIPLE J CHARTERS	5130 OVERSEAS HWY #2	WR
400	Fishing Diving Charter	PUBLIC SERVICE MARINE SALVAGE	OCEAN RECOVERY SALVAGE	7007 SHRIMP RD	WR
401	Fishing Diving Charter	PUBLIC SERVICE/SAILBOAT RIDES	TEMPLE ROBERT	1 FLAMINGO HWY	WR
402	Fishing Diving Charter	PUBLIC SERVICE/SPORT FISHING	AMERICAN SPORTS FISHING CO INC	201 OCEAN REEF DR H11	WR
403	Fishing Diving Charter	SAIL CHARTER	ARTERS CHARTERS LLC	28500 OVERSEAS HWY	WD
404	Fishing Diving Charter	SAILBOAT & KAYAK RENTAL	INT'L MERCANTILE MARINE INC	94381 OVERSEAS HWY	WD
405	Fishing Diving Charter	SAILING CHARTER	LILYANNA ENTERPRISES LTD	DOLPHIN MARINA 28530 OVERSEAS HWY	WD
406	Fishing Diving Charter	SAILING CHARTER	MORNING STAR CHARTERS LLC	KEY LARGO FISHERIES INC 1313 OCEAN BAY DRIVE	WD
407	Fishing Diving Charter	SAILING CHARTERS	ROSA DEL MAR SAILING	527 CARIBBEAN DR	WD
408	Fishing Diving Charter	SCUBA & SNORKEL CHARTERS	CRISTAL CLEAR CHARTERS /J J VESSEL LEASING INC	39 FISHING VILLAGE DR	WD
409	Fishing Diving Charter	SCUBA AND DIVE BOAT	BLUE WATER SURRENDER INC	161 GEORGIA AVE	WD
410	Fishing Diving Charter	SCUBA CHARTER FL7864NL	KEY'S SCUBA SHACK LLC	5130 US HWY 1	WD
411	Fishing Diving Charter	SCUBA DIVE CHARTERS	ECO SCUBA LLC	5130 OVERSEAS HWY	WD
412	Fishing Diving Charter	SCUBA DIVE CHARTERS	PAN AM DIVERS	500 BURTON DR	WD
413	Fishing Diving Charter	SCUBA DIVING CHARTERS DO104423	ISLAND VENTURES -JADE DIVING INC	103900 OVERSEAS HWY	WD
414	Fishing Diving Charter	SCUBA DIVING CHARTERS DO685287	ISLAND VENTURES -JADE DIVING INC	103900 OVERSEAS HWY	WD
415	Fishing Diving Charter	SEA BOOTS (DO951122)	SEA BOOTS CHARTERS INC	24386 OVERSEAS HWY	WD
416	Fishing Diving Charter	SEA BOOTS II (FL6192EY	SEA BOOTS CHARTERS INC SEA BOOTS II	24386 OVERSEAS HWY	WD

Table 3.19 – Inventory of Water-Dependent and Water-Related Uses (Continued)

Row	Category Name	Occupation Desc.	Business Name	Business Address	WR or WR
417	Fishing Diving Charter	SERVICE-DIVE CHARTER(DO632540)	CAPT SLATES ATLANTIS DIVE CENT DIVE PROFESSIONAL INC	51 GARDEN COVE DR	WD
418	Fishing Diving Charter	SNORKEL CHARTERS	CRISTAL CLEAR CHARTERS LLC	39 FISHING VILLAGE DR	WD
419	Fishing Diving Charter	SNORKEL EXCURSIONS	KEYS DIVER / KEYS DIVER SNORKEL TOURS KEYS WATER ADVENTURES INC	99696 OVERSEAS HWY	WD
420	Fishing Diving Charter	SNORKEL EXPRESS BOAT	CORAL REEF PARK CO INC	102601 OVERSEAS HWY	WD
421	Fishing Diving Charter	SPORT FISHING & SNORKEL TRIPS	ISLAND CHARTERS	24838 OVERSEAS HWY	WD
422	Fishing Diving Charter	TOUR BOAT	CARIBBEAN WATERSPORTS DBA CARIBBEAN JET SKI INC	97000 OVERSEAS HWY	WD
423	Fishing Diving Charter	TOUR BOAT DO1176737	CORAL REEF PARK CO INC	102601 OVERSEAS HWY	WD
424	Fishing Diving Charter	TOUR BOAT SPIRIT OF PENNEKAMP	CORAL REEF PARK CO INC	102601 OVERSEAS HWY	WD
425	Fishing Diving Charter	TOURS	SUNSET WATERSPORTS INC	5130 OVERSEAS HWY 1	WD
426	Fishing Diving Charter	TOURS/BOAT RENTALS & MARINA SERV	EVERGLADES NATIONAL PARK BOAT TOURS TWO INC	1 FLAMINGO LODGE HWY SR 9336	WD
427	Fishing Diving Charter	WATERSPORTS RENTALS	CARIBBEAN JET SKI INC	97000 OVERSEAS HWY	WD
428	Fishing Diving Charter	WATERSPORTS RENTALS	JDI PH MARINA HOLDING LLC	13 SEAGATE BLVD	WD
429	Fishing Diving Charter	WAVE RUNNER RENTALS	KEYS ADVENTURES WATERSPORTS /DRUNK MONKEYS LLC	107900 OVERSEAS HWY	WD
430	Fishing Diving Charter	WAVERUNNER TOURS & RENTALS	KEY WEST WATER TOURS LLC	5130 OVERSEAS HWY	WD
431	Marinas & Storage		SAND LAKE MARINA/WSG SAND LAKE LP	6001 PENINSULAR AVE AKA 8 PENINSULAR AVE	WD
432	Marinas & Storage	BOAT STORAGE	ROCK HARBOR MARINA RENTALS INC	OCEANSIDE DR	WD
433	Marinas & Storage	BOAT STORAGE	TEE TOP FACTORY INC THE	98750 OVERSEAS HWY	WR
434	Marinas & Storage	BOAT/RV/TRAILER STORAGE & MARINE REPAIR	BOAT DEPOT LLC	101500 OVERSEAS HWY	WD
435	Marinas & Storage	DRY STORAGE	BIG PINE BUSINESS CENTER LAN-EARL LLC	30375 QUAIL ROOST TRAIL	WR
436	Marinas & Storage	DRY STORAGE	STEWART DERWOOD AND SHERRY	22895 CUDJOE DR	WR
437	Marinas & Storage	DRY STORAGE (LOT 24,25,26,27,28) BILLBOARD SIGN	SHATT J MURRAY AND MARY H	24672 OVERSEAS HWY	WR
438	Marinas & Storage	DRY STORAGE WAREHOUSE	HENSON STEVE R & DEBORAH A	6409 2ND TERR	WR
439	Marinas & Storage	DRY STRORAGE	SCHULTZ KENNETH & DEBORAH L	99 CALLE UNO	WR
440	Marinas & Storage	MARINA	ANGLERS CLUB MEMBERS ASSOC INC	50 CLUBHOUSE RD	WD
441	Marinas & Storage	MARINA	CHEVRON ISLAND-R & C ENTRPRISES LLC	24838 OVERSEAS HWY	WD
442	Marinas & Storage	MARINA	HURRICANE HOLE MARINA /HISTORIC SEAPORT DISTRICT INC	5130 OVERSEAS HWY	WD
443	Marinas & Storage	MARINA	MARINERS CLUB KEY LARGO INC/OCEAN KEY ASSOCIATES LTD	97501 OVERSEAS HWY	WD
444	Marinas & Storage	MARINA	SEAFARER RESORT LLC	97684 OVERSEAS HWY	WD
445	Marinas & Storage	MARINA & DIVE SERVICE	ISLAND BAY RESORT ISLAND BAY RESORT INC	92530 OVERSEAS HWY	WD
446	Marinas & Storage	MARINA SERV & BOAT RENTALS	DOLPHIN MARINA ASSOCIATES LTD	28500 OVERSEAS HWY	WD
447	Marinas & Storage	MARINA SERV/BOAT RENTALS & RV RENTAL SITES	DREAM BAY MARINA LLC	1 WOODWARD WAY	WD
448	Marinas & Storage	MARINA SERV/REPAIR & BOAT RENTALS	DUCK KEY MARINA TURN KEY MARINA MGMNT SERVICE	1149 GREENBRIAR RD	WD
449	Marinas & Storage	MARINA SERVICE	BAY HARBOR LODGE SEE THE SEAS OF KEY LARGO INC	97702 OVERSEAS HWY	WD
450	Marinas & Storage	MARINA SERVICE	BLUE FIN MARINA MM 97.5 K L OCEANSDIE MARINA I	81 EAST 2ND ST	WD
451	Marinas & Storage	MARINA SERVICE	GEIGER KEY MARINA PBP MARINA INC	5 GEIGER ROAD	WD
452	Marinas & Storage	MARINA SERVICE	LOOE KEY REEF RESORT & DIVE CENTER LLC	27340 OVERSEAS HWY	WD
453	Marinas & Storage	MARINA SERVICE	MANGROVE MARINA-SUMMIT TAVERNIER LLC	200 FLORIDA AVE	WD
454	Marinas & Storage	MARINA SERVICE	SAUNDERS & DOELMAN TRANSPROP LLC	6631 MALONEY AVE	WD
455	Marinas & Storage	MARINA SERVICE & BOAT RENTALS	CROSS KEY MARINA LLC	599 MORRIS LN	WD
456	Marinas & Storage	MARINA SERVICE & BOAT REPAIR	MURRAY MARINE INC	5710 US 1 MM 5 SI	WD
457	Marinas & Storage	MARINA SERVICE & CANOE RENTALS	PELICAN CAY HARBOR LLC	299 MORRIS AVE	WD
458	Marinas & Storage	MARINA SERVICE & REPAIR & SALVAGE	HANKS KEY MARINA	999 MORRIS AVE 5	WD

Table 3.19 – Inventory of Water-Dependent and Water-Related Uses (Continued)

Row	Category Name	Occupation Desc.	Business Name	Business Address	WR or WR
459	Marinas & Storage	MARINA SERVICE TOWING & BOAT RENTALS	CORAL REEF PARK CO INC	102601 OVERSEAS HWY	WD
460	Marinas & Storage	MARINA SERVICE/TOWING & BOAT RENTALS	SAFE HARBOUR MARINA	6810 FRONT ST	WD
461	Marinas & Storage	MARINA SERVICES	COW KEY MARINA MAD COW KEY LLC	5001 5TH AVE	WD
462	Marinas & Storage	MARINA SERVICES/BOAT RENTALS & MARINE REPAIR	MANATEE BAY MARINE INC	99 MORRIS LN	WD
463	Marinas & Storage	MARINA/BOAT RENTAL/DIVE EQUIP RENTAL	CUDJOE GARDENS MARINA /PIRATES COVE PROPERTIES LLC	477 DROST DR	WD
464	Marinas & Storage	MARINA/DIVE CHARTERS & BOAT RENTAL	PIRATE ISLAND DIVERS INC	103800 OVERSEAS HWY	WD
465	Marinas & Storage	MARINA/DOCKS/STORAGE	KEY WEST HARBOUR YACHT CLUB	6000 PENNISULAR AVE	WD
466	Marinas & Storage	MARINA/STORAGE & BOAT RENTALS	CARIBBEAN MARINA & BOAT RENTAL	1250 OVERSEAS HWY	WD
467	Marinas & Storage	MARINA/STORAGE & RENTAL CAMPING EQUIP	BIG PINE KEY FISHING LODGE INC	33000 OVERSEAS HWY	WD
468	Marinas & Storage	MARINAS	MANATEE BAY CLUB SEAPORT DEVELOPMENT LLC	100 MORRIS LN	WD
469	Marinas & Storage	MARINAS & STORAGE	A1A STORAGE	100 INDUSTRIAL RD	WD
470	Marinas & Storage	MARINAS & STORAGE	ADVANCED MARINE	30933 AVE A	WD
471	Marinas & Storage	MARINAS & STORAGE	ANCHORAGE RESORT & YACHT CLUB INC	107050 OVERSEAS HWY	WD
472	Marinas & Storage	MARINAS & STORAGE	ATLANTIC BAY RESORT /VAUGHN LLC	160 STERLING RD	WD
473	Marinas & Storage	MARINAS & STORAGE	BIG PINE EQUIPMENT & STORAGE	5TH AVE	WD
474	Marinas & Storage	MARINAS & STORAGE	BLACKWATER SOUND MARINA LLC	103950 OVERSEAS HWY	WD
475	Marinas & Storage	MARINAS & STORAGE	BLUE WATER MARINA INC	230 BANYAN LN	WD
476	Marinas & Storage	MARINAS & STORAGE	COURTYARD BY MARRIOTT KEY LARGO-PORT LARGO RESORT & RAM KEY LLC	99751 OVERSEAS HWY	WD
477	Marinas & Storage	MARINAS & STORAGE	CURTIS MARINE INC	229 BANYAN LN	WD
478	Marinas & Storage	MARINAS & STORAGE	GARDEN COVE MARINA DBA SIEVERS MARINA INC	21 GARDEN COVE DR	WD
479	Marinas & Storage	MARINAS & STORAGE	GIL'S GRILL & MARINA	94825 OVERSEAS HWY	WD
480	Marinas & Storage	MARINAS & STORAGE	HAMPTON INN KEY LARGO	102400 OVERSEAS HWY	WD
481	Marinas & Storage	MARINAS & STORAGE	KARINA BAY RESORT LLC	107900 OVERSEAS HWY	WD
482	Marinas & Storage	MARINAS & STORAGE	KEY LARGO FISH MARINA INC	1313 OCEAN BAY DR	WD
483	Marinas & Storage	MARINAS & STORAGE	KEY LARGO GRANDE RESORT &BEACH CLUB	97000 OVERSEAS HWY	WD
484	Marinas & Storage	MARINAS & STORAGE	KEY LARGO HARBOR MARINA/LACROSS MARINA LLC	400 OCEAN DR	WD
485	Marinas & Storage	MARINAS & STORAGE	KEYS MARINA /SUMMERLAND KEY MARINA LLC	24326 OVERSEAS HWY	WD
486	Marinas & Storage	MARINAS & STORAGE	KOBLICK MARINE CENTER INC	47 SHORELAND DR	WD
487	Marinas & Storage	MARINAS & STORAGE	LARGO SUN VISTA ACQUISITION CO LLC	104550 OVERSEAS HWY	WD
488	Marinas & Storage	MARINAS & STORAGE	LESICK THOMAS	24500 OVERSEAS HWY	WD
489	Marinas & Storage	MARINAS & STORAGE	MARINA DEL MAR RESORT	527 CARIBBEAN DR	WD
490	Marinas & Storage	MARINAS & STORAGE	MARKEY MARINE SERVICE INC	98250 OVERSEAS HWY	WD
491	Marinas & Storage	MARINAS & STORAGE	MOLASSES REEF MARINA MOLASSES REEF MARINA CORP	1550 OCEAN BAY DR	WD
492	Marinas & Storage	MARINAS & STORAGE	MONROE PARK MARINA	300 MORRIS LN	WD
493	Marinas & Storage	MARINAS & STORAGE	NEWFOUND HARBOR MOTEL	1300 BIG PINE AVE	WD
494	Marinas & Storage	MARINAS & STORAGE	NORTHSTAR RESORT ENTERPRISES CORP	99096 OVERSEAS HWY	WD
495	Marinas & Storage	MARINAS & STORAGE	OCEAN REEF CLUB OCEAN REEF CLUB INC	35 OCEAN REEF DR	WD
496	Marinas & Storage	MARINAS & STORAGE	OLD ISLAND MARINA	7009 SHRIMP RD #2	WD
497	Marinas & Storage	MARINAS & STORAGE	OLD WOODEN BRIDGE FISHING CAMP LLC	1791 BOGIE DR	WD
498	Marinas & Storage	MARINAS & STORAGE	PARMERS RESORT /LITTLE TORCH RESORT INC	565 BARRY AVE	WD
499	Marinas & Storage	MARINAS & STORAGE	PH MARINA/RESTAURANT LLC	13 SEAGATE BLVD	WD
500	Marinas & Storage	MARINAS & STORAGE	ROCK HARBOR MARINA INC	36 E SECOND ST	WD
501	Marinas & Storage	MARINAS & STORAGE	SAAA BOATS AND TIRES ROCK HARBOR MARINA RENTALS INC	97951 OVERSEAS HWY	WD
502	Marinas & Storage	MARINAS & STORAGE	SENOR FRIJOLES INC	103900 OVERSEAS HWY	WD
503	Marinas & Storage	MARINAS & STORAGE	SNAPPERS DOVE CREEK CO	139 SEASIDE AVE	WD
504	Marinas & Storage	MARINAS & STORAGE	SPIRIT MARINE	MM 25 SUMMERLAND YACHT HAR	WD
505	Marinas & Storage	MARINAS & STORAGE	STRIKE ZONE CHARTERS INC	29675 OVERSEAS HWY	WD
506	Marinas & Storage	MARINAS & STORAGE	SUITES OF KEY LARGO	201 OCEAN DR	WD
507	Marinas & Storage	MARINAS & STORAGE	TARPON FLATS OF KEY LARGO	29 SHORELAND DR	WD

Table 3.19 – Inventory of Water-Dependent and Water-Related Uses (Continued)

Row	Category Name	Occupation Desc.	Business Name	Business Address	WR or WR
508	Marinas & Storage	MARINAS & STORAGE	TREASURE ISLAND PARK	6633 MALONEY AVE	WD
509	Marinas & Storage	MARINAS & STORAGE	VENTURE OUT AT CUDJOE CAY	701 SPANISH MAIN DR	WD
510	Marinas & Storage	MARINAS & STORAGE	WHITEHURST FAMILY PARTNERSHIP	LOTS 10-14 BAYWOOD S	WD
511	Marinas & Storage	MARINAS & STORAGE/BOAT & FISHING & DIVE EQUIP RENTAL	SUGARLOAF MARINA/IASLND AUTO SALES INC	17015 OVERSEAS HWY	WD
512	Marinas & Storage	MARINAS & STORAGE/BOAT RENTALS	SUNSHINE KEY RV RESORT & MARIN	38801 OVERSEAS HWY	WD
513	Marinas & Storage	MARINAS & STORAGE/MARINE REPAIR	PIRATE HAT MARINA LLC	199 MORRIS LN	WD
514	Marinas & Storage	MARINAS & STORAGE/MARINE REPAIR	SEA CENTER LLC BIG PINE KEY FISHING LODGE INC	29740 OVERSEAS HWY	WD
515	Marinas & Storage	MARINE REPAIR,AUTO, BOAT & RV STORAGE	CRUZ & LIMA MARINE CORP	98640 OVERSEAS HWY	WD
516	Marinas & Storage	MARINE STORAGE & EQUIP RENTALS & REPAIRS	CORAL REEF PARK CO	BAHIA HONDA STATE PA	WD
517	Marinas & Storage	MINI STORAGE	TAVERNIER MINI STORAGE INC	135 HOOD AVE	neither
518	Marinas & Storage	MISC STORAGE	ANDREWS STEWART J	5517 5TH AVE SI	neither
519	Marinas & Storage	SELF STORAGE	KEY WEST WELDING & FABRICATION INC	5650 FIRST AVE	neither
520	Marinas & Storage	STORAGE	AAA ALL MARINE	77 INDUSTRIAL RD	WR
521	Marinas & Storage	STORAGE	KEYSBOAT INC	24931 OVERSEAS HWY	WR
522	Marinas & Storage	STORAGE	NINEHOUSER APPLIANCE INC	101961 OVERSEAS HWY	neither
523	Marinas & Storage	STORAGE	ROCK HARBOR MARINA RENTALS INC	97900 OVERSEAS HWY	WR
524	Marinas & Storage	STORAGE & COMMERCIAL RENTALS	BLK STORAGE & RENTALS	75 INDUSTRIAL RD	neither
525	Marinas & Storage	STORAGE & MARINE REPAIR	BC ENTERPRISES INC	100480 OVERSEAS HWY	WR
526	Marinas & Storage	STORAGE COMMERCIAL RENTALS	BLK STORAGE & RENTALS	79 INDUSTRIAL RD	neither
527	Marinas & Storage	STORAGE MINI WAREHOUSES	K & W ENTERPRISES OF MONROE INC	105700 OVERSEAS HWY	neither
528	Marinas & Storage	STORAGE RENTAL LOT	TRIPLE J INVESTMENTS INC	102265 OVERSEAS HWY	neither
529	Marinas & Storage	TRAILER STORAGE SERVICE	SPINDRIFT COMPANY	LTS 18&19 B1 CUDJOE	WR
530	Marine Repair		MARINEMAX AT OCEAN REEF MARINEMAX EAST INC	2 FISHING VILLAGE DR	WR
531	Marine Repair	/MOBILE MARINE REPAIR	DOCKSIDE SERVICES	135 HOOD AVE	WR
532	Marine Repair	BOAT REPAIR	ALL FIBERGLASS REPAIRS	172 FLORIDA AVE	WR
533	Marine Repair	BOAT REPAIR	LIGHTHOUSE BOAT CENTER INC	101000 OVERSEAS HWY	WR
534	Marine Repair	BOAT REPAIR	SHIPWRIGHT ARTISAN KEY WEST	6810 FRONT ST	WR
535	Marine Repair	BOAT REPAIR/MARINE PAINTING/ STORAGE YARD	TIKI WATER SPORTS INC	94381 OVERSEAS HWY	WR
536	Marine Repair	COMMERCIAL TOWING	SEA TOW KEY WEST	6840 FRONT ST	WR
537	Marine Repair	COMPASS REPAIR & ADJUSTING	COMPASS SERVICE CENTER	229 BANYON LN	WR
538	Marine Repair	DEISEL MECHANICAL REPAIR	TOM GALLAGHER DIESEL SERVICE LLC	2 B FISHING VILLAGE	WR
539	Marine Repair	FIBERGLASS REPAIR SERVICE	FIBERGLASS SHOP THE	104525 OVERSEAS HWY	WR
540	Marine Repair	FIBERGLASS REPAIR/MARINE STORAGE	ALL ABOARD FIBERGLASS REPAIRS LLC	104335 OVERSEAS HWY	WR
541	Marine Repair	MARINE CANVAS REPAIR	COCOA MOES DOCKSIDE CANVAS	30375 QUAIL ROOST TRAIL UNIT N	WR
542	Marine Repair	MARINE CARPENTRY SERVICE	KEY WEST WOODWORKS	6810 FRONT ST	WR
543	Marine Repair	MARINE REPAIR	CUDJOE GARDENS MARINA & DIVE CENTER INC	477 DROST DR	WR
544	Marine Repair	MARINE REPAIR	FLORIDA KEYS WATERCRAFT INC	102451 OVERSEAS HWY B	WR
545	Marine Repair	MARINE REPAIR	GARDEN COVE MARINE SERVICES	105664 OVERSEAS HWY	WR
546	Marine Repair	MARINE REPAIR	GULF ATLANTIC ELECTRIC OF THE KEYS INC	5700 4TH AVE	WR
547	Marine Repair	MARINE REPAIR	J & B MARINE REPAIRS	92466 OVERSEAS HWY	WR
548	Marine Repair	MARINE REPAIR	JOE'S BOATWORKS	156 FLORIDA AVE	WR
549	Marine Repair	MARINE REPAIR	KEY LARGO BOATING CENTER /TREASURE COAST BOATING CENTER INC	98150 OVERSEAS HWY	WR
550	Marine Repair	MARINE REPAIR	KEYS YAMAHA SERVICE INC	5950 PENINSULAR AVE	WR
551	Marine Repair	MARINE REPAIR	MARINA MANAGEMENT OF THE KEYS LLC	200 FLORIDA AVE	WR
552	Marine Repair	MARINE REPAIR	PERFORMANCE MOBILE MARINE INC	200 FLORIDA AVE	WR
553	Marine Repair	MARINE REPAIR	RIVA SOUTH MOTORSPORTS /RIVA YAMAHA SOUTH INC	102250 OVERSEAS HWY	WR

Table 3.19 – Inventory of Water-Dependent and Water-Related Uses (Continued)

Row	Category Name	Occupation Desc.	Business Name	Business Address	WR or WR
554	Marine Repair	MARINE REPAIR	THRASHER ROGER	MO CTY	WR
555	Marine Repair	MARINE REPAIR & BOAT RENTALS	FAST ACTION MARINE INC.	30233 OVERSEAS HWY	WR
556	Marine Repair	MARINE REPAIR ELECTRONICS	QUARTERDECK INC THE	5635 4TH AVE SI	WR
557	Marine Repair	MARINE REPAIR ONLY	R & R DIESEL	5176 US 1 HWY	WR
558	Marine Repair	MARINE REPAIR SERVICE	CHRIS CARSONS MARINE SERVICE & SUPPLY	82 HENRY MORGAN DR	WR
559	Marine Repair	MARINE REPAIR SERVICE	COLUMBIA YACHT SERVICE	135 ELLIS DR	WR
560	Marine Repair	MARINE REPAIR SERVICE	ISLAND MARINE REPAIR INC	106 MARINA AVE	WR
561	Marine Repair	MARINE REPAIR TOWING & SALVAGE	ANDREWS PROPELLER SERVICE /DELTA MARINE INC	5600 3RD AVE	WR
562	Marine Repair	MARINE REPAIR TOWING & SALVAGE	BLACKBEARD MARINE TOW & SALVAG HUTCHINGS & SONS INC DBA	145 VALOIS BLVD	WR
563	Marine Repair	MARINE REPAIR TOWING & SALVAGE	BOYZ-N-THEIR TOYZ MARINE	23000 OVERSEAS HWY	WR
564	Marine Repair	MARINE REPAIR TOWING & SALVAGE	COFFIN JOHN	CENTRAL & GERALDINE	WR
565	Marine Repair	MARINE REPAIR TOWING & SALVAGE	ISLAND MAINTENANCE & REPAIR	MO CTY	WR
566	Marine Repair	MARINE REPAIR TOWING & SALVAGE	JOHNNYS MARINE REPAIR INC	104525 OVERSEAS HWY	WR
567	Marine Repair	MARINE REPAIR TOWING & SALVAGE	K & K MOBILE MARINE	MO CTY	WR
568	Marine Repair	MARINE REPAIR TOWING & SALVAGE	SAFE HARBOR DIESEL REPAIR	6810 FRONT ST	WR
569	Marine Repair	MARINE REPAIR TOWING & SALVAGE	SPIRIT TOWING	25500 US 1	WR
570	Marine Repair	MARINE REPAIR/BOAT RENTAL SERVICE	SUGARLOAF KEY K O A	MM 20 STATE ROAD 939	WR
571	Marine Repair	MARINE TOWING	ADVENTURE ENVIROMENTAL INC	10 PIGEON DR	WR
572	Marine Repair	MARINE TOWING & SALVAGE	ADVANCED MARINE TOWING RECOVERY & SALVAGE INC	47 SHORELINE DR	WR
573	Marine Repair	MARINE TOWING & SALVAGE	BLUE WATER MARINE SERVICES INC	11400 OVERSEAS HWY 115	WR
574	Marine Repair	MARINE TOWING & SALVAGE	CANNONBALL ENTERPRISES	PILOT HOUSE MARINA	WR
575	Marine Repair	MARINE TOWING & SALVAGE	TOW BOAT US BIG PINE KEY LOWER KEYS MARINE TOWING&	28500 OVERSEAS HWY	WR
576	Marine Repair	MARINE TOWING SALVAGE	SEA TOW OF KEY LARGO /POWERS MARINE SERVICE LLC	21 GARDEN COVE DR	WR
577	Marine Repair	MARINE TOWING, SALVAGE & DIVING	DOUBLE D MARINE	178 BUTTONWOOD AVENUE	WR
578	Marine Repair	MARINE WELDING	WELD ON 2	156 FLORIDA AVE	WR
579	Marine Repair	MARINE WELDING AND REPAIR	FABRICATORS INC	124 INDUSTRIAL RD	WR
580	Marine Repair	MOBILE MARINE ENGINE REPAIR	SLACK OFF MOBILE MARINE	MO CTY	WR
581	Marine Repair	OUTBOARD & MARINE & STORAGE REPAIR	ROUILLARDS MARINE	98468 OVERSEAS HWY	WR
582	Marine Repair	REPAIRS BOATS	GUS TOY BOX LLC	100850 OVERSEAS HWY	WR
583	Marine Repair	SALVAGE	J B MAGRUDER INC	7007 SHRIMP RD	WR
584	Mobile Marine Service	BOAT TRAILERS & MARINE REPAIS	ON THE SPOT TRAILER REPAIR INC	MO CTY	WR
585	Mobile Marine Service	ENVIORNMENTAL MARINE CONSULTING	CBE MARINE LLC	MO CTY	WR
586	Mobile Marine Service	MARINE & CAR AUDIO INSTALLATION	MOTION MARINE & CAR AUDIO	MO CTY	WR
587	Mobile Marine Service	MARINE & R.V REPAIR	MARINE & R.V. SERVICES OF THE KEYS, INC	MO CTY	WR
588	Mobile Marine Service	MARINE & TRAILER REPAIR	TRAILER SHOP THE INC	MO CTY	WR
589	Mobile Marine Service	MARINE CLEANING	CHRISSIES MARINE SERVICES	MO CTY	WR
590	Mobile Marine Service	MARINE CONSULTANT	BWG BOATWORKS LLC	11 ORANGE DR	WR
591	Mobile Marine Service	MARINE HYDRAULIC REPAIR	DOLPHIN HYDRAULICS	31019 AVENUE G	WR
592	Mobile Marine Service	MARINE MAINTENANCE	D & L MARINE MAINTENANCE	MO CTY	WR
593	Mobile Marine Service	MARINE MAINTENANCE	MOBILE MARINE MAINTENANCE & YACHT COMMISSIONING	MO CTY	WR
594	Mobile Marine Service	MARINE MECHANIC	J & J MARINE SERVICE INC	MO CTY	WR
595	Mobile Marine Service	MARINE REPAIR	BLUE WATER MOBILE MARINE	MO CTY	WR
596	Mobile Marine Service	MARINE REPAIR	CARTERS MOBILE MARINE SERVICE	MO CTY	WR

Table 3.19 – Inventory of Water-Dependent and Water-Related Uses (Continued)

Row	Category Name	Occupation Desc.	Business Name	Business Address	WR or WR
597	Mobile Marine Service	MARINE REPAIR	CONCH REPUBLIC MARINE LLC	MO CTY	WR
598	Mobile Marine Service	MARINE REPAIR	JAMES ROBERTS MOBILE MARINE SERVICES	MO CTY	WR
599	Mobile Marine Service	MARINE REPAIR	KEYS MOBILE MARINE LLC	MO CTY	WR
600	Mobile Marine Service	MARINE REPAIR	LEBOEUFS OUTBOARD REPAIR	MO CTY	WR
601	Mobile Marine Service	MARINE REPAIR	PETER J ANGELOTTI BOAT REPAIR	MO CTY	WR
602	Mobile Marine Service	MARINE REPAIR	PETER'S MOBILE MARINE	MO CTY	WR
603	Mobile Marine Service	MARINE TRANSPORT SERVIC	CDT	MO CTY	WR
604	Mobile Marine Service	MARINE WELDING & REPAIR	ARC TECH WELDING & REPAIR SERV THOMPSON INDUSTRIES LLC	MO CTY	WR
605	Mobile Marine Service	MBL AUTO & MARINE DETAILING	HARRYS BEST DETAILING	MO CTY	WR
606	Mobile Marine Service	MOBILE MARINE	JOHN FERRARO MOTORSPORTS LLC	MO CTY	WR
607	Mobile Marine Service	MOBILE MARINE	QUALITY MARINE SERVICE	MO CTY	WR
608	Mobile Marine Service	MOBILE MARINE BOAT DETAILING	RAINBOW BOAT CARE INC	MO CTY	WR
609	Mobile Marine Service	MOBILE MARINE CARPENTRY	TURN OF THE CENTURY WOODEN BOAT WORKS	MO CTY	WR
610	Mobile Marine Service	MOBILE MARINE DETAILING	STEM TO STERN YACHT SERVICES INC	MO CTY	WR
611	Mobile Marine Service	MOBILE MARINE HULL CLEANING	TIM MACSHANE MOBILE MARINE MAINTENANCE	MO CTY	WR
612	Mobile Marine Service	MOBILE MARINE MAINTENANCE	MONTES MAINTENANCE	MO CTY	WR
613	Mobile Marine Service	MOBILE MARINE MAINTENANCE	WILLIAM SCHIRRA MOBILE DIESEL & BOAT MAINTENANCE	MO CTY	WR
614	Mobile Marine Service	MOBILE MARINE REPAIR	CANNON MOBILE MARINE /GARY N CANNON INC	MO CTY	WR
615	Mobile Marine Service	MOBILE MARINE REPAIR	DAVIS MARINE CORP	MO CTY	WR
616	Mobile Marine Service	MOBILE MARINE REPAIR	DONALD KELLEY MARINE REPAIR	MO CTY	WR
617	Mobile Marine Service	MOBILE MARINE REPAIR	GARDEN COVE MARINE SERVICES	MO CTY	WR
618	Mobile Marine Service	MOBILE MARINE REPAIR	GLADDING MARINE SERVICE INC	MO CTY	WR
619	Mobile Marine Service	MOBILE MARINE REPAIR	GOTCHA COVERED LLC	MO CTY	WR
620	Mobile Marine Service	MOBILE MARINE REPAIR	I KNOW BOATS INC	MO CTY	WR
621	Mobile Marine Service	MOBILE MARINE REPAIR	JOE PARKERS ALL MARINE SERVICE	MO CTY	WR
622	Mobile Marine Service	MOBILE MARINE REPAIR	PAUL'S MOBILE MARINE REPAIR	MO CTY	WR
623	Mobile Marine Service	MOBILE MARINE REPAIR	REEF MARINE MAINTENANCE	MO CTY	WR
624	Mobile Marine Service	MOBILE MARINE REPAIR	S JONES INC	MO CTY	WR
625	Mobile Marine Service	MOBILE MARINE REPAIR	SAUDER LISA & JOHN	MO CTY	WR
626	Mobile Marine Service	MOBILE MARINE REPAIR	SK MARINE SERVICE INC	MO CTY	WR
627	Mobile Marine Service	MOBILE MARINE REPAIR	SKINNYS MARINE MART LLC	MO CTY	WR
628	Mobile Marine Service	MOBILE MARINE REPAIR	TREJO JOHN	MO CTY	WR
629	Mobile Marine Service	MOBILE MARINE REPAIR	TRI COUNTY YACHT & MARINE SERVICE INC	MO CTY	WR
630	Mobile Marine Service	MOBILE MARINE REPAIR & SALVAGE	ARNOLD'S AUTO & MARINE REPAIR INC	5540 3RD AVE	WR
631	Mobile Marine Service	MOBILE MARINE REPAIR/MARINE DETAILING	V & T BOAT REPAIR & MAINTENANCE	MO CTY	WR
632	Mobile Marine Service	MOBILE MARINE REPAIRS	DIMICH ROD	MO CTY	WR
633	Mobile Marine Service	MOBILE MARINE RIGGING	MARINERS ADVANTAGE	30880 WITTERS LANE	WR
634	Mobile Marine Service	MOBILE MARINE SERVICE	GREAT WHITE MARINE SERVICES	MO CTY	WR
635	Mobile Marine Service	MOBILE MARINE SERVICE	SOUTH FLORIDA YACHT SERVICE, LLC	MO CTY	WR
636	Mobile Marine Service	MOBILE MARINE SERVICES	KIPP DOUGLAS L	MO CTY	WR
637	Mobile Marine Service	MOBILE MARINE SERVICES	SERGIO KUSHCHOVY DIVER	MO CTY	WR
638	Mobile Marine Service	MOBILE MARINE SERVICESS	FLORIDA KEYS MARINE SERVICES	MO CTY	WR
639	Mobile Marine Service	MOBILE OUTBOARD MARINE SVC	PREFERRED OUTBOARD SERVICE	MO CTY	WR
640	Mobile Marine Service	MOBILE/MARINE PAINTING-MANITAN	SHORT STROKE MARINE INC	MOCTY	WR
641	Mobile Marine Service	MOBILE/MARINE REPAIR	ACTION MARINE & DIVE INC	MO CTY	WR
642	Mobile Marine Service	MOBILE/MARINE REPAIRS	PROFESSIONAL YACHT MAINTENANCE KEY LARGO PYM INC	MO CTY	WR
643	Mobile Marine Service	MOBILE/MARINE REPAIRS	RICK ALVAREZ REPAIR & SERVICE	MO CTY	WR
644	Mobile Marine Service	SERVICE: MOBILE MARINE REPAIR	GRESH MARINE REPAIR	MO CTY	WR
645	Marine Retail Sales	&WHOLESALE (MARINE LIFE)	FLORIDA KEYS MARINE LIFE LLC	29431 BIG PINE ST	WR

Table 3.19 – Inventory of Water-Dependent and Water-Related Uses (Continued)

Row	Category Name	Occupation Desc.	Business Name	Business Address	WR or WR
646	Marine Retail Sales	BOATS TRLR & MARINE PRODUCTS	LIFETIME DOCK AND LUMBER INC	24536 OVERSEAS HWY	WR
647	Marine Retail Sales	BOATS,TOOLS & MARINE EQUIPMENT	SKEETERS MARINE REPAIR MAR CAYA INC	30641 OVERSEAS HWY	WR
648	Marine Retail Sales	MARINE & RV SUPPLY	GULF ATLANTIC ELECTRIC OF THE KEYS INC	5700 4TH AVE	WR
649	Marine Retail Sales	MARINE ACCESSORIES	BUTTONWOOD BAY CONDO ASSOC INC	96000 OVERSEAS HWY	WR
650	Marine Retail Sales	MARINE CANVAS	BAYSIDE MARINE CANVAS KEY LARGO INC	103100 OVERSEAS HWY	WR
651	Marine Retail Sales	MARINE RETAIL SALES	PROFESSIONAL YACHT MAINTENANCE KEY LARGO PYM INC	84 ROCK HARBOR DR	WR
652	Marine Retail Sales	MARINE SALES	PETERSON VENTURES LLC	23000 OVERSEAS HWY	WR
653	Marine Retail Sales	MARINE SUPPLIES	KEY WEST HARBOUR YACHT CLUB	6000 PENNISULAR AVE	WR
654	Marine Retail Sales	MARINE SUPPLIES	KEYS MARINE SERVICE & SALVAGE INC	5550 5TH AVE	WR
655	Marine Retail Sales	MARINE SUPPLIES,BAIT & BOAT SALES	GARDEN COVE MARINA /SIEVERS MARINA INC	21 GARDEN COVE DR	WR
656	Marine Retail Sales	ORNIMENTAL MARINE & CORAL	ATLANTIC REEF AQUACULTURE LLC	17156 BONTA LANE WEST	WR
657	Marine Retail Sales	RETAIL AUTO & MARINE PARTS	BIG PINE MARINE & AUTO REPAIR	B AVE & 2ND ST	WR
658	Marine Retail Sales	RETAIL BOAT & MARINE STORE	MARKEY MARINE SERVICE INC	98250 OVERSEAS HWY	WR
659	Marine Retail Sales	RETAIL BOAT DEALER/MARINE SUPPLIES	MANATEE BAY MARINE INC	99 MORRIS LN	WR
660	Marine Retail Sales	RETAIL BOATS & MARINE SUPPLIES	BLACKWATER SOUND MARINA LLC	103950 OVERSEAS HWY	WR
661	Marine Retail Sales	RETAIL MARINE & CAR AUDIO	MOTION MARINE & CAR AUDIO	97300 OVERSEAS HWY	WR
662	Marine Retail Sales	RETAIL MARINE PRODUCTS	SEA CENTER LLC BIG PINE FISHING LODGE INC	29740 OVERSEAS HWY	WR
663	Marine Retail Sales	RETAIL MARINE SALES	DOLPHIN MARINA ASSOCIATES LTD	28500 OVERSEAS HWY	WR
664	Marine Retail Sales	RETAIL MARINE SUPPLIES	CHRIS CARSONS MARINE SERVICE & SUPPLY	82 HENRY MORGAN DR	WR
665	Marine Retail Sales	RETAIL MARINE SUPPLIES	KEY LARGO HARBOR MARINA/LACROSS MARINA LLC	400 OCEAN DR	WR
666	Marine Retail Sales	RETAIL MARINE SUPPLIES	MURRAY MARINE INC	5710 US 1 MM 5 SI	WR
667	Marine Retail Sales	RETAIL MARINE SUPPLIES	WEST MARINE PRODUCTS INC	103400 OVERSEAS HWY 124	WR
668	Marine Retail Sales	RETAIL MARINE SUPPLIES & PREPACKAGED SNACKS	COW KEY MARINA MAD COW KEY LLC	5001 5TH AVE	WR
669	Marine Retail Sales	RETAIL MARINE SUPPLIES TRL BTS	ALLABOARD FIBERGLASS REPAIRS LLC	104335 OVERSEAS HWY	WR
670	Marine Retail Sales	RETAIL SALES MARINE PARTS	BOAT DOCTOR'S QUARTERS	22815 CUDJOE DR	WR
671	Marine Retail Sales	RETAIL SALES MARINE SUPP	DUCK KEY MARINA TURNKEY MARINA MGMNT SERV INC	1149 GREENBRIAR RD	WR
672	Marine Retail Sales	RETAIL SALES MARINE SUPP	KEY LARGO ANGLERS	50 CLUBHOUSE RD	WR
673	Marine Retail Sales	RETAIL SALES MARINE SUPP	KINGS KAMP BLACKWATER SOUND HOLDINGS LLLP	103650 OVERSEAS HWY	WR
674	Marine Retail Sales	RETAIL SALES MARINE SUPP	LARGO SUN VISTA ACQUISITION CO LLC	104550 OVERSEAS HWY	WR
675	Marine Retail Sales	RETAIL SALES MARINE SUPPLY	SUGARLOAF MARINA/ISLAND AUTO SALES INC	17015 OVERSEAS HWY	WR
676	Marine Retail Sales	RETAIL SALES-AUTO & MARINE	SOUTHERN MOST HOT RODS	30582 5TH AVE	WR
677	Marine Retail Sales	RETAIL/MARINE SUPPLIES/BOATS	BLUE WATER MARINA INC	230 BANYAN LN	WR
678	Marine Retail Sales	RETAIL/WHOLESALE MARINE PARTS	AAA ALL MARINE	77 INDUSTRIAL RD	WR
679	Marine Wholesale Sales	MARINE EQUIPMENT & SUPPLIES	ENVIRONMENTAL MOORINGS INTERNATIONAL INC	172 LORELANE PL	WR
680	Marine Wholesale Sales	MARINE PARTS	KEYS HYDRAULICS	601 PORTIA CR	WR
681	Marine Wholesale Sales	WHOLESALE/RETAIL MARINE SUPPLIES	CURTIS MARINE INC	229 BANYON LN	WR
682	Marinas & Storage	MARINAS & STORAGE	NEWFOUND HARBOR MOTEL (SEACAMP)	1300 BIG PINE AVE	WD

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Some of the decline in the number of commercial fishing vessels can be attributed to less dock space, higher dockage fees, and the rising cost of living in the Keys (see *Chapter 2.0 Future Land Use Element*). During the period 1980-1990, the number of commercial fishing boats declined 6 percent while the number of pleasure boats increased 67 percent. This increased demand for recreational marinas has squeezed the supply of commercial fishing marinas and increased the pressure to redevelop commercial fishing marinas for recreational marina use.

Conflicts also occur where adjacent shoreline uses are incompatible. The potential for conflict is greatest among water-dependent or water-related uses which may be perceived as nuisance-producing (commercial fishing and support facilities, boat storage, marine repair, marine industrial, fish houses) and uses that are reliant on the scenic quality and amenity provided by a shoreline location (recreational, residential, tourist-related services). The noise, smells, and visual character of some water-dependent/water-related uses may be undesirable to adjacent tourist, residents, and recreation users. Often, existing water-dependent/water-related uses do not become troublesome until newer residential and commercial uses locate on adjacent sites. The harborside area in Marathon is one of many existing locations where conflicts result from residential uses sited adjacent to commercial fishing uses.

Increased shoreline development, which may contribute to the destruction of marine habitats and a decrease in fish populations, conflicts with commercial fishing activities which are dependent on marine resources and conservation uses which attempt to protect and preserve marine resources. Some active recreational activities (motor boating, water-skiing, and jet-skiing) can potentially damage marine resources valued by other recreational activities (scuba/snorkeling, recreational fishing) as well as commercial fishing. Water-dependent recreation uses present a different conflict. Friction between active and passive recreational uses can occur where shared recreational facilities do not allow adequate separation.

3.20.2.2 Working Waterfronts

A "recreational and commercial working waterfront" is defined in the Florida Waterway and Waterfront Improvement Act, Florida Statute Sec. 342.07, as "*a parcel or parcels of real property that provide access for water-dependent commercial activities, including hotels and motels as defined in s. 509.242(1), or provide access for the public to the navigable waters of the state. Recreational and commercial working waterfronts require direct access to or a location on, over, or adjacent to a navigable body of water. The term includes water-dependent facilities that are open to the public and offer public access by vessels to the waters of the State or that are support facilities for recreational, commercial, research, or governmental vessels. These facilities include public lodging establishments, docks, wharfs, lifts, wet and dry marinas, boat ramps, boat hauling and repair facilities, commercial fishing facilities, boat construction facilities, and other support structures over the water*." Prior to 2006, hotels and motels were not included in the definition.

Working waterfronts are important because they contribute to the economy, heritage, and overall quality of life and provide the coastal community character that visitors come to the Keys to experience (http://www.cues.fau.edu/toolbox/subchapter.asp?SubchapterID =120&ChapterID=4). In Islamorada, for example, working waterfronts have given the area the nickname of "the sportfishing capital of the world" and the working waterfronts attract tourists worldwide to compete in fishing tournaments.

As the coastal population increases, there is more competition for waterfront access and consequently, property values rise. There is increasing pressure to redevelop, often to uses that are not water-dependent. Many traditional working waterfront uses are squeezed out by more intense private residential and commercial developments. For example, this has been evident on Stock Island – home to an important community of workers and businesses that serve the local economy. Stock Island has been facing increased pressure to redevelop many of its waterfront industries into upscale residential communities. Of significance is the fact that this island contains the only industrial, deepwater port remaining in the lower Keys.

Recognizing the importance of addressing the loss of recreational and commercial working waterfronts, the Florida Legislature passed the Florida Waterway and Waterfront Improvement Act of 2005 to encourage preservation of working waterfronts. One requirement of the Florida Waterway and Waterfront Improvement Act of 2005 applicable to the County, a waterfront community, is for the County's Comprehensive Plan (see *Chapter 2.0 Future Land Use Element*, and *Chapter 13.0 Recreation and Open Space Element*) to set forth regulatory incentives and criteria that encourage the preservation of commercial and recreational working waterfronts, including public access. Also, coastal local governments must include strategies that will be used to preserve the recreational and commercial working waterfronts (Chapter 163.3178(2)(g), F.S.) in the shoreline use component of the coastal management element.

The DCA's Waterfronts Florida Program (http://www.dca.state.fl.us/ fdcp/dcp/waterfronts) provides assistance to local governments in revitalizing their working waterfronts through resources for planning and the provision of intense technical assistance and training. DCA's publication *Guiding the Way to Waterfront Revitalization: Best Management Practices* (DCA, 2007b) is a guide that provides an overview of what is happening at waterfronts around the United States, presents a series of best practices, highlights lessons learned, illustrates the key components of the Waterfronts Florida Program through case studies, and provides information on additional working waterfronts resources such as funding sources, planning tools, and project management. The DCA's Waterfronts Florida Program offers help to all coastal local governments in Florida to revitalize their working waterfronts by providing resources for planning. In addition, the Program designates selected communities to receive technical and limited financial assistance through the Waterfronts Florida Partnership Program. New communities are designated as Waterfronts Florida Partnership Communities through a competitive application process held every two years. Since 1997, a total of 23 communities have received designation as Waterfronts Florida Partnership Communities. Once it receives the designation, a community receives intensive technical assistance and

limited financial assistance from the DCA, resulting in a new or refined community-designed vision plan (special area management plan) to guide the revitalization of the community's designated waterfront area. There are no designated Waterfronts Florida Partnership Communities in the County.

The County retained the SFRPC and the Center for Urban and Environmental Solutions of Florida Atlantic University (CUES) to develop the Monroe County Marine Management Strategic Plan (SFRPC, 2005). Completed in December 2005, the Monroe County Marine Management Strategic Plan provides a comprehensive strategy for protecting and preserving the working waterfronts of the County. It presents a coordinated implementation strategy specifying government policies, programs, regulations, and legislative measures to establish the structure to achieve the objective of preserving the working waterfront. It included a Marine Facilities Database with maps of an inventory of marine facilities.

Subsequently, the County retained SFRPC and CUES to develop the Working Waterfronts Preservation Master Plan. Dated April 30, 2007, the Working Waterfronts Preservation Master Plan incorporated several products including (1) the Working Waterfronts Master Plan which included proposed CDMP and LDR amendments, (2) an updated Marine Facilities Database and GIS Map which added over 100 facilities to a previous inventory developed in the 1990s, and (3) the Monroe County Marina Siting Plan which was required by State statute. The Marina Siting Plan helps to inform marina development through criteria-based site suitability analysis and maps of suitability zones.

The amount of loss of working waterfronts in the Keys has not been quantified. In the Monroe County Working Waterfronts Preservation Master Plan (SFRPC, 2007), current and historic County property appraiser's data were analyzed to pinpoint changes in property codes indicative of working waterfront conversion. These data did point to broad land use changes. For example, property codes would show that a certain property converted from commercial to vacant. However, property codes did not provide sufficiently detailed information to extract changes related to working waterfronts from the database and identify the precise characteristics of these changes. In addition, the County building permit data were obtained and analyzed in the hopes of generating a more complete picture of working waterfront conversion. This dataset reflected all permitted new and modified structures in the Keys; however, it only classified new structural changes into general categories—residential, commercial, and industrial—impeding the ability to isolate working waterfront properties and classify new property uses unfolding there. Finally, State data were obtained from the Department of Business and Professional Regulation and Department of Revenue. These datasets only denoted conversion of a subset of the County parcels affected by conversions and did not specify the new uses to which parcels were converted. In conclusion, existing data sources could not provide a sufficiently specific understanding of working waterfront conversion because of their limited structure and content. Regardless of the limitations of the existing datasets, one need only travel through the Keys to see the significant change and redevelopment of waterfront properties and marine-related uses (SFRPC, 2007).

The economic importance of working waterfronts was estimated in the Monroe County Working Waterfronts Preservation Master Plan (SFRPC, 2007). A demographic and economic analysis showed the following under the two scenarios tested: (1) the loss of the entire commercial fishing industry and associated fish houses without any replacement economic activities was estimated to lead to a reduction of approximately three percent in economic output for the Florida Keys over a 25-year horizon; and (2) the conversion of half of the marinas and boatyards into residential units, with the corresponding increase of the resident population, could lead to almost two percent in additional economic output for the County. These impacts, while modest when viewed from a strictly economic perspective, do not consider the historical and cultural value of the "working waterfront" in the County (SFRPC, 2007).

3.20.2.1.1 Marine Facilities Inventory

The Working Waterfronts Preservation Master Plan (SFRPC, 2007) included an updated Marine Facilities Database and GIS Map. The Marine Facilities Database is an inventory of marine facilities in the County. It updated a previous database developed in the 1990s. The inventory was prepared using the original County database, the Florida Fish and Wildlife Research Institute (FWRI) Marinas Database, the FDEP Marinas Database, public websites, aerial photographs, and field investigations. The survey information was tabulated and also presented on the GIS Map. A series of maps illustrated facilities in the Upper Keys, Middle Keys, Lower Keys, and on Stock Island. Each facility was categorized as follows:

Facility	**Characteristic Description of Facility Characteristic**
Marina (Monroe County)	Marina means a facility for the storage (wet and dry), launching and mooring of boats together with accessory retail and service uses, including restaurants and live-aboards, charter boat and sport diving uses, except where prohibited, but not including docks accessory to a land-based dwelling unit limited to the use of owners or occupants of those dwelling units
Commercial Fishing	Any water-dependent facility (marina, boat yard, etc.) that provides support services to commercial fishing activities
Seafood Processing	Any water-dependent facility that receives fresh seafood for processing
Seafood Sales	Any water-dependent facility that receives fresh seafood from commercial fishermen for resale
Trap Yard	Space for storage of lobster traps and access to load / unload them on vessels
Charter Fishing	Any water-dependent facility (marina, boat yard, etc.) that provides support services to recreational fishing activities (charters) and/or sales/rentals of equipment and supplies for recreational fishing
Sport Diving	Any water-dependent facility (marina, boat yard, etc.) that provides support services to recreational diving activities and/or sales/rentals of equipment and supplies for diving
Boat Manufacturing	Manufacturing of marine vessels
Boat Sales	Retail sales of marine vessels
Boat Repair	Any water-dependent facility that provides maintenance and/or repair

Facility	Characteristic Description of Facility Characteristic
	services for marine vessels
Fuel Sales	Any water-dependent facility that provides retail marine fuel sales
Pump-out	Pump-out capability associated with a qualified marine facility
Restaurant	Restaurant associated with a qualified marine facility
Residential	Residential housing (including single family, multi-family and condominiums) associated with a qualified marine facility - excludes workforce housing for the facility
Hotel / Motel	Hotel / motel associated with a qualified marine facility, including cabins and/or rental spaces in campgrounds and transient RV parks
Live-aboards	Slips, docks or mooring sites where live-aboard vessels are allowed to moor
Docks / Broadside	Docks or broadside space available for rental (including transient) or purchase, or owned by associated residential for the benefit of owners
Wet Slips	Wet slips available for rental or purchase, or owned by associated residential
Moorings	Mooring sites available for rental or purchase, or owned by associated residential
Ramps	One or more points of access to the water for launching trailered vessels
Parking	Parking for vehicles and/or trailers associated with a qualified marine facility
Lifts / Hoists	Equipment that can lift marine vessels to move them between the water and dry storage or maintenance and repair facilities
Dry Storage	Dry stack (inside or outside) and outside storage for marine vessels
Source: SFRPC, 2007	

The marine facility database contained information on a total of 545 facilities, of which 260 are in unincorporated Monroe County. There are a total of 176 marinas in unincorporated Monroe County, including 13 commercial fishing marinas and 4 boatyards:

Marine Facility Type	Unincorporated	Incorporated	Total
Marinas	176	240	416
Primary Use	61	97	158
Commercial Fishing	13	18	31
Boatyard	4	7	11
Other	44	72	116
Accessory Use	87	92	179
Residential Use	28	51	79
Other	84	45	129
Total Facilities	260	285	545
Number of Wet Slips	2,730	2,380	5,110

Source: SFRPC, 2007

The majority of the facilities in the inventory (386) include docks or some type of broadside space, and 251 have wet slips that attach to the docks. There are 63 facilities in the inventory that offer charter boat fishing and 8 that offer sport diving services; 59 offer fuel sales and 46 offer pump-out; 197 have ramps, 27 have lifts or hoists, and 48 offer dry storage. Many of the facilities are associated with residential uses such as a condominium (171) or a hotel/motel (126), and 55 offer berthing or services for live-aboard vessels.

3.20.2.1.2 Marina Siting Plan

The Working Waterfronts Preservation Master Plan (SFRPC, 2007) included the Monroe County Marina Siting Plan (CUES, 2007). The Marina Siting Plan was prepared in April 2007 by CUES at Florida Atlantic University. The Marina Siting Plan identified specific criteria for new or expanding marina facilities with three or more slips. The Plan identified areas with adequate water depth and good flushing (requiring no new dredging) and do not have substantial concerns with impacts to manatees, crocodiles, turtles, seagrasses, and other marine resources. Based on the criteria, site suitability was identified. The Marina Siting Plan provides three categories of site suitability zones defining Preferred, Conditional, and Exclusionary locations for new or expanded marinas with three or more slips. Site suitability was mapped, to the extent data currently exist; using Geographic Information System (GIS) techniques and maps are included in Appendix E of the Marina Siting Plan (CUES, 2007).

"Exclusionary" shoreline segments include those areas with a water depth of less than four feet below mean low water (within 100 feet of a parcel boundary, per maximum dock length), and/or include existing conservation lands managed at a protection status of 1 as defined by FNAI. This category includes parcels already acquired under the Florida Forever program and designated at a protection status of 1. It should also be noted that lands adjacent and in proximity to boat restricted areas, such as those in the FKNMS (including, but not limited to, Wildlife Management Areas with access restrictions designated "no-access buffer zones," "no-motor zones," and "closed"), as well as those described in Monroe County Code Section 5.5-108(c) and (d) ("combustion engine exclusion" and "motorboats prohibited" zones), can be considered "Exclusionary" for the purposes of the Plan.

"Preferred" shoreline segments include those areas with a minimum water depth of four feet (within 100 feet of a parcel boundary, per maximum dock length) and a minimal risk of natural resource impacts. Preferred areas are considered appropriate for all types of new or expanding marinas.

"Conditional" shoreline segments include those areas where there is a moderate risk of natural resource impacts. Criteria include a minimum water depth of four feet (within 100 feet of parcel boundary, per maximum dock length). In addition, any or all of the following conditions may be present:

- The land is managed at a protection status of 2 or 3 as defined by the FNAI.
- The parcel boundary includes an area of continuous seagrass.
- The parcel is in an area of known American crocodile range.
- The water quality of an adjacent canal is listed as poor.
- The parcel is in an area of high watercraft manatee mortality (within the County).
- The parcel boundary includes a beach known to be used for sea turtle nesting.

- The parcel is listed by the Florida Forever Board of Trustees as lands proposed and approved by the State's Acquisition and Restoration Council for acquisition because of outstanding natural resources.

The Marina Siting Plan (CUES, 2007) includes recommendations for the County to take to protect, preserve, and enhance public water access and boating-related uses.

3.20.2.3 Live-Aboards

A live-aboard vessel is defined in the Monroe County Code as:

- any vessel used solely as a residence;
- any vessel represented as a place of business, a professional or other commercial enterprise, or a legal residence, except for commercial fishing vessels; or
- any vessel with a person or persons living aboard that is anchored, moored, or docked in the same location for seventy-two consecutive hours.

The definition in Chapter 327.02, F.S. is different, specifically excluding commercial fishing boats:

- any vessel used solely as a residence; or
- any vessel represented as a place of business, a professional or other commercial enterprise, or a legal residence, and
- A commercial fishing boat is expressly excluded from the term live-aboard vessel.

Because the State's definition is narrower, it excludes many vessels that the County normally considers to be live-aboard vessels. The discussion of live-aboard vessels in the following sections is based on the County's broader definition.

3.20.2.3.1 Service Demands of Live-Aboards

Although live-aboards technically reside on water, they rely on a number of dockside services (dockage, toilets, showers, laundry, telephone, mail, ice, refrigeration, parking, dinghy dockage, and pump-out), commercial services (stores, restaurants), and community services (medical, dental, fire, police, and education). According to a 1988 survey of live-aboards (Antonini et al., 1990), services most often sought include:

- improved dockside facilities;
- showers and restrooms;
- sewerage pump-out facilities;
- recreation; and
- public dinghy dockage (Antonini et al., 1990)

3.20.2.3.2 Conflicts between Live-Aboards and Land Residents

There were six locations where single family homes are located in proximity to concentrations of live-aboard vessels: Pine Channel, Boot Key, Key Colony, Coco Plum, Key Largo Beach, and Port Largo Canal.

Live-aboards are commonly perceived by shore residents as transients who degrade the coastal environment and contribute little to the coastal community. Live-aboards complain of the noise generated by recreational boaters and restricted access to the shore. Major areas of conflict include:

- access from the live-aboard boats to the shoreline;
- disposal of kitchen and sanitary wastes;
- abandonment of vessels;
- location, crowding, and appearance of live-aboard vessels;
- live-aboard settlement rights and preemptive uses of water space;
- surveillance of live-aboard activities by local authorities;
- general impact of live-aboard vessels on the scenic and ecological qualities of the waterfront; and
- appropriate fees for live-aboard services.

Both shore residents and live-aboards ranked sewerage as the number one waterfront problem. Water quality issues associated with live-aboard vessels is discussed in Section 3.5.3.2.5 (Live-Aboard Vessels).

Escalating conflicts in Boot Key Harbor area, where there is a high concentration of live-aboard vessels, once led to harbor blockades by live-aboards and boarding of live-aboard vessels by law enforcement agencies (Antonini et al., 1990). Subsequently, the Boot Key Harbor Mooring Field was established. It contains 226 permanently-attached engineered mooring systems. It has been successful in accommodating the needs of live-aboards, increasing overall harbor capacity, and reducing many of the user conflicts.

3.20.3 Need for Water-Dependent and Water-Related Uses [Rule 9J-5.012(2)(a), F.A.C.]

The inventory of water-dependent and water-related facilities is listed in **Table 3.19** and provides information on the number and type of water-dependent and water-related facilities. A capacity analysis for sandy beach, boat ramps, and non-boat fishing facilities (see *Chapter 13.0 Recreation and Open Space Element*) determined a surplus of these facilities based on the current functional population. Despite the fact that water-dependent and water-related uses are a part of the history and culture that makes the Keys unique, there are no population-based standards to determine the capacity and need for other types of water-dependent or water-related facilities.

The County has identified a need for the establishment and management of mooring fields. A mooring field is a controlled area where boaters tie up to a floating buoy that is attached to the bottom by a heavy anchor or by an augered system. Each buoy is assigned to a boater by a harbormaster and a fee is charged (daily or monthly). Managed mooring fields have been acknowledged by the County and FDEP as a way to:

- eliminate abandoned and derelict vessels;
- provide anchorage and services for transient vessels;
- reduce damage to benthic habitats; and
- eliminate sewage discharges.

The County's Marine Resources Office (formerly Department of Marine Resources) conducted a survey of 15 anchorage sites within the County (Monroe County Department of Marine Resources, 2002). Five sites within unincorporated Monroe County were identified as moderate to high priority sites that needed anchorage management:

- Buttonwood Sound;
- Community Harbor;
- Rock Harbor;
- South Pine Channel; and
- Boca Chica Harbor.

A common problem identified in all five areas was the high number of abandoned and derelict vessels. Other identified problems were the lack of pump-out facilities or pump-out boats, inadequate landing areas, and the need to provide adequate restrooms, showers, shops, marina facilities, and vehicle parking.

The County is participating in the FFWCC's anchorage ordinance pilot program. Section 327.4105 F.S. established the pilot program in 2009 to develop and test policies and regulatory options that promote the establishment and use of public mooring fields, protect the marine environment, and allow for local regulation of non-live-aboard vessels. Currently, local governments have no authority to regulate the anchoring activity of non-live-aboard vessels. The pilot program will provide the authority for the County to develop such anchoring regulations. Any anchoring ordinances created by the County will be reviewed for approval and permitting by FFWCC. Enforcement of anchoring regulations developed under the pilot program may be provided by any local or State law enforcement agency under Sections 327 and 328, F.S. The FFWCC will submit a report of the pilot program findings by 2014, and all ordinances enacted through the pilot program will expire concurrently with the expiration of the pilot program on July 1, 2014 unless re-enacted by the Florida Legislature.

3.20.4 Areas in Need of Redevelopment in the Coastal Area [Rule 9J-5.012(2)(a), F.A.C.]

The entire County is located within a coastal area. Therefore, the areas in need of redevelopment in the coastal area are identical to those identified in *Chapter 2.0 Future Land Use Element*.

3.21 Analysis of the Economic Conditions and Trend of the Coastal Area [Rule 9 J-5.012(2)(a), F.A.C.]

The entire County is located within the coastal area. Therefore, the economic conditions and trends of the coastal area are identical to those identified in *Chapter 2.0 Future Land Use Element*.

3.22 Effects of Future Land Uses on the Coastal Environment [Rule 9J-5.012(2)(b), F.A.C.]

The Coastal Zone Management Act (CZMA) seeks to preserve, protect, develop and, where possible, to restore and enhance the resources of the nation's coastal zone. It encourages coastal states to develop and implement comprehensive management programs that will balance the need for coastal resource protection with the need for economic growth and development in the coastal zone. If a management program developed by a coastal state is approved by the U.S. Department of Commerce National Oceanic and Atmospheric Administration (NOAA), the state is authorized to review certain federal activities affecting the land or water uses or natural resources of its coastal zone for consistency with its program. This authority is referred to as "*federal consistency*" and allows states to review the following:

- activities conducted by or on behalf of a federal government agency,
- activities requiring federal licenses or permits,
- permits issued under the Outer Continental Shelf Lands Act for offshore minerals exploration or development, and
- federally funded activities (federal assistance to state and local governments).

The Florida Coastal Management Program (FCMP) was approved by NOAA in 1981 and is codified in Chapter 380, Part II, F.S. The FCMP consists of a network of 24 Florida statutes (i.e., enforceable policies) administered by nine State agencies and five water management districts.

Federal consistency reviews are integrated into other review processes (e.g., Florida State Clearinghouse, environmental resource permits, and joint coastal permits) conducted by the State depending on the type of federal action being proposed. Regardless of the process used, the review of federal activities is coordinated with the applicable FCMP member agencies, which includes the Department of Community Affairs. Agencies authorized to review and comment on the consistency of federal activities subject to State review under

the FCMP are those agencies charged with the implementation of the statutes and rules included in the federally approved program.

Each agency is given an opportunity to provide comments on the merits of the proposed action, address concerns, make recommendations, and state whether the project is consistent with its statutory authorities in the FCMP. The Florida Department of Environmental Protection, as the designated lead coastal agency for the State, communicates the agencies' comments and the State's final consistency decision to federal agencies and applicants through the approval or denial of a permit.

This framework allows the State to make integrated, balanced decisions that ensure the wise use and protection of the State's water, property, cultural, historic, and biological resources; protect public health; minimize the State's vulnerability to coastal hazards; ensure orderly, managed growth; protect the state's transportation system; and sustain a vital economy.

3.22.1 Effects of Future Land Uses on Natural Habitats [Rule 9J-5.012(2)(b), F.A.C.]

3.22.1.1 Effects on Vegetative Cover [Rule 9J-5.012(2)(b), F.A.C.]

3.22.1.1.1 Natural Habitats and Future Land Use

A geospatial GIS analysis was conducted to examine the potential effects of proposed future land uses on vegetation cover. The analysis overlayed the existing vegetation cover map (habitat map) with the Future Land Use map.

A comparison of the existing vegetation cover map with the Future Land Use map is a useful indication of the potential effect of future land use on habitat. It must be noted, however, that these two maps do not align precisely due to differences in how the County has created the GIS layers for these maps (e.g., where the shoreline is depicted along mangrove fringes is locally different in the two databases). The methods by which the maps were created, and the inherent differences between them, are outlined in Chapter 2.0 (see *Chapter 2.0 Future Land Use Element*). As a result of these differences, there are apparent discrepancies in the acreages of natural habitats in this section compared to other sections in this Conservation and Coastal Element.

Table 3.20 identifies the amount of existing natural habitats on future land use designations, based on the Future Land Use map series. Current land uses coded as Developed Lands or Impervious Surface were not included in this analysis because they do not contain natural habitats. 78.4 percent of the total acreage for all natural habitats have a future land use of Conservation or Residential Conservation, suggesting that a majority of natural habitat acreage has a relatively high level of protection. This is evident for all individual habitat types (Mangrove, Hammock, Pineland, etc.) except for Water (which includes both salt and freshwater ponds), Exotic dominated lands, and Beach/Berm. For

Water (which includes both salt and freshwater ponds) and Exotic dominated lands, future land use is primarily Conservation, Residential Conservation, and Military use. For Beach Berm, future land use is 31.3 percent for Recreation followed by 26.8 percent for Residential Conservation. This is the only natural habitat with a relatively small percentage of land categorized as Conservation.

The natural communities that have the most percentage located in future residential land uses (low density, medium density, and high density residential) are Exotic dominated lands (31.8 percent), Freshwater Wetlands (30.1 percent), Tropical Hardwood Hammocks (26.4 percent), Undeveloped lands (24.4 percent), Pinelands (22.6 percent), Beach/Berm (19.6 percent), and Buttonwood (13.4 percent). Although located in future Residential land use designations, residential (and other) development is controlled by the ROGO/NROGO ordinances and by the the Tier Overlay Ordinance [see Section 3.19 (Effects of Future Land Use on Natural Resources) and below]. Most of the highest quality habitats are located in Tier 1 lands. For example, 95 percent of all of the Freshwater Wetlands in the Keys are located in Tier 1, 93 percent of Tropical Hardwood Hammocks are located in Tier 1, 98 percent of Pinelands are located in Tier 1, 83 percent of Beach/Berm are located in Tier 1, and 90 percent of Buttonwood are located in Tier 1. The Tier Overlay Ordinance is summarized in the following section.

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Table 3.20 - Summary of the Acres and Percentages of Natural Habitat Located within Each Future Land Use Designation

Future Land Use	Acres	Percent of Total
Mangrove		
Agriculture	6.43	< 0.01
Airport District	0.98	< 0.01
Conservation	16,728.27	57.2
Education	0.06	< 0.01
Industrial	14.76	0.1
Institutional	5.97	< 0.01
Military	938.37	3.2
Mixed Use Commercial	84.37	0.3
Mixed Use/Commercial Fishing	11.89	< 0.01
Public Buildings	0.60	< 0.01
Public Facilities	6.86	< 0.01
Recreation	862.64	2.9
Residential Conservation	8,868.74	30.3
Residential High	27.41	0.1
Residential Low	191.54	0.7
Residential Medium	134.05	0.5
Undesignated	1,396.51	4.8
Total Mangrove	29,270.47	
Scrub Mangrove		
Agriculture	0	-
Airport District	0.18	< 0.01
Conservation	4,432.25	44.6
Education	0.34	< 0.01
Industrial	10.98	0.1
Institutional	0.09	< 0.01
Military	821.98	8.3
Mixed Use Commercial	5.92	0.1
Mixed Use/Commercial Fishing	0.01	< 0.01
Public Buildings	0.83	< 0.01
Public Facilities	1.17	< 0.01
Recreation	66.09	0.7
Residential Conservation	4,118.91	41.5
Residential High	3.33	< 0.01
Residential Low	110.99	1.1
Residential Medium	15.26	0.2
Undesignated	344.17	3.5
Total Scrub Mangrove	9,932.51	

Table 3.20 - Summary of the Acres and Percentages of Natural Habitat Located within Each Future Land Use Designation (continued)

Future Land Use	Acres	Percent of Total
Tropical Hardwood Hammock		
Agriculture	1.10	< 0.01
Airport District	0	
Conservation	4,079.26	51.6
Education	18.82	0.2
Industrial	5.60	0.1
Institutional	4.52	0.1
Military	126.95	1.6
Mixed Use Commercial	173.19	2.2
Mixed Use/Commercial Fishing	12.86	0.2
Public Buildings	8.38	0.1
Public Facilities	21.16	0.3
Recreation	226.17	2.9
Residential Conservation	1,131.60	14.3
Residential High	50.93	0.6
Residential Low	1,605.62	20.3
Residential Medium	437.86	5.5
Undesignated	0	-
Total Tropical Hardwood Hammock	7,904.00	
Pinelands		
Agriculture	0	-
Airport District	0	-
Conservation	1,140.64	64.9
Education	0	-
Industrial	4.02	0.2
Institutional	7.13	0.4
Military	0	-
Mixed Use Commercial	45.79	2.6
Mixed Use/Commercial Fishing	0.22	< 0.01
Public Buildings	0	-
Public Facilities	0	-
Recreation	0.02	< 0.01
Residential Conservation	161.80	9.2
Residential High	0	-
Residential Low	296.99	16.9
Residential Medium	100.54	5.7
Undesignated	0	-
Total Pinelands	1,757.17	

Table 3.20 - Summary of the Acres and Percentages of Natural Habitat Located within Each Future Land Use Designation (continued)

Future Land Use	Acres	Percent of Total
Buttonwood		
Agriculture	0	-
Airport District	0.04	< 0.01
Conservation	1,630.21	43.4
Education	0	-
Industrial	2.38	0.1
Institutional	11.88	0.3
Military	296.26	7.9
Mixed Use Commercial	26.59	0.7
Mixed Use/Commercial Fishing	8.61	0.2
Public Buildings	1.06	< 0.01
Public Facilities	5.17	0.1
Recreation	95.68	2.5
Residential Conservation	1,163.80	31.0
Residential High	4.48	0.1
Residential Low	395.45	10.5
Residential Medium	104.83	2.8
Undesignated	7.45	0.2
Total Buttonwood	3,753.87	
Salt Marsh		
Agriculture	0.28	< 0.01
Airport District	1.60	0.01
Conservation	1,178.41	44.7
Education	0	-
Industrial	4.95	0.2
Institutional	0.82	< 0.01
Military	264.46	10.0
Mixed Use Commercial	19.01	0.7
Mixed Use/Commercial Fishing	0	-
Public Buildings	0	-
Public Facilities	0.43	< 0.01
Recreation	31.23	1.2
Residential Conservation	1,000.66	38.0
Residential High	1.55	0.1
Residential Low	81.80	3.1
Residential Medium	43.54	1.7
Undesignated	7.41	0.3
Total Salt Marsh	2,636.15	

Table 3.20 - Summary of the Acres and Percentages of Natural Habitat Located within Each Future Land Use Designation (continued)

Future Land Use	Acres	Percent of Total
Water		
Agriculture	0.74	< 0.01
Airport District	0	-
Conservation	976.72	28.4
Education	0	-
Industrial	122.68	3.6
Institutional	1.82	0.1
Military	685.24	19.9
Mixed Use Commercial	39.93	1.2
Mixed Use/Commercial Fishing	17.24	0.5
Public Buildings	0	-
Public Facilities	3.61	0.1
Recreation	157.80	4.6
Residential Conservation	992.49	28.8
Residential High	14.72	0.4
Residential Low	69.01	2.0
Residential Medium	29.11	0.8
Undesignated	332.43	9.7
Total Water	3,443.52	
Freshwater Wetland		
Agriculture	0	-
Airport District	0	-
Conservation	493.09	48.4
Education	5.15	0.5
Industrial	0.68	0.1
Institutional	0.76	0.1
Military	26.93	2.6
Mixed Use Commercial	2.10	0.2
Mixed Use/Commercial Fishing	0	-
Public Buildings	0	-
Public Facilities	0	-
Recreation	0.09	< 0.01
Residential Conservation	183.04	18.0
Residential High	2.56	0.3
Residential Low	251.85	24.7
Residential Medium	52.42	5.1
Undesignated	0	-
Total Freshwater Wetland	1,018.70	

Table 3.20 - Summary of the Acres and Percentages of Natural Habitat Located within Each Future Land Use Designation (continued)

Future Land Use	Acres	Percent of Total
Beach/Berm		
Agriculture	0	-
Airport District	0	-
Conservation	9.07	7.9
Education	0	-
Industrial	0	-
Institutional	5.04	4.4
Military	6.82	6.0
Mixed Use Commercial	1.33	1.2
Mixed Use/Commercial Fishing	0.18	0.2
Public Buildings	0	-
Public Facilities	0.85	0.7
Recreation	35.67	31.3
Residential Conservation	30.63	26.8
Residential High	3.45	3.0
Residential Low	8.62	7.6
Residential Medium	10.22	9.0
Undesignated	2.21	1.9
Total Beach/Berm	114.08	
Undeveloped Land		
Agriculture	4.09	0.2
Airport District	11.71	0.6
Conservation	92.81	5.0
Education	3.13	0.2
Industrial	113.08	6.0
Institutional	15.45	0.8
Military	694.40	37.1
Mixed Use Commercial	230.38	12.3
Mixed Use/Commercial Fishing	20.40	1.1
Public Buildings	0.26	< 0.01
Public Facilities	4.76	0.3
Recreation	36.78	2.0
Residential Conservation	188.42	10.1
Residential High	27.47	1.5
Residential Low	162.68	8.7
Residential Medium	266.76	14.2
Undesignated	0	-
Total Undeveloped Land	1,872.55	

Table 3.20 - Summary of the Acres and Percentages of Natural Habitat Located within Each Future Land Use Designation (continued)

Future Land Use	Acres	Percent of Total
Exotic		
Agriculture	0	-
Airport District	0	-
Conservation	19.17	5.9
Education	0.01	< 0.01
Industrial	6.82	2.1
Institutional	0.34	0.1
Military	120.86	37.0
Mixed Use Commercial	18.61	5.7
Mixed Use/Commercial Fishing	2.23	0.7
Public Buildings	0	-
Public Facilities	1.04	0.3
Recreation	2.38	0.7
Residential Conservation	35.50	10.9
Residential High	2.00	0.6
Residential Low	16.21	5.0
Residential Medium	85.73	26.2
Undesignated	15.82	4.8
Total Exotic	326.72	
TOTAL ALL FUTURE LAND USES		
Agriculture	12.65	0.02
Airport District	14.52	0.02
Conservation	30,779.90	49.6
Education	27.51	0.04
Industrial	285.95	0.5
Institutional	53.82	0.1
Military	3,982.27	6.4
Mixed Use Commercial	647.21	1.0
Mixed Use/Commercial Fishing	73.64	0.1
Public Buildings	11.12	0.02
Public Facilities	45.04	0.1
Recreation	1,505.55	2.4
Residential Conservation	17,875.58	28.8
Residential High	137.91	0.2
Residential Low	3,190.76	5.1
Residential Medium	1,280.33	2.1
Undesignated	2,105.99	3.4
TOTAL	62,029.75	

3.22.1.1.2 Tier Overlay Ordinance

The Tier Overlay Ordinance currently in place in the County classifies environmentally sensitive lands as Tier I or Tier II (Big Pine Key and No Name Key only). Parcels classified as Special Protection Area (III-A) have a medium development probability, while Tier III represents the majority of developable acreage in the County. The Tier Overlay analysis was conducted by using the tier GIS database that is based on parcel informationand was provided by Growth Management Division. This database shows different acreages than those shown for the future land use analysis. These differences are primarily due to the way offshore islands were mapped. Off shore islands do not have a tier designation and Ocean Reef is exempt from the tier system. Despite these differences, overall trends are apparent and are discussed in this section.

Approximately 3,000 vacant parcels have a Tier III designation and account for approximately 650 acres. Approximately 90 percent of the parcels are residential lots under a quarter acre in size. **Table 3.21** summarizes the amount of natural habitat land in each tier category by each planning area. The tier designations for some individual parcels are subject to change as the tier designation gets re-classified or as undesignated parcels are assigned to a tier. Therefore, it is recognized that the amount of natural habitat in each tier category will change as the tier designations change. However, Table 3.21 provides current (2010) conditions and an indication of which habitats are generally well protected in the Tier Overlay Ordinance and which ones are not as well protected. In addition, most freshwater wetlands are protected by the Tier Overlay Ordinance, ROGO/NROGO, and the LDRs. In addition, filling or alteration of freshwater wetlands would be subject to permit authorization by the SFWMD and/or FDEP and the USACE.

Most of the land in each land use category is categorized as Tier I (90.5 percent). Land owned by the federal government as military lands (no tier designation) makes up the next largest percentage of land (5.3 percent of the total). As a percentage of the total, Tier II represents only 0.1 percent of land because they are found only in the Lower Keys. Because the Middle Keys have a relatively small amount of land in the unincorporated portion of Monroe County, this planning area has a small amount of natural habitats in all categories. Some habitat types are present only in the Lower Keys Planning Area or predominantely in the Lower Keys Planning Area (Pinelands, Freshwater Wetland, and Salt Marsh). Buttonwwood Wetlands and Beach/Berm habitats are found predominately in the Lower Keys. Mangroves are present throughout the Keys, although scrub mangroves are found predominately in the Lower Keys. The Water category includes both freshwater and salt ponds so that this category is found throughout the Keys. Undeveloped land, which includes open, scarified, or disturbed lands, occurs throughout the Keys with the highest acreage in the Lower Keys. Similarly, because of the larger amount of natural habitats and undeveloped parcels, the acreage dominated by Exotic species is the most prevalent in the Lower Keys.

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Table 3.21 - Summary of Acreage of Each Natural Habitat Type Included in Each Tier Category

Habitat Type	Tier				Undesignated		
	I	II	III	III A	N	M	U
Mangrove							
Lower Keys	9,533.5	2.3	75.1	4.9	123.6	764.7	123.6
Middle Keys	575.2	0	7.3	0	27.4	0	36.1
Upper Keys	11,163.1	0	18.3	9.6	206.5	0	35.8
Mangrove Total	**21,271.8**	**2.3**	**100.7**	**14.5**	**357.5**	**764.7**	**195.5**
Scrub Mangrove							
Lower Keys	7,802.4	0	14.4	0	22.8	551.1	20.1
Middle Keys	25.7	0	0	0	1.0	0	3.2
Upper Keys	319.6	0	5.1	0.3	14.4	0	0.6
Scrub Mangrove Total	**8,147.7**	**0**	**19.5**	**0.3**	**38.2**	**551.1**	**23.9**
Tropical Hardwood Hammock							
Lower Keys	3,578.4	7.3	7.7	29.3	18.4	95.4	15.6
Middle Keys	89.9	0	0	0	1.2	0	2.6
Upper Keys	2,988.6	0	39.8	130.1	71.6	0	117.3
Tropical Hardwood Hammock Total	**6,656.9**	**7.3**	**47.5**	**159.4**	**91.2**	**95.4**	**135.5**
Pinelands							
Lower Keys	1,649.5	5.3	8.6	0	18.1	0	0
Middle Keys	0	0	0	0	0	0	0
Upper Keys	0	0	0	0	0	0	0
Pinelands Total	**1,649.5**	**5.3**	**8.6**	**0**	**18.1**	**0**	**0**
Buttonwood Wetlands							
Lower Keys	2,358.9	3.6	14.5	6.5	9.2	256.7	20.4
Middle Keys	84.6	0	18.5	0	0	0	0.8
Upper Keys	709.5	0	1.8	12.7	1.7	0	8.6
Buttonwood Wetlands Total	**3,153.0**	**3.6**	**34.8**	**19.2**	**10.9**	**256.7**	**29.8**

Table 3.21 - Summary of Acreage of Each Natural Habitat Type Included in Each Tier Category (continued)

Habitat Type	Tier				Undesignated		
	I	II	III	III A	N	M	U
Salt Marsh							
Lower Keys	2,136.4	1.5	25.7	0.2	10.5	213.8	14.0
Middle Keys	31.4	0	0	0	0	0	4.3
Upper Keys	102.3	0	1.8	0	0	0	0.4
Salt Marsh Total	**2,270.1**	**1.5**	**27.5**	**0.2**	**10.5**	**213.8**	**18.7**
Freshwater Wetland							
Lower Keys	915.8	0	2.9	7.8	4.2	26.9	1.7
Middle Keys	0	0	0	0	0	0	0
Upper Keys	0	0	0	0	0	0	0
Freshwater Wetland Total	**915.8**	**0**	**2.9**	**7.8**	**4.2**	**26.9**	**1.7**
Water							
Lower Keys	1,014.8	0	33.0	0.5	9.9	283.1	91.9
Middle Keys	31.6	0	0.7	0	1.9	0	0
Upper Keys	833.4	0	8.5	0.1	12.0	0	1.9
Water Total	**1,879.8**	**0**	**42.2**	**0.6**	**23.9**	**283.1**	**93.8**
Beach/Berm							
Lower Keys	72.5	0	0.3	4.8	1.2	2.7	2.9
Middle Keys	9.0	0	0.4	0	0.6	0	1.6
Upper Keys	1.3	0	0.8	1.0	0.5	0	0.1
Beach/Berm Total	**82.8**	**0**	**1.5**	**5.8**	**2.3**	**2.7**	**4.6**
Undeveloped Land							
Lower Keys	320.2	32.2	193.4	14.2	21.9	482.9	46.1
Middle Keys	2.5	0	26.7	0	0.1	0	0
Upper Keys	113.4	0	99.3	27.2	16.6	0	31.0
Undeveloped Land Total	**436.1**	**32.2**	**319.4**	**41.4**	**38.6**	**482.9**	**77.1**

Table 3.21 - Summary of Acreage of Each Natural Habitat Type Included in Each Tier Category (continued)

Habitat Type	Tier				Undesignated		
	I	II	III	III A	N	M	U
Exotic							
Lower Keys	106.0	1.5	25.1	0	6.3	39.3	16.6
Middle Keys	1.8	0	13.6	0	0	0	0
Upper Keys	12.2	0	7.4	0	4.3	0	8.3
Exotic Total	**120.0**	**1.5**	**46.1**	**0**	**10.6**	**39.3**	**24.9**
Florida Keys Total	**46,583.5**	**53.7**	**650.7**	**249.2**	**605.9**	**2,716.6**	**605.5**
Percent of Total	**90.5%**	**0.1%**	**1.3%**	**0.5%**	**1.2%**	**5.3%**	**1.2%**

The tier designations for some individual parcels are subject to change as the tier designation for a parcel is re-classified or as undesignated parcels are assigned to a tier. Therefore, it is recognized that the amount of natural habitat in each tier category will change as the tier designations change. However, the table provides a snapshot of current conditions and an indication of which habitats are generally well protected in the Tier Overlay Ordinance and which ones are not as well protected.

Tiers are:

I = Tier I (see Section 3.19)
II = Tier II
III = Tier III
III-A = Special Protection Area (SPA)

Undesignated areas include:

N = Property does not have a Tier designation. Most of these occur in Ocean Reef (which is exempt from the Tier Overlay Ordinance) and some right of way parcels. Some lots were not originally designated because of mapping errors; the majority of which are currently being reviewed by the Tier Designation Review Committee and will be designated at a later date.

M = Military land use – no Tier designation.

U =Properties that originally had a Tier designation but became undesignated by a court order. This court order was in response to the Everglades Law Center's analysis of the TierOverlay Ordinance. Therefore, it was determined that a number of parcels should be re-designated. The Tier Designation Review Committee is currently addressing the issues.

ROGO/NROGO and the Tier Overlay Ordinance were designed to direct development to areas already disturbed or to infill areas. Taken together, parcels classified as either III, III-A, or undesignated make up 3.0 percent of the total acreage under the Tier Overlay Ordinance.

3.22.1.2 Effects of Future Land Uses on Coastal Flooding [Rule 9J-5.012(2)(b), F.A.C.]

Most of the land area in the Florida Keys is 2 to 3 feet above high tide. The maximum elevations of 18 feet are found in only two locations [see Section 3.7 (Floodplains)]. In addition, a large percentage of the County is located within the Coastal High Hazard Area (CHHA; defined as the evacuation zone for a Category 1 hurricane; see Section 3.23.2 (Coastal High Hazard Area). As a result, the Keys are susceptible to storm flooding.

It is likely that future development will take place within the designated floodplain and the CHHA. The current ROGO/NROGO and the Tier Overlay Ordinance as well as the LDRs discourage development in flood prone areas, particularly the CHHA. In addition, several Comprehensive Plan Goals and Policies specifically protect those areas that have flood water storage and attenuation features (mangroves, salt ponds, saltmarsh, and buttonwood wetlands, and freshwater wetlands). The policy document also seeks to restore native vegetation within the floodplains. The current LDRs discourage new development within the coastal floodplains through the ROGO/NROGO ordinance by assigning -4 points for an application that proposes development within a "V" zone on the FEMA flood insurance rate map. The LDRs specify flood protection measures, floodplain encroachment standards, and permit requirements [Chapter 122 (Floodplain Management)].

As the coastal area develops, it is anticipated that there is a desire to develop or re-develop in areas known as “working waterfronts” [see Section 3.20.2.2 (Working Waterfronts)]. The Working Waterfronts Preservation Master Plan included the Monroe County Marina Siting Plan, which identified specific criteria for new or expanding marinas. The Plan identified areas with adequate water depth and good flushing (requiring no new dredging) and do not have substantial concerns with listed species and other marine resources.

The need to protect, maintain, or expand working waterfronts and code requirements as well as permitting requirements of State and federal agencies will be a balance of future development in the transition area between marine and terrestrial resources.

3.22.1.3 Effects of Future Land Uses on Wildlife Habitat [Rule 9J-5.012(2)(b), F.A.C.]

The most suitable habitat for listed species and unprotected plant and animal species is located within parks, preserves, and refuges (**Table 3.18)**. These lands and a majority of remaining suitable habitat are located within lands predominately categorized as Tier I lands. As discussed for each listed species, the most suitable habitat for each terrestrial species is generally located in lands protected by the Tier Overlay System (**Table 3.21**).

The County's ROGO/NROGO as well as the LDRs further protect these habitats. In addition, most wetlands (freshwater marsh, salt marsh, buttonwood, salt ponds, freshwater lenses, mangroves, and some areas of tropical hardwood hammocks and pinelands), which provide habitat for several protected species, are protected by State and federal regulations.

The tier boundaries on Big Pine Key and No Name Key were designated using the Big Pine Key and No Name Key HCP and the adopted community master plan for Big Pine Key and No Name Key. The HCP, developed in conjunction with an Incidental Take Permit, protects the highest quality habitat and directs development to areas that have already been impacted. Thus, future development would affect lands that have little or no habitat value for protected wildlife species.

3.22.1.4 Effects of Future Land Uses on Living Marine Resources [Rule 9J-5.012(2)(b), F.A.C.]

Living marine resources include seagrass beds, coral communities, and mangroves. This section will discuss the various federal, State, and County actions that have been taken to protect these resources.

3.22.1.4.1 Effects of Future Land Uses on Seagrass Beds

The FKNMS Management Plan provides the basis for future federal, State, and local conservation activities affecting the resources of the FKNMS, including its seagrass beds. The County's Comprehensive Plan and LDRs provide similar goals, strategies, and code regulations to provide protection to seagrass communities.

Seagrass beds protection in the future can be achieved through the LDRs and by actions of the Monroe County Marine Resources Office. The LDRs currently prohibit new dredging in the Florida Keys and prohibits maintenance dredging within areas vegetated with seagrass beds. No new dredging has taken place in unincorporated Monroe County in recent years and it is expected that this trend will continue. State regulations oversee placement of boat docks and associated structures. However, inexperienced boaters often contribute to benthic resource damage. The FKNMS Management Plan has implemented the Mooring Buoy and Waterway Management Action Plan to reduce vessel damage to seagrass beds (as well as coral reefs and other benthic communities). The Marine Resources Office coordinates with FDEP to develop a consistent policy prohibiting mooring buoy fields over seagrass beds. The Marine Resources Office identifies derelict vessels and receives financial assistance to remove them.

3.22.1.4.2 Effects of Future Land Uses on Coral Communities

The FKNMS Water Quality Protection Plan monitoring program was established to study the status and trends of the coral communities. Monitoring has identified a large loss of coral and that many of the causes of these declines originate from outside the influence of

the County. Losses have been attributed to nutrients and water flows from the mainland or from ocean/gulf currents. Warming ocean temperatures associated with global climate change have been identified as a major factor in coral bleaching. Solutions will require action on local, regional, and global scales, many of which are out of the control of the County. However, the water quality provisions discussed in the next section are in the control of the County and it is anticipated that, under these provisions, nearshore water quality will be improved.

3.22.1.4.3 Effects of Future Land Uses on Mangroves

No documented reports of mangrove losses in the Keys have been due to poor water quality. However, they are sensitive to herbicides, petroleum products, and heavy sediment loads. Most of the County's mangroves are protected in federal or State parks, preserves, or refuges. The FKNMS Management Plan provides the basis for future federal, State, and local conservation activities affecting the resources of the FKNMS, including its mangrove forests. The Plan identifies the regulatory strategies and responsibilities for resource protection. It includes a public education program for mangrove conservation.

Current LDRs limit the alteration of fringing shoreline mangroves along much of the Keys' unaltered open water shorelines and along altered shorelines and shorelines of artificial waterways. The LDRs, as well as State and federal regulations, specify the heights and amount of mangrove trimming that is allowed by exemption or by permit.

3.22.1.5 Effects of Future Land Uses on Water Quality [Rule 9J-5.012(2)(d), F.A.C.]

Point source discharges have reduced significantly since the mid-1970s. Wastewater point source discharges were reduced from 70 in 1974 to five in 2010. With the waters in the Florida Keys being designated as Outstanding Florida Waters (OFW), it is more difficult to meet the higher standards and obtain point source discharge permits. Dischargers are opting for alternative disposal methods such as regional facilities using deep well injection. As regional domestic wastewater facilities come on line, developed properties within the service region will be required to connect to the new facilities, reducing the use of septic tanks. Further, Senate Bill 550 amended Chapter 381, F.S. to ensure the proper management of OSTDS. The new law requires documented inspections and stricter discharge standards. Along with the reduction of point source discharges as a result of regional facilities, and the maintenance and repair of OSTDS systems that remain, the law will play a role in improving the water quality in the County.

Other potential sources of water quality degradation are landfills, marinas, live-aboard vessels, pesticide application, and stormwater runoff. The County has no active landfills. Monitoring of the inactive sites has not identified any leaching into marine waters. However, continued monitoring will allow the implementation of remedial actions if problems are discovered. Wastewater generated from live-aboard vessels can result in localized water quality degradation. Enforcement of the Clean Vessel Act prohibiting the discharge of raw sewage from live-aboard vessels in conjunction with the No Discharge Zone designation prohibiting discharge of sewage into all waters of the FKNMS resulted in

the use of pump-out facilities. The pump-out facilities will also result in improvements to water quality at marinas. The application of pesticides is currently regulated by the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA); however, in 2011, an NPDES permit will be required for the discharges of biological and chemical pesticides that result in a residue in State waters. Although much of the development in the Keys occurred prior to the implementation of stormwater treatment criteria, discharges of stormwater runoff from new or modified facilities must meet the OFW receiving water standards, which will protect and improve the water quality in the Keys.

3.22.2 *Effects of Future Land Uses on Historic Resources* [Rule 9J-5.012(2)(c), F.A.C.]

All of the Keys are located within the coastal area. Therefore, the effects of future land use on historic resources in the coastal area are identical to those identified in *Chapter 2.0 Future Land Use Element*.

3.22.3 Effects of Future Land Uses on the Built Environment

All of the Keys are located within the coastal area. Therefore, the effects of future land uses on the Built Environment are identical to those identified in the Traffic Circulation Element; Ports, Aviation and Related Facilities Element; Solid Waste Element; Sanitary Sewer Element; and the Drainage Element.

3.23 Natural Disaster Planning [Rule 9J-5.012(2)(e), F.A.C.]

3.23.1 Hurricane Evacuation Planning [Rule 9J-5.012(2)(e)1., F.A.C.]

3.23.1.1 Introduction

A guiding principle of growth management and comprehensive planning is the protection of the public health, safety, and welfare. The most common catastrophic threat to public safety in the coastal areas of the Florida is the potential loss of life and property from storm surge, flooding, and high winds associated with hurricanes. Nowhere in Florida is this hurricane threat as grave as it is in the Florida Keys due to the 112-mile long evacuation route, plus the potential for near total inundation by the hurricane storm surge. The severity of the threat is such as to preclude any policy option other than evacuation to the mainland, particularly when faced with a Category 3 to 5 hurricane.

On September 7, 2005, Executive Order 05-178, created the Coastal High Hazard Study Committee. The Committee was charged with studying and formulating recommendations for managing growth in coastal high hazard areas. Legislation passed in the 2006 Session encompassed many of the Committee's recommendations. Rule 9J-5.012(3)(b)6. and 7., F.A.C. require objectives in the Comprehensive Plan to direct population concentrations away from known or predicted coastal high hazard areas and maintenance or reduction of hurricane evacuation times. The State's Department of Emergency Management manages

the update of studies, ensures they are done consistently, and ensures that the methodology used for modeling storm surge is that used by the National Hurricane Center. Section 163.3178(9)(c), F.S. requires that "No later than July 1, 2008, local governments shall amend their future land use map and coastal management element to include the new definition of coastal high-hazard area and to depict the coastal high-hazard area on the future land use map."

The County's specific emergency response procedures are detailed in the Monroe County Comprehensive Emergency Management Plan (CEMP) (November 2007). This plan outlines the procedures and protocols for coordinating emergency response and evacuation procedures, and is incorporated in this Conservation and Coastal Management Element by reference. However, it is not discussed in detail in this section because the procedures contained in the plan are periodically updated and refined to ensure that emergency response procedures remain current, flexible, and sufficient to meet the demands of a storm event.

3.23.1.2 Hurricane Vulnerability

The County's subtropical location, extensive shoreline, and proximity to the Caribbean Sea in an area of high hurricane activity make it among the most hurricane vulnerable areas in the United States. Hurricanes are defined as tropical cyclonic disturbances with winds in excess of 74 miles per hour. Most hurricanes form between 5 and 20 degrees latitudes in all tropical oceans except the South Atlantic and eastern South Pacific (Monroe County Department of Emergency Management, 1991). Hurricanes are most common in the County in September and October, although they have occurred in all months between June and December. One of the greatest threats posed by hurricanes are their erratic and irregular tracks, making prediction of landfall difficult. Between 1886 and 1987, 43 tropical storms of hurricane intensity have passed within 125 miles of Marathon, with an average of one storm within a 125 mile radius every 2.4 years. Since 1987, there have been several active hurricane seasons. From 1998 through 2009, hurricanes that have required evacuations or required declaration of a State of Local Emergency in Monroe County include Hurricane Georges (1998), Hurricane Floyd (1999), Hurricane Irene (1999), Hurricane Ivan (2004), Hurricane Dennis (2005), Hurricane Rita (2005), Hurricane Wilma (2005), Hurricane Ernesto (2006), Tropical Storm Fay (2008), Tropical Storm Gustav (2008), and Tropical Storm Ike (2008). Of the 43 recorded hurricanes that have occurred within 125 miles of Marathon between 1886 and 1987, 22 have been classified as major (Category 3, 4, or 5) on the Saffir-Simpson Scale, which measures hurricane intensity based upon wind speed and barometric pressure).

Category	Central Barometric Pressure (millibars)	Central Barometric Pressure (inches)	Wind Speed (MPH)	Wind Speed (Knots)	Likely Damage
1	>980	>28.94	74-95	64-83	Minimal
2	965-979	28.50-28.91	96-110	84-96	Moderate
3	945-964	27.91-28.47	111-130	97-113	Extensive
4	920-944	27.17-27.88	131-155	114-135	Extreme
5	<920	<27.17	>155	>135	Catastrophic

Source: Monroe County Department of Emergency Management

Damage caused by hurricanes can be divided into three categories: wind damage, storm surge and inland freshwater flooding. The most devastating damage is caused by storm surge. Storm surge is responsible not only for a large proportion of coastal property damage, but also for 90 percent of hurricane-caused deaths. Storm surge occurs along a 40 to 50 mile long dome of water caused by high winds near the storm's center that can strike the coast near where the eye, or center, of the hurricane makes landfall. Storm surge is the height of water above normal tide level, with wind-driven waves super-imposed on the surge. Storm surge is caused when water that is displaced by wind-driven water on the surface can no longer be dissipated because of the shallow depths near shore, so that water builds up and moves with the storm as it approaches land. The island nature of the Keys and large areas of coastline along Florida Bay, the Gulf of Mexico, and the Atlantic Ocean make the County vulnerable to the impacts of storm surge from major water bodies.

The storm surge associated with any one storm is difficult to predict, since the surge is a factor of the strength of the hurricane, its direction and speed, and the tide period when it makes landfall. To predict the possible effects of storm surge, the National Hurricane Center has developed a complex computer model known as SLOSH (Sea and Lake Overland Surge from Hurricanes). The SLOSH model maps for the County are valuable for indicating areas that may be affected by storm surge. However, they cannot be used as predictive tools for identifying areas that would be impacted by a particular storm event.

The Hurricane Vulnerability Zone is defined by Rule 9J-5.003, F.A.C. as:

> "…areas delineated by the regional or local hurricane plan as requiring evacuation. The hurricane vulnerability zone shall include areas requiring evacuation in the event of a 100-year storm or Category 3 storm event".

This definition would place the entire County, including the mainland, in the Hurricane Vulnerability Zone. The mainland is included because it serves as part of the Lake Okeechobee drainage basin, and flooding is anticipated if the lake was impacted by a hurricane.

3.23.1.3 Hurricane Evacuation Considerations

The County uses a staged/phased evacuation approach that takes into account the type of evacuee (tourists, mobile home residents, permanent residents, etc.) and five geographic evacuation zones. The actual timing and sequence of the evacuation by zones varies depending on the characteristics of the individual storm.

3.23.1.3.1 Number of Persons Requiring Evacuation

As a result of the entire County being located within the Hurricane Vulnerability Zone, the population at risk is defined as all county residents and seasonal population. This "functional population" is the basis of the calculation of hurricane evacuation clearance times for the County. As reported in Demographic Analysis for the Statewide Regional Evacuation Study, the estimated population of Monroe County (site built homes, mobile homes, and hotel-motel units) in 2006 was 83,081.

3.23.1.3.2 Evacuation Routes

One of the most critical parts of a hurricane evacuation is the route to be used by evacuees. From Key West to Key Largo (MM 106), U.S. 1 provides the only route out of the County. At MM 106, partial diversion of the traffic to SR 905 (Card Sound Road) can occur.

3.23.1.3.3 Transportation and Hazard Constraints on the Evacuation Routes

Many portions of both U.S. 1 and Card Sound Road are low-lying, and therefore prone to flooding. There are many points along U.S. 1 between MM 7.5 and MM 112.6 that are below 7 feet National Geodetic Vertical Datum (NGVD). The presence of these low points necessitates early evacuation of the County in advance of the arrival of a hurricane.

3.23.1.3.4 Evacuation Times

Hurricane evacuation clearance time in the County, as determined by modeling efforts, is one of the key factors used to control growth within the County, as required by Chapter 28-20.140 F.A.C. Clearance time is defined as, "…the time required to clear the roadways of all vehicles evacuating in response to a hurricane situation. Clearance time begins when the first evacuating vehicle enters the road network and ends when the last evacuating vehicle reaches its destination."[12]

Based upon the current policies established in the *2010 Comprehensive Plan*, the County must achieve evacuation clearance within 24 hours. Since development of the initial Miller Model in 2000, the County amended the comprehensive plan, adding Policy 216.1.8, which requires phased evacuation with visitors leaving 48 hours, mobile home residents leaving 36 hours, and permanent residents leaving 30 hours in advance of tropical storm winds in a Category 3-5 storm.

[12] Ewing, R. *Monroe County Hurricane Evacuation Clearance Time – Final Report*, September 17, 2010.

Clearance time modeling, through various iterations of the *Lower Southeast Florida Hurricane Evacuation Study*, prepared by Post, Buckley, Schuh & Jernigan, Inc. (PBS&J), has been conducted for the County since the early 1990s. In 2000, pursuant to the requirements of the County's Work Program (see **Section 2.2.7**), Miller Consulting developed *The Florida Keys Hurricane Evacuation Model* (the "Miller Model") to "…measure and analyze the unique characteristics of the Florida Keys and to determine the clearance time required to evacuate the Florida Keys up to Florida City, based upon existing US 1 conditions." This model is based on the number of dwelling units and capacity of roadway links.

In November of 2009, County staff, municipal representatives, DCA and other State of Florida agencies attended a Hurricane Modeling Work Group meeting to develop various assumptions to be used in the hurricane evacuation modeling. Two assumptions used previously in the modeling effort have been substantially changed since the initial model was developed, including the original participation rates and flow rates, which are: 1) 70 percent participation (meaning 70 percent of the people would evacuate) and 2) maximum FDOT capacity of roadways.

During 2010, two substantial modeling efforts were completed:

- *The Florida Keys Hurricane Evacuation Model*

The County, with the DCA participation, commissioned an update to the original *Florida Keys Hurricane Evacuation Study* commonly known as "The Miller Model". In 2008, the DCA retained Professor Earl Baker at Florida State University to conduct a survey of residents in unincorporated Monroe County regarding whether or not they would evacuate their homes if mandatory evacuation notices were issued for Category 3-5 hurricanes. The results indicate that close to 90 percent of those surveyed would evacuate. In June 2010, Dr. Brian Wolshon, P.E. of Louisiana State University and Joaquin Vargas, P.E., of Traf Tech Engineering, Inc, (for FDOT) provided revised traffic flow rates. Dr. Reid Ewing, Ph.D., Professor of City and Metropolitan Planning at the University of Utah, conducted a modeling effort, using the Miller Model, to accommodate phased evacuation, the FDOT 5-Year Work Program roadway projects, as well as updated participation rate and traffic flow rate assumptions to determine projected clearance time results.

Pursuant to Rule 28-20.140 F.A.C. (see below), this model will serve as the tool DCA uses to evaluate comprehensive plan amendments that propose increases in density and intensity; the County's annual ROGO allocations that affect build-out; and the mandatory 24-hour evacuation requirement under Chapter 380.0552(9)(a)(2), F.S.

- *The South Florida Regional Hurricane Evacuation Study*

The South Florida Regional Planning Council (SFRPC), with the assistance of the FDOT, PBS&J and Miller Consulting, Inc., finalized a regional evacuation study that includes

Miami-Dade, Broward, and Monroe Counties to model hurricane evacuation from a regional perspective, assuming multi-county evacuation at the same time. Although hurricanes are a prominent concern in the study, the study includes an "all hazards" analysis to prepare for other types of evacuations as well, such as inland flooding or wildfires.

As it pertains to Monroe County, according to the SFRPC, *The South Florida Regional Hurricane Evacuation Study,* completed in 2006, is to be considered an operational tool that highlights weaknesses which need to be addressed in the regional evacuation system. Over 13,000 scenarios were run, identifying needs, such as traffic bottle necks, that could be incorporated into the FDOT District *Long Range Transportation Plan*. It is also an emergency management tool as it relates to planning for the placement and distribution of equipment and personnel to address an evacuation event. In addition, there is associated software available that would enable emergency managers to run their own scenarios for emergency management planning purposes.

The summary results of these two models are provided below:

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The Florida Keys Hurricane Evacuation Model (The Miller Model), Summary Results

	Low Occupancies (2001) Occupancy by Zone 1=67%; 2=54%; 3=47%; 4=35%; 5=46%; 6=52%; 7=27%		**High Occupancies (2008)** Occupancy by Zone 1=84%; 2=67%; 3=59%; 4=44%; 5=58%; 6=65%; 7=34%	
	Low Participation Approx. 70%	High Participation Approx. 90-95%	Low Participation Approx. 70%	High Participation Approx. 90-95%
2001 Lanes/2001 Miller Flow Rates	16 hours 16 minutes	18 hours 50 minutes	18 hours 32 minutes	22 hours 6 minutes
2001 Lanes/2010 FDOT Flow Rates	18 hours 58 minutes	22 hours 28 minutes	22 hours 8 minutes	27 hours 2 minutes
2015 Lanes/2010 FDOT Flow Rates	16 hours 16 minutes	16 hours 16 minutes	16 hours 16 minutes	18 hours 40 minutes
2015 Lanes/2010 FDOT Flow Rates (without outbound shoulder from mm 90 to mm 106)	16 hours 16 minutes	17 hours 16 minutes	17 hours 4 minutes	20 hours 16 minutes

Source: Ewing, R. *Monroe County Hurricane Evacuation Clearance Time – Final Report*, September 17, 2010.

The South Florida Regional Hurricane Evacuation Study, Summary Results

Evacuation Scenario	**Assumptions**	**Clearance Time (Hours)**
2005 Baseline	▪ Simultaneous evacuation of tourist, mobile home residents and permanent residents ▪ 100% evacuation participation rate for all units types	37.5 hours
2005 Baseline incorporating Phased Evacuation of Tourists and Mobile Home Residents (Test Scenario 1)	▪ Only the effect of permanent resident evacuation on clearance time is measured. Tourists and mobile home residents are taken out of the evacuation in accordance with Monroe County's adopted phased evacuation plan. ▪ 100% evacuation participation rate for permanent residents	23.6 hours
Monroe County Phase Evacuation with miller Model Participation Rates (Test Scenario 8)	▪ Only permanent resident evacuation is measured ▪ 75% evacuation participation rate for permanent residents	18.2 hours

Source: 2006 South Florida Regional Hurricane Evacuation Traffic Study.

The evacuation clearance times in the updated Miller Model range from 16 hours, 16 minutes to 27 hours, two minutes. Evacuation clearance times in the Regional Study ranges from 18 hours, two minutes to 37 hours, five minutes. The distinctions between the models are explained in the *Monroe County 30-Day Report 2010,* (page 3) and the draft Rule 28-20.140 F.A.C. (see below). The DCA notes that for regulatory purposes, Monroe County, as an Area of Critical State Concern, is to follow the requirements specified within Rule 28-20.140 F.A.C.

The Rule outlines various tasks to be achieved relative to hurricane evacuation. They are:

- *By July 1, 2012, Monroe County shall enter into a memorandum of understanding with the Department of Community Affairs, Division of Emergency Management, Marathon, Islamorada, Key West, Key Colony Beach, and Layton after a notice and comment period of at least 30 days for interested parties. The memorandum of understanding shall stipulate, based on professionally acceptable data and analysis, the input variables and assumptions, including regional considerations, for utilizing the Florida Keys Hurricane Evacuation Model or other models acceptable to the Department to accurately depict evacuation clearance times for the population of the Florida Keys.*

- *By July 1, 2012, the Florida Keys Hurricane Evacuation Model shall be run with the agreed upon variables from the memorandum of understanding to complete an analysis of maximum build-out capacity for the Florida Keys Area of Critical State Concern, consistent with the requirement to maintain a 24-hour evacuation clearance time and the Florida Keys Carrying Capacity Study constraints. This analysis shall be prepared in coordination with the Department of Community Affairs and each municipality in the Keys.*

- *By July 1, 2012, the County and the Department of Community Affairs shall update the data for the Florida Keys Hurricane Evacuation Model as professionally acceptable sources of information are released (such as the Census, American Communities Survey, Bureau of Economic and Business Research, and other studies). The County shall also evaluate and address appropriate adjustments to the hurricane evacuation model within each Evaluation and Appraisal Report.*

- *By July 1, 2012, the Department of Community Affairs shall apply the derived clearance time to assess and determine the remaining allocations for the Florida Keys Areas of Critical State Concern. The Department will recommend appropriate revisions to the Administration Commission regarding the allocation rates and distribution of allocations to Monroe County, Marathon, Islamorada, Key West, Layton and Key Colony Beach or identify alternative evacuation strategies that support the 24-hour evacuation clearance time. If necessary, the Department of Community Affairs shall work with each local government to*

amend the Comprehensive Plans to reflect revised allocation rates and distributions or propose rule making to the Administration Commission.

3.23.1.3.5 Projected Impact of the Anticipated Population Density Proposed in the Future Land Use Element

Population is one of several factors that impacts hurricane evacuation and clearance time. If all other factors are kept the same (capacity of roadway links, behavior of evacuees, storm characteristics, phasing of evacuation, etc.), a higher population will increase clearance time, and a lower population will decrease clearance time. The ability to safely evacuate residents and visitors in advance of an approaching hurricane is paramount. Thus, growth as managed through the Rate of Growth Ordinance (ROGO) allocations of housing units, should not exceed the point where the ability to safely evacuate the Keys is compromised. This would mean that once a certain population/housing unit count is reached, it would not be safe to allow additional population/housing units.

3.23.1.3.6 Special Needs of the Elderly, Handicapped, Hospitalized, or other Special Needs of the Existing and Anticipated Populations

Monroe County Social Services has a Special Needs Registry Program that offers assistance to persons with special needs living in the Keys during evacuation and sheltering. Registered persons are those persons who have requested transportation assistance in the event of an evacuation, including handicapped and transportation-disadvantaged persons. As of mid-2005, the Special Needs Registry includes approximately 363 people enrolled in the Special Needs Hurricane Evacuation Program due to age, medical condition, or other factors and require assistance from the County to evacuate during an emergency (Source: Monroe County Local Mitigation Strategy, November 2005, Chapter 2).

Live-aboards are a special hurricane evacuation issue. Live-aboard vessels are generally not capable of surviving a major hurricane, and many vessels do not have the ability or necessary speed to move from predicted hurricane impact zones. Occupants of live-aboard vessels may not have a vehicle to evacuate by U.S. 1. The evacuation plan should contain provisions for safe evacuation of live-aboards.

3.23.1.3.7 Measures that the Local Government Could Adopt to Maintain or Reduce Hurricane Evacuation Times

The evacuation plan should be monitored and updated periodically to reflect changes in the size and distribution of the population, empirical data from actual hurricane evacuations, changes in roadway capacities, and other data. The staged/phased evacuation plan can be optimized to maintain or reduce evacuation times.

3.23.1.4 Hurricane Shelters

While County policy mandates that 100 percent of County residents and visitors be evacuated to the mainland prior to arrival of a Category 3 or greater hurricane, and evacuation is a wise action in the face of any hurricane threat, shelter and refuge must be provided as a contingency for those who may not leave. In addition, shelters within the County must be provided during less severe Category 1 and 2 storms. During Category 3 or greater storm events, these shelters will not be opened as shelters. For those remaining who are unable to leave or who choose not to leave after an evacuation order, Refuges of Last Resort are opened. The locations of these facilities are announced at a predetermined time prior to the onset of tropical storm force winds. These facilities are not publicized until the time of their opening.

The locations of and approximate capacities of existing hurricane shelters available for County residents are:

Location	Capacity
Key West High School: 2100 Flagler Ave., Key West	352
Sugarloaf Elementary School: Crane Blvd., MM 19	307
Stanley Switlik Elementary School: U.S. 1 Gulfside, MM 48.5	280
Coral Shores High School: U.S. 1 Oceanside, Plantation Key, MM 90	236
Back-Up Shelters Only	
St. Justin Catholic Church: U.S.1 Gulfside, Key Largo, MM 105.5	136
Ponciana School: 1407 Kennedy Drive, Key West	248

These shelters are for Category 1 and 2 storms for residents of Monroe County including Ocean Reef. For Category 3, 4, and 5 storms, the general public shelter is located out of the County at Florida International University in Miami-Dade County (Source: Monroe County Emergency Management, June 9, 2010 and June 23, 2010).

As of mid-2005, the Special Needs Registry includes approximately 363 people enrolled in the Special Needs Hurricane Evacuation Program due to age, medical condition, or other factors and require assistance from the County to evacuate during an emergency (Source: Monroe County Local Mitigation Strategy, November 2005, Chapter 2). Special Needs are evacuated to Florida International University for all hurricane intensity categories. They are not sheltered within the County. The Florida International University Recreation Center can accommodate 787 general population evacuees or 262 special needs evacuees.

3.23.2 Coastal High Hazard Area [Rule 9J-5.012(2)(e)3., F.A.C.]

In response to the impacts noted during the 2004 and 2005 hurricane seasons, State legislation was passed (HB 1359 amending portions of Chapter 163, F.S.) that identified new hurricane evacuation planning requirements and a new definition of the Coastal High Hazard Area (CHHA). The new definition of the CHHA is "the area below the elevation of the Category 1 storm surge line as established by a Sea, Lake and Overland Surges from Hurricanes (SLOSH) computerized storm surge model" (Section 163.3178(2)(h), F.S.). The

State of Florida Division of Emergency Management obtained grant money through the Federal Emergency Management Agency's (FEMA) Hazard Mitigation Grant Program and charged the Regional Planning Councils to conduct regional evacuation modeling and studies across the State, including modeling and boundary mapping for the CHHA.

The South Florida Regional Planning Council is currently undertaking SLOSH modeling for the Miami-Dade, Broward, and Monroe County region which will delineate the storm tide limits. The current CHHA boundary is shown on **Map Series 3.7**. The information in the subsections below is based on the current SLOSH model and the current CHHA maps, and may require update after release of the boundary maps by the SFRPC.

3.23.3 Existing Infrastructure within the Coastal High Hazard Area

3.23.3.1 Roadways

U.S. 1, the primary roadway of the Florida Keys, extends from the Miami-Dade County line to Key West. For most of its length, this roadway is of sufficient elevation to be located out of the CHHA. However, a number of low points are located below 7 feet NGVD in elevation and thus are subject to flooding [see Section 3.23.1.3 (Hurricane Evacuation Considerations)]. In addition, there are 41 bridges totaling 19 miles in length on the unincorporated portion of the County connecting the many keys (see *Chapter 4.0 Traffic Circulation Element*). Although the roadway surface of theses bridges is elevated above the CHHA, their support structures are not.

Because of its role as a link between U.S. 1 and outlying residential areas, much of the county road network is located within the CHHA. Card Sound Road is a county road which provides an alternate route to U.S. 1 connecting CR-905 on North Key Largo with the mainland. The County road system includes 37 bridges totaling 1.6 miles in length. The longest of these bridges is the Card Sound Bridge which connects North Key Largo with the mainland.

3.23.3.2 Potable Water Facilities

The primary transmission main connecting the Florida City Wellfield in Miami-Dade County with the County runs the length of U.S. 1 to Key West. This main is buried on land and runs along the sides of the bridges connecting the keys. This main is connected to a series of storage and pumping facilities and a separate network of small distribution lines serving developed portions of the Keys, including areas within the CHHA. Recent water main installations have been buried as a means of hazard mitigation. Chapter 122 (Floodplain Management) of the Monroe County LDRs requires that new or replacement water supply systems in areas of special flood hazard (the 100-year floodplain, a more extensive area than the CHHA) be installed in accordance with the methods and practices that minimize flood damage.

3.23.3.3 Sanitary Sewer Facilities

Developed areas within the CHHA are served by a variety of wastewater facilities including community sanitary sewer collection and treatment facilities. Privately owned and maintained OSTDS include septic tank systems and cesspools, and package treatment plants. Chapter 122 (Floodplain Management) of the Monroe County LDRs requires that new or replacement sanitary sewer systems installed in areas of special flood hazard be constructed to minimize infiltration of floodwaters into the system and discharge from the system into floodwaters.

3.23.3.4 Man-Made Drainage Facilities

For the most part, developed as well as undeveloped portions of the County within the CHHA are not served by man-made drainage facilities. The SFWMD has issued permits for residential, commercial, and roadway projects allowing stormwater discharge to the Gulf of Mexico, Florida Bay, and Atlantic Ocean (see *Chapter 11.0 Drainage Element*).

3.23.3.5 Shore Protection Structures

Public shore protection structures in the County include structures located near bridges and at other locations along U.S. 1 which are maintained by FDOT. Groins have been constructed at the Bahia Honda State Recreation Area Beach to control erosion. Private shoreline structures including riprap and vertical bulkheads have been constructed throughout the Keys, especially along manmade water bodies. The County does not currently permit hardened vertical structures which are damaged beyond repair to be replaced with sloping revetment structures. Beach and dune erosion and accretion trends including the effects of shore protection structures are discussed in Section 3.10 (Beach/Berm Communities).

3.23.4 Post-Disaster Redevelopment [Rule 9J-5.012(2)(e)2., F.A.C.]

Post-disaster redevelopment refers to the short- and long-term actions that will be taken to recover from the effects of a natural or man-made disaster which results in extensive damage to property. Planning for post-disaster redevelopment is of paramount importance in the County because a large percentage of the County's land area is located within the CHHA and thus is vulnerable to hurricane damage from a relatively minor (Category 1) hurricane. More intense hurricanes would have higher storm surges and thus would likely inundate a larger area, resulting in more extensive damage. Closely related to post-disaster redevelopment planning is hazard mitigation, which refers to the implementation of programs prior to the occurrence of a natural or manmade hazard which serves to avoid or reduce the probability of a disaster occurrence (loss of life or property).

3.23.4.1 Existing Land Use in the Coastal High Hazard Area

The majority of land within the CHHA is either owned for conservation purposes or is vacant. Much of the existing development in the County is concentrated along U.S. 1 in areas that are located outside of the CHHA. However, a significant portion of the CHHA is developed for a variety of uses including residential (single-family detached homes, mobile homes, multi-family apartments, and mixed-use residential areas), commercial (general commercial, tourist commercial, and commercial fishing), institutional, public, and military uses.

3.23.4.2 Structures with a History of Repeated Damage in Coastal Storms

Data provided by FEMA to the Florida DCA identifies properties that are, or have been, insured by the National Flood Insurance Program and that have received two or more claims of at least $1,000. Within unincorporated Monroe County there are 161 repetitive loss properties (based on data as of October 2003). The cumulative payments (claims paid on building damage and on contents damage) range from just over $2,000 to more than $238,000 (Source: Monroe County Local Mitigation Strategy, November 2005).

3.23.4.3 Proposed Land Use in the Coastal High Hazard Area

Because of the low-lying nature of the Keys, approximately a large percentage of the County is located within the CHHA. The area outside of the CHHA is largely confined to a linear zone along much of U.S. 1.

Future development throughout much of unincorporated Monroe County, including the areas within the CHHA, is controlled by ROGO and the Tier Overlay Ordinance. Points are deducted to discourage development in environmentally sensitive areas. In addition, points are deducted on applications that propose development within a "V" flood zone on the FEMA flood insurance rate maps. Proposed future land uses in the CHHA are identified in *Chapter 2.0 Future Land Use Element*.

3.23.4.4 Hazard Mitigation Measures

In the State Mitigation Plan, the Florida DCA uses six general categories or approaches to mitigation. These are summarized in the County Local Mitigation Strategy, November 2005.

Preventive measures keep problems from getting started or getting worse. When hazards are known and can be factored in to development decisions early in the process, risks are reduced and future property damage is minimized. Building, zoning, planning, and/or code enforcement officials usually administer these activities:

- Planning and zoning;
- Open space preservation;

- Building codes and enforcement; and
- Infrastructure design requirements.

Property protection measures are actions that go directly to permanently reducing risks that are present due to development that pre-dates current codes and regulations and include:

- Property acquisition in floodplains;
- Relocation out of hazard-prone areas;
- Elevation of structures in floodplains; and
- Retrofit of structures in high wind zones.

Emergency services measures are taken immediately before or during a hazard event to minimize impacts. These measures are the responsibility of city or county emergency management staff, operators of major and critical facilities, and other local emergency service organizations and include:

- Alert warning systems;
- Hazard/weather monitoring systems;
- Emergency response planning;
- Evacuation;
- Critical facilities protection; and
- Preservation of health and safety

Structural projects are usually designed by engineers and managed and maintained by public entities. They are designed to reduce or redirect the impact of natural disasters (especially floods) away from at-risk population areas:

- Levees, floodwalls, dunes, and berms;
- Drainage diversions; and
- Stormwater management facilities.

Natural resource protection projects preserve or restore natural areas or their natural functions. Park and recreation organizations, conservation agencies or wildlife groups may implement such measures:

- Wetland protection or restoration;
- Beach and dune protection; and
- Erosion and sediment control.

Public information programs advise property owners, potential property owners, and others of prevalent hazards and ways to protect people and property. A public information office usually implements these activities, often with private partner support:

- Flood maps and data;
- Public information and outreach;
- Technical assistance for property owners;
- Real estate disclosure information; and
- Environmental education programs.

The County and the cities all have ongoing programs and activities that contribute to disaster resistance even if those actions were not initiated in response to the Local Mitigation Strategy process. For example, every jurisdiction issues building permits and administers a floodplain management ordinance. New buildings and infrastructure must comply with current Florida Building Code and regulations which are deemed to be sufficient to minimize future damage due to hurricanes, high winds and flooding. Every jurisdiction maintains its roads, which reduces the likelihood of washout damage. The County and the cities participate in public information and outreach, encouraging residents and visitors to be aware of the potential for hurricanes, and to be aware of the actions to take to reduce property damage and to facilitate safe evacuation. Similarly, the utilities have on-going responsibilities intended to reduce the impacts of natural hazards. The Florida Keys Aqueduct Authority has contingencies for drought. The Florida Keys Electric Cooperative, the Key West City Electric System, and Florida Power and Light take steps to minimize damage to their infrastructure and distribution systems to be able to recover as quickly as possible after hurricanes.

3.23.4.5 Post-Disaster Redevelopment

Immediately following the passage of a hurricane or other disaster occurrence, the focus of governmental agencies shifts from evacuation and shelter to recovery. Post-disaster recovery operations consist of the following three stages:

- immediate safety and damage survey, including assessing the status of the remaining populations;
- immediate repair and cleanup actions and re-entry procedures for the population evacuated from the County; and
- long-term recovery including redevelopment.

During the first stage of post-disaster recovery operations, governmental agencies and utility companies conduct an initial survey of the damaged area to identify immediate safety and health concerns. Movement by the public may be restricted during this period and shelters remain open. Actions taken during this stage include the immediate removal of safety and health hazards and the initiation of search and rescue operations.

During the second stage of post-disaster recovery operations, local, State, and federal officials assess damage; assess the needs of the remaining population; and assist with marshalling resources to meet those needs. This stage will likely last from two to five days. During this period, the public may find that little food or other amenities are available and shelters may remain open.

The final stage of post-disaster recovery operations involves long-term rebuilding and redevelopment of damaged properties, a period which could last one year or longer. During this stage, the County will be responsible for the review and permitting of proposed redevelopment.

Planning for the first two stages of post-disaster recovery primarily involves intergovernmental coordination among federal, State, and local agencies; and interdepartmental coordination within the County government. The State of Florida has in place hurricane coordination procedures which prescribe immediate post disaster actions to be taken as well as procedures for damage assessment and disaster relief. These procedures, which are carried out in coordination with federal and local agencies, are constantly being updated and refined as deficiencies are identified. Examples of such deficiencies which are currently being investigated include prevention and control of post-disaster looters arriving by boat, the staging and availability of equipment for debris removal, and the stockpiling and disposal of debris. Because new issues continually arise and the best methods for addressing such issues may change, annual assessment and coordination of post-disaster is necessary. Such coordination is especially needed to involve agencies which do not normally address disaster preparedness in their day to day operations (e.g., the FDEP and the Monroe County Public Works Department). The County's Comprehensive Emergency Management Plan currently addresses coordination procedures during the period immediately preceding the occurrence of a hurricane. Equivalent coordination procedures for immediate post-disaster recovery operations should be implemented and reviewed on an annual basis.

The County formulated in August 2003, with the guidance of the SFRPC, a Post-Disaster Redevelopment Plan (PDRP) to address the short- and long-term stages of post-disaster redevelopment. The PDRP establishes goals, objectives, and policies for procedures and programs for immediate repair, replacement, and cleanup operations following a disaster and long-term rebuilding and redevelopment. The plan addresses immediate recovery activities such as search and rescue/fire suppression, emergency law enforcement, damage assessment, temporary housing, relocation of displaced residents, and debris removal. The PDRP also addresses the following issues related to long-term post-disaster redevelopment:

- Establishment of a post-disaster redevelopment task force to guide implementation of the PDRP;
- Establishment of permitting procedures which allow for an orderly process of reviewing private and public redevelopment proposals after a disaster. These procedures should specify coordination mechanisms required to implement permitting procedures (e.g., building inspector and other staff assistance programs) and criteria for distinguishing between minor and major repair and replacement;
- Procedures for the identification of damaged infrastructure and consideration of alternatives to its repair or replacement in the CHHA;

- Identification of particularly vulnerable areas within the CHHA (e.g., FEMA- designated V zones and repetitive loss areas). Measures should be implemented for such areas which encourage the relocation or replacement of infrastructure away from them and limit redevelopment following occurrence of a hurricane; and
- Procedures for the advance identification of redevelopment areas (e.g., any areas identified as being in need of redevelopment pursuant to the Florida Community Redevelopment Act, Chapter 163, Part III) and implementation of redevelopment plans for such areas upon damage or loss due to a natural disaster.

3.24 Public Access Facilities [Rule 9J-5.012(2)(g), F.A.C.]

Public access facilities are those which allow the public access to the beach or shoreline. The County's island configuration offers the public a variety of opportunities for physical or visual access to the beach and shoreline.

3.24.1 Existing Public Access Facilities

For the purposes of compiling the existing information on public access as required by Chapter 163.3178 F. S. and 9J-5.012(2)(g) F.A.C., it is necessary to establish basic definitions and criteria for the selection of these facilities as they are not only numerous but also varied in description throughout the County. "Public Access" is defined in 9J-5.003 F.A.C. as, " … the ability of the public to physically reach, enter or use recreation sites including beaches and shores." The definition of "public access" is not fully clear; therefore, for the purpose of this summary, the definition of this term will be: *"Any water-oriented facility available to the public in general either without fee or by use of a paid fee or by being a patron of the business that provides the facility."* The term "water-oriented" as used in this study means any facility that is actually on the water and controls the access to the water. The key element under this summary is the public's access to the water. For example, under this definition, John Pennekamp State Park would be a public access facility. It has boat ramps and as a State Park is classified as a public facility, but a fee is charged to enter the park and use the boat ramps. Another example would be a private business such as a camping resort with boat ramps: the public user would have to be a patron and/or pay a fee to use those boat ramps. This would also be a public access facility.

From these general terms, this summary has grouped the uses into six categories:

1. Marinas and Dockage;
2. Boat Ramps;
3. Fishing Piers and Boardwalks;
4. Public and Commercial Docks;
5. Beaches, Shorelines, and Waterfront Parks; and
6. Scenic Overlooks.

In total, there are 221 public and private facilities in unincorporated and incorporated areas which provide public access to the beach or shoreline (**Table 3.22**). The locations of these facilities are shown on the **Map Series 3.6**.

Table 3.22 – Public Access Facilities Summary

Category	Number of Facilities*				
	Mainland	Upper Keys	Middle Keys	Lower Keys	Total
Marinas & Dockage	1	38	5	21	65
Boat Ramps	3	29	9	24	65
Fishing Piers & Boardwalks	1	23	5	11	40
Public & Commercial Docks	1	3	0	0	4
Beaches, Shorelines, Waterfront Parks	1	22	6	15	44
Scenic Overlooks	1	0	0	2	3
Total	8	115	25	73	221

*Includes publicly-owned facilities plus privately-owned facilities which allow public access with a fee paid. Includes unincorporated and incorporated areas.

Each category is addressed below as to the type of facilities included and the general physical characteristics which define them. Only those facilities that occur within the unincorporated area of the County are reported, with the exception being any facility, within an incorporated city, that is owned by the Federal or State government, Monroe County, or by non-profit conservation groups such as The Nature Conservancy and Florida Keys Land and Sea Trust. Also included would be facilities that are owned and operated somewhat autonomously from the city governments (examples include The Boy Scouts and The Audubon Society). These government, non-profit, and related facilities are included because they generally provide regional public access from incorporated as well as unincorporated areas.

Marinas and Dockage: Included in this category are facilities that are licensed as a "marina", providing they have water access. The traditional larger boat-on-water storage docks and associated services such as gas, repair, parts, maintenance facilities, or utility hook-ups would be part of this end of the definition. On the lower end, any business facility, such as a campground, which advertises a "marina" on site, may only provide dock storage and limited utility hook-ups. These latter "marinas" might fall under the associated item of "dockage". Here the public may only be able to access the site by water and tie their boat up for a limited period of time. Because there is not a clear distinction between them, marinas and dockage are consolidated into a single category.

Boat Ramps: For this summary, if a particular site has more than one ramp, the both ramps were counted. Also ramps were counted without concern to available parking. The condition of the boat ramp was not taken in consideration. Some ramps are of proper concrete construction and grades and have designated trailer parking. Other ramps are no

more than areas where the public has used the land bank to push their boat into the water; these typically can service only small lightweight boats. If a private business, such as a resort, advertises a boat ramp as one of its amenities to it's guests, the ramps are included within this inventory. Privately-owned ramps that are not available to the public are not included.

Fishing Piers and Boardwalks: For fishing piers, these include docks or catwalks where no boats would be tied up but were directly over water. In the County there are old vehicle bridges that no longer serve vehicles but allow fishing from them. In a private business, if "fishing" is advertised separate from the dockage of boats, these are included in the inventory of these facilities. In the County, there are some sites that are generally natural conservation areas where a hiking or boardwalk system has been developed for the use of the public which winds through natural areas including over water or marsh. These "boardwalks" may not be traditional wood, but may be on grade trails as long as it traverses through water areas or natural marsh or flood prone areas.

Public and Commercial Docks: This category includes those dock sites in the County where commercial private boat charter businesses operate; and where the public, as the clients, would have access to these docks. Also included are those sites where the public traveling by boat could pull up and temporarily moor while using the adjacent facilities. An example of this would be a water side restaurant where patrons could arrive and depart by boat. This category is difficult to quantify without a physical inventory throughout the County to field-verify the data; however, the inventory included in this category, which is by no means exhaustive, was researched through internet and other research sources.

Beaches, Shorelines, and Waterfront Parks: These three elements have been grouped together because of their similar uses by the public. "Waterfront Parks" is easily counted as they are specific in their locations and ownership. Under the term "beaches" there is a wide range due to the character and geology of the County. Beaches range from tens of feet to miles in length and the geology ranges from native sands and limestone to imported sand on man-made beaches. If a private business, such as a resort, advertised a beach as an amenity, it was counted. "Shorelines" are difficult to define, especially since the County is almost entirely shoreline of some type. For the purposes of counting it in this category, a "shoreline" must be on the water, separate in ownership from any adjacent business, and defined as a site with some boundaries; generally this means a vacant and undeveloped parcel owned by a governmental agency.

Scenic Overlooks: This was indicated in 9J-5 as a category and for this summary it is counted separately from many of the other categories which might also offer scenic overlooks. This list includes sites that offer a scenic overlook but no other facilities (marinas, boat ramps, fishing piers, boardwalks, docks, beaches, etc). For example, some of the abandoned vehicle bridges, some of which the public can fish from, offer scenic overlooks directly out over the water. If the public can fish from them, then they were counted in the category of fishing piers. If not, then they are counted as scenic overlooks. The Florida Department of Transportation offers some pull off areas, or wayside parks (with no other facilities) along U.S. 1, SR 905, SR 905A, SR 4, and Card Sound Road; these

were counted as scenic overlooks. Because there are many informal areas that provide scenic overlooks, the reported number of scenic overlooks in this category is probably lower than the actual number, but a more accurate count would require extensive field investigation.

3.24.2 Coastal Roads and Facilities Providing Scenic Overlooks

3.24.2.1 Overseas Highway

While serving as the County's primary highway and major vehicular link to the mainland, the Overseas Highway (U.S. 1) also serves as one of the County's primary ways of providing public access to the scenery and natural beauty of the Florida Keys. For most of its 112 miles, stretching from the Miami-Dade County Line to Key West, U.S. 1 is within a half mile of the Atlantic Ocean, Florida Bay, or the Gulf of Mexico. The highway includes 42 bridges which provide panoramic views of the water and the Middle and Lower Keys. The highway has some small pull-off areas. For the most part, these pull-offs are informal rather than developed viewing areas. However, approaches to Bahia Honda and Long Key State Parks include designated pull-off areas.

3.24.2.2 Old Highway and Railroad Bridges

Along some portions of U.S. 1, the old highway and railroad bridges have been retained as fishing piers and viewing areas. These bridges allow pedestrian access to the water. Public access points are identified in **Table 3.23**.

Table 3.23 - Coastal Roads and Facilities Providing Scenic Overlooks

Location	Mile Marker	Planning Area	Overlook Facilities	Ownership/ Maintained
Lower Matecumbe Key-Craig Key	73	Middle Keys	Beach, parking, fishing	FDOT
Channel Two Catwalk	73	Middle Keys	Fishing area, parking	FDOT
Channel Five Catwalk- Long Key	71	Middle Keys	Fishing area, parking	FDOT
Fat Deer Key	53.5-56	Middle Keys	Fishing, parking, boat ramp	FDOT
Old Seven Mile Bridge / Sunset Park	40-47	Lower Keys	Fishing, parking	FDOT
Spanish Harbor Wayside Park	33	Lower Keys	Boat ramp. parking	FDOT
Big Pine Key- Old Wooden Bridge Marina	30.5	Lower Keys	Fishing areas, parking	FDOT
Little Torch Key (S.R. 4)	29	Lower Keys	Boat ramp	County
Kemp Channel Bridge	23.5	Lower Keys	Fishing area, parking	FDOT
Shark Key to Saddlebunch Key	11.5-15	Lower Keys	Boat ramp, parking	FDOT
Boca Chica	6.5	Lower Keys	Catwalk	FDOT

Source: Monroe County Growth Management Division.

3.24.3 Capacity of and Need for Public Access Facilities

The inventory of public access facilities in **Table 3.22** provides information on the number and type of existing public access facilities. A capacity analysis for sandy beach, boat ramps, and non-boat fishing facilities (see *Chapter 13.0 Recreation and Open Space Element*) determined a surplus of these facilities based on the current functional population.

There are no population-based standards to determine the capacity and need for other water-dependent public access facilities such as:

- public access points to the beach or shoreline through public lands;
- public access points to the beach or shoreline through private lands;
- parking facilities for beach or shoreline access;
- coastal roads and facilities providing scenic overlook;
- marinas; and
- public docks.

Future demand for public access facilities is discussed in *Chapter 13.0 Recreation and Open Space Element*.

3.25 Existing Infrastructure in the Coastal Area [Rule 9J-5.012(2)(h), F.A.C.]

The entire County is located within the coastal area. Therefore, existing infrastructure in the coastal area is identical to the infrastructure in the following Elements:

- *Chapter 4.0 Traffic Circulation;*
- *Chapter 6.0 Ports, Aviation and related Facilities;*
- *Chapter 8.0 Potable Water;*
- *Chapter 9.0 Solid Waste;*
- *Chapter 10.0 Sanitary Sewer; and*
- *Chapter 11.0 Drainage.*

3.26 Energy Conservation and Reduction of Greenhouse Gases [Rule 9J-5.013(1)(d) and (e), F.A.C.]

Monroe County recognizes that greenhouse gas emissions reductions are critical to avoiding the impacts of climate change globally. Pursuant to Section 163.3177(d)(d), F.S., a Conservation Element for the conservation, use and protection of natural resources of the area must include factors that affect energy conservation.

While the County has initiated an effort to start addressing greenhouse gas emissions through multiple actions, this section analyzes the natural resource factors that affect energy conservation. The remaing requirements of recent legislation related to the reduction of greenhouse gas emissions (HB 697 passed in 2008) are met through the required elements of the Comprehensive Plan. Because of Monroe County's unique resources and geography,

these issues will be addressed more fully in a new optional element of the Comprehensive Plan on Energy Conservation and Climate Change.

The County has a task force to provide recommendations to the BOCC for environmentally sound practices and techniques to protect the environment and to make recommendations on issues related to climate change. The Green Initiative Task Force was created on June 18, 2008 (*Resolution No. 177-2008*) by the Monroe County Board of County Commissioners. Originally called the Green Building Code Task Force, the name was officially changed with the adoption of *Resolution 121-2009* on April 15, 2009. The website is http://monroecofl.virtualtownhall.net/ Pages/MonroeCoFl_ExtenServ/GITF. Additionally, the County has recently received a grant from the Florida Energy and Climate Commission to begin energy conservation retrofits on its buildings.

3.26.1 Energy Reduction and Greenhouse Gas Emission Reduction

The County has signed the U.S. Mayor's Climate Protection Agreement. The County has also passed several resolutions, including Resolution 235-007 which established milestones to:

- conduct a greenhouse gas emissions inventory;
- establish a greenhouse gas emissions target;
- develop an action plan to meet the local greenhouse gas reduction target;
- implement the action plan; and
- monitor and report progress.

The first step towards developing an energy conservation program is development of a baseline of energy use and greenhouse gas emissions. Pursuant to that end, the County developed a 2005 baseline greenhouse gas inventory of County facilities. The Green Initiative Task Force recommended to the Board of County Commissioners on February 17, 2010 to set a target to reduce greenhouse gas emissions related to County operations by 20 percent by year 2020. The County is finalizing a communitywide greenhouse gas inventory and a recommendations document.

3.26.2 Land Use and Natural Resource Factors that Affect Energy Conservation and Reduction of Greenhouse Gases

A basic natural resource factor affecting energy conservation is the use of the land and preservation of it. Lands occupied by developed uses contain buildings and structures affecting use as well as infrastructure that requires energy consumption (e.g., lighting, air conditioning). This use of energy by occupied lands contributes to greenhouse gas emissions. Vacant but cleared lands generally do not have infrastructure that requires energy consumption, and these areas neither increase or decrease greenhouse gases. Lands that are occupied by vegetated natural resources generally do not have infrastructure that requires energy consumption, and the vegetation has some capacity to reduce greenhouse gases through carbon sequestration processes. Therefore, land uses that negatively affect energy use and conservation include developed lands, and land uses that beneficially affect

energy use and conservation include natural resources such as hammocks, pinelands, exotic vegetated dominated lands, and mangroves and other wetlands. These vegetation community types are quantified in Sections 3.9 (Wetlands) and 3.11 (Upland Vegetation). **Map Series 3.8** depicts the Energy Conservation Areas.

Land use and natural resource factors that improve energy conservation and reduce greenhouse gases include green initiatives such as:

- Conserving the remaining natural vegetated habitats, and reducing the amount of vegetation to be removed when a site is developed;
- Using native shade trees and landscaping to expand green spaces in scarified and developed areas;
- Instead of sod in turf grass lawns, easements, and rights-of-way; using native plants and trees to provide greater carbon sequestration;
- Using green (vegetated) roofs and other sustainability practices;
- Using local community gardens and local commercial urban farming operations – these provide carbon sequestration and reduce long-distance transportation of produce; and
- Using water conservation strategies (including but not limited to use of cisterns, stormwater on-site collection systems used for irrigation, and bio-swales) that reduce the demand for surface water treatment in the natural environment while maintaining the viability of freshwater wetlands and upland forested natural communities.

Implementing the Tier Overlay Ordinance, ROGO, and the other land development controls affect energy conservation. The shift of the County's land acquisition efforts in recent years to focus on the higher quality hammocks is a natural resource factor affecting energy conservation. Establishing a recurring funding source for effective long-term management of acquired lands can increase or maintain their carbon sequestration attributes.

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3.27 Literature Cited

Andrews, K., L. Nall, C. Jeffrey, and S. Pittman, 2008. The state of coral reef ecosystems of Florida. In: The State of Coral Reef Ecosystems of the United States and Pacific Freely Associated States. National Oceanographic and Atmospheric Administration. Technical Memorandum NOS NCC OS 73.

Alexander, T.R., 1953. Plant succession on Key Largo, Florida involving *Pinus caribaea* and *Quercus virginiana*. Quarterly Journal of the Florida Academy of Science 16:133-138.

Alexander, T.R. and J.D. Dickson, 1972. Vegetational changes in the National Key Deer Refuge, part II. Quarterly Journal of the Florida Academy of Science 35:85-96.

Antoine, J.W. and J.L. Harding, 1963. Structure of the continental shelf of northeastern Gulf of Mexico. Technical Report 63-13T, Department of Oceanography, Texas A&M University, College Station, Texas. 18 pp.

Antonini, G.A., L. Zobler, H. Tupper, and R. Ryder, 1990. Boat live-aboards in the Florida Keys: A new factor in waterfront development. Florida Sea Grant Report Number SGR-98, FLSGP-T-90-007. http://nsgl.gso.uri.edu/flsgp/flsgpt90007/flsgpt90007index.html.

Avery, G.N. and L.L. Loope, 1980. Endemic taxa in the flora of south Florida. South Florida Research Center Report T-558.

Baggett, H.D., 1982. Schaus' swallowtail. Pp. 73-74 in: Franz, R. (ed.). Rare and endangered biota of Florida, Volume six, Invertebrates. University Presses of Florida, Gainesville, Florida. 131 pp.

Ballantine, D., and H.J. Humm, 1975. Benthic algae of the Anclote Estuary I. epiphytes of seagrass leaves. Florida Scientist 38(3):150-162.

Barbour, T., and G.M. Allen. 1982. The white-tailed deer of eastern United States. Journal of Mammology 3:65-78.

Barbour, D.B., and S.R. Humphrey, 1982. Status and habitat of the Key Largo woodrat and cotton mouse (*Neotoma floridana smallii* and *Peromyscus gossypinus allapaticola*). Journal of Mammology 63(1):144-148.

Bergh, C., 2009. Initial Estimates of the Ecological and Economic Consequences of Sea Level Rise on the Florida Keys through the Year 2100, The Nature Conservancy, The Florida Reef Resilience Program, August 2009. http://www.frrp.org/SLR.htm.

Boesch, D.F., N.E. Armstrong, C.F. D'Elia, N.G. Maynard, H.W. Paerl, and S.L. Williams, 1993. Deterioration of the Florida Bay ecosystem: an evaluation of the scientific evidence. Report prepared for the Interagency Working Group on Florida Bay, sponsored by the National Fish and Wildlife Foundation, the National Park Service, and the South Florida Water Management District.

Boyer, J.N. and H.O. Briceño, 2008. 2008 Annual Report of the Water Quality Monitoring Project for the Water Quality Protection Program of the Florida Keys National Marine Sanctuary, Southeast Environmental Research Center, Florida International University, Miami, FL, http://serc.fiu.edu/wqmnetwork.

Braden, A.W., R.R. Lopez, C.W. Roberts, N.J. Silvy, C.B. Owen, and P.A. Frank, 2008. Florida Key deer *Odocoileus virginianus clavium* underpass use and movements along a highway corridor. Wildlife Biology 14:155-163.

Brand, L.E., 2002. The transport of terrestrial nutrients to south Florida coastal waters. Pages 361-414 *in* J.W. Porter and K.G. Porter, editors. The Everglades, Florida Bay, and Coral Reefs of the Florida Keys – An Ecosystem Sourcebook. CRC Press, Boca Raton.

Brown, L.N., 1978. Key Largo woodrat. Pp. 11-12 in: Layne, J.N. (ed.). Rare and endangered biota of Florida, volume one, Mammals. University Presses of Florida, Gainesville, Florida. 52 pp.

Camp, Dresser, and McKee, 2001. Monroe County Stormwater Management Master Plan, Vol. 1-2.

Carr, A.W., and C.J. Goin, 1955. Reptiles, amphibians and freshwater fishes of Florida. University of Florida, Gainesville, Florida. 341 pp.

Cazenave, A., A. Lombard, and W. Llovel, 2008. Present-day sea level rise: A synthesis. *Geoscience* , 761-770.

CH2M Hill, 2000. Monroe County Sanitary Wastewater Master Plan, Vol. 1-8.

Chafin, 2000. Field guide to the rare plants of Florida. Florida Natural Areas Inventory, Tallahasee, Florida.

Chester, R.H., 1974. Canal coral surve: Florida Keys. A Report for the Society for Correlation of Progress and Environment.

Chiappone, M., A. White, D.W. Swanson, and S.L. Miller, 2002. Occurrence and biological impacts of fishing gear and other marine debris in the Florida Keys. Marine Pollution Bulletin 44: 597-604. http://faculty.mdc.edu/mchiappo/ chiappone_et_al_2002_ florida_keys_marine_debris_mar_pollut_bull_44.pdf.

Church, J. A. and N.J. White, 2006. A 20th century acceleration in global sea-level rise. Geophysical Research Letters 33, L01602, doi:10.1029/2005GL024826.

Clark, J.R., 1977. Coastal ecosystem management. John Wiley & Sons, New York, New York.

Cook, C., 1997. Reef corals and their symbiotic algae as indicators of nutrient exposure. Final Report submitted to the Water Quality Protection Program as cited in Kruczynski, 1999. As cited in FEMA, 2000.

CSA, 1991. Water quality protection program for the Florida Keys National Marine Sanctuary: Phase 1 report (draft). Continental Shelf Associates, prepared for the U.S. Environmental Protection Agency, Atlanta, GA.

CUES, 2007. Monroe County Marina Siting Plan. Center for Urban and Environmental Solutions at Florida Atlantic University, April 2007. http://www.sfrpc.org/data/MCWorkWater/MonroeCountyMarinaSitingPlanFinal.pdf.

DCA, 2007a. Annual Assessment Report, Florida Keys Area of Critical State Concern, Work Program Year 10, July 13, 2006 – July 12, 2007. Florida Department of Community Affairs, September 28, 2007.

DCA, 2007b. Guiding the Way to Waterfront Revitalization: Best Management Practices, Florida Department of Community Affairs, June 2007. Available online at http://www.dca.state.fl.us/FDCP/DCP/waterfronts/Files/BPGuide.pdfhttp://www.dca.state.fl.us/FDCP/DCP/waterfronts/Files/BPGuide.pdf.

DCA, 2010. Florida Keys Area of Critical State Concern. 2010 Removal of Designation Report. Florida Department of Community Affairs, Division of Community Planning, Areas of Critical State Concern Section.

de la Cruz, A.A., 1982. The impact of crude oil and oil-related activities on coastal wetlands - A review. Proceedings of International Wetlands Conference, Delhi, India.

Donahue, S., A. Acosta, L. Akins, J. Ault, J. Bohnsack, J. Boyer, M. Callahan, B. Causey, C. Cox, J. Delaney, G. Delgado, K. Edwards, G. Garrett, B. Keller, G.T. Kellison, V.R. Leeworthy, L. MacLaughlin, L. McClenachan, M.W. Miller, S.L. Miller, K. Ritchie, S. Rohmann, D. Santavy, C. Pattengill-Semmens, B. Sniffen, S. Werndli and D.E. Williams, 2008. The State of Coral Reef Ecosystems of the Florida Keys. In: The State of Coral Reef Ecosystems of the United States and Pacific Freely Associated States. National Oceanographic and Atmospheric Administration. Technical Memorandum NOS NCC OS 73.

Emmel, T.C., 1986. Status survey and habitat requirements of Florida's endemic Schaus' swallowtail butterfly. Florida Game and Fresh Water Fish Commission, Division of Wildlife, Nongame Wildlife Section, Tallahassee, Florida.

Enos, P., 1977. Quarternary sedimentation in South Florida: part 1 -holocene sediment accumulations of the South Florida Shelf margin. Geological Society ofAmerica Memoir 147:1-130.

Ernst, S.H. and R.W. Barbour, 1972. Turtles of the United States. University of Kentucky Press, Lexington, Kentucky. 299 pp.

Evink, G.L., 1981. Hydrological study in the areas of Cross Key, Florida. Florida Department of Transportation, FDOT FL-ER-16-81.

Ewing, R., 2010. Monroe County Evacuation Clearance Time – Final Report, University of Utah, Department of City & Metropolitan Planning, September 17, 2010.

FDEP, 2002. Critical Beach Erosion Areas in Florida. Florida Department of Environmental Protection, Bureau of Beaches And Coastal Systems, Division of Water Facilities, Report No. BCS-99-02. 75 pp.

FDEP, 2006. Air Monitoring Report 2006, Department of Environmental Protection, Division of Air Resource. Accessed 6/2010: http://dep.state.fl.us/ air/air_quality/ techrpt/amr06.pdf

FDEP, 2008. Strategic Beach Management Plan for the Florida Keys Region. Florida Department of Environmental Protection, Bureau of Beaches and Coastal Systems. Accessed 5/2010: http://www.dep.state.fl.us/ beaches/publications /pdf/SBMP/ Florida%20Keys%20Region.pdf.

FDEP, 2009. Critically Eroded Beaches in Florida. Florida Department of Environmental Protection, Bureau of Beaches and Coastal Systems. Accessed 5/2010: http://www.dep.state.fl.us/ beaches/publications/pdf/ CritEroRpt09.pdf.

FDEP, 2010. Wastewater Facility Information. Accessed 7/6/2010: http://dep.state.fl.us/ water/wastewater/facinfo.

FDER, 1987. Florida Keys monitoring study, water quality assessment of five selected pollutant sources in Marathon, Florida Keys. Florida Department of Environmental Regulation, Marathon, Florida. 196 pp.

FDER, 1988. Campbell's Marina Study. Florida Department of Environmental Regulation, Marathon, FL.

FDER, 1990. Boot Key Harbor Study. Preliminary draft manuscript. Florida Department of Environmental Regulation, Marathon, Florida.

FEMA, 1989. Flood Insurance Study, Monroe County Florida and incorporated areas. Federal Emergency Management Agency, Washington, D.C.

FEMA, 2002. Final Programmatic Environmental Assessment, Wastewater Management Improvements in the Florida Keys, Florida. Federal Emergency Management Agency, URS Group, Inc., Miami Springs, Florida.

FEMA, 2005. Flood Insurance Study, Monroe County and Incorporated Areas, Federal Emergency Management Agency, 2005. Community Number – 12087CV000A.

Fenner. D. and K. Banks. 2004. Orange cup coral, Tubastraea coccinea invades Florida and the Flower Garden Banks, Northwestern Gulf of Mexico. Coral Reefs 23: 505-507.

Fish and Wildlife Research Institute, 2009. Florida Fish and Wildlife Conservation Commission Status and Trends 2008 Report - Florida's Inshore and Nearshore Species. http://research.myfwc.com/features/category_sub.asp?id=2972.

Florida DNR, 1991a. Coupon Bight Aquatic Preserve Management Plan. Florida Department of Environmental Regulation, Florida. 193 pp.

Florida DNR, 1991b. Management Plan for Biscayne Bay Aquatic Preserve: Card Sound. Florida Department of Environmental Regulation.

Florida DNR, 1989. Monroe County Beach Restoration Management Plan. Florida Department of Environmental Regulation, Tallahassee, Florida. 39pp.

Florida Exotic Pest Plant Council, 2007. List of Florida's Invasive Plant Species. Internet: http://www.fleppc.org/07list.htm.

FIMC, 1991. The Florida Keys National Marine Sanctuary Program: An opportunity for state involvement and coordination in resource protection. Florida Interagency Management Committee. Tallahassee, Florida.

FNAI, 2009. Rockland Hammock. Guide to the Natural Communities of Florida (Draft Revised Edition). June 2009 Draft.

Fourqurean, J.W. and S.P. Escorcia, 2008. Seagrass Monitoring in the Florida Keys National Marine Sanctuary, FY 2008 Annual Report, Executive Summary. Southeast Environmental Research Center and Department of Biology, Marine Sciences Program. Florida International University. 9 pp.

Fuss, L., 2000. Keys canal water may be hazardous to health, study finds. Miami Herald, Sunday June 14, 2000.

Ginsburg, R.N., 1964. Florida Bay, Introduction. In: R.N. Ginsburg (Ed). South Florida carbonate sediment. The Geological Society of America, Annual Convention. 11 Pp.

Ginsburg, R.N., 1956. Environmental relationships of grain size and constituent particles in some south Florida carbonate sediments. Bulletin of the American Association of Petroleum Geologists 40(10):2384-2427.

Grinsted, A. J., 2008. Reconstructing sea level from Paleo and projected temperatures 200 to 2100AD. Climate Dynamics, 34: 461-472.

Hanson, C.E., 1980. Freshwater resources of Big Pine Key, Florida. U.S. Geological Survey Open File Report 80-447.

Harrington J. and T.L. Walton, 2008. Climate change in coastal areas in Florida: Sea level rise estimation and economic analysis to year 2080. Florida State University, Tallahassee, FL. Available at http://www.cefa.fsu.edu/ uploaded%20currents%20projects/ FSU%208%2014%202008final.pdf.

Hartman, D.S. 1978. West Indian manatee. Pp. 27-30. In: Layne, J.N. (Ed.). Rare and endangered biota of Florida, Volume One, Mammals, University Presses, Gainesville, Florida. 52 pp.

Heald, E.J. and W.E. Odum. 1970. The contribution of mangrove swamps to Florida fisheries. Proceedings of the Gulf and Caribbean Fisheries Institute 22: 130-135.

Heimlich, B.N., F. Bloetscher, D.E. Meeroff, and J. Murley, 2009. Southeast Florida's Resilient Water Resources: Adaptation to Sea Level Rise and Other Climate Change Impacts. Center for Urban and Environmental Solutions and Department of Civil Engineering, Environmental, and Geomatics Engineering. Florida Atlantic University.

Hipes, D., D.R. Jackson, K.N. Smith, D. Printiss, and K. Brandt, 2001. Field guide to the rare animals of Florida. Florida Natural Areas Inventory. Tallahassee, Florida.

IARU, 2009. International Alliance of Research Universities, 2009. Climate Change: Global Risks, Challenges & Decisions. Synthesis Report, International Alliance of Research Universities, Copenhagen.

IPCC, 2007. 4th Assessment Report. International Panel on Climate Change, 2007.

Jaap, W.C., 1982. The ecology of the coral reefs of south Florida: a community profile. U.S. Fish and Wildlife Service, Office of Biol. Svc., Washington, D.C. FWS/OBS-82/02.

Jaap, W.C., 1984. The ecology of the south Florida coral reefs: a community profile. U.S. Fish and Wildlife Service, FWS/OBS-82/08. 138 pp.

Jaap, W.C. and P. Hallock, 1990a. Coastal and nearshore communities: Coral reefs. In: N. Phillips and K. Larson (Eds.). Synthesis of available biological, geological, chemical, socio-economic, and cultural resource information for the South Florida area. Continental Shelf Associates. Contract no 14-12-0001-30417. 657 pp.

Jaap, W.C. and P. Hallock, 1990b. Coral reefs. Pp. 574-616. In: Myers, R.L. and J.J. Ewel (Eds.). Ecosystems of Florida. University of Central Florida Press, Orlando.

Jackson, D.R., 1989. The fauna of freshwater and non-tidal wetlands on Big Pine Key. pp. 37-58 in ML Robertson, J.M. Young eds. Freshwater and Surface Water Resources of Big Pine Key, Monroe County, Florida. The Nature Conservancy, Key West, Florida. 122 pp.

Jacobsen, T., 1983. Crocodilians and islands: status of the American alligator and the American crocodile in the lower Florida Keys. Florida Field Naturalist 11(1):1-24.

Johnson, A.F. and M.G. Barbour, 2001. Dunes and Maritime Forests. Pg. 429-480. In Myers, R.L. and J.J. Ewel (eds.). Ecosystems of Florida. University of Central Florida Press, Orlando.

Johnson, A. F. and K. Gulledge, 2005. Update to a 1992 assessment of Florida's remaining coastal upland natural communities. Florida Natural Areas Inventory, Tallahassee, Florida.

Jones, J.A. 1977. Morphology and development of southeastern Florida patch reefs. pp. 231-235 in Proceedings: 3rd International Coral Reef Symposium. Rosensteil School of Marine & Atmospheric Science. University of Miami, Miami, Florida.

Jones, R. and J. Boyer, 2001. Water Quality Monitoring Project: FY 2000 Annual Report. Published by the Southeast Environmental Research Center, Florida International University under contract to USEPA.

Kalla, P.I., 2000. Technical Summary Document for the Advance Identification of Wetlands of the Florida Keys. U.S. Environmental Protection Agency Region 4, Science and Ecosystem Support Division, Athens, GA.

Karl, T. R., et al., 2009. Global Climate Change Impacts in the United States. U.S. Climate Change Science Program and NOAA. Cambridge University Press.

King, W., and T. Krakauer. 1966. The exotic herpetofauna of southeastern Florida Quarterly Journal of the Florida Academy of Science 29:149-154.

King, W., and T. Krakauer, 1968. The ecology of the neotropical toad, *Bufo marinus*, in south Florida. Herptological 24:214-221.

Kissling, D.L., 1977. Coral reefs in the lower Florida Keys: a preliminary report. Pp. 209-215. In: H.G. Multer (Ed). Field Guide to some carbonate rock environments: Florida Keys and western Bahamas. U.S.G.S. Open File Report 70-010. Kendall/Hunt Publishing Company, Florida.

Klein, H., 1970. Preliminary evaluation of availability of potable water on Elliott Key, Dade County, Florida. U.S. Geological Survey, Open File Report 70010.

Kochman, H.I., 1978. Eastern indigo snake. Pp. 68-69 in: McDiarmid, R.W.(ed.) Rare and endangered biota of Florida, Volume Three, Amphibians and Reptiles. University Presses of Florida, Gainesville, Florida. 74 pp.

Koopman, B., J.P. Heaney, F.Y. Cakir, M. Rembold, P. Indeglia, G. Kini, 2006. Ocean Outfall Study. Department of Environmental Engineering Sciences, University of Florida. Prepared for Florida Department of Environmental Protection. http://www.dep.state.fl.us/ water/reuse/docs/oceanoutfallstudy.pdf.

Krakauer, T., 1970. The invasion of the toads. Florida Naturalist 44:12-14.

Kramer, P.A., 2003. Synthesis of coral reef health indicators for the Western Atlantic: Results of the AGRRA program (1997–2003). In: Lang JC (Ed.). Status of coral reefs in the western Atlantic: Results of initial surveys, Atlantic and Gulf Rapid Reef Assessment (AGRRA) Program. Atoll Research Bulletim 496:1–58.

Kruczynski, W. L., 1999. Water Quality Concerns in the Florida Keys: Sources, Effects, and Solutions**.** U.S. Environmental Protection Agency, Florida Keys National Marine Sanctuary, Water Quality Protection Program, September 1999. 68 pp. http://floridakeys.noaa.gov/ research_monitoring/wqpp_white_paper.pdf.

Kruer, C., 1991. Draft assessment of Florida's remaining coastal upland natural communities. Florida Natural Areas Inventory, Tallahassee, Florida.

Kushlan, J.A., 1979. Feeding ecology and prey selection in the white ibis. Condor, 81:376-389.

Kushlan, J.A., J.C. Ogden and A.L. Higer, 1975. Relation of water level and fish availability to wood stork reproduction in the southern Everglades, Florida. U.S. Dept. of the Interior, Geological Survey. Open File Report 75-434. Tallahassee, Florida. 56 pp.

Lane, E., 1981. Environmental Geology Series - Miami Sheet. Florida Geological Survey Map Series 101, Florida Geological Survey, Tallahassee, Florida.

Lane, E., 1986. Geology of the state parks in the Florida Keys. Florida Geological Survey Leaflet No. 14, Florida Geological Survey, Tallahassee, Florida.

Langevin, C.D., M.T. Stewart, and C.M. Beaudoin, 1998. Effects of Sea Water Canals on Fresh Water Resources: An Example from Big Pine Key, Florida. Ground Water, 36: 503-513.

Lapointe, B.E., 1989. Pollution of Ground Waters and Surface Waters of Big Pine Key. Pp. 100-116. In: M. L. Robertson, J.M. Young (Eds.) Freshwater and Surface Water Resources of Big Pine Key, Monroe County, Florida. The Nature Conservancy, Key West, Florida.

Lapointe, B.E., J.D. O'Connell, and G.S. Garrett, 1990. The effects on on-site sewage disposal systems on nutrient relations of groundwaters and nearshore surface waters of the Florida Keys. Biogeochemistry 10: 289-307.

Lapointe, B.E., J.D. O'Connell, and G.S. Garrett, 1999. Nutrient couplings between on-site sewage disposal systems, groundwaters, and nearshore surface waters of the Florida Keys. Biogeochemistry (now Biodegradation) 10: 289-307.

Lapointe, B. E., W.R. Matzie and P.J. Barile, 2002. Biotic phase-shifts in Florida Bay and fore reef communities of the Florida Keys: linkages with historical freshwater flows and nitrogen loading from Everglades runoff. In: J. and K. Porter (Eds.). The Everglades, Florida Bay, and Coral Reefs of the Florida. CRC Press, Boca Raton, Florida.

Layne, J.N., 1974. The land mammals of South Florida. Geological Society of America Memoir 2: 386-413.

Lazell, J.D., 1984. A new marsh rabbit (Sylvilagus palustris) from Florida's Lower Keys. Journal of Mammology 65:26-33.

Lazell, J.D., 1989. Wildlife of the Florida Keys: A Natural History. Island Press, Washingon, D.C. 253 pp.

Lewis, R.R.,III., 1980. Impacts of oil spills on mangrove forests. In: Second International Symposium in Biological Management of Mangroves in Tropical Shallow Water Communities, Port Moresby, Madang, Papua New Guinea.

Lewis, R.R.,III, R.G. Jr. Gilmore, C.W. Crewz, and W.E. Odum, 1985. Mangrove habitat and fishery resources of Florida. Pp. 281-336. In: W. Seaman, Jr., (Ed.). Florida Aquatic Habitat and Fishery Resources. Florida Chapter of the American Fisheries Society, Kissimmee.

Livingston, R.J., 1990. Inshore marine habitats. Pp. 549-573. In: Meyers and Ewel (Eds.) Ecosystems of Florida. University of Central Florida Press, Orlando.

Lloyd, J.M., 1991. Part 1: 1988 and 1989 Florida petroleum production and exploration. Florida Geological Survey Information Circular No. 107, Florida Geological Survey, Tallahassee, Florida.

Lodge, T.E., 2005. The Everglades Handbook: Understanding the Ecosystem. Second Edition. CRC Press, Boca Raton, Florida.

Loftus, W.F. and J.A. Kushlan, 1982. The status of the Schaus' swallowtail and the Bahama swallowtail butterflies in Biscayne National Park. South Florida Research Center Report M-649. 18 pp.

Lopez, R.R., 2001. Population ecology of Florida Key deer. Ph.D. dissertation, Texas A&M University. College Station, Texas. 203 pp.

Lugo, A.E. and S.C. Snedaker, 1974. The ecology of mangroves. Annual Review of Ecology and Systematics. 5:39-64.

Lund, F., 1978. Atlantic hawksbill, Atlantic leatherback, Atlantic loggerhead. in: McDiarmid, R.W.(ed.). Rare and endangered biota of Florida, Volume Three, Amphibians and reptiles. University Presses of Florida, Gainesville, Florida. 74 pp.

Marszelak, D.S., 1984. Florida reef tract marine habitats and ecosystems (map series, 1:30,000 scale). Rosenstiel School of Marine and Atmospheric Sciences, Univeristy of Miami, Miami, Florida, and U.S. Dept. Interior, Minerals Management Service, New Orleans, Louisiana.

Marszelak, D.S., G. Babashoff, M.R. Noel and D.R. Worley, 1977. Reef distribution in South Florida. Pp. 223-230. In: D.L. Taylor (Ed.) Proceedings of the 3rd International Coral Reef Symposium, Vol. 2. Rosenstiel School of Marine and Atmospheric Science. University of Miami, Miami, Florida.

Maul, G.A., 2008. Florida's changing sea level. Shoreline: May 2008. Florida Shore and Beach Preservation Association. 3 p. http://www.fsbpa.com/publications.html.

McCleery, R.A., 2003. Aspects of Key Largo Woodrat Ecology. M.S. Thesis. Texas A&M University.

McGuire, H.L., 2002. Taxonomic status of the great white heron (*Ardea herodias occidentalis*): an analysis of behavioral, genetic, and morphometric evidence. Final Report. Florida Fish and Wildlife Conservation Commission, Tallahassee, Florida, USA.

Merchant, R. and J. Haberfeld, 1988. Memorandum: Characterization of secondarily treated domestic sewage disosed of via Class V injection wells (boreholes) in the Florida Keys. FDER, Marathon, FL.

Meyers, R.L. and J.J. Ewel (eds.), 1990. Ecosystems of Florida. University of Central Florida Press, Orlando.

Miller, M.W. and A.M. Szmant, 2008. Lessons learned from experimental key-species restoration. Pp. 219-233. In: Precht, W.F. (Ed.). Coral Reef Restoration Handbook. CRC Press, Boca Raton, Florida.

Monroe County Board of County Commissioners, Florida Department of Transportation, District 4, and Florida Department of Community Affairs. 2006. Habitat Conservation Plan for Florida Key Deer (*Odocoileus virginianus clavium*) and other Protected Species on Big Pine Key and No Name Key, Monroe County, Florida. Report prepared for the US Fish and Wildlife Service.

Monroe County Department of Emergency Management, 1991. Monroe County hurricane preparedness evacuation and shelter plan. Monroe County Department of Emergency Management, Key West, Florida.

Monroe County Department of Marine Resources, 2002. Keys-Wide Mooring Field System. Preliminary Planning Document.

Monroe County Growth Management, 2008. Monroe County Area of Critical State Concern De-Designation Report, Final Document. Monroe County Growth Management Department.

Montegue, C.L. and R.G. Wiegert, 2001. Salt Marshes. Pg. 481-516. In Myers, R.L. and J.J. Ewel (Eds.). Ecosystems of Florida. University of Central Florida Press, Orlando.

Mozumder, P. and E. Flugman, 2009. Adaptation Behavior in the Face of Global Climate Change and Accelerating Sea-Level Rise, Survey Responses from Federal, State, Regional and Local Management Personnel, Environmental Specialists, Policymakers and Community Leaders in the Florida Keys, U.S.A. A Report by the Program for Adaptation to Climate Change and Extreme Events (*PACE*) at Florida International University (FIU). May 2009.

Multer, H.G., 1977. Field Guide to Some Carbonate Rock Environments, Florida Keys and Western Bahamas. Kendall/Hunt Publ. Co., Dubuque, Iowa. 415 pp.

Nagelkerken, I. and G. van der Velde, 2004. A comparison of fish communities of subtidal seagrass beds and sandy seabeds in 13 marine embayments of a Caribbean island, based on species, families, size distribution and functional groups. Journal of Sea Research 52: 127-147.

Nelson, C.E., C. Crumley, B. Fritxche, and B. Adcock, 1989. Behavioral analysis in lower southeast Florida hurricane evacuation study update. U.S. Army Corps of Engineers, Jacksonville, Florida.

NMFS, 2006. Recovery Plan for Smalltooth Sawfish (*Pristis pectinata*). Prepared by the Smalltooth Sawfish Recovery Team for the National Marine Fisheries Service, Silver Spring, Maryland.

NOAA, 2004. Programmatic Environmental Impact Statement for Seagrass Restoration in the Florida Keys National Marine Sanctuary. National Oceanographic and Atmospheric Administration.

NOAA, 2008. State of the Science Fact Sheet, Ocean Acidification, National Oceanic and Atmospheric Association, May 2008. http://oceanservice.noaa.gov/education /yos/resource/01state_of_science.pdf.

Odum, W.E. and C.C. McIvor, 1990. Mangroves. Pg. 517-548. In: Myers, R.L. and J.J. Ewel (Eds.). Ecosystems of Florida. University of Central Florida Press, Orlando.

Odum, W.E., C.C. McIvor, T.J. Smith, III., 1982. The ecology of the mangroves of south Florida: a community profile. U.S. Fish and Wildlife Service, Office of Biological Services, Washington, D.C. FWS/OBS-81/24. 144 pp.

Ogden, J.C., 1978a. American crocodile. Pp.21-2. In: McDiamird, R.W.(ed.). Rare and endangered biota of Florida, Volume Three, Amphibians and reptiles. University Presses of Florida, Gainesville, Florida. 74 pp.

Ogden, J.C., 1978b. Status and nesting biology of the American crocodile, *Crocodylus acutus,* (Reptilia, Crocodilidae) in Florida. Journal of Herptology 12:183-196.

Ogden, J.C., 1978c. Wood Stork. Pp. 3-4. In: Kale, H.W.II (Ed.). Rare and endangered biota of Florida, Volume Two, Birds, University Presses of Florida, Gainesville, Florida. 121 pp.

Ogden, J.C., J.A. Kushlan and J.T. Tilmant, 1978. The food habitats and nesting success of wood storks in Everglades National Park 1974. U.S.Dept. of the Interior, National Park Service Natural Resources Report No.16, Washington, D.C. 25pp.

Olmstead, I.D., and L.L. Loope, 1984. Plant communities of Everglades National Park. Pp. 167-184. In: Gleason, P.J. (Ed). Environments of South Florida, Present and Past II. Miami Geology Society, Coral Gables, Florida.

PBS&J, 1989. Technical memorandum: Monroe County comprehensive plan hurricane evacuation analysis. Post, Buckley, Schuh & Jernigan, Inc., Talahassee, Florida.

Porter J.W. and K.G. Porter. 2002. The Everglades, Florida Bay, and Coral Reefs of the Florida Keys: An Ecosystem Sourcebook. CRC Press, Boca Raton.

Precht, W.F. and M. Robbart, 2006. Coral reef restoration: The rehabilitatioan of an ecosystem under siege. Pp 1-24. In: Precht, W.F. (Ed.). Coral Reef Restoration Handbook. CRC Press, Boca Raton, Florida.

Rahmstorf, S., 2007. A semi-empirical approach to projecting future sea-level rise. Science 315(5810): 368-370.

Randazzo, A.F. and R. Halley, 1997. Geology of the Florida Keys. Pp. 251-259. In: Geology of Florida. University Press of Florida, Florida.

Robblee, M.B., T.R. Barber, P.R. Carlson, Jr., M.J. Durako, J.W. Fourqurean, L.K. Muehlstein, D. Porter, L.A. Yarbro, R.T. Zieman, J.C. Zieman. 1991. Mass mortality of the tropical seagrass *Thallassia testudinum* in Florida Bay (USA). Marine Ecology Progress Series 71: 297-299.

Robertson, W.B. Jr., 1978. Roseate tern. Pp. 39-40. In: Kale, H.W.II (Ed.). Rare and endangered biota of Florida, Volume Two, Birds. University Presses of Florida, Gainesville, Florida. 121 pp.

Rosenau et al., 1977. Springs of Florida. Bulletin 31 (Revised). Tallahassee: State of Florida, Department of Natural Resources, Division of Resource Management, Bureau of Geology.

Ross, M.S., 1989. Effects of hydrologic factors on the vegetation of Big Pine Key. Pp. 29-36. In: M.L. Robertson, J.M. Young (Eds.). Freshwater and Surface Water Resources of Big Pine Key, Monroe County, Florida. The Nature Conservancy, Key West, Florida. 122 pp.

Ross, M.S., J.J. O'Brien, and L.J. Flynn, 1992. Ecological site classification of Florida Keys terrestrial habitats. Biotropica 24: 488-502.

Ross M.S., J.J. O'Brien, and L. da Silveira Lobo Sternberg. 1994. Sea level rise and the reduction in pine forests in the Florida Keys. Ecological Applications 4: 144–56.

Ross, M.S., J.J. O'Brien, R.G.Ford, K. Zhang, and A. Morkill. 2009. Disturbance and the rising tide: the challenge of biodiversity management on low-island ecosystems. Frontiers in Ecology and Environment 7: 471–478.

Rudnick, D.T., Z. Chen, D.L. Childers, J.N. Boyer and T.D. Fontaine, III., 1999. Phosphorus and nitrogen inputs to Florida Bay: the Importance of the Everglades Watershed. Estuaries 22:398-416.

Rudnick, R., C. Madden, S. Kelly, R. Bennett, and K. Cunniff. 2006. Report on Algae Blooms in Eastern Florida Bay and Southern Biscayne Bay. Coastal Ecosystems Division. South Florida Water Management District. Available at http://floridakeys.noaa.gov/news/algae_blooms.pdf.

Schomer, N.S., and R.D. Drew. 1982. An ecological characterization of the Lower Everglades, Florida Bay and the Florida Keys. U.S. Fish and Wildlife Service, Office of Biological Services, Washington, D.C. FWS/OBS-82.58.1.

Scurlock, J.P., 1996. Native trees of the Florida Keys. 1996. Laurel and Herbert, Inc. Sugarloaf Shores Florida.

Scoffin, T.P., 1970. The trapping and binding of subtidal carbonate sediments by marine vegetation in Bimini Lagoon, Bahamas. Journal of Sedimentary Petrology 40:249-273.

SFRPC, 2005. Monroe County Marine Management Strategic Plan. South Florida Regional Planning Council and the Center for Urban and Environmental Solutions of Florida Atlantic University. December 2005. http://www.sfrpc.com/mcmmsp.htm.

SFRPC, 2007. Monroe County Working Waterfronts Preservation Master Plan. South Florida Regional Planning Council. April 30, 2007. http://www.sfrpc.com/MCWorkwater.htm.

SFWMD, 1991. Final draft surface water improvement and management plan for the Everglades. Volumes I, II, III, IV, Appendices A-D. South Florida Water Management District, West Palm Beach, Florida.

Silvy, N.J., 1975. Population density, movements and habitat utilization of Key deer, *Odocoileus virginianus clavium*. Ph.D. dissertertation., Southern Illinois University, Carbondale, Illinois. 152 pp.

Simberloff, D., and E.O. Wilson, 1969. Experimental zoogeography of islands: the colonization of empty islands. Ecology 50:278-296.

Snedaker, S.C., 1990. Water quality problems and issues in the Florida Keys. In: Robertson, M.L. (Ed.). The Florida Keys marine waters and coral reefs strategies for improvement. The Nature Conservancy, Key West, Florida. 35 pp.

Snyder, J.R., A. Herndon, and W.B. Robertson, Jr., 1990. South Florida Rockland. Pp. 230-277. In: Meyers and Ewel (eds.). Ecosystems of Florida. University of Central Florida Press, Orlando.

Somerfield, P.J., W.C. Jaap, K.R. Clarke, M. Callahan, K. Hackett, J. Porter, M. Lybolt, C. Tsokos, and G. Yanev, 2008. Changes in coral reef communities among the Florida Keys, 1996–2003. Coral Reefs 27: 951–965.

Spitzer, N.C., 1983. Aspects of the biology of the silver rice rat *Oryzomys argentatus*. Unpublished M.S. Thesis, University of Rhode Island, Kingston, 101 pp.

Spitzer, N.C. and J.D. Lazell, Jr., 1978. A new rice rat (Genus *Oryzomys*) from Florida's Lower Keys. Journal of Mammology 59:787-792.

Steiner, T.M., O.L. Bass, Jr. and J.A. Kushlan, 1983. Status of the eastern indigo snake in southern Florida national parks and vicinity. Southern Florida Center (Everglades National Park), Report #SFRC-83/01. 25 pp.

Stewart, M.T., M.J. Wightman and K.M. Beaudoin, 1989. The freshwater lenses of Big Pine Key. In: M.L. Robertson, J.M. Yound (Eds). Freshwater and Surface Water Resources of Big Pine Key, Monroe County, FLorida. The Nature Conservancy, Key West, Florida. 122 pp.

Stober, Q.J., K. Thornton, R. Jones, J. Richards, C. Ivey, R. Welch, M. Madden, J. Trexler, E. Gaiser, D. Scheidt and S. Rathbun, 2001. South Florida Ecosystem Assessment - Phase I/II – Everglades stressor interactions: hydropatterns, euthrophication, habitat alteration, and mercury contamination. Monitoring for adaptive management: implications for ecosystem restoration. United States Environmental Protection Agency, EPA 904-R-01-002.

Szmant, A.M., and A. Forrester, 1996. Water column and sediment nitrogen and phosphorus distribution patterns in the Florida Keys, USA. Coral Reefs 15:21-41.

Tabb, D.C., 1967. Prediction of estuarine salinities in Everglades National Park, Florida, by the use of ground water records. PhD. Dissertation, University of Miami, Coral Gables, Florida.

Taylor, W.K., 1998. Florida wildflowers in their natural communities. University Press of Florida, Gainesville.

Teas, H. and J. Kelly, 1975. Effects of herbicides on mangroves of South Vietnam and Florida. Pp. 719-728. In: Walsh, G., S. Snedaker, and H. Teas (Eds.), Proceedings of the International Symposium of the Biological Management of Mangroves, University of Florida, Gainesville, Florida.

Tetra Tech, Inc., 1983. Ecological impacts of sewage discharges on coral reef communities. U.S. Environmental Protection Agency 420-9-83-010, Washington, D.C. 85 pp.

Thomas, T.M., 1974. A detailed analysis of climatological and hydrological records of South Florida with reference to man's influence upon ecosystem evolution. Pp. 82-122. In: Gleason, P.J. (Ed.). Environments of South Florida: Present and Past. Miami Geological Society, Miami, Florida.

Tilmant, J.T., 1989. Foreword (symposium on Florida Bay, a subtropical lagoon). Bulletin of Marine Science 44:1-2.

Tomlinson, P.B., 1980. The biology of trees native to tropical florida. Maria Moors Cabot Foundation for Botanical Research and Atkins Garden Fund of Harvard University. 480 pp.

UNEP, 2010. Solid Waste and Marine Litter. United Nations Environment Programme Caribbean Environment Programme. http://www.cep.unep.org/ publications-and-resources/ marine-and-coastal-issues-links/ solid-waste-and-marine-litter.

USACE and SFWMD, 2004. Final Programmatic Environmental Impact Statement - Florida Keys Water Quality Improvements Program, U.S. Army Corps of Engineers Jacksonville District and South Florida Water Management District, August 2004. http://www.evergladesplan.org/ pm/projects/non_cerp_sf_projects_fkwqip.aspx#info

USACE and SFWMD, 2006. Florida Keys Water Quality Improvements Program, Program Management Plan, Final, U.S. Army Corps of Engineers Jacksonville District and South Florida Water Management District, September 2006. http://www.evergladesplan.org/ pm/projects/non_cerp_sf_projects_fkwqip.aspx#info.

USDA, 2010. Soil Maps and Soil Data. U.S. Department of Agriculture, Soil Conservation Service. http://websoilsurvey.nrcs.usda.gov/app (Soil Maps Version 1, Aug 2, 2007; Soil Data Version 2, Jan 13, 2010).

U.S. Department of Commerce, 1995. Florida Keys National Marine Sanctuary. Draft Management Plan/Environmental Impact Statement. Volume II. Development of the Management Plan: Environmental Impact Statement. Florida Keys National Marine Sanctuary, Key West, Florida.

U.S. Department of Commerce, 2007. Florida Keys National Marine Sanctuary Revised Management Plan. National Oceanographic and Atmospheric Administration, Florida Keys National Marine Sanctuary, Key West, Florida.

U.S. Department of the Interior, 1988. Coastal Barriers Study Group. Executive summary. In: Report to Congress: Coastal Barrier Resources System. U.S. Department of the Interior, Washington, D.C. 27 pp.

U.S. Department of the Interior, 1989. Big Cypress National Preserve Draft General Management Plan and Draft Environmental Impact Statement. U.S. Fish and Wildlife Service, Atlanta, Georgia.

USEPA, date unknown. Hazardous waste assessments, Monroe County, Florida, Component two: Identification of abandoned dump sites. U.S. Environmental Protection Agency. 16 pp.

USEPA, 1996. Water Quality Protection Program for the Florida Keys National Marine Sanctuary. U.S. Environmental Protection Agency, Battelle Ocean Sciences, Duxbury, Massachusetts, and Continental Shelf Associates, Inc. Jupiter, Florida.

US EPA, 2009. Synthesis and Assessment Product 4.1, Coastal Sensitivity to Sea Level Rise: A Focus on the Mid-Atlantic Region. U.S. Climate Change Science Program.

USFWS, 1999. South Florida Multi-species Recovery Plan. U.S. Fish and Wildlife Service, Southeast Region. Atlanta Georgia.

USFWS, 2006. Biological Opinion issued to Federal Emergency Management Agency. U.S. Fish and Wildlife Service, Letter Report issued August 8, 2006. FWS/R4/ES.

USFWS, 2008. Draft Comprehensive Conservation Plan and Environmental Assessment. Lower Florida Keys National Wildlife Refuges: National Key Deer Refuge; Key West National Wildlife Refuge; and Great White Heron National Wildlife Refuge. U.S. Department of the Interior, Fish and Wildlife Service, Southeast Region, Atlanta, Georgia.

USFWS, 2009. Lower Florida Keys National Wildlife Refuges. Comprehensive Conservation Plan. National Key Deer Refuge, Key West National Wildlife Refuge, Great White Heron National Wildlife Refuge Monroe County, Florida. October, 2009.

Wanless, H., 2008. Miami-Dade County Climate Change Advisory Task Force Science and Technology Committee Report: Statement on Sea Level in the Coming Century.

Weiner, A.H., 1979. The hardwood hammocks of the Florida Keys: an ecological study. National Audubon Society and Florida Keys Land and Sea Trust. Key West, Florida.

Zieman, J.C., 1972. Origin of circular beds of *Thalassia* (Spermatophyta: Hydrocharitaceae) in South Biscayne Bay, Florida, and their relationship to mangrove hammocks. Bulletin of Marine Science 22:559-574.

Zieman, J.C., 1982. The ecology of the seagrasses of south Florida: a community profile. U.S. Fish and Wildlife Service, Office of Biological Services, Washington, D.C. FWS/OBS-82/25. 158 pp.

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4.0 TRAFFIC CIRCULATION ELEMENT
[9J-5.019(1), (2), and (3)]

The Traffic Circulation Element of the Monroe County (County) Comprehensive Plan addresses the data inventory requirements of 9J-5.019(1), (2), and (3) of the Florida Administrative Code (F.A.C.). The data inventory requirement will support the development of goals, objectives, policies, and implementation programs for the Traffic Circulation Element.

4.1 Introduction

Pursuant to Rule 9J-5.019, F.A.C., local governments not located within the urban area of a Metropolitan Planning Organization (MPO) with population in excess of 50,000, shall adopt a traffic circulation, mass transit, ports, aviation, and related facilities elements consistent with the provisions of this rule and Chapter 163, Part II, F.S. The County is not located within an urban area of a MPO, but has a population in excess of 50,000.

The purpose of the Traffic Circulation Element Data Inventory and Analysis is to describe and analyze the existing traffic conditions, project future conditions, and prepare a foundation for the formulation of goals, objectives, and policies for the County. Data has been gathered, analyzed, and portrayed in textual, tabular, and graphic form, including a series of transportation maps. An additional focus of this element is to further multimodal opportunities within the County, adhering to requirements outlined in Senate Bill (SB) 360 and House Bill (HB) 697 that revise Chapter 163, F.S. The Traffic Circulation Element and Data and Inventory Analysis presents:

1. An analysis of the existing transportation system, including the ability of transportation facilities and services to serve existing land uses, and the adequacy of the existing and projected transportation system to provide emergency evacuations;

2. Growth trends and travel patterns, including relationships between land uses and the transportation system;

3. Projected transportation system level of service;

4. An analysis of local and state programs;

5. Maintenance of adopted levels of service standards; and

6. Land use policy implications of transportation management programs necessary to promote public transportation.

4.2 Definitions of Terms and Concepts

4.2.1 Classification of Major Thoroughfares

Major thoroughfares are categorized into functional classification groups according to the character of service they provide. The four functional classification groups for urban areas are principal arterials, minor arterials, collectors, and local streets. The extent and degree of access control is a significant factor in defining the functional classification of a roadway. Regulated limitation of access is necessary on arterials to enhance their primary function of mobility, while the primary function of local streets is to provide access. The functional classifications of major thoroughfares are defined in *A Policy on Geometric Design of Highways and Streets* (American Association of State Highway and Transportation Officials, 2004), and provided below:

- **Principal Arterials**. The principal arterial system serves the major centers of activity and the highest volume traffic corridors of urbanized areas. Principal arterials typically serve longer distance trips. Although they constitute a small percentage of the total roadway network, principal arterials carry a high portion of the total urban area traffic. The principal arterial system also carries most of the trips entering and exiting the urban area. Service on principal arterials is normally continuous with relatively high traffic volumes, long average trip lengths, and high operating speeds. Service to abutting lands is typically subordinate to the provision of travel service and major traffic movements.

- **Rural Principal Arterials**. The rural principal arterial system consists of a network of routes that provide for movements between urban areas. The system provides for corridor movement with trip density suitable for substantial statewide travel. In more densely populated states, this class of highway includes most of the heavily traveled routes that might warrant multilane improvements. The rural principal arterial system includes most existing rural freeways, and is stratified into two design groups consisting of freeways and other principal arterials.

- **Minor Arterials**. The minor arterial system interconnects and supports the principal arterial system. It accommodates trips of moderate lengths at a lower level of mobility than provided by principal arterials. Minor arterials provide continuity among communities and, ideally, do not penetrate identifiable neighborhoods. Generally, the spacing of minor arterials is not greater than one mile in developed areas. Currently, there are no minor arterials in the County.

- **Collectors**. The collector street system provides vehicular access to and mobility within residential neighborhoods, commercial, and industrial areas. It differs from the arterial system by penetrating neighborhoods and distributing trips from arterials to their ultimate destinations. Collector streets also channelize vehicular traffic from local streets onto the arterial system, and have moderate operating speeds and shorter travel distances than arterials.

- **Local Streets**. The local street system comprises all roadways not in one of the higher systems. It provides direct access to abutting land uses and connections to the higher order systems. Local streets offer the lowest level of vehicular mobility and service, through traffic is often discouraged.

4.2.2 Level of Service [9J-5.019(3)(a)]

Level of Service (LOS) standards can be determined for various public facilities. For roadways, it is defined in the *Highway Capacity Manual 2000* (Transportation Research Board, 2000) as:

> *"A qualitative measure describing operational conditions within a traffic stream, based on service measures such as speed and travel time, freedom to maneuver, traffic interruptions, comfort, and convenience."*

There are six different LOS classifications that represent a range of operating conditions and the driver's perception of those conditions. They are described below.

- **Level of Service A**. This LOS generally describes free-flow traffic operations where motorists are completely unimpeded in their ability to maneuver within the traffic stream. Drivers are able to travel at their desired speed, and delays at intersections are minimal.

- **Level of Service B**. This LOS also describes free-flow traffic conditions, although the presence of other vehicles within the traffic stream is noticeable. The ability to maneuver within the traffic stream is only slightly restricted and stopped delays are not significant.

- **Level of Service C**. For LOS C conditions, traffic flow is generally stable, although the driver's choice of speeds and ability to maneuver are increasingly restricted. Longer queues at signalized intersections characterize this level of service.

- **Level of Service D**. Traffic flow is generally unstable where minor increases in flow result in substantial delay. Driving speeds are tolerable for short periods, but are subject to sudden variance. The ability to maneuver and select a travel speed is severely restricted.

- **Level of Service E**. Large traffic volumes and significant delay typify this LOS traffic flow is unstable and is generally maintained by a low speed. Driver comfort is low due to limited space between vehicles and rapidly changing speeds, and extensive delays are typically experienced at critical intersections.

- **Level of Service F**. Traffic flow is characterized by extremely low speeds. Driving comfort is low and motorists incur significant delays. Substantial queuing also occurs at critical intersections.

Traffic performance calculations are generally based upon a methodology obtained from the latest edition of the Transportation Research Board's *Highway Capacity Manual*. However, since U.S. 1 is the only principal arterial serving the people and visitors of the Florida Keys, a task force was established in the early 1990s to develop a methodology to assess LOS and capacity of U.S. 1 in this unique setting.

As noted in the *2010 U.S. 1 Arterial Travel Time and Delay Study* by the County, the methodology is a procedure for using travel speeds as a means to assess LOS and reserve capacity on U.S. 1. "The method….considers both the overall level of service from Key West to the mainland, and the level of service on 24 selected segments. [It] was developed from basic criteria and principles in Chapter 7 (Rural Multilane Highways), Chapter 8 (Rural Two-Lane Highways), and Chapter 11 (Urban and Suburban Arterials) of the *Highway Capacity Manual*." Summarized in detail in the *Analysis of Existing Transportation System* section, the approach is based on a comparison of posted speed limits and median travel speeds that are measured in the field.

For other roadways within the County, the LOS shall be determined based on the Generalized Service Volume Tables as published in the most recent *Quality/Level of Service Handbook* by the Florida Department of Transportation (FDOT). These tables list the maximum service volumes based upon various roadway characteristics including, but not limited to, number of lanes, presence of a divided median, number of traffic signals per mile, and provision of turn lanes at intersections.

4.3 Analysis of Existing Transportation System *[9J-5.019(3) (a), (b)]*

4.3.1 Existing Roadway System Overview

4.3.1.1 Overview

The roadway network in the County, particularly the Florida Keys, is unique. The Harry S. Truman Blue Star Memorial Overseas Highway (U.S. 1 and S.R. 5), functions as an arterial, collector, and "Main Street" all rolled into one. Nowhere else is there a 112 miles-plus long archipelago connected by over 40 bridges along a single roadway.

While U.S. 1 is the principal highway in Monroe County, it is by no means the only road. Branching off from U.S. 1 are numerous local and collector roads serving the many subdivisions and the five incorporated cities throughout the Keys.

Roadway access to and from Monroe County is provided by only two roads: U.S. 1 and Card Sound Road (CR 905A). These two facilities serve the Florida Keys as economic and public safety lifelines. It cannot be overstated the need to assess the operation of U.S. 1 within a

regional context to ensure the Florida Keys' only continuous roadway link will continue to function properly.

The total 2009 Monroe County roadway centerline mileage and daily vehicle miles traveled (DVMT) distributions by functional classification (for all state, county, local/city roads) are presented in **Table 4.1**[1]. As shown in the table, as of the end of 2009, the county has a total of 801.445 centerline miles of roadways. Of this total, 583.453 miles are in designated small urban areas and 217.992 miles are in designated rural areas.

Table 4.1 - Monroe County Public Road Mileage and Miles Traveled, 2009

Functional Classification	Centerline Miles[1]		Daily Vehicle Miles Traveled – DVMT [2]	
	Small Urban [3]	Rural [4]	Small Urban [3]	Rural [4]
Principal Arterial	79.072	40.188	1,668,092	583,040
Minor Arterials	5.000	15.636	83,509	54,331
Urban/Major Collector	42.063	12.109	200,082	34,047
Rural Minor Collector	0.000	10.269	0	131,276
Locals	457.318	139.790	370,766	68,100
Sub-Totals	583.453	217.992	2,322,449	870,794
Totals	**801.445**		**3,193,243**	

Source: Florida Department of Transportation

Notes:

1. Length of a roadway without regard to number of lanes.
2. DVMT: The product of a road's centerline miles and its annual average daily traffic, AADT.
3. In an area with population 5,000 to 49,999.
4. In an area with less than 5,000.

The daily vehicle miles traveled averaged 3,193,243 DVMT. The County's designated small urban areas[2] account for approximately 2,322,449 DVMT, or 72.7 percent of the County's total DVMT. The rural areas account for 870,794 DVMT or 27.3 percent of the total DVMT.

[1] Source: Florida Department of Transportation.

[2] The designated urban areas are Key West, Marathon, Village of Islamorada, Key Colony Beach, and the City of Layton. These cities/town maintain all local streets within each corespondiong jurisdiction.

As of June 30, 2010, the FDOT has estimated that state roadways in Monroe County, comprised of U.S. 1/S.R. 5 and S.R. A-1-A, totaled 119.3 centerline miles: 79.1 miles in urban areas and 40.2 miles in rural areas. The corresponding DVMT are 1,668,100 DVMT for urban areas and 583,000 DVMT in the rural areas.

4.3.1.2 State Maintained Roads and Bridges

The Florida Department of Transportation is responsible for maintaining and improving State roads. The FDOT's Five Year Work Program, which is updated annually, provides a schedule of major roadway improvements. Funding for these improvements comes from fuel taxes, vehicle license fees, federal aid, and occasionally from bond sales.

U.S. 1 and South Roosevelt Boulevard/S.R. A1A are the only state roads in the County. U.S. 1 originates in the City of Key West on Whitehead Street at the corner of Fleming Street (MM 0.0). The route traverses approximately four miles within Key West via Truman Avenue and North Roosevelt Boulevard before converting to the Overseas Highway at MM 4.5 and extending 112 miles to the Miami-Dade County Line.

SR A1A begins at the intersection of Bertha Street and Roosevelt Boulevard as a four lane undivided roadway, extending eastward past the Key West International Airport before terminating at the intersection with U.S. 1 at the east end of the island.

Roadways are generally classified based on their role meeting travel demand needs, assisting in defining land use relationships, and the jurisdiction responsible for its maintenance. The functional classification for U.S. 1 in the County is a principal arterial. Within some areas, U.S. 1 is classified as a rural principal arterial while in others, such as the cities of Marathon and Key West, it is classified as an urban principal arterial. **Table 4.2** presents the designated functional classifications for U.S. 1 and SR A1A by segments within Monroe County.

Table 4.3 presents the listing of the 57 bridges under FDOT jurisdiction as of October 2010. These bridges represent over 19 miles of structures primarily along the U.S. 1/SR 5 Corridor. The only non-U.S. 1 related bridge structure is the South Roosevelt Boulevard (SR A1A) bridge over the Riviera Canal in Key West.

4.3.1.3 County Maintained Roads

While the geography of the Keys precludes the typical roadway grid found in other developed areas of Florida, there are a significant number of local and collector roads throughout the archipelago. The County maintained roadways are generally considered to be collectors, while the remaining roadways are local streets. Both types of facilities ultimately channel traffic towards U.S. 1.

Aside from U.S. 1 and its rights of way, which are under the purview of the Florida Department of Transportation (FDOT), the Monroe County Engineering Department

oversees the design and construction of Monroe County's roads, public rights of way, bridges, sidewalks, and bike paths. The department also maintains U.S. 1 and the County's traffic signals and street lights.

The Monroe County Division of Public Works, Roads and Bridges Department operates from locations in Key West and Plantation Key. Primary responsibilities involve maintaining county roads and rights of way, bike paths, and county bridges. Routine maintenance procedures, including trimming trees, mowing, street sweeping, striping, signage, shoulder work, and repairing potholes, are performed on a continuous basis. The department follows the Seven Year Roadway and Bicycle Path Plan as a guide when repairing and resurfacing roads and bridges throughout the county. Proposed roadway improvements are evaluated and prioritized based on a point system developed by the County. The primary funding sources for improvements to County roads are the constitutional and local option gas taxes. This funding is supplemented by Card Sound tolls, impact fees, right-of-way permit fees, and joint participation funding.

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Table 4.2 – Functional Classification of State Roads in Monroe County

Roadway Name	County/ State/ Federal No.	Roadway Segment	Maintenance Jurisdiction	Functional Classification[1]	Length (miles)
Whitehead St. / Truman Ave. / N. Roosevelt Blvd.	U.S. 1 / SR 5	Fleming Street to Stock Island	FDOT	U-PA	4.531
Overseas Highway	U.S. 1 / SR 5	Stock Island to Boca Chica	FDOT	U-PA	13.655
Overseas Highway	U.S. 1/SR 5	Boca Chica to 0.947 mile west of Parrish Avenue	FDOT	R-PA	28.593
Overseas Highway	U.S. 1 / SR 5	Palm Island Drive to 0.947 mile east of 122nd Street	FDOT	U-PA	6.220
Overseas Highway	U.S. 1/SR 5	0.947 mile east of 122nd Street to 0.814 mile west of Estall Street	FDOT	R-PA	42.843
Overseas Highway	U.S. 1 / SR 5	0.814 mile north of Estall Street to 0.303 mile north of CR 905	FDOT	U-PA	9.324
Overseas Highway	U.S. 1/SR 5	0.303 mile west of junction CR 905 to Miami-Dade County Line	FDOT	R-PA	5.870
South Roosevelt Boulevard	SR A1A	Bertha Street to U.S. 1	FDOT	U-PA	2.935

Source: FDOT's 2009 Florida Traffic Information and Highway Data CD

Notes: 1. U-PA -- Urban, Principal Arterial; R-PA -- Rural, Principal Arterial

The County maintains over 600 miles of secondary roads, in addition to 25 bridges totaling less than one mile in length. The County is therefore responsible for a roadway system roughly five times the length of U.S. 1. These secondary roads are vital to Monroe County in that these roads link U.S. 1 to residential, commercial, and recreational areas.

Tables 4.4 and **4.5** provide an inventory of county maintained major roads and bridges, respectively. Included in these totals are CR-905 through North Key Largo and Card Sound Road (CR-905A), which combined provide an alternate route to the mainland. The County collects tolls at Card Sound Bridge, the longest County-maintained bridge, through an enterprise fund for the Card Sound Road and Toll District. The tolls provide operation and improvement funding for CR-905A within the district, which extends from the Miami-Dade County line to CR-905.

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Table 4.3 – FDOT Bridges in Monroe County

Bridge ID	Bridge Name/Location	Bridge ID	Bridge Name/Location
900003	Boca Chica Channel SR 5 (U.S. 1) SB	900105	Ohio Bahia Honda Channel SR 5 (U.S. 1)
900016	Bahia Honda SR 5 (U.S. 1) SB	900106	Spanish Harbor Channel SR 5 (U.S. 1)
900045	Bahia Honda SR 5 (U.S. 1) NB	900107	Harris Channel SR 5 (U.S. 1)
900054	Riviera Canal SR-A1A (Key West)	900108	Harris Gap SR 5 (U.S. 1)
900073	Key Largo Cut SR 5 (U.S. 1) NB	900109	North Harris Channel SR 5 (U.S. 1)
900074	Boca Chica Channel SR 5 (U.S. 1) NB	900110	North Pine Channel SR 5 (U.S. 1)
900076	Whale Harbor U.S. 1 (SR 5)	900111	South Pine Channel U.S. 1 (SR 5)
900077	U.S. 1 & Snake Creek Canal SR 5 (U.S. 1)	900112	Park Channel SR 5 (U.S. 1)
900078	Tavernier Creek SR 5 NB (U.S. 1)	900113	Torch Channel SR 5 (U.S. -1)
900080	Rockland Channel SR 5 (U.S. 1)	900114	Torch Ramrod Channel SR 5 (U.S. 1)
900081	Shark Channel U.S. 1 (SR 5)	900115	Bow Channel SR 5 (U.S. 1)
900086	Cow Key Channel U.S. 1 (SR 5)	900116	Kemp Channel SR 5 (U.S. 1)
900088	Tea Table Relief SR 5 (U.S. 1)	900117	Niles Channel Comp SR 5
900089	Tea Table Channel SR 5 (U.S. 1)	900125	Cow Key Channel U.S. 1 (SR 5) SB
900090	Saddle Bunch #5 SR 5 (U.S. 1)	900126	Vaca Cut U.S. 1 (SR 5)
900091	Saddle Bunch # 4 SR 5 (U.S. 1)	900127	Tavernier Creek SR 5 SB (U.S. 1)
900092	Saddle Bunch #3 Channel SR 5 (U.S. 1)	900128	Salt Run SR 5 (U.S. 1)
900093	Saddle Bunch #2 SR 5 (U.S. 1)	900129	NAS Overpass Boca Chica SR 5 (U.S. 1)
900094	Dante B. Fascel (Long Key Channel) SR 5	900130	Key Largo Cut SR 5 (U.S. 1) SB
900095	Indian Key Channel SR 5 (U.S. 1)	900131	Jewfish Creek Bridge SR 5 (U.S. 1)
900096	Lignum Vitae Channel SR 5 (U.S. 1)	900132	Jewfish Creek Bridge Ramp A SR 5 (U.S. 1)
900097	Channel No. 2 SR 5 (U.S. 1)	900133	Jewfish Crk Bridge Ramp B SR 5 (U.S. 1)
900098	Channel Five U.S. 1 / SR 5	900134	Jewfish Crk Bridge Ramp C To NB U.S. 1
900099	Tom's Harbor Cut U.S. 1 (SR 5)	900135	Jewfish Creek Bridge Ramp D SR 5 (U.S. 1)
900100	Tom's Harbor Channel U.S. 1 (SR 5)	900136	Crocodile Crossing Bridge SR 5 (U.S. 1)
900101	Seven Mile Bridge SR 5 (U.S. 1)	900137	First Deer Crossing SR 5 (U.S. 1)
900102	Lower Sugarloaf Channel SR 5 (U.S. 1)	900138	Second Deer Crossing SR 5 (U.S. 1)
900103	Missouri Little Duck Channel SR 5 (U.S. 1)	900139	Manatee Creek Bridge U.S. 1 (N.B. & S.B.)
900104	Ohio Missouri Channel SR 5 (U.S. 1)		

Source: Florida Bridge Information, FDOT, Office of Maintenance, October 1, 2010.

Table 4.4 – Monroe County Arterial and Collector Roads

Roadway Name	Segment	Near U.S. 1 MM	Classi-fication	Length (Miles)	Key
Duval Street	Truman Avenue to Eaton Street		U-mA	0.483	Key West
Flagler Avenue (CR-5)	White Street to S. Roosevelt		U-mA	1.981	Key West
Whitehead Street	Fleming Street to Eaton Street		U-mA	0.100	Key West
Eaton Street	Whitehead Street to Palm Avenue		U-mA	0.832	Key West
Palm Avenue	Eaton Street to N. Roosevelt Blvd.		U-mA	0.429	Key West
First Street	Flagler Avenue to N. Roosevelt Blvd.		U-mA	0.385	Key West
Bertha Street	Flagler Avenue to S. Roosevelt Blvd.		U-mA	0.387	Key West
Fifth Street	McDonald Avenue to Cow Key	5	U-C	0.896	Stock Island
McDonald/ Mahoney Avenue (CR 941)	Peninsular Avenue to U.S. 1	5	U-C	1.149	Stock Island
Key Haven Road	U.S. 1 to Evergreen Avenue	6	U-C	0.684	Racoon
Boca Chica Road (CR 941)	U.S. 1 to Boundary Lane	11	U-C	5.600	Boca Chica
Cross Street	U.S. 1 to 12th Avenue	4	U-C	0.516	Stock Island
Ocean Bay Drive	U.S. 1 to Atlantic Ocean	99	U-C	0.510	Key Largo
Atlantic Boulevard	U.S. 1 to Caribbean Drive	100	U-C	0.350	Key Largo
Sugarloaf Boulevard (CR 939)	U.S. 1 to Atlantic Ocean	17	R-MC	6.600	Lower Sugarloaf
Blimp Road/Dump Road	U.S. 1 to Kemp Channel	21	R-mC	1.948	Cudjoe
Middle Torch Road	U.S. 1 to Big Torch Key Road	28	R-mC	2.992	Middle Torch
Little Torch Key Road	U.S. 1 to Lobster Tail Road	28	R-mC	1.618	Little Torch
Key Deer Boulevard (CR 940)	U.S. 1 to Big Spanish Channel	30	R-mC	3.423	Big Pine
Watson Boulevard (CR 940)	Channel to Avenue B	31	R-mC	4.470	Big Pine
Duck Key/Bimini	U.S. 1 to Toms Harbor Cut	61	R-mC	0.508	Duck
CR 905	U.S. 1 to Ocean Reef Club	106	R-mC	10.909	Key Largo
Card Sound Road (CR 905A)	U.S. 1 to Miami-Dade County Line	--	R-mC	5.000	Key Largo
Bluewater Drive (CR 9617)	U.S. 1 and U.S. 1		R-MC	0.917	Saddlebunch
CR 939A	Sugarloaf Channel to CR 939		R-MC	2.480	Sugarloaf

Sources: FDOT's 2009 Florida Traffic Information and Highway Data CD and Monroe County, Roads and Bridges Division.
Notes: Classifications: U-mA - Urban, Minor Arterial; U-C - Urban Collector; R-MC – Rural, Major Collector; R-mC – Rural, Minor Collector.

Table 4.5 – Monroe County Maintained Bridges

Bridge ID No.	Location	Length (feet)	Key	Lanes
904025	Palm Avenue at Garrison Bight	117	Key West	2
904110	Boca Chica (CR-941) at Geiger Key Cut	125	Geiger Key	2
904120	Boca Chica (CR-941) at Similar Sound	51	Boca Chica	2
904140	Palm Drive at Bay Point Canal	25	Saddlebunch	2
904151	Shore Drive over un-named canal	N/A	Sugarloaf	2
904152	Shore Drive at canal	25	Sugarloaf	2
904153	Sugarloaf Boulevard (CR-939) at un-named canal	123	Sugarloaf	2
904155	Old State Road 4A at Sugarloaf Creek	200	Sugarloaf	2
904160	CR-938B at Sugarloaf Creek	N/A	Sugarloaf	
904165	Tarpon Creek	46	Sugarloaf	2
904250	Caribbean Drive	24	Summerland	2
904305	Watson Boulevard at un-named canal	28	Big Pine	2
904307	Fern Avenue at Joe's Canal	28	Big Pine	2
904310	Watson Boulevard at un-named canal	28	Big Pine	2
904320	Watson Road at Bogie Channel	N/A	Big Pine	
904600	Duck Key Drive at Tom's Harbor Channel	245	Duck	2
904602	Truman Bridge/Duck Key Drive	76	Duck	
904603	Bimini Drive at Sam's Canal	42	Duck	2
904604	Harbor Drive at Joe's Canal	55	Duck	2
904606	Seaview Drive at un-named canal	55	Duck	2
904608	Valois Boulevard at Canal	N/A	Largo	2
904910	Bahama Drive	31	Duck	2
904916	Ocean Bay Drive	18	Largo	2
904980	CR-905A at Steamboat Creek	312	Largo	2
904982	Card Sound Road (CR-905A) at Tubby's Creek	100	Largo	2
904984	Card Sound Road (CR-905A) at Mosquito Creek	100	Largo	2
904986	Card Sound Road (CR-905A) at Saunder's Creek	100	Largo	2
904990	Card Sound Road (CR-905A) at I.C.W.W.	2,775	Largo	2

Source: Monroe County, Roads and Bridges Division, December 2010.

Table 4.6 presents the Monroe County paved roadway inventory, including the incorporated cities. Approximately 85 percent of the County's roadways are paved.

Mainland Monroe County consists primarily of government-owned parks and preserves, and consequently has very few roads. The only road in the area that was County-maintained is Loop Road (CR-94), a 16-mile excursion off US 41 crossing the Miami-Dade Dade and Collier County lines. Loop Road can be found on most maps as CR 94, although

the roadway no longer has a numbered designation and is now managed by the National Park Service (NPS). The Flamingo Lodge Highway is a mainland Monroe County road that is also under NPS administration.

Table 4.6 – 2009 Monroe County Paved Roadway Inventory

Jurisdiction	Paved Miles	Unpaved Miles	Total Miles
Monroe County Roads in unincorporated areas	**306.1**	**91.4**	**397.5**
Incorporated City Roads			
Islamorada	64.5	2.0	66.5
Key Colony Beach	7.3	0.0	7.3
Key West	80.2	0.0	80.2
Layton	1.8	0.0	1.8
Marathon	64.1	0.0	64.1
Total City Mileage	**217.9**	**2.0**	**219.9**
Total County and City Roads	**524.0**	**93.4**	**617.4**

Source: Florida Department of Transportation. Data as of September 30, 2009.

Map Series 4-1 depicts the current roadway network and jurisdiction within the County and **Map Series 4-2** depicts the current roadway functional classification.

4.3.2 Traffic Performance on County Roads

For County roadways, the maximum service volume threshold standard is established as LOS D. This LOS standard shall be determined based on the Generalized Service Volume Tables as published in the most recent *Quality/Level of Service Handbook* by the FDOT. **Table 4.7** and **Map Series 4-4** summarizes the LOS for the County roadways where data is available.

As summarized in **Table 4.7** and according to the *2008 Monroe County Public Facilities Capacity Assessment Report*, almost all county roadways currently operate at or better than LOS D. The one exception is Palm Avenue between White Street and U.S. 1 (N. Roosevelt Boulevard) which has a peak hour LOS of F based on 2009 traffic data.

4.3.3 Existing U.S. 1/SR 5 Corridor

U.S. 1/SR 5 in the County is defined between MM 0.00 and 112.6. It generally consists of a cross-section varying between two and four lanes. The posted speed limits also vary from 35 miles per hour in urban areas, such as in the cities of Marathon and Key West, to 55 miles per hour in rural segments. Of its 112 total miles, approximately 80 miles (74%) are two-lane segments that are undivided. The 4-lane sections are located on Key Largo, Tavernier (MM 90 to 106), the Marathon area (MM 48 to 54), Bahia Honda (MM 35 to 37), and from Key West to Boca Chica (MM 2 to 9). **Map Series 4-3** depicts the number of through lanes for U.S. 1 and the County maintained roadways.

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Table 4.7 – 2009 County Roads Level of Service

Near U.S. 1 MM	Key	Roadway	From	To	Type	No. of Lanes	FDOT Count Station	AADT[1]	Two Way Peak Hour Volume[2]	Peak Hour Peak Direction Volume[2]	Peak Hour Peak Direction MSV[3]	LOS
---	Key West	Flagler Avenue (CR 5A)	White Street	2nd Street	C-I	2LU	5025	10,500	1,074	608	790	C
---	Key West	Flagler Avenue (CR 5A)	2nd Street	S. Roosevelt Boulevard	C-I	4LD	5017	11,900	1,123	672	1,760	B
---	Key West	Palm Avenue	White Street	U.S. 1	C-I	2LU	0103	18,300	1,872	1,058	790	F
---	Key West	Duval Street	North of Wall Street	South of South Street	C-III/IV	2LU	0023	7,000	716	405	570	D
---	Key West	Eaton Street	Duval Street	White Street	C-III/IV	2LU	0020	4,700	480	272	570	D
---	Key West	Whitehead Street	Front Street	South Street	C-III/IV	2LU	5013	6,700	685	388	570	D
11	Geiger	CR 941 / Boca Chica Road	U.S. 1	Boundary Lane	Unint.	2LU	0050	2,900	297	168	1,030	B
30	Big Pine	CR 940 / Key Deer Boulevard	U.S. 1	Big Spanish Channel / Mills Road	Unint.	2LU	0053	10,700	1,094	619	1,030	B
106	Key Largo	CR 905	U.S. 1	Ocean Beef Club	Unint.	2LU	0002	4,600	471	266	1,030	B

Legend: C-I: Arterial Class I C-III/IV: Arterial Class III/IV Unint.: Uninterrupted

Notes:

1. AADT obtained from FDOT's 2009 Florida Traffic Information and Highway Data.Two-way peak hour volumes and peak hour peak direction volumes derived by applying the appropriate K, D, and other factors. Peak hour volume is the highest hour between 4:00 and 6:00 PM.
2. Maximum Service Volume (MSV) at the adopted Level of Service (LOS) "D" (adjusted by -10% for non-state signalized roadways) are obtained from the 2009 FDOT Quality/Level of Service Handbook generalized tables.

Table 4.8 presents a summary of the operational evaluation of U.S. 1 within the City of Key West (MM 0.0 to MM 4.0). As shown in the table, several segments of Truman Avenue (two lanes) and North Roosevelt Boulevard (four lane divided facility) are at or over capacity.

Table 4.8– 2009 Operational Assessment of U.S. 1 in the City of Key West

US 1 Segment in Key West	From	To	FDOT Count Station (1)	Posted Speed	Number of Lanes	2009 AADT	Two Way Peak Hour Volume (2)	Peak Hour Peak Direction Volume (2)	Peak Hour Peak Direction MSV (3)	LOS
Whitehead Street (MM 0.0)	Fleming Street	Truman Avenue	5013	30	2LU	6,700	685	387	570	D
Truman Street	White-head Street	Simonton Street	5011	30	2LU	9,300	951	538	570	D
Truman Street	Simonton Street	White Street	5008	30	2LU	16,800	1,719	972	880	F
Truman Street	White Street	Jose Marti Drive	5004	25	2LU	16,800	1,719	972	880	F
North Roosevelt Boulevard	Jose Marti Drive	First Street	5004	30	4LU	19,600	2,005	1,134	1,960	B
North Roosevelt Boulevard	First Street	Kennedy Drive	5034	35	4LU	34,500	3,529	1,996	1,960	F
North Roosevelt Boulevard	Kennedy Drive	US 1/S. Roosevelt Blvd.	0105	35	4LU	33,500	3,427	1,938	1,960	D

Notes:

1. Traffic information obtained from FDOT's 2009 Florida Traffic Information and Highway Data CD.
2. Two-way Peak hour peak hour, peak direction volumes derived through the application of corresponding K and D factors provided in the preceding source.
3. Maximum Service Volumes (MSV) based on LOS D value as obtained from FDOT's Generalized Peak Hour Directional Volumes for Florida's Urbanized Areas, 2009 FDOT Quality / Level of Service Handbook, Table 7.

Many sections of U.S. 1 in urban Monroe County contain parallel frontage roads. In several cases, these frontage roads are the old U.S. 1 segments. Pursuant to *A Policy on Geometric Design of Highways and Local Streets* (American Association of State Highway Transportation Officials, 2004), frontage roads serve numerous functions, depending upon the type of arterial they serve and the character of the surrounding area. Such roads may be used to control access to an arterial highway; to function as a street facility serving adjoining property; and to maintain circulation of traffic on each side of the arterial. The frontage roads generally separate local traffic from the higher speed through traffic on U.S. 1 in the County. By serving local traffic, these roads assist in reducing traffic volumes on U.S. 1 thereby facilitating an increase in level of service. Typically, bicycle and pedestrian facilities are located on or adjacent to frontage roads in urban areas.

Eighteen traffic signals are located along U.S. 1 (Overseas Highway) within the Florida Keys. These locations include pedestrian signals at MM 48.5, MM 53.0 in the City of Marathon, and MM 105 in Key Largo. **Table 4.9** identifies the traffic signals along U.S. 1 (excluding those found on Key West).

Table 4.9 - U.S. 1 Signalized Intersection/Crossing Locations

MM	Key	Cross street	Type
4.4	Stock Island	College Road	Fully signalized
4.6	Stock Island	Cross Street	Fully signalized
4.8	Stock Island	MacDonald Avenue	Fully signalized
19.5	Upper Sugarloaf	Crane Blvd	Fully signalized
30.3	Big Pine	Key Deer Blvd	Fully signalized
48.5	Marathon	33rd Street/School Crossing	Fully signalized[1]
50.0	Marathon	Sombrero Beach Blvd	Fully signalized
52.4	Marathon	107th Street	Fully signalized
52.5	Marathon	109th Street	Fully signalized
53.0	Marathon	Pedestrian Crossing	Pedestrian Crossing
53.5	Fat Deer	Key Colony Causeway	Fully signalized
54.0	Fat Deer	Coco Plum Drive	Fully signalized
90.0	Plantation	Woods Avenue/School Crossing	Fully signalized[2]
90.5	Plantation	Sunshine Road	Fully signalized
91.5	Tavernier	Ocean Blvd	Fully signalized
99.5	Key Largo	Atlantic Blvd	Fully signalized
101.0	Key Largo	Tradewinds	Fully signalized
105.0	Key Largo	Pedestrian Crossing	Pedestrian Crossing

Notes:
1. Fisherman's Hospital Campus.
2. Coral Shores High School (only during school times).

4.3.4 Traffic Performance on U.S. 1(Overseas Highway)

4.3.4.1 Methodology

The U.S. 1 Level of Service Task Force, a multi-agency group comprised of the County, FDOT, and Florida Department of Community Affairs, prepared the methodology used for monitoring conditions on U.S. 1 in the Florida Keys. The Task Force formulated the methodology in 1993 and amended in 1997 (U.S. 1 Methodology).

The U.S. 1 Methodology developed utilizes an empirical relationship between the volume-based capacities and the speed-based LOS methodology. It established a procedure for using travel speeds on U.S. 1 as a means of assessing LOS and reserve capacity. The method

considers both the overall LOS of the entire 108-mile stretch of U.S. 1 from Key West to the mainland, as well as the LOS for 24 smaller roadway segments[3] as shown in **Table 4.10**.

Based on the current methodology to assess LOS on U.S. 1 in the Florida Keys, LOS is based on a comparison between average posted speed limits and average travel speeds for individual segments along U.S. 1. Data collected annually during the spring (peak seasonal population) to assess the LOS on U.S. 1 is compiled and analyzed in accordance with the Task Force's methodology that has been vetted and approved by many agencies, including FDOT. The methodology and the resultant analysis do not include peak hour, peak direction data or analysis.

Measurements of the travel speeds on U.S. 1 are established by conducting travel time runs from Key West to the mainland during peak tourist season, defined as the 6-week period beginning the second week of February and ending the fourth week of March each year. The minimum acceptable LOS for U.S. 1 is C, while the overall (108-miles) travel speed on U.S. 1 is established as 45 miles per hour to equate to LOS C, regardless of the posted speed limit of a segment. As noted in the 2010 *U.S. 1 Arterial Travel Time and Delay Study* by the County: "Under the adopted growth management process if the overall LOS for U.S. 1 falls below the LOS C Standard, then no additional land development will be allowed in the Florida Keys."

U.S. 1 in some sections of the County is considered to be an uninterrupted flow facility. However, in more urban settings, U.S. 1 functions as an interrupted flow facility given the number of closely spaced traffic signals within a segment. **Table 4.11** summarizes the LOS thresholds for interrupted and uninterrupted flow segments of U.S. 1 utilizing the U.S. 1 Task Force methodology, which are based on travel speeds. **Table 4.11** also summarizes the LOS thresholds for the overall U.S. 1 108-mile corridor.

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[3] *2010 U.S. 1 Arterial Travel Time and Delay Study*

Table 4.10 – U.S. 1 Overseas Roadway Segments

Seg.	From	To	Begin MM	End MM	Facility Type	Posted Speed Limit
1	Cow Key Bridge (N)	Key Haven Boulevard	4.0	5.0	4LD	30/35/45
2	Key Haven Boulevard	Rockland Drive	5.0	9.0	4LD	55/45
3	Rockland Drive	Boca Chica Road	9.0	10.5	2LU	45/55
4	Boca Chica Road	Harris Channel Bridge (N)	10.5	16.5	2LU	45/55
5	Harris Channel Bridge (N)	Bow Channel Bridge (N)	16.5	20.5	2LU	45/55
6	Bow Channel Bridge (N)	Spanish Main Drive	20.5	23.0	2LU	45/55
7	Spanish Main Drive	East Shore Drive	23.0	25.0	2LU	45
8	East Shore Drive	Torch-Ramrod Bridge (S)	25.0	27.5	2LU	45
9	Torch-Ramrod Bridge (S)	N. Pine Channel Bridge (N)	27.5	29.5	2LU	45
10	N. Pine Channel Bridge (N)	Long Beach Drive	29.5	33.0	2LU	45
11	Long Beach Drive	7-Mile Bridge (S)	33.0	40.0	2LU (70%) 4LD (30%)	45/50/55
12	7-Mile Bridge (S)	7-Mile Bridge (N)	40.0	47.0	2LU	55
13	7-Mile Bridge (N)	Cocoa Plum Drive	47.0	54.0	2LU (13%) 4LD (87%)	35/45
14	Coco Plum Drive	Toms Harbor Ch Bridge (S)	54.0	60.5	2LU	45/55
15	Toms Harbor Ch Bridge (S)	Long Key Bridge (S)	60.5	63.0	2LU	55
16	Long Key Bridge (S)	Channel #2 Bridge (N)	63.0	73.0	2LU	55/45
17	Channel #2 Bridge (N)	Lignum Vitae Bridge (S)	73.0	77.5	2LU	55
18	Lignum Vitae Bridge (S)	Tea Table Relief Bridge (N)	77.5	79.5	2LU	55/45
19	Tea Table Relief Bridge (N)	Whale Harbor Bridge (S)	79.5	84.0	2LU	45
20	Whale Harbor Bridge (S)	Snake Creek Bridge (N)	84.0	86.0	2LU	45
21	Snake Creek Bridge (N)	Ocean Boulevard	86.0	91.5	2LU	45
22	Ocean Boulevard	Atlantic Boulevard	91.5	99.5	4LD	45/50
23	Atlantic Boulevard	C-905	99.5	106.0	4LD	35/45
24	C-905	County Line Sign	106.0	112.6	2LD	35/45/55

Table 4.11 - U.S. 1 Overseas Highway Level of Service Thresholds

LOS	Interrupted Flow	Uninterrupted Flow
Segments		
A	≥ 35 mph	1.5 mph above speed limit
B	≥ 28 mph	1.5 mph below speed limit
C	≥ 22 mph	4.5 mph below speed limit
D	≥ 17 mph	7.5 mph below speed limit
E	≥ 13 mph	13.5 mph below speed limit
F	< 13 mph	More than 13.5 mph below speed limit
Overall 108-mile Corridor		
A	51.0 mph or above	
B	50.9 mph to 48 mph	
C	47.9 mph to 45 mph	
D	44.9 mph to 42 mph	
E	41.9 mph to 36 mph	
F	Below 36 mph	

Source: DRAFT 2010 U.S. 1 Arterial Travel Time and Delay Study (July 2010).

The adopted LOS standard for U.S. 1 in the County is LOS C, as defined in the U.S. 1 Task Force methodology which provides that the LOS shall be maintained with 5 percent of LOS C. For County roadways, the adopted LOS standard is D, utilizing the methodology described in the latest edition of the *Quality Level of Service Handbook* prepared by FDOT. In particular, the Generalized Service Volume tables are used to assign LOS peak hour, peak direction volume thresholds.

4.3.4.2 Level of Service on U.S. 1

The existing (2010) LOS analysis for the 24 roadway segments of U.S. 1 from Key West to the mainland is summarized in **Table 4.12** and depicted in **Map Series 4-4**.

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Table 4-12– 2006 through 2010 U.S. 1 Level of Service

Seg.	From	To	LOS Sta.[1]	Posted Speed Limit	2006		2007		2008		2009		2010	
					Med.[2] Speed	LOS	Med.[2] Speed	LOS	Med.[2] Speed	LOS	Med.[2] Speed	LOS	Med.[2] Speed	LOS
1	Cow Key Bridge (N)	Key Haven Boulevard	C	30/35/45	31.2	B	34.6	B	31.7	B	34.2	B	34.0	B
2	Key Haven Boulevard	Rockland Drive	C	55/45	57.7	A	57.9	A	55.5	B	56.7	A	57.3	A
3	Rockland Drive	Boca Chica Road	C	45/55	46.2	C	45.2	C	45.7	C	42.3	D	43.8	D
4	Boca Chica Road	Harris Channel Bridge (N)	C	45/55	52.1	C	52.2	C	51.6	C	52.4	C	52.3	C
5	Harris Channel Bridge (N)	Bow Channel Bridge (N)	C	45/55	48.2	C	47.8	C	47.2	D	46.5	D	48.0	C
6	Bow Channel Bridge (N)	Spanish Main Drive	C	45/55	48.1	A	48.5	A	47.7	A	47.0	B	47.1	A
7	Spanish Main Drive	East Shore Drive	C	45	45.7	B	45.6	B	46.4	B	44.7	B	45.9	B
8	East Shore Drive	Torch-Ramrod Bridge (S)	C	45	46.3	B	48.1	A	47.7	A	47.6	A	45.4	B
9	Torch-Ramrod Bridge (S)	N. Pine Channel Bridge (N)	C	45	48.2	A	47.1	A	46.6	A	47.9	A	46.5	A
10	N. Pine Channel Bridge (N)	Long Beach Drive	C	45	38.0	C	39.0	C	35.7	D	37.9	C	39.7	C
11	Long Beach Drive	7-Mile Bridge (S)	C	45/50/55	54.3	A	54.1	A	52.3	B	51.7	B	53.8	A
12	7-Mile Bridge (S)	7-Mile Bridge (N)	C	55	53.9	B	55.1	B	56.1	B	55.4	B	53.8	B
13	7-Mile Bridge (N)	Cocoa Plum Drive	C	35/45	36.0	A	37.7	A	37.3	A	38.2	A	36.7	A
14	Cocoa Plum Drive	Cocoa Plum Drive	C	45/55	50.3	C	50.9	C	50.7	C	50.3	C	47.2	D
15	Cocoa Plum Drive	Long Key Bridge (S)	C	55	53.9	B	52.9	C	54.4	B	51.3	C	54.0	B
16	Long Key Bridge (S)	Long Key Bridge (S)	C	55/45	52.1	B	51.3	C	52.3	B	51.3	C	53.1	B
17	Long Key Bridge (S)	Lignum Vitae Bridge (S)	C	55	49.0	D	51.1	C	51.0	C	51.4	C	49.2	D
18	Lignum Vitae Bridge (S)	Tea Table Relief Bridge (N)	C	55/45	50.1	C	49.8	D	50.0	D	48.5	D	49.6	D
19	Tea Table Relief Bridge (N)	Whale Harbor Bridge (S)	C	45	40.6	C	41.4	C	42.1	C	40.8	C	41.4	C
20	Whale Harbor Bridge (S)	Snake Creek Bridge (N)	C	45	41.4	A	42.4	A	43.8	A	42.2	A	45.6	A
21	Snake Creek Bridge (N)	Ocean Boulevard	C	45	42.2	B	41.8	B	41.9	B	39.6	C	41.3	B
22	Ocean Boulevard	Atlantic Boulevard	C	45/50	49.0	A	49.9	A	47.6	A	48.2	A	47.7	A
23	Atlantic Boulevard	C-905	C	35/45	45.9	A	45.7	A	44.4	A	46.0	A	45.8	A
24	C-905	County Line Sign	C	35/45/55	44.0	C	37.1	E	38.3	E	52.1	A	50.7	A
Overall					45.9	C	45.7	C	46.4	C	46.6	C	46.9	C

Source: 2009 U.S.1 Arterial Travel Time and DelaCy Study (August 2009) and DRAFT 2010 U.S. 1 Arterial Travel Time and Delay Study (July 2010).

Notes: 1. Sta LOS = Level of Service Standard; 2. Med Speed = Median Speed (mph)

Based upon measured speeds and travel times for the various segments as reported in the DRAFT 2010 *U.S. 1 Arterial Travel Time and Delay Study*, four segments of U.S. 1 currently fail to operate at an acceptable LOS (i.e. below LOS C). They are:

- U.S. 1 on Big Coppitt Key from MM 9.0 to MM 10.5 (segment 3);
- U.S. 1 on Grassy Key from MM 54.0 to 60.5 (Segment 14);
- U.S. 1 on Lower Matecumbe Key from MM 73.0 to 77.5 (Segment 17); and
- U.S. 1 on Tea Table Key from MM 77.5 to MM 79.5 (segment 18).

Table 4.12 also provides a summary of the historic LOS analysis between years 2006 and 2010. The data shows that segments 3 and 18 may need capacity improvements to maintain the adopted LOS C standard. Segment 3 is at LOS D for the two most recent consecutive years, 2009 and 2010. Segment 18 is at LOS D for four consecutive years, 2007 through 2010.

4.3.4.3 U.S. 1 Reserve Capacity

The difference between segment travel speeds and the LOS C standard is known as the Reserve Speed. Based upon the U.S. 1 Task Force methodology, Reserve Speed is converted into an estimated reserve capacity of additional traffic volumes and corresponding additional development. If the LOS C standard is exceeded, a fixed number of additional trips for land development are allowed as calculated based on the U.S. 1 Methodology until the next update of the U.S. 1 Arterial Travel Time and Delay Study or until mitigation actions are implemented.

According to the 2010 *U.S. 1 Arterial Travel Time and Delay Study (August 2010),* segments 3, 17, and 18 have reserve capacity within the 5 percent allocation. No reserve capacity exists on U.S. 1 on segment 14 due to the deficiency magnitude. However, a portion of U.S. 1 in segment 14 (Grassy Key) is under construction, and is expected to have better LOS once the construction is complete.

The remaining 20 segments on U.S. 1 currently operate at an acceptable LOS. Additionally, U.S. 1 overall currently has a measured travel speed of 46.9 miles per hour which equates to LOS C with a reserve speed of 1.9 miles per hour or 35,240 daily trips as reserve volume. The 2010 available capacity for each segment on U.S. 1 is summarized in **Table 4.13**. The individual segments reserve volumes may be unobtainable, due to the constraint imposed by the overall reserve volume.

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Table 4.13 - 2010 U.S. 1 Reserve Capacity

Segment	From	To	Reserve Volume	5% Allocation below LOS C
1	Cow Key Bridge (N)	Key Haven Boulevard	2,186	N/A
2	Key Haven Boulevard	Rockland Drive	4,973	N/A
3	Rockland Drive	Boca Chica Road	0	549
4	Boca Chica Road	Harris Channel Bridge (N)	2,593	N/A
5	Harris Channel Bridge (N)	Bow Channel Bridge (N)	265	N/A
6	Bow Channel Bridge (N)	Spanish Main Drive	2,525	N/A
7	Spanish Main Drive	East Shore Drive	1,967	N/A
8	East Shore Drive	Torch-Ramrod Bridge (S)	1,866	N/A
9	Torch-Ramrod Bridge (S)	N. Pine Channel Bridge (N)	2,087	N/A
10	N. Pine Channel Bridge (N)	Long Beach Drive	1,520	N/A
11	Long Beach Drive	7-Mile Bridge (S)	7,187	N/A
12	7-Mile Bridge (S)	7-Mile Bridge (N)	3,716	N/A
13	7-Mile Bridge (N)	Cocoa Plum Drive	17,771	N/A
14	Cocoa Plum Drive	Toms Harbor Ch Bridge (S)	0	0
15	Toms Harbor Ch Bridge (S)	Long Key Bridge (S)	1,565	N/A
16	Long Key Bridge (S)	Channel #2 Bridge (N)	6,722	N/A
17	Channel #2 Bridge (N)	Lignum Vitae Bridge (S)	0	940
18	Lignum Vitae Bridge (S)	Tea Table Relief Bridge (N)	0	727
19	Tea Table Relief Bridge (N)	Whale Harbor Bridge (S)	611	N/A
20	Whale Harbor Bridge (S)	Snake Creek Bridge (N)	4,468	N/A
21	Snake Creek Bridge (N)	Ocean Boulevard	2,881	N/A
22	Ocean Boulevard	Atlantic Boulevard	9,539	N/A
23	Atlantic Boulevard	C-905	9,121	N/A
24	C-905	County Line Sign	7,187	N/A

Source: DRAFT 2010 U.S.1 Arterial Travel Time and Delay Study (July 2010).

4.3.4.4 Traffic Volumes on U.S. 1

Traffic volumes along U.S. 1 were obtained from FDOT's count stations. **Table 4.14** summarizes the Historic Annual Average Daily Traffic (AADT) on U.S. 1 between 1999 and 2009. The historic AADT between 1999 and 2008 were obtained from the 2008 Florida Traffic Information CD published by FDOT. The 2009 AADT was estimated by adjusting the 24-hour daily traffic counts obtained from FDOT synopsis reports with seasonal and axle factors. **Table 4.15** summarizes the 2009 two-way and peak direction peak hour volumes on U.S. 1.

Table 4.14 - 1999 to 2009 Average Annual Daily Traffic on U.S. 1

Seg.	FDOT Station	MM	Key	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
1	0201	4.3	Stock Island	40,000	22,500	42,000	30,000	44,000	41,500	43,500	45,500	38,500	48,500	39,500
1	0165	4.4	Stock Island	29,838	35,472	37,401	37,478	37,403	37,926	37,137	36,598	36,080	34,602	35,471
2	0009	6.5	Boca Chica	24,000	25,500	24,000	24,500	27,000	23,500	23,000	23,500	24,000	23,500	25,500
3	0010	9.6	Big Coppitt	20,500	21,500	22,500	20,500	22,500	24,000	23,000	23,500	21,500	20,000	21,500
4	0106	12	Saddlebunch	18,200	16,900	16,400	16,800	20,000	18,300	17,200	17,800	20,000	15,000	20,500
7	0108	24	Summerland	14,500	16,700	16,000	14,200	16,500	16,200	15,800	17,600	17,500	16,400	19,500
9	0109	29.5	Big Pine	18,000	19,000	17,300	19,900	20,000	18,100	18,000	26,500	20,000	16,600	18,600
10	0227	29.6	Big Pine	17,198	17,482	17,544	17,388	17,591	17,597	17,003	16,772	16,665	15,862	16,293
10	0016	30.5	Big Pine	17,500	18,200	17,100	16,700	17,500	16,000	18,800	18,700	18,200	16,300	19,600
12	0066	47	Knight's	13,000	13,600	11,600	12,800	15,000	12,700	13,800	13,300	13,300	11,200	14,800
13	0642	48	Marathon	13,700	14,000	12,100	12,900	19,000	15,200	15,500	14,600	17,700	17,100	17,600
13	0110	50.5	Marathon	31,000	28,500	27,000	30,500	31,000	27,000	31,000	29,500	31,500	38,000	32,000
13	0045	53	Marathon	29,000	24,000	22,000	24,500	24,500	22,000	25,500	24,000	29,000	25,000	30,000
14	5040	56.5	Crawl	N/A	N/A	N/A	N/A	N/A	N/A	N/A	32,500	15,800	14,500	16,400
16	0065/ 9065	72	Craig	14,300	11,400	11,700	11,800	11,500	10,500	10,800	12,300	11,403	10,200	9,900
17	0623	77.5	Tea Table	14,200	15,300	14,200	13,500	13,000	12,800	13,000	14,500	13,700	15,200	13,600
20	0101/ 9101	86	Plantation	31,500	20,200	20,500	20,500	23,000	19,900	20,500	27,000	19,893	18,200	13,700
21	0102	91	Plantation	28,500	23,500	25,000	27,000	26,500	27,000	28,000	27,000	30,000	27,500	34,500

Table 4.14 - 1999 to 2009 Average Annual Daily Traffic on U.S. 1 (Continued)

Seg.	FDOT Station	MM	Key	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
22	0062& 5043	92.5	Tavernier	28,000	27,500	27,000	26,000	26,500	25,500	28,500	29,000	25,500	22,500	28,500
22	5041	95	Tavernier	N/A	N/A	N/A	N/A	N/A	N/A	N/A	26,000	23,000	20,800	24,500
22	5042 (1)	98	Tavernier	N/A	N/A	N/A	N/A	N/A	N/A	N/A	13,500	13,000	12,000	12,000
23	0064	100	Key Largo	26,500	26,500	28,500	26,000	28,500	27,000	32,000	31,500	33,000	30,000	35,000
23	0094	103.5	Key Largo	30,000	30,500	31,000	35,000	28,500	30,500	31,000	28,500	32,000	25,000	33,500
23	0164	106	Key Largo	24,279	24,222	24,390	24,488	24,685	24,490	24,580	23,807	23,661	22,528	23,162
23	0200	106	Key Largo	19,600	35,500	22,000	37,500	23,000	22,000	23,000	24,000	23,000	20,700	22,000
24	0001	107.5	Cross	17,400	18,100	18,200	15,100	17,500	17,800	18,500	18,600	17,400	17,000	17,600

Note: (1) Southbound U.S. 1 only.

Table 4.15 –2009 Two-way and Peak Direction Peak Hour Volumes on U.S. 1

Segment	Begin MM	End MM	FDOT Count Station	Two-Way Peak Hour Volume[1]	Peak Hour Peak Direction Volume[1]
1	4.0	5.0	0201	3,228	1,648
			0165	N/A	N/A
2	5.0	9.0	0009	2,076	1,271
3	9.0	10.5	0010	2,014	1,320
4	10.5	16.5	0106	1,734	1,068
5	16.5	20.5	N/A	N/A	N/A
6	20.5	23.0	N/A	N/A	N/A
7	23.0	25.0	0108	1,417	764
8	25.0	27.5	N/A	N/A	N/A
9	27.5	29.5	0109	1,476	843
10	29.5	33.0	0227	N/A	N/A
			0016	1,893	1,063
11	33.0	40.0	N/A	N/A	N/A
12	40.0	47.0	0066	1,139	599
13	47.0	54.0	0642	1,338	728
			0110	2,533	1,305
			0045	2,334	1,207
14	54.0	60.5	5040	1,253	665
15	60.5	63.0	N/A	N/A	N/A
16	63.0	73.0	0065/9065	744	393
17	73.0	77.5	0623	1,046	528
18	77.5	79.5	N/A	N/A	N/A
19	79.5	84.0	N/A	N/A	N/A
20	84.0	86.0	0101/9101	1,089	570
21	86.0	91.5	0102	2,724	1,417
22	91.5	99.5	5043&0062	2,159	1,107
			5041	1,949	1,067
23	99.5	106.0	0064	2,816	1,552
			0094	2,753	1,537
24	106.0	112.6	0164	N/A	N/A
			0200	1,707	906
			0001	1,391	848

FDOT has three permanent count stations on U.S. 1 in Monroe County. Station #164 is located 200 feet south of County road 905 on Key Largo, Station #227 is located 200 feet northeast of North Pine Channel Bridge on Big Pine Key, and Station #165 is located 200 feet east of Cow Key Bridge on Stock Island. **Table 4.16** summarizes the monthly average daily traffic between 2004 and 2008 at the three permanent count stations.

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Table 4.16 – 2004 to 2008 Monthly Average Daily Traffic on U.S. 1

Month	2004	2005	2006	2007	2008	Total 2004 - 2008	Percent Difference from AADT
FDOT Count Station 0165 (Stock Island)							
January	38,800	39,600	*38,250	36,900	36,700	190,250	
February	41,000	41,300	41,500	38,800	39,300	201,900	
March	43,200	43,000	41,300	40,500	39,900	207,900	**13**
April	40,500	39,200	38,700	38,300	36,700	193,400	
May	38,400	38,300	37,100	36,500	35,100	185,400	
June	37,900	36,900	36,000	35,500	34,300	180,600	
July	38,000	33,900	35,600	35,100	33,300	175,900	
August	34,800	33,500	33,400	34,700	32,200	168,600	
September	30,200	33,700	32,900	32,900	28,800	158,500	**-20**
October	37,000	32,000	35,100	34,700	32,600	171,400	
November	37,300	40,300	34,400	33,900	32,200	178,100	
December	36,600	*36,000	35,400	35,200	34,000	177,200	
FDOT Count Station 0227 (Big Pine Key)							
January	18,800	18,700	18,500	17,700	17,100	90,800	
February	21,100	20,600	20,000	19,300	19,400	100,400	
March	21,700	21,600	20,600	20,300	19,600	103,800	**19**
April	19,200	18,200	18,400	18,100	17,300	91,200	
May	17,400	17,300	16,700	16,500	15,800	83,700	
June	17,200	16,500	16,100	16,100	15,400	81,300	
July	18,200	16,700	16,400	16,700	15,800	83,800	
August	15,700	15,300	14,400	15,800	14,400	75,600	
September	13,300	13,300	13,800	14,000	11,600	66,000	**-37**
October	15,800	12,300	14,900	14,700	14,000	71,700	
November	16,400	16,300	15,500	15,100	14,500	77,800	
December	17,000	17,300	16,000	15,800	15,500	81,600	
FDOT Count Station 0164 (Key Largo)							
January	24,800	24,300	24,000	23,800	22,700	119,600	
February	27,400	26,400	25,700	25,100	24,900	129,500	
March	28,300	28,800	25,900	26,800	25,900	135,700	**13**
April	26,800	25,400	26,400	26,100	24,600	129,300	
May	26,200	26,200	25,300	24,700	23,800	126,200	
June	25,300	24,200	24,100	23,800	22,900	120,300	
July	27,300	26,200	25,000	25,700	24,100	128,300	
August	22,700	25,600	21,700	23,500	21,600	115,100	
September	17,400	*18,900	20,400	20,700	17,600	95,000	**-28**
October	21,900	18,300	21,100	20,200	19,300	100,800	
November	23,300	21,900	22,500	21,900	21,100	110,700	
December	22,700	23,100	21,800	21,600	21,800	111,000	

*Denotes average between the two adjacent years. Data was not available.

The data indicates that March is the peak month and September is the low month for traffic at the three locations of the Keys.

On Big Pine Key, the peak season fluctuations are more extreme on a percentage basis. At this location, March traffic is 19 percent higher than the annual average, and September traffic is 37 percent less than the average traffic. On Stock Island, the same months are 13 percent above and 20 percent below the annual average. On Key Largo, the same months are 13 percent above and 28 percent below the annual average.

It should be noted that the drop in traffic during the month of September corresponds almost directly with the drop in hotel occupancy for the Keys. The Trend Report, published annually by Smith Travel Research for the Monroe County Tourist Development Council, documents the monthly hotel/guest quarters occupancy rates for Monroe County and, separately, the City of Key West. A review of the rates for the year 2009 reveals a significant reduction in the Monroe County occupancy rate during the month of September (-38 percent) with respect to the 2009 average occupancy rate of 61.9 percent. In a simialr fashion, the maximum hotel/guest quarters occupancy tends to occur during the months of February and March with an increase of as much as 20 percent above the average annual rate. As such, it appears that the transient population directly impacts the rise aqnd fall of traffic flow in Monroe County.

4.3.5 2009 Operational Assessment of SR A-1-A

Table 4.17 presents a summary of the operational evaluation of SR A-1-A within the City of Key West. As shown in the table, SR A-1-A operates at LOS B or C throughout its length.

Table 4.17 – 2009 Operational Assessment of SR A-1-A in the City of Key West

From	To	FDOT Count Station	Posted Speed (MPH)	Number of Lanes	2009 AADT	Two Way Peak Hour Volume	Peak Hour Peak Direction Volume	Peak Hour Peak Direction MSV	LOS
Bertha Street	Key West Airport	5028	30	4LU	7,200	1,961	1,183	1,470	C
Key West Airport	Flagler Avenue	5027	30	4LU	11,200	1,046	558	1,470	B
Flagler Avenue	US-1	0049	30	4LU	19,400	1,783	1,085	1,470	B

Sources: (1) 2009 Florida Traffic Information DVD, Florida Department of Transportation and (2) 2009 FDOPT Quality/Level of Service Handbook.

4.3.6 Existing Modal Split and Vehicle Occupancy Rates

The automobile is typically the most convenient mode of transportation because of the ability to travel instantaneously as needed for the individual. Alternative modes of

transportation often incur delay associated with waiting for a bus, train, airplane, etc., in addition to the actual travel time on that mode to a particular destination. Thus, alternate modes often have difficulty competing against the automobile. Transportation options currently available in the County include the automobile, airplane, bus, bicycle, boat, and as a pedestrian.

Information regarding modal split and vehicle occupancy rates for the County is not available. However, the modal split is likely to significantly favor the automobile due to the lack of an extensive transit system, lack of population density, and a lack of connectivity of bicycle/pedestrian paths at the present time.

4.3.7 Significant Existing Pedestrian and Bicycle Facilities

In general, the existing pedestrian and bicycle facilities throughout the County parallel U.S. 1 (non-continuous). These facilities are part of The Florida Keys Overseas Heritage Trail Master Plan. The Master Plan will incorporate the existing trail segments to create a continuous pedestrian and bicycle facility from Key Largo at MM 106 to Key West at MM 0 that will connect communities, school, and businesses, along U.S. 1. Most of the trail is currently in existence, while a portion of it is still under construction. There are 60 miles of existing bike paths spread throughout the Keys and an additional 40 miles of new trail started construction in 2010. **Map Series 4-5** depicts the significant bicycle and pedestrian ways in the County.

4.3.8 Capacity of Significant Public Parking Facilities

There are two significant (i.e. public parking is in excess of 100 spaces) County-owned public parking facilities in the County and one owned by the City of Key West. One of the County facilities is located at the Key West International Airport while the other is at the Florida Keys Marathon Airport as shown in **Map Series 4-7**. The parking facility located at the Key West International Airport, was completed in 2009 and provides approximately 200 parking spaces at a cost of $10 per day and $50 for 5 to 7 days. This parking facility, which is managed by Republic Parking, Inc., has no separation for short term or long term parking.

The Florida Keys Marathon Airport parking facility offers 182 parking spaces, including five handicap accessible spaces at no charge.

The Key West Department of Transportation owns and operates the 300-space Old Town Garage, Park-N-Ride, in the Old Town Historic District. The 24-hour access garage is located at the intersection of Grinnell and Caroline Streets. Parking rates are $2.00 per hour with a maximum of $13.00 per day. A monthly permit costs $99.75. A Park-N-Ride Garage ticket entitles the bearer to ride public transportation in the City of Key West for free. **Map Series 4-7** also show the location of the Old Town Garage.

4.3.9 Availability of Transportation Facilities and Services for Existing Uses [9J-5.019(3)(b)]

As previously noted, U.S. 1 is the main arterial roadway within the Florida Keys and the County. County and local roadways, including frontage roads, generally serve shorter trip lengths while providing direct access to adjacent land uses. These current facilities effectively funnel traffic towards U.S. 1. Currently, existing land uses are adequately served by this roadway network since they are either adjacent to or within a few hundred feet of U.S. 1 and the collector roadways. Further supporting the roadway network is an interconnected network of bicycle and pedestrian paths. These bicycle and pedestrian paths generally parallel U.S. 1 providing multimodal access to existing land uses within the County.

In addition to U.S. 1, there are more than 600 miles of county (secondary) roads. The Monroe County Division of Public Works is charged with maintaining and improving secondary roads which are located within the boundaries of unincorporated Monroe County. The FDOT is responsible for maintaining U.S. 1[4] and SR A1A.

Pursuant to Sections 15.4.7of the Land Development Code, the Growth Management Department will not issue building permits for all traffic generating developments that would impact roadways with inadequate LOS**.**

4.3.10 Adequacy to Evacuate Population [9J-5.019(3)(c)]

U.S. 1 and Card Sound Road/CR-905 are designated as the evacuation routes for the Florida Keys as depicted in **Map Series 4-6**. U.S. 1 is the only land-based connection to the mainland with a variable roadway cross-section of two and four travel lanes throughout its length. Northeast of Key Largo, the U.S. 1 corridor splits into two roadways. U.S. 1 veers northwest connecting to Miami-Dade County, while Card Sound Road/CR-905 continues in the northeast direction. U.S. 1 specifically between MM 106 and MM 126 varies between a 2-lane divided roadway and a 4-lane divided roadway. In Florida City, U.S. 1 becomes a 4-lane divided facility.

Evacuation clearance times are used as emergency management tools throughout the State of Florida. However, in the County, they are also utilized for regulatory purposes. Specifically, since 1992, the County has implemented policies to ensure that clearance times shall not exceed 24 hours. **Table 4.18** summarizes the evacuation clearance times.

The *2006 South Florida Regional Hurricane Evacuation Traffic Study*, prepared by the South Florida Regional Planning Council, provides a summary and analysis of evacuation of the population of the County via U.S. 1 and Card Sound Road/CR-905. This analysis includes an estimate of the clearance times required to evacuate the County using these two roadways.

[4] *2008 Monroe County Public Facilities Capacity Assessment Report*

The study identifies evacuation zones, critical roadway segments, and clearance times based on development patterns, functional population, and behavioral analysis.

Based on a Category 4-5 hurricane on the Saffir-Simpson scale, analysis indicates that an early, phased evacuation of tourists and mobile home residents prior to the evacuation of permanent residents would result in evacuation clearance times for the County population of less than 24-hours. It was assumed in the analysis that the evacuation of tourists would begin approximately 48 hours in advance, followed by a 36-hour advance evacuation of mobile home residents, and a 30-hour advance evacuation of permanent residents.

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Table 4.18 - Evacuation Clearance Times

Evacuation Scenario[1]		Assumptions	Clearance Time	Required Clearance Time	Adequacy to Evacuate
South Florida Regional Model	2005 Baseline[2]	• 100% Evacuation Participation • 80% Vehicle Utilization Rates	35.7 Hours	24 Hours	No
	2005 Baseline with Phased Evacuation of Tourists and Mobile Home Resident[3]	• 70%/30% U.S. 1/Card Sound Road Distribution Split • 85% High Tourists Occupancy	23.6 Hours		Yes
Miller Model	2005 Baseline[2]	• 75% Evacuation Participation Rate • 70% Vehicle Utilization Rates	24.04 Hours		No
	2005 Baseline with Phased Evacuation of Tourists and Mobile Home Residents[3]	• 66% / 33% U.S. 1/Card Sound Road Distribution Split • 45% High Tourist Occupancy	18.1 Hours		Yes

Notes:

1. Assumed Category 4-5 Hurricane storm conditions.
2. Base Line Scenario assumes all residents and tourists would evacuate at the same time.
3. The Scenario is designed to represent the staged evacuation process adopted by Monroe County. It requires an approximately 48-hour advance evacuation for tourists, a 36-hour advance evacuation for mobile homes, and a 30-hour advance evacuation for permanent residents.

4.3.11 FDOT – Five-Year Work Program [9J-5.019(3)(g)]

The current County's Capital Improvement Program list does not include roadway improvements. Also, the City of Key West, City of Key Colony Beach, and City of Islamorada do not have future transportation improvements. The City of Marathon and City of Layton transportation improvements are limited to maintenance and resurfacing. However, major improvements scheduled for U.S. 1 are outlined in the FDOT Five-Year Work Program (2010 – 2014) as summarized in **Table 4.19** below:

Table 4.19 - FDOT's Five-Year Work Program (2010 – 2014)

Florida Keys – Overseas Heritage Trail
• The segment from MM 60.5-Craig Key to 62.9-Long Key • The segment from MM 16.5-Lower Sugarloaf to MM 24.5-Summerland Key • The segment from MM 47 to MM 54 for safety improvements • The segment from MM 106 (new trailhead) between U.S. 1 and Card Sound Road • The segment from MM 83.5-Windley Key to MM 84.8 • The segment from MM 92 to MM 96 (safety improvements) • The segment from MM 15 to MM 16.5- Lower Sugarloaf Key • The segment from MM 96 to MM 106- Key Largo • The segment from City of Layton to Channel 5 Bridge • The segment from MM 33.3-Spanish Harbor to MM 40.5-7 mile bridge • The segment from MM 5.2-Key Haven to MM 11-Big Coppitt Key
Historic Bridges Scheduled for Reconstruction that are Part of the Overseas Heritage Trail
• The Ohio-Missouri Historic Bridge (MM 39.1) • The Kemp Channel Bridge (MM 23.6) • The Spanish Harbor Historic Bridge (MM 33) • The Historic South Pine Channel Bridge (MM 29)
Other Bike Path Trails
• Atlantic Boulevard from Bertha Street to White Street • College Road from Florida Keys Community College to SR 5/U.S. 1 • Glenn Archer Drive from SR 5/N Roosevelt Boulevard to Flagler Avenue
Bridge Repairs and Rehabilitations
• Baypoint Bridge #904140 at Palm Drive (Saddlebunch Key) • Geiger Key Bride #904110 on Boca Chica Road • SR 5/Indian Key Channel Bridge #900095 substructure repairs • SR 5/Overseas Highway Big Spanish channel (Bahia Honda) • SR 5/Spanish Harbor Big Pine Key at Bahia Honda • SR 5/Toms Harbor Channel in Little Duck Key • SR A1A/S. Roosevelt Boulevard Bridge #90054 over Thompson Creek • SR A1A/S. Roosevelt Boulevard from Bertha Street to SR 5/U.S. 1 • SR 5/Channel 2 Bridge substructure repairs

Table 4.19 - FDOT's Five-Year Work Program (2010 – 2014) (Continued)

Resurfacing
• SR 5 From Ships Way To Sands Rd And From Sands Rd To W Of Key Deer Crossing • SR 5/Overseas Hwy. From N Of 37 St./MM49.1 To N Of Cocoplum Dr/MM 54.6
Resurfacing and Additional Shoulder Pavement
• SR 5/Overseas Hwy. From Knights Key, MM 47.0 To Coast Guard Entrance, MM 48.0 The Kemp Channel Bridge (MM 23.6) (Hurricane Evacuation) • SR 5/Overseas Hwy. From MM 93 To MM 97 (Hurricane Evacuation) • SR 5/Overseas Hwy. From MM 103/Hialeah Lane To MM 107/Lake Surprise Rd (Hurricane Evacuation) • SR 5/Overseas Hwy. From MM 86.8/S Of East Ridge Rd To MM 90/Poinciana Blvd (Hurricane Evacuation) • SR 5/Overseas Hwy. From MM 99.7/S Of Laguna Ave To MM 103.1/Hialeah Ln (Hurricane Evacuation) • SR 5/Overseas Hwy. From N Jo-Jean Way/MM 92 To S Of Camelot Dr/MM 93 (Hurricane Evacuation) • SR 5/Overseas Hwy. From Tavernier Creek Bridge/MM 91 To Jo-Jean Way/MM 92 (Hurricane Evacuation) • SR 5/Overseas Hwy. From Travel Trailer Town/MM 96 To 175' N-Sunset Blvd/MM 99 (Hurricane Evacuation) • SR 5/Overseas Hwy. From 950' E Of Jade Drive To 680' E Of Shark Key • SR 5/Overseas Hwy. From 50' S Of Fontaine Dr To S Of Tavernier Creek Bridge • SR 5/Overseas Hwy. From Blue Isle Blvd, MM 59.9 To N Of Beach Entrance, MM 73.4 • SR 5/Overseas Hwy. From Jerome Ave MM 81.4 To Whale Harbor Channel, MM 84.0 • SR 5/Overseas Hwy. From MM 11.7/Shark Key Entrance To MM 14.6/West Circle Dr • SR 5/Overseas Hwy. From Whale Harbor, MM 84.0 To Smugglers Cove Entrance, MM 85.6 • SR 5/Overseas Hwy. From 270'S Of Harbor View To 760' N Of MM 93 (S/B) • SR 5/Overseas Hwy. From 490'E Of West Indies Dr To 150' W Of Palmetto Ave • SR 5/Overseas Hwy. From 2580' S Of MM 97 To 2000'S Of MM 100(S/B Only)
Roadway Widening
• SR 5/Big Coppitt Key From Rockland Channel Bridge To Old Boca Chica Channel (2L to 3L – Center Turn Lane) • SR 5 from Ships Way to Sands Road and from Sands Road to west of Key Deer Crossing in Big Pine Key (2L to 3L – Center Turn Lane).

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4.4 Future Traffic Circulation

4.4.1 Introduction

This section of the Traffic Circulation Element describes the procedures developed to forecast future traffic growth in the County through 2030, provides an analysis of the future traffic conditions and presents transportation system improvements necessary to address those deficiencies.

Trip forecasts were developed based upon projected household or occupied dwelling unit estimated for the County and the incorporated urban areas: City of Marathon, City of Key West, City of Layton, City of Key Colony Beach, and Islamorada--Village of Islands. Future household estimates for the incorporated urban areas were derived from each of the corresponding jurisdiction's comprehensive plan and/or planning documents. Future household estimates for the County were derived as described in Section 2.6 of the Future Land Use Element.

A key traffic capacity limitation in the County is the ability of various segments of U.S. 1 to accommodate traffic volume increases at LOS C. The ability of the County to accommodate traffic volume growth varies by segment of U.S. 1 and by collector roadway. Thus, the distribution of potential residential growth by segment of U.S. 1 (and by Planning Area) will be the critical factor in determining the future roadway segments which are over capacity.

4.4.2 Trip Forecasts for Monroe County

Table 4.20 presents the projected functional (seasonal plus permanent) population and household growth for the unincorporated areas of the County from 2010 to 2030. The functional population estimates reflect the County's current general policies regarding limited and controlled growth (see **Section 2.6** of the Future Land Use Element). The projected annual population growth rate between 2010 and 2030 is about 0.218 percent per year. The functional households were estimated based upon persons per household factors of 2.2 for the permanent population and 2.7 for the seasonal population.

Table 4.21 presents the estimated daily trips per five year period for each of the three Planning Areas (PA). The daily household trips were determined based on the trip generation rate of 8 daily trips per household unit.[5] The total new unincorporated County generated daily trips by 2030 are estimated at 8,912. Of this total, the Upper Keys PA is forecast to generate 3,632 of daily trips or 40.8 percent of the total. The Middle Keys PA would generate about 272 daily trips or 3.1 percent of the total; whereas, the Lower Keys PA would generate 5,008 trips or 56.2 percent of the total.

[5] 2010 U.S. 1 Arterial Travel Time and Delay Study, URS, August 2010.

Table 4.20 - Functional Population and Household Estimates for the Unincorporated County

Year	Functional Population				Households (HH)			
	Lower Keys	Middle Keys	Upper Keys	Total Pop	Lower Keys	Middle Keys	Upper Keys	Functional Households
2010	39,645	2,183	28,980	70,808	16,350	900	11,952	29,202
2015	40,181	2,212	29,370	71,763	16,564	912	12,107	29,584
2020	40,592	2,234	29,668	72,494	16,701	919	12,207	29,827
2025	41,003	2,256	29,966	73,225	16,838	926	12,306	30,071
2030	41,414	2,278	30,265	73,957	16,976	934	12,406	30,315

Source: Keith and Schnars, P.A. and Fishkind & Associates, Inc., Unincorporated Monroe County Population Projections, February 2011

Table 4.21 - Forecast of Unincorporated Monroe County Trips, 2010-2030

Forecast Year	Lower Keys			Middle Keys			Upper Keys			Total Trips per Period
	House holds (HH)	HH per Period	Trips per Period	House holds (HH)	HH per Period	Trips per Period	House holds (HH)	HH per Period	Trips per Period	
2010	16,350	--	--	900	--	--	11,952	--	--	--
2015	16,564	214	1,712	912	12	96	12,107	155	1,240	3,048
2020	16,701	137	1,096	919	7	56	12,207	100	800	1,952
2025	16,838	137	1,096	926	7	56	12,306	99	792	1,944
2030	16,976	138	1,104	934	8	64	12,406	100	800	1,968
Totals 2010-2030		**626**	**5,008**		**34**	**272**		**454**	**3,632**	**8,912**

Source: Keith and Schnars, P.A. and Fishkind & Associates, Inc., Unincorporated Monroe County Population Projections, February 2011

4.4.3 Trip Forecasts for Incorporated Urban Areas

4.4.3.1 City of Key West

The City of Key West is preparing a new Building Permit Allocation System Ordinance. This ordinance, commonly referred to as the Rate of Growth Ordinance (ROGO) allocates units for new development within the City as part of a growth management process mandated by the adopted Comprehensive Plan. The original 1993 plan was devised to tie new growth to hurricane evacuation clearance times. New development would only be allowed if hurricane evacuation stayed under 24 hours. In the beginning, a limited number of new units were allocated and assigned to specific developments. In time, however, almost all the available allocations were exhausted. A small pool of units dedicated to affordable housing and for "beneficial use" (the minimum use needed to provide owners with reasonable use of their land) were reserved.

Since February 2008, the City of Key West instituted a "zoning in progress" doctrine during the preparation of the new ordinance. The City will only allocate new units for workforce housing. Because so few new units existed in the system anyway, the zoning in progress resolution has had little impact on actual development in the City. Most development continues to be redevelopment of existing units which are either acknowledged as lawfully established prior to the institution of the Building Permit Allocation System or can demonstrate that they have valid allocations.

Due to the inability to project the demand volumes for workforce housing for the City of Key West, for planning purposes, it has been assumed that the City has a minimal housing unit impact with respect to traffic.

4.4.3.2 City of Marathon

Housing projections for the City of Marathon were obtained from the City of Marathon Comprehensive Plan, Adopted March 8, 2005. Currently, under the ROGO, the City of Marathon is allocated 30 residential units per each ROGO allocation year by the State of Florida. Based on the housing information from the 2000 U. S. Census, and highlighted in the City's comprehensive plan, the City will have added 600 units by 2020 for a projected total of 7,391 permanent housing units.[6]

The number of permanent occupied units, 4,996 units, was determined by multiplying the total projected units by 67.59 percent. The number of persons per occupied dwelling unit (or household) is 2.19. The number of seasonal units projected for 2020 is estimated at 3,090. The occupancy is estimated at 59.7 percent with 2.92 persons per unit.

[6] Source: Table I-7: Population Estimates and Projections, 2000-2020, page 11 of 218, Chapter I Future Land Use Data Inventory and Analysis, City of Marathon Comprehensive Plan, March 8, 2005.

Table 4.22 presents the 2010-2030 forecasts for both the permanent and seasonal occupied units as well as estimated daily trips per 5-year forecast period.

4.4.3.3 City of Key Colony Beach

The City of Key Colony Beach's housing stock is predominantly duplex and multifamily. According to the U.S. Census Bureau American Community Survey, approximately 80 percent of the City's housing units are multi-family with less than 20 percent being single family units. **Table 4.23** presents the forecasted population, household, and daily trip estimates for the City of Key Colony Beach between 2010 and 2030. Projections beyond 2020 were estimated based on the estimated yearly growth rate through 2020. Daily trips were determined by applying the rate of 8 trips per dwelling unit as per the **2010 U.S. 1 Arterial Travel Time and Delay Study**, URS, August 2010.

Table 4.22 - Forecasted Household and Daily Trip Growth for the City of Marathon, 2010-2030

Year	2005 [1]	2010 [1]	2015 [1]	2020 [1]	2025 [2]	2030 [2]
Permanent Occupied Units	4,692	4,793	4,895	4,996	5,097	5,198
Seasonal Occupied Units	2,829	2,913	3,000	3,090	3,180	3,270
Total Occupied Units	7,521	7,706	7,895	8,086	8,277	8,468
Change per 5-Year Period	--	185	189	191	191	191
Daily Trips [3]	--	1,480	1,512	1,528	1,528	1,528

1. Source: City of Marathon Comprehensive Plan, March 2005.
2. Projections beyond 2020 are estimated based on yearly growth estimate.
3. Daily trips determined by applying rate of 8 trips per dwelling unit as per 2010 U.S. 1 Arterial Travel Time and Delay Study, URS, August 2010.

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Table 4.23 - Forecasted Population, Household, and Daily Trip Growth for the City of Key Colony Beach, 2010-2030

Year	2005 [1]	2010 [1]	2015 [1]	2020 [1]	2025 [2]	2030 [2]
Permanent Population	836	832	819	808	795	783
Seasonal Population	1,726	1,768	1,810	1,852	1,897	1,943
Total Peak Population	2,562	2,600	2,629	2,660	2,692	2,726
Change in Population	--	38	29	31	32	34
Dwelling Units [3]		20	16	17	17	18
Daily Trips [4]		160	128	136	136	144

1. City of Key Colony Beach Comprehensive Plan, Adopted July 2007 and amended November 2008, and LaRue Planning and Management Services, Inc., 2005.
2. Projected population based on annual growth rates, 2005-2020.
3. Assumed a factor of 1.87 persons per dwelling unit among both permanent and seasonal populations.
4. Daily trips determined by applying rate of 8 trips per dwelling unit as per 2010 U.S. 1 Arterial Travel Time and Delay Study, URS, August 2010.

4.4.3.4 City of Layton

As the smallest incorporated area, the City of Layton is nearing full residential build-out. Forecasted single and multi-unit residential dwelling unit estimates for the City of Layton were determined based on the information provided in the City's 2020 Comprehensive Plan, Adopted November 16, 1990, amended March 12, 2009. In 2007, a capacity for a projected 22 single family dwelling units was determined.

Table 4.24 presents the estimated incremental five-year period residential unit growth for the City of Layton, as well as the estimated daily trips for each period. It was assumed that residential build-out of 205 units will be achieved by 2020 and no or negligible growth beyond that period.

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Table 4.24 - Forecasted Residential Dwelling Unit Growth for the City of Layton, 2010-2030

Dwelling Unit Type	Year					
	2007 [1]	2010 [1]	2015 [1]	2020 [1]	2025 [2]	2030 [2]
Single Family	130	139	147	152	152	152
Multifamily	54	54	55	58	58	58
Total	184	193	202	210	210	210
Incremental Growth 2010-2030	--	9	9	8	0	0
Daily Trips [3]	--	72	72	64	0	0

1. Dwelling unit estimate based on assessment of Figure 3-3, Existing Land Use Map, May 2007 and Figure 3-4, Future Land Use Map 2020, City of Layton, Florida, Comprehensive Plan, Adopted November 16, 1990, Amended March 12, 2009.
2. Residential development build-out assumed by 2020.
3. Daily trips determined by applying rate of 8 trips per dwelling unit as per 2010 U.S. 1 Arterial Travel Time and Delay Study, URS, August 2010.

4.4.3.5 Islamorada, Village of Islands

The previous ROGO program for Islamorada allows up to 22 residential units (18 market rate and 4 affordable units) to be constructed each year within the Village. If the Village adheres to this growth rate through the horizon date of its Comprehensive Plan (2020), then 440 new units would be constructed above the 2001 housing stock. The land use plan parameters allows for a residential and commercial mix equal in impact to 396 residential dwelling units, its maximum build-out conditions. After 2003, the annual allotment was set at 14 units per year through year 2020. New residential development should not exceed 302 units over the twenty year (2001-2020) planning period.

Table 4.25 presents the forecasted dwelling units and daily trips through 2030 for Islamorada.

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Table 4.25 - Forecasted Dwelling Units and Daily Trip Growth for Islamorada, Village of Islands, 2010-2030[1]

Year	2010 [2]	2015 [2]	2020 [2]	2025 [3]	2030 [3]
Dwelling Units	70	70	70	0	0
Daily Trips [4]	560	560	560	0	0

1. Islamorada, Village of Islands, Comprehensive Plan, Data Inventory and Data Analysis, January 2001.
2. No more than 14 residential units per year can be constructed under the proposed program through year 2020. New residential development should not exceed 302 units over the twenty year (2001-2020) planning period.
3. Build-out assumed by 2020.
4. Daily trips determined by applying rate of 8 trips per dwelling unit as per 2010 U.S. 1 Arterial Travel Time and Delay Study, URS, August 2010.

4.4.3.6 Summary of Daily Trips and Residential Units

Table 4.26 shows a summary of the County and incorporated areas forecasted dwelling units and new daily trips per five-year forecast period through 2030. The overall growth trend of future residential units is expected to gradually decrease through 2025 and reverse upward by 2030. Most of the traffic increase beyond 2020 will be associated with the development of potential residential units in the cities (e.g. Marathon), an upward change in the County's functional population before 2030, and a possible increase in dwelling unit occupancies (Key West and Key Colony Beach). The cities of Layton and Key Colony Beach are expected to have been build-out by 2020.

Table 4.26 - Summary of Daily Trip and Residential Unit Forecasts

Year	Daily Trips [1]	Residential Units
2015	5,320	665
2020	4,240	530
2025	3,608	451
2030	3,640	455
20-Year Totals	**16,808**	**2,101**

1. The daily trips for each year consists of the estimated daily trips of each of the three Monroe County geographic study areas (non-incorporated areas) and the incorporated municipalities.

4.4.4 Future Traffic Forecasts

4.4.4.1 Annual Average Daily Traffic Forecast

Estimates of future AADT along the U.S. 1 corridor were made based upon a combination of the historic AADT volumes and growth rates at each of the FDOT count stations and the estimated daily trips for the forecasted residential development for the county and cities through 2030. The following is a summary of the procedure applied to estimate the forecasted AADT for each of the 24 segments of the U.S. 1 corridor:

- An annual system-wide background or ambient growth rate of 0.31 percent per year was applied to all future estimates through 2030 at each of the count stations.[7] This rate was determined from the weighted average of the 2000-2009 growth rates at the following key stations, located at or near the Keys Planning Area limits:
  - Station #0009 and Station #0066 which are located at the western and eastern limits, respectively, of the Lower Keys Planning Area;
  - Station #0066 and Station #0065 which are located at the western and eastern limits, respectively, of the Middle Keys Planning Area; and
  - Station #0065 and Stations #0001 (U.S. 1) and #0002 (Card Sound Road) which are located at the western and northern limits, respectively, of the Upper Keys Planning Area.

- The estimated daily trips generated by the planned or permitted residential units for both the unincorporated county areas and cities, were added to each five-year forecast period at each of the count stations.

- Where there were more than one count station within a U.S. 1 segment, the average value of the stations was determined and applied to the segment analysis (Segments 1 (Stock Island), 10 (Big Pine), 12 (7-Mile Bridge), 22 (Travernier), and 23 (Key Largo).

- In Segment 13 (Marathon) the station with the highest recorded volume was selected for the analysis (FDOT Station 0064, MM 100).

Table 4.27 presents the estimated 2010-2030 AADT forecasts for each of the U.S. 1 segments.

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[7] The 2000-2009 AADT growth rate parallels the Monroe County functional population growth rate of 0.3 percent per year.

Table 4.27 - 2010-2030 Annual Average Daily Traffic Forecasts for U.S. 1

U.S. 1 Segment		Begin MM End MM	Area	Annual Average Daily Traffic Forecasts				
				2010	2015	2020	2025	2030
1	Stock Island	4.0 - 5.0	Monroe	37,883	39,651	40,807	41,964	43,131
2	Boca Chica	5.0 - 9.0	Monroe	25,589	27,685	29,196	30,730	32,295
3	Big Coppitt	9.0 - 10.5	Monroe	21,659	23,696	25,147	26,621	28,124
4	Saddlebunch	10.5 - 16.5	Monroe	20,846	22,871	24,310	25,770	27,261
5	Sugarloaf	16.5 - 20.5	Monroe	19,488	21,492	22,911	24,350	25,820
6	Cudjoe	20.5 - 23.0	Monroe	19,488	21,492	22,911	24,350	25,820
7	Summerland	23.0 - 25.0	Monroe	18,129	20,113	21,511	22,929	24,377
8	Ramrod	25.0 - 27.5	Monroe	18,484	20,473	21,876	23,301	24,754
9	Torch	27.5 - 29.5	Monroe	18,838	20,833	22,241	23,671	25,130
10	Big Pine	29.5 - 33.0	Monroe	18,027	20,009	21,406	22,823	24,269
11	Bahia Honda	33.0 - 40.0	Monroe	17,387	19,360	20,746	22,153	23,590
12	7-Mile Bridge	40.0 - 47.0	Monroe	15,087	17,073	18,641	20,187	21,755
13	Marathon	47.0 - 54.0	Marathon & Key Colony Beach	32,502	34,798	36,582	38,302	40,038
14	Grassy	54.0 - 60.5	Marathon & Key Colony Beach	16,482	18,537	20,321	22,041	23,777
15	Duck	60.5 - 63.0	Monroe	13,208	15,214	16,998	18,718	20,454
16	Long	63.0 - 73.0	Monroe	9,933	11,890	13,674	15,394	17,130
17	Lower Matecumbe	73.0 - 77.5	Islamorada	13,751	15,757	17,794	19,861	21,958
18	Tea Table	77.5 - 79.5	Islamorada	13,793	15,800	17,837	19,904	22,003
19	Upper Matecumbe	79.5 - 84.0	Islamorada	13,793	15,800	17,837	19,904	22,003
20	Windley	84.0 - 86.0	Islamorada	13,834	15,842	17,879	19,948	22,047
21	Plantation	86.0 - 91.5	Islamorada	34,045	37,371	39,731	42,127	44,559
22	Tavernier	91.5 - 99.5	Monroe	26,701	28,902	31,135	33,402	35,703
23	Key Largo	99.5 - 106.0	Monroe	28,738	30,538	33,233	35,532	37,865
24	Cross	106.0 - 112.5	Monroe	17,787	19,854	21,952	24,081	26,242

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4.4.4.2 Forecast of Reserve Speed and Residential Capacity

As previously described in **Section 4.3.4.4**, the difference between segment travel speeds and the LOS C standard is known as the "Reserve Speed". Reserve speed is converted into an estimated reserve capacity of additional traffic volumes and corresponding additional development. If the LOS C standard is exceeded, a fixed number of additional trips for land development are allowed as calculated based on the U.S. 1 Methodology until the next update of the *U.S. 1 Arterial Travel Time and Delay Study* (the "Study") or until mitigation actions are implemented.

Whereas the reserve speeds are derived from the annual travel time and delay studies, a methodology to determine future reserve speeds (and thus, future reserve volumes and residential capacities for each segment) was developed based on the forecasted AADT volumes and median speeds.

- The incremental increase in forecast AADT between each 5-year period was determined and a factor of 1,656 trips/mph[8] was applied, yielding an estimated reduction factor for the median speed for the segment.

- The speed reduction was then applied to the previous 5-year period's median speed to determine the forecast period's median speed.

- The difference between the forecast period's median speed and the LOS C value established for each segment provides the reserve speed for that segment.

Table 4.28 presents the estimated 2015-2030 forecasts of reserve speeds for each of the U.S. 1 segments. The reserve speeds for 2010 were obtained from the recently completed Study.

Table 4.29 presents the estimated 2015-2030 forecasts of reserve volumes and residential capacities for each of the U.S. 1 segments. These were derived through the application of the U.S. 1 Methodology as described in **Section 4.3.4.4.** The individual reserve volumes may be unobtainable, due to the constraint imposed by the overall reserve volume of 35,240 daily trips as determined in the Study. For planning purposes, the 5 percent allocation for future timeframes was not determined.

It is important to note that the median speed, reserve volume, and residential capacity projections are based upon the reserve speeds for 2010 as established in the Study; and as such are valid until the next update of the Study or until mitigation actions are implemented.

[8] Source: 2010 U.S. 1 Arterial Travel Time and Delay Study, August 2010

Table 4.28 - 2010-2030 Reserve Speed Forecast for U.S. 1

U.S. 1 Segment		Segment Length (Miles)	Reserve Speed Forecast				
			2010	2015	2020	2025	2030
1	Stock Island	1.1	12.0	10.9	10.2	9.5	8.8
2	Boca Chica	3.9	7.7	6.4	5.5	4.6	3.7
3	Big Coppitt	1.5	0.0	-2.6	-3.5	-4.4	-5.3
4	Saddlebunch	5.8	2.7	1.5	0.6	-0.3	-1.2
5	Sugarloaf	4	0.4	-0.8	-1.7	-2.5	-3.4
6	Cudjoe	2.5	6.1	4.9	4.0	3.2	2.3
7	Summerland	2.2	5.4	4.2	3.4	2.5	1.6
8	Ramrod	2.3	4.9	3.7	2.9	2.0	1.1
9	Torch	2.1	6.0	4.8	3.9	3.1	2.2
10	Big Pine	3.4	2.7	1.5	0.7	-0.2	-1.1
11	Bahia Honda	7	6.2	5.0	4.2	3.3	2.5
12	7-Mile Bridge	6.8	3.3	2.1	1.2	0.2	-0.7
13	Marathon	7.3	14.7	13.3	12.2	11.2	10.1
14	Grassy	6.4	-2.7	-3.9	-5.0	-6.1	-7.1
15	Duck	2.7	3.5	2.3	1.2	0.2	-0.9
16	Long	9.9	4.1	2.9	1.8	0.8	-0.2
17	Lower Matecumbe	4.5	-1.3	-2.5	-3.7	-5.0	-6.3
18	Tea Table	2.2	-0.5	-1.7	-2.9	-4.2	-5.5
19	Upper Matecumbe	4.1	0.9	-0.3	-1.5	-2.8	-4.1
20	Windley	1.9	14.2	13.0	11.8	10.5	9.2
21	Plantation	5.8	3.0	1.0	-0.4	-1.9	-3.3
22	Tavernier	8	7.2	5.9	4.5	3.2	1.8
23	Key Largo	6.8	8.1	7.0	5.4	4.0	2.6
24	Cross	6.2	7.0	5.8	4.5	3.2	1.9

Table 4.29 - 2010-2030 Reserve Volume and Residential Unit Capacity Forecast per Segment of U.S. 1

U.S. 1 Segment		2010		2015		2020		2025		2030	
		Reserve Volume [1]	Residential Unit Capacity	Reserve Volume [1]	Residential Unit Capacity	Reserve Volume [1]	Residential Unit Capacity	Reserve Volume [1]	Residential Unit Capacity	Reserve Volume [1]	Residential Unit Capacity
1	Stock Island	2,186	342	1,991	311	1,864	291	1,737	271	1,609	251
2	Boca Chica	4,973	777	4,156	649	3,566	557	2,968	464	2,358	368
3	Big Coppitt	549[2]	86	Note 3	Note 3	Note 3	Note 3	Note 3	Note 3	Note 3	Note 3
4	Saddlebunch	2,593	405	1,419	222	584	91	Note 3	Note 3	Note 3	Note 3
5	Sugarloaf	265	41	Note 3	Note 3	Note 3	Note 3	Note 3	Note 3	Note 3	Note 3
6	Cudjoe	2,525	395	2,024	316	1,670	261	1,310	205	942	147
7	Summerland	1,967	307	1,531	239	1,223	191	911	142	593	93
8	Ramrod	1,866	292	1,409	220	1,086	170	758	119	424	66
9	Torch	2,087	326	1,668	261	1,372	214	1,072	167	765	120
10	Big Pine	1,520	238	846	132	371	58	Note 3	Note 3	Note 3	Note 3
11	Bahia Honda	7,187	1,123	5,806	907	4,836	756	3,851	602	2,845	445
12	7-Mile Bridge	3,716	581	2,366	370	1,299	203	248	39	Note 3	Note 3
13	Marathon	17,771	2,777	16,094	2,515	14,792	2,311	13,537	2,115	12,269	1,917
14	Grassy	0[2]	0	Note 3	Note 3	Note 3	Note 3	Note 3	Note 3	Note 3	Note 3
15	Duck	1,565	245	1,023	160	542	85	77	12	Note 3	Note 3
16	Long	6,722	1,050	4,784	748	3,018	472	1,315	206	Note 3	Note 3
17	Lower Matecumbe	940[2]	147	Note 3	Note 3	Note 3	Note 3	Note 3	Note 3	Note 3	Note 3
18	Tea Table	727[2]	114	Note 3	Note 3	Note 3	Note 3	Note 3	Note 3	Note 3	Note 3
19	Upper Matecumbe	611	95	Note 3	Note 3	Note 3	Note 3	Note 3	Note 3	Note 3	Note 3
20	Windley	4,468	698	4,086	638	3,699	578	3,306	517	2,907	454
21	Plantation	2,881	450	952	149	Note 3	Note 3	Note 3	Note 3	Note 3	Note 3
22	Tavernier	9,539	1,490	7,778	1,215	5,991	936	4,178	653	2,337	365
23	Key Largo	9,121	1,425	7,897	1,234	6,065	948	4,501	703	2,915	455
24	Cross	7,187	1,123	5,906	923	4,605	719	3,285	513	1,945	304

1. These individual reserve volumes may be unobtainable, due to the constraint imposed by the overall reserve volume.

Table 4.29 notes (continued):

2. Value shown is 5% Allocation for 2010. County regulations and FDOT policy allow segments that fail to meet LOS C standards to receive an allocation not to exceed five percent below the LOS C standard. The resulting flexibility allows a limited amount of additional land development (number of residential units as shown) to continue until traffic speeds are measured the following year or until remedial actions are implemented.
3. Residential capacity not determined for future years where forecast reserve capacity is negative.

4.4.4.3 Projected U.S. 1 Level of Service

The information presented in **Tables 4.28** and **4.29** provides a "snapshot" of the current (2010) segments where there is potential for significant residential development restrictions notwithstanding any restrictions regarding local development, redevelopment, or hurricane evacuation restrictions. These segments are candidates for being designated as either "backlogged" or "constrained" by FDOT.

Based upon the measured and forecasted speeds, reserve volumes and residential capacities for all of the U.S. 1 segments, the following segments are projected to operate below the acceptable LOS C:

Year 2010 (Current):

- U.S. 1 on Big Coppitt Key from MM 9.0 to MM 10.5 (segment 3), LOS D;
- U.S. 1 on Grassy Key from MM 54.0 to 60.5 (Segment 14), LOS D;
- U.S. 1 on Lower Matecumbe Key from MM 73.0 to 77.5 (Segment 17), LOS D; and
- U.S. 1 on Tea Table Key from MM 77.5 to MM 79.5 (segment 18), LOS D.

Year 2015:

- U.S. 1 on Big Coppitt Key from MM 9.0 to MM 10.5 (segment 3), LOS D;
- U.S. 1 on Sugarloaf Key from MM 16.5 to 20.5 (segment 5), LOS D;
- U.S. 1 on Grassy Key from MM 54.0 to 60.5 (Segment 14), LOS E;
- U.S. 1 on Lower Matecumbe Key from MM 73.0 to 77.5 (Segment 17), LOS D;
- U.S. 1 on Tea Table Key from MM 77.5 to MM 79.5 (segment 18), LOS D; and
- U.S. 1 on Upper Matecumbe Key from MM 79.5 to 84.0 (Segment 19), LOS D.

Year 2020:

- U.S. 1 on Big Coppitt Key from MM 9.0 to MM 10.5 (segment 3), LOS D;
- U.S. 1 on Sugarloaf Key from MM 16.5 to 20.5 (segment 5), LOS D;
- U.S. 1 on Grassy Key from MM 54.0 to 60.5 (Segment 14), LOS E;
- U.S. 1 on Lower Matecumbe Key from MM 73.0 to 77.5 (Segment 17), LOS D;
- U.S. 1 on Tea Table Key from MM 77.5 to MM 79.5 (segment 18), LOS D;
- U.S. 1 on Upper Matecumbe Key from MM 79.5 to 84.0 (Segment 19), LOS D; and
- U.S. 1 on Plantation Key from MM 86.0 to 91.5 (Segment 21), LOS D.

Year 2025:

- U.S. 1 on Big Coppitt Key from MM 9.0 to MM 10.5 (segment 3), LOS E;
- U.S. 1 on Saddlebunch Key from MM 10.5 to 16.5 (segment 4), LOS D;

- U.S. 1 on Sugarloaf Key from MM 16.5 to 20.5 (segment 5), LOS D;
- U.S. 1 on Big Pine Key from MM 29.5 to 33.0 (segment 10), LOS E;
- U.S. 1 on Grassy Key from MM 54.0 to 60.5 (Segment 14), LOS E;
- U.S. 1 on Lower Matecumbe Key from MM 73.0 to 77.5 (Segment 17), LOS E;
- U.S. 1 on Tea Table Key from MM 77.5 to MM 79.5 (segment 18), LOS E;
- U.S. 1 on Upper Matecumbe Key from MM 79.5 to 84.0 (Segment 19), LOS D; and
- U.S. 1 on Plantation Key from MM 86.0 to 91.5 (Segment 21), LOS D.

Year 2030:

- U.S. 1 on Big Coppitt Key from MM 9.0 to MM 10.5 (segment 3), LOS E;
- U.S. 1 on Saddlebunch Key from MM 10.5 to 16.5 (segment 4), LOS D;
- U.S. 1 on Sugarloaf Key from MM 16.5 to 20.5 (segment 5), LOS E;
- U.S. 1 on Big Pine Key from MM 29.5 to 33.0 (segment 10), LOS E;
- U.S. 1 on 7-Mile Bridge from MM 40.0 to 47.0 (segment 11), LOS D;
- U.S. 1 on Grassy Key from MM 54.0 to 60.5 (Segment 14), LOS E;
- U.S. 1 on Duck Key from MM 60.5 to 63.0 (segment 15), LOS D;
- U.S. 1 on Long Key from MM 63.0 to 73.0 (segment 16), LOS D;
- U.S. 1 on Lower Matecumbe Key from MM 73.0 to 77.5 (Segment 17), LOS E;
- U.S. 1 on Tea Table Key from MM 77.5 to MM 79.5 (segment 18), LOS E;
- U.S. 1 on Upper Matecumbe Key from MM 79.5 to 84.0 (Segment 19), LOS E; and
- U.S. 1 on Plantation Key from MM 86.0 to 91.5 (Segment 21), LOS E.

The projected 2010-2030 levels of service for each of the U.S. 1 corridor segments are presented in **Table 4.30**. The LOS for each segment per forecast period was derived from the application of the LOS criteria as per the Study as presented previously in **Table 4.12**.

Those segments that have the potential to achieve LOS E prior to 2020 should be more closely monitored and given a higher priority for improvements.

Segments that have used-up the 5 percent reserve trips are restricted from new development or redevelopment, except where redevelopment has no net increase in trips. A portion of US 1 in the Grassy Key segment was under construction at the time of the Study and was expected to improve operationally once the construction was completed. Therefore, the restrictions cannot be imposed on this segment until such time that the impact of the improvements are validated.

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Table 4.30 - Projected U.S. 1 Level of Service, 2010 – 2030

U.S. 1 Segment		Begin MM - End MM	Level of Service for Forecast Years [1, 2]				
			2010	2015	2020	2025	2030
1	Stock Island	4.0 - 5.0	B	B	B	B	B
2	Boca Chica	5.0 - 9.0	A	A	A	A	A
3	Big Coppitt	9.0 - 10.5	**D**	**D**	**D**	**E**	**E**
4	Saddlebunch	10.5 - 16.5	C	C	C	**D**	**D**
5	Sugarloaf	16.5 - 20.5	C	**D**	**D**	**D**	**E**
6	Cudjoe	20.5 - 23.0	A	A	B	B	C
7	Summerland	23.0 - 25.0	B	B	B	B	C
8	Ramrod	25.0 - 27.5	B	B	B	B	C
9	Torch	27.5 - 29.5	A	A	B	B	C
10	Big Pine	29.5 - 33.0	C	C	C	**E**	**E**
11	Bahia Honda	33.0 - 40.0	A	A	A	A	C
12	7-Mile Bridge	40.0 - 47.0	B	B	B	B	**D**
13	Marathon	47.0 - 54.0	A	A	B	B	B
14	Grassy	54.0 - 60.5	**D**	**E**	**E**	**E**	**E**
15	Duck	60.5 - 63.0	B	B	C	C	**D**
16	Long	63.0 - 73.0	B	B	C	C	**D**
17	Lower Matecumbe	73.0 - 77.5	**D**	**D**	**D**	**E**	**E**
18	Tea Table	77.5 - 79.5	**D**	**D**	**D**	**E**	**E**
19	Upper Matecumbe	79.5 - 84.0	C	**D**	**D**	**D**	**E**
20	Windley	84.0 - 86.0	A	B	B	B	C
21	Plantation	86.0 - 91.5	B	C	**D**	**D**	**E**
22	Tavernier	91.5 - 99.5	A	B	B	B	B
23	Key Largo	99.5 - 106.0	A	A	A	B	B
24	Cross	106.0 - 112.5	A	A	A	B	B

Notes:

1. Both Monroe County and Florida Department of Transportation have adopted a LOS C standard for U.S. 1.
2. Determination of segment LOS based on criteria and procedures presented in 2010 -- *U.S. 1 Arterial Travel Time and Delay Study*, Monroe County, Florida; URS Corporation; August 2010.
3. Bold text indicates LOS below C.

The critical segments (LOS D or E) within County jurisdiction include:

- Big Coppitt Key (Segment 3), 2010-2030;
- Saddlebunch Key (Segment 4), 2025-2030;
- Sugarloaf Key (Segment 5), 2015-2030;
- Big Pine Key (Segment 10), 2025-2030;
- 7-Mile Bridge (Segment 12), 2030;
- Duck Key (Segment 15), 2030; and
- Long Key (Segment 16), 2030.

The segments traversing the cities of Marathon (Grassy Key, Segment 14) and Islamorada (Lower Matecumbe, Tea Table, Upper Matecumbe, and Plantation Keys, Segments 17, 18, 19, and 21, respectively) are the most impacted by future residential and traffic growth.

4.4.4.4 Alternative Mitigation Measures

If traditional roadway capacity techniques were to be applied to the potentially failing segments, the constrained segments would have to rely primarily on roadway widenings for relief. However, County and FDOT policies for U.S. 1 and the speed-based methodology do not necessarily depend upon the provision of additional traffic lanes to correct capacity deficiencies. Since level of service (degree of congestion) is measured by median travel speeds, Transportation Systems Management (TSM) techniques have been and should continue to be considered as effective as roadway widening in increasing median travel speeds, and, thereby increasing reserve capacity. Where such TSM techniques are determined to be ineffective at relieving the localized congestion, other, more costly options, including roadway widening may then be considered.

Specific TSM actions directly applicable to U.S. 1 include:

- Traffic Management Activities (traffic operations, traffic control and access management techniques);
- Transit Management Actions (transit operations, transit marketing and inter-modal coordination);
- Demand Reduction Activities (carpools/vanpools, dial-a-ride, work hours changes); and
- Restraint Measures (parking management, restricted areas, pricing/tolls, time period restrictions on commercial vehicles).

Since most of U.S. 1 in the Florida Keys operates as an uninterrupted flow facility; there are few traffic signals on U.S. 1; the public transit service is very limited; and U.S. 1 serves as a local access road for a large portion of the population, the most effective of these TSM techniques to improve travel speeds are those associated with access management. The following four specific access management techniques are considered to have the greatest potential impact:

- limiting the number of conflict points;
- separating basic conflict areas;
- limiting deceleration requirements; and
- removing turning vehicles from through lanes.

The following access management techniques are most appropriate for application to uninterrupted flow segments of U.S. 1:

- provide a center, two-way left turn lane within a two-lane section;
- limit the number of access drives between U.S. 1 and the existing frontage road (Old U.S. 1) to encourage the use of the frontage road for local access;
- provide a non-mountable median on U.S. 1 in two-lane sections to prevent left turn access to and from adjacent property where widening is impractical due to proximity of adjacent land uses;
- provide adjacent one-way left turn lanes in sections where driveway spacing is great enough to allow for it;
- provide right turn acceleration lanes on high speed sections to facilitate turning movements onto U.S. 1 while reducing the speed differential with through traffic;
- provide right turn deceleration lanes on U.S. 1 to allow for vehicles to safely decelerate before entering driveways serving adjacent land uses;
- increase turn lane storage lengths at signalized intersections so that vehicles in adjacent through lanes are not impeded;
- convert closely-spaced shared driveways to inbound/outbound (one-way) operation;
- provide channelizing islands which prevent left turn inbound and outbound movements at driveways;
- consolidate access drives to serve adjacent properties; and
- construct continuous right turn lanes to serve closely-spaced driveways.

Specific measures of site-specific effectiveness will vary depending on such factors as the number of turning vehicles at individual intersections and driveways, driveway spacing and specific traffic signal operations.

The current FDOT Five-Year Work Program previously shown in **Table 4.19** includes roadway widening with the addition of a center turn lane on two U.S. 1 sections at Big Coppitt Key (Segment 3) and Big Pine Key (Segment 10). The programmed improvement on Big Coppitt Key, which has been identified as one of the four 2010 segments with LOS below C, should help to improve travel speed on Big Coppitt Key, eventually increasing the reserve volume and subsequently increase the residential capacity. Although Big Pine Key (Segment 10) is not expected to have a LOS problem until sometime beyond 2020, the impact of the widening may extend to other segments and push back the date of potential segment failure.

4.4.5 Traffic Monitoring Program

The currently established U.S. 1 Methodology for determining level of service serves to make a determination as to which segments of US 1 will require improvement in the future and which segments have available reserve volumes and residential capacity for future development and growth. The County should continue the travel speed runs along U.S. 1 every year to determine the cumulative effects of new development along with background growth along U.S. 1, based on the County-adopted speed-based methodology in conjunction with yearly updates of the forecast methodology presented herein. If segments are found to be over capacity, proposed development approvals that would impact these segments would be halted until the necessary capacity improvements are implemented.

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CHAPTER 4.0 - TRAFFIC CIRCULATION – COMMENT RESPONSES

Commenter: Trish Smith **Date Received: April 5, 2011**		
Location	**Comment**	**Action**
Page 6/Section 4.3.1.3	Engineering Services improves the roads. Public Works maintains the roads.	Correction made.
Page 7/Section 4.3.1.3	7-year road and bike plan is not updated annually. The last update was done about 4-5 years ago.	Comment noted.
N/A	Is there updated hurricane evacuation information?	Not at the time of this analysis
N/A	Suggest sending this to Judy Clarke in Engineering Services since she is responsible for road/bridge improvements. She does have some bridge projects she is working on.	Comment noted.
Commenter: Rajendran Shanmugam, P.E. URS Corporation South **Monroe County Traffic Consultant** **Date Received: April 12, 2011**		
Location	**Comment**	**Action**
Page 7/ Section 4.3.1.3	Last paragraph, first sentence should read: Tables 4.4 and 4.5 provide an inventory of county maintained major roads and bridges, respectively	Agreed. Revision made.
Page 9/ Table 4.4:	Isn't Flagler Avenue limits are from White Street to S. Roosevelt Blvd.?	Agreed. Revision made.

Location	Comment	Action
Page 14/Section 4.3.4.2	Table 4.8 N. Roosevelt Blvd. (all three segments) should be 4LU.	Agreed. Revision made.
Page 25/ Section 4.3.5 Table 4.17	Table title should be revised to SR A1A (not US 1). First segment should be 4LU, and next two segments should be 2LU, which will change the MSV and LOS.	Agreed. Table 4.17 revised based on Sources: (1) 2009 Florida Traffic Information DVD, Florida Department of Transportation and (2) 2009 FDOPT Quality/Level of Service Handbook. A review of Google Earth for December 2008 and the 2009 FDOT Highway DVD indicate that SR A-1-A is basically a four lane, undivided roadway from east of Bertha Street to US-1.
Commenter: Mayte Santemaria, Assistant Planning Director **Date Received: March 22, 2011**		
Location	**Comment**	**Action**
Page 3 (PAGE 33 Revised)	Marathon housing projections – details – why is the discussion based on 2020? How were the 7,391 permanent housing units calculated?	The housing projections were taken directly from *Table I-7: Population Estimates and Projections, 2000 - -2020, page 11 of 218, Chapter I Future Land Use Data Inventory and Analysis, City of Marathon Comprehensive Plan, March 8, 2005*. Reference added to text for clarification.
Page 6 (PAGE 36 Revised)	Summary of Daily Trips and Residential Units (Table 4.26) "Most of the traffic increase beyond 2020 will be associated with the development of potential residential units in the cities (Marathon and Islamorada..."?	Text changed to read: "*Most of the traffic increase beyond 2020 will be associated with the development of potential residential units in the cities (e.g., Marathon).*" removing Islamorada.
Page 17	Hurricane Evac – is this discussion about the 2006 South Florida Regional Hurricane Evacuation Traffic Study or the new 2010 Statewide Regional Evac Study?	Please note that the text Keys Hurricane Evacuation has been revised and is referenced in *Section 4.3.10: Adequacy to Evacuate Population [9J-5.019(3)(c)].*
Page 18	Table 4.30 Hurricane Evac Model Summary Results – is this table correct? Occupancy rates are higher in 2008 than 2001?	See Note above.

Location	Comment	Action
Page 20	Paragraph repeated (The DCA notes that for...)	See Note above.
Page 21	The last two paragraphs seem to imply that the SFRPC model (2006 or 2010?) is used by DCA to evaluate comp plan amendments. Should this be the Miller Model?	See Note Above.
Commenter: Rajendran Shanmugam, P.E., Vice President / Branch Manager, URS Corporation Southern: Date Received: May 18, 2011		
Page 35/Section 4.4.1	Second paragraph - text revision remove the (,): ..... Islamorada~~,~~ --Village of Islands.	Correction made.
Page 41/Section 4.4.3.6	first paragraph - text revision: ..... decrease ~~up~~ through	Correction made.
Page 41/ Table 4.26	Expand to show the make-up of total numbers; i.e., the 2015 Daily Trips is made-up of Daily Trips of three geographical areas and each municipalities.	Correction made.
Page 7, Section 4.4.4.1 & Table 4.27	Section 4.4.4.1 is unclear how the numbers in the Table were achieved - NEED FURTHER EXPLANATION OR AN EXAMPLE.	The following is an example of the calculation process for determining the Annual Average Daily Traffic (AADT) forecasts for each US-1 road segments for each 5-year increment from 2010 through 2030 (Table 5.27). The example used involves US-1 Segment Number 13, between Mile Markers 47.0 and 54.0, within the Middle Keys Study Area. Step 1: Selection of FDOT Count Station Segment 13 has three (3) FDOT count stations: Station 0642 (MM 48.0), Station 0110 (MM 50.5), and Station 0045 (MM 53.0). For Segment 13 forecasting purposes, Station 0110 was chosen as the base station since it had the highest recorded 2009 AADT: 32,000 AADT vs. 30,000 AADT for Station 0045 and 17,600 AADT for Station 0642 (Note: 2009 AADT used since 2010 values

		had not been officially published at time of analysis.) Step 2: Estimate 2010 AADT The 2010 AADT for Segment 13 was determined by applying the average yearly growth rate for the station. 1.57 percent, to the 2009 AADT to yield a 2010 AADT of 32,502. This value is presented in Table 4.27. Step 3: Estimate 2015 AADT The 2015 AADT was estimated by growing the background 2010 traffic (32,502 AADT) by the application of a growth rate of 0.3 percent, reflecting the average growth rate at the FDOT count stations at each end of the Monroe County Study Area Limits (Stations 0009 – MM 6.5 and 0002+0001 MM 107.5 plus CR-905). The corresponding estimated 2015 daily trips for Unincorporated Monroe County/Middle Keys – 96 daily trips (Table 4.21), the City of Marathon estimated 2015 daily trips – 1,512 daily trips (Table 4.22), the City of Key Colony Beach estimated 2015 daily trips – 128 daily trips (Table 4.23), and the City of Layton estimated 2015 daily trips – 72 daily trips (Table 4.24) were added to the 2015 background volume to yield a total of 34,798 AADT for Segment 13. This three step process was applied to each US-1 segment and for each 5-year increment through 2030. The Lower Keys included only the Unincorporated Monroe County trips; the Middle Keys included the cities of Layton, Marathon, and Key Colony Beach as well as the unincorporated areas of Monroe County; and the Upper Keys included the Village of Islamorada as well as the unincorporated areas of Monroe County.
Page 48/Section 4.4.4.3	Second paragraph - text revision: ..... segments that ~~that~~ have	Correction made.
Page 50/Section 4.4.4.3	fifth bullet item - text revision: ..... 7-Mile Bridge ~~Key~~	Correction made.

Page 52/Section 4.4.5	The recommendation on Section 4.4.5 to update annually the Forecasted LOS is VERY GOOD	Comment noted.
Commenter: Judith S. Clarke, P.E., Director of Engineering Services **Date Received: April 5, 2011**		
Location	Comment	Action
Page 42/Section 4.4.4.1	The only comment that I had was minor; Section 4.4.4.1 is titled AADT Forecast but I didn't see anywhere previously where AADT is written out. Given that it is a section heading if it wasn't written out anywhere earlier in the report (previous sections that I don't have in front of me) they may want to do so here.	Correction made to title of Section 4.4.4.1.

MASS TRANSIT
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5.0 MASS TRANSIT ELEMENT

The Mass Transit Element of the Monroe County (County) Comprehensive Plan addresses the data inventory requirements of 9J-5.019(1), (2), and (3) of the Florida Administrative Code (F.A.C.). The data inventory requirement will support the development of goals, objectives, policies, and implementation programs for the Mass Transit Element.

5.1 Introduction

Pursuant to Rule 9J-5.019, F.A.C., local governments not located within the urban area of a Metropolitan Planning Organization (MPO) with population in excess of 50,000, shall adopt traffic circulation, mass transit, ports, aviation, and related facilities elements consistent with the provisions of this rule and Chapter 163, Part II, F.S. The County is not located within an urban area of a MPO, but has a population in excess of 50,000.

The purpose of the Mass Transit Element Data Inventory and Analysis is to describe and analyze the existing public transportation services, project future conditions, and to prepare a foundation for the formulation of goals, objectives, and policies for the County. Data has been gathered, analyzed, and displayed in textual, tabular, and graphic form, including a series of transportation maps. An additional focus of this element is to advance multi-modal opportunities within the County, on the context of the requirements in Chapter 163, F.S. The Mass Transit Element and Data and Inventory Analysis presents:

- An analysis of the existing public transportation services, including the ability of transportation facilities and services to serve existing land uses, and the adequacy of the existing and projected transportation system to provide emergency evacuations;
- Growth trends and travel patterns, including relationships between land uses and the transportation system;
- Current and projected transportation system levels of service;
- An analysis of local and state programs;
- Strategies to maintain adopted levels of service standards; and
- Land use policy implications of transportation management programs necessary to promote public transportation.

5.2 Existing Public Transit Facilities and Routes

The County is currently served by two main public transit systems:

- Miami-Dade Transit (MDT) in the northern region of the County with two routes (Dade-Monroe Express and Card Sound Express) serving the County from Key Largo to the City of Marathon; and

- The City of Key West Department of Transportation (KWDOT) which operates:

    - Key West Transit (KWT) with four fixed-route bus routes serving the City of Key West and Stock Island;

    - The Lower Keys Shuttle providing service in the southern portion of the County from the City of Marathon to the City of Key West; and

    - The Key West Park-N-Ride at The Old Town Garage.

The current County-wide public transit services are presented in **Map Series 5-1**. The locations of significant bus stops or bus run ends located near major destinations along the transit routes are also shown in **Map Series 5-1.** The route terminus area at U.S. 1 and Sombrero Beach Road serves as a transfer point between the bus services provided by MDT Dade-Monroe Express Bus Route #301 and the KWDOT Lower Keys Shuttle.

Other transit related services providing limited service in the County include:

- Monroe County Transit's Paratransit Service;

- Guidance Clinic of the Middle Keys (GCMK); and

- Greyhound Bus Line.

5.2.1 Miami-Dade Transit Service

5.2.1.1 Dade-Monroe Express - Route #301

Miami-Dade Transit has contracted with American Coach Lines to provide bus service along the U.S. 1 corridor between Florida City (Wal-Mart) and the City of Marathon. The bus service is known as Dade-Monroe Express with the route designation being #301 (see **Map Series 5-1**). The County currently does not provide any funding, equipment, or personnel for the provision of this service.

The route operates seven days a week, generally from 5:15 a.m. to 1:20 a.m.

Based on ridership data provided by MDT, the total 2009 ridership for this route was 235,167 trips.

The basic cash fare for this route is $2.35. This includes the basic MDT fare of $1.50 plus a $0.50 transfer fee charged for transferring to the Dade-Monroe Express bus from a regular MDT bus route and $0.35 when boarding the Dade-Monroe Express. The transfer and Express bus fees are waived for passengers using MDT's EasyCard. Metro Bus Passes, Bus Tokens, Golden and Patriot Passports, and MDT Employee ID's are accepted as well.

There is no transfer fee or credit agreement for transfers between the MDT route and the Lower Keys Shuttle. Passengers must pay the full fare price of the corresponding system.

The route's northern terminus is located at the Super Wal-Mart at NE 6th Avenue and Lucy Street (SE 8th Street) in Florida City. The bus route operates 17 daily bus trips (or runs) in each direction (southbound and northbound) based on scheduled segmented route trips as shown in **Table 5.1** and described as follows:

- Florida City – Key Largo. This bus trip segment operates from the Florida City Wal-Mart southbound to the intersection of U.S. 1 and Second Street (Tom Thumb Store) in Key Largo near MM 98. The bus then returns northbound on U.S. 1 to Florida City. This segment is covered by only one of the 17 daily Dade-Monroe Express bus runs.

- Florida City – Tavernier. This bus trip segment operates from the Florida City Wal-Mart southbound to a point near MM 87 near the entrance to Treasure Village. The bus then returns northbound on U.S. 1 to Florida City. This segment is covered by three of the 17 daily Dade-Monroe Express bus runs.

- Florida City – Islamorada. This bus trip segment operates from the Florida City Wal-Mart southbound to a point located in the vicinity of Gulf View Drive and White Marlin Boulevard on Islamorada near MM 74. The bus then returns northbound on U.S. 1 to Florida City. This segment is covered by seven of the 17 daily Dade-Monroe Express bus runs.

- Florida City – Marathon. This bus trip segment operates from the Florida City Wal-Mart southbound to Sombrero Beach Road near MM 50. The route ends near the Publix Supermarket. This segment is covered by six of the 17 daily Dade-Monroe Express bus runs. Transfers to and from the Lower Keys Shuttle are made near this location.

Within Miami-Dade County, the Dade-Monroe Express buses make regular passenger stops at designated bus stops. However, within Monroe County, there are no designated MDT bus stops. Passengers have to hail the buses to stop. The bus drivers are instructed to stop only at locations or areas which are deemed to be safe for passenger boarding or alighting and will not result in obstruction of traffic. Some of the safe areas include a number of bus passenger shelters along the U.S. 1 corridor that have been installed by the Monroe County Public Works Department (see **Table 5.2**).

Table 5.1 – Dade-Monroe Express (Route #301) Southbound Schedule

Dade-Monroe Express Southbound				
Depart Florida City Wal-Mart	Arrive Key Largo MM 98	Arrive Tavernier MM 87	Arrive Islamorada MM 74	Arrive Marathon MM 50
05:15AM	06:10AM	06:30AM	06:55AM	n/a
05:30AM	06:25AM	06:45AM	07:10AM	n/a
05:35AM	06:30AM	06:50AM	n/a	n/a
05:40AM	06:35AM	06:55AM	07:20AM	07:55AM
07:40AM	08:35AM	08:55AM	09:20AM	n/a
08:20AM	09:15AM	09:35AM	10:00AM	n/a
10:30AM	11:25AM	11:45AM	12:10PM	12:45PM
11:30AM	12:25PM	12:45PM	n/a	n/a
01:00PM	01:55PM	02:15PM	02:40PM	03:15PM
01:05PM	02:00PM	02:20PM	02:45PM	n/a
02:00PM	02:55PM	03:15PM	03:40PM	n/a
03:15PM	04:10PM	04:30PM	04:55PM	05:30PM
05:30PM	06:25PM	06:45PM	07:10PM	n/a
06:30PM	07:25PM	07:40PM	08:05PM	08:40PM
08:00PM	08:55PM	n/a	n/a	n/a
09:00PM	09:55PM	10:10PM	10:35PM	11:05PM
10:00PM	10:55PM	11:10PM	n/a	n/a
Dade-Monroe Express - Northbound				
Depart Marathon MM 50	Depart Islamorada MM 74	Depart Tavernier MM 87	Depart Key Largo MM 98	Arrive Florida City Wal-Mart
n/a	n/a	06:55AM	07:10AM	08:05AM
n/a	06:55AM	07:20AM	07:35AM	08:35AM
n/a	07:10AM	07:35AM	07:50AM	08:50AM
08:05AM	08:40AM	09:05AM	09:20AM	10:15AM
n/a	09:30AM	09:55AM	10:10AM	11:05AM
n/a	10:15AM	10:40AM	10:55AM	11:50AM
n/a	n/a	12:45PM	01:00PM	01:55PM
01:00PM	01:35PM	02:00PM	02:15PM	03:10PM
n/a	03:30PM	04:00PM	04:20PM	05:00PM
n/a	03:50PM	04:15PM	04:30PM	05:25PM
03:45PM	04:20PM	04:45PM	05:00PM	05:55PM
05:30PM	06:05PM	06:30PM	06:45PM	07:40PM
n/a	07:20PM	07:45PM	08:00PM	08:55PM
n/a	n/a	n/a	09:00PM	09:55PM
09:00PM	09:35PM	10:00PM	10:15PM	11:10PM
n/a	n/a	11:15PM	11:30PM	12:25AM
11:15PM	11:45PM	12:00AM	12:25AM	01:20AM

Source: Miami-Dade Transit
Note: Route schedule effective seven days per week.

Previous to May 2011, Clear Channel Outdoor, Inc. installed and maintained a number of bus passenger shelters along U.S. 1, under contract to Monroe County. Earlier in 2011, this company chose not to renew its contract with Monroe County, which was set for expiration on May, 17, 2011. As of June 2011, Monroe County was in the process of (1) incorporating the shelters within the Lower Keys Shuttle Service Area into the shelter program managed by KWDOT and (2) negotiating a new contract for a company to manage the shelters in the Upper Keys (north of Marathon). The current Monroe County bus passenger shelters (as of June 2011) are presented in Table **5.2**.

Table 5.2 - U.S. 1 Corridor Monroe County Bus Passenger Shelters as of June 2011

Mile Marker	Direction	Notes
MM 102.6	Northbound	Near Pennekamp State Park
MM 101.4	Southbound	Across from Tradewinds Plaza
MM 99.95	Northbound	Waldorf Shopping Center
MM 52.3	Northbound	Area to be serviced by Lower Keys Shuttle
MM 50.5	Southbound	Area serviced by Lower Keys Shuttle
MM 50.2	Southbound	Area serviced by Lower Keys Shuttle
MM 48	Southbound	Area serviced by Lower Keys Shuttle
MM 47.4	Northbound	Area serviced by Lower Keys Shuttle
MM 29.7	Northbound	Area serviced by Lower Keys Shuttle
MM 28.5	Southbound	Area serviced by Lower Keys Shuttle
MM 14.3	Northbound	Area serviced by Lower Keys Shuttle
MM 9.4	Southbound	Area serviced by Lower Keys Shuttle

Source: Information as of June 2011 as provided by Monroe County Engineering Services.

5.2.1.2 Card Sound Express - Route #302

Miami-Dade Transit has contracted with JGT Transportation, Inc. to provide bus service between Florida City (City Hall) and Ocean Reef Club at the northern extent of Key Largo (see **Map Series 5-1**). The bus service serves almost exclusively Ocean Reef Club employees and visitors. The route operates along U.S. 1, Card Sound Road (County Road 905A), and State Route 905. The County currently does not provide any funding, equipment, or personnel for the provision of this service.

The route operates seven days a week, with six daily round trips with three trips during the morning peak period and three during the afternoon peak period. The morning operating hours are from 5:30 a.m. to 10:05 a.m. The afternoon operating hours are from 2:35 p.m. to 7:10 p.m.

Based on ridership data provided by MDT, the total 2009 ridership for this route is 25,555 trips.

The fare for each one-way trip on the Card Sound Express is $2.35 (cash - exact change). Metro Bus Passes, Bus Tokens, Golden and Patriot Passports, and MDT Employee ID's are accepted as well. A $0.50 transfer fee is charged for transferring to the Card Sound Express bus from the mainland MDT bus. This is in addition to the regular $1.50 MDT bus fare. Also, another $0.35 is paid when boarding the Card Sound Express for a total cost of $2.35 for the combined trip.

5.2.2 City of Key West Transportation Services

5.2.2.1 Key West Shuttle Bus System

Key West's transit system was originally established in 1972 as the Key West Port and Transit Authority. The system, now known as Key West Transit (KWT), is a department of the City of Key West and is managed by the Department of Transportation, KWDOT (website – www.keywestcity.com)

As of May 2010, the KWDOT operates the Key West Shuttle Bus System serving primarily the City of Key West Downtown area and Stock Island. The Shuttle Bus System consists of four fixed-route bus services. All of the routes make a connection with the Lower Keys Shuttle at Searstown. The KWDOT bus inventory consists of 17 buses that seat 23 or more people. All of the buses are diesel powered and accessible to persons with disabilities. These buses are also used for the Lower Keys Shuttle Bus service.

Two (2) of the bus routes, the BLUE and GREEN Routes, operate full loop routes through Stock Island and Key West City. The BLUE AND GREEN routes operate 7-days per week. The GREEN Route provides 11 full loop round trips per day; whereas, the BLUE Route provides 10 full loop round trips per day. The BLUE Route's daily operations extend from 6:10 AM to 7:54 PM; whereas, the daily operations for the GREEN Route extend from 6:00 AM to 10:09 PM. Service headways on the Green Route range from 84 minutes to 98 minutes. Headways on the Blue Route range from 78 to 95 minutes.

Figure 5.1 presents the current route map (as of March 15, 2010) for the BLUE and GREEN Routes.

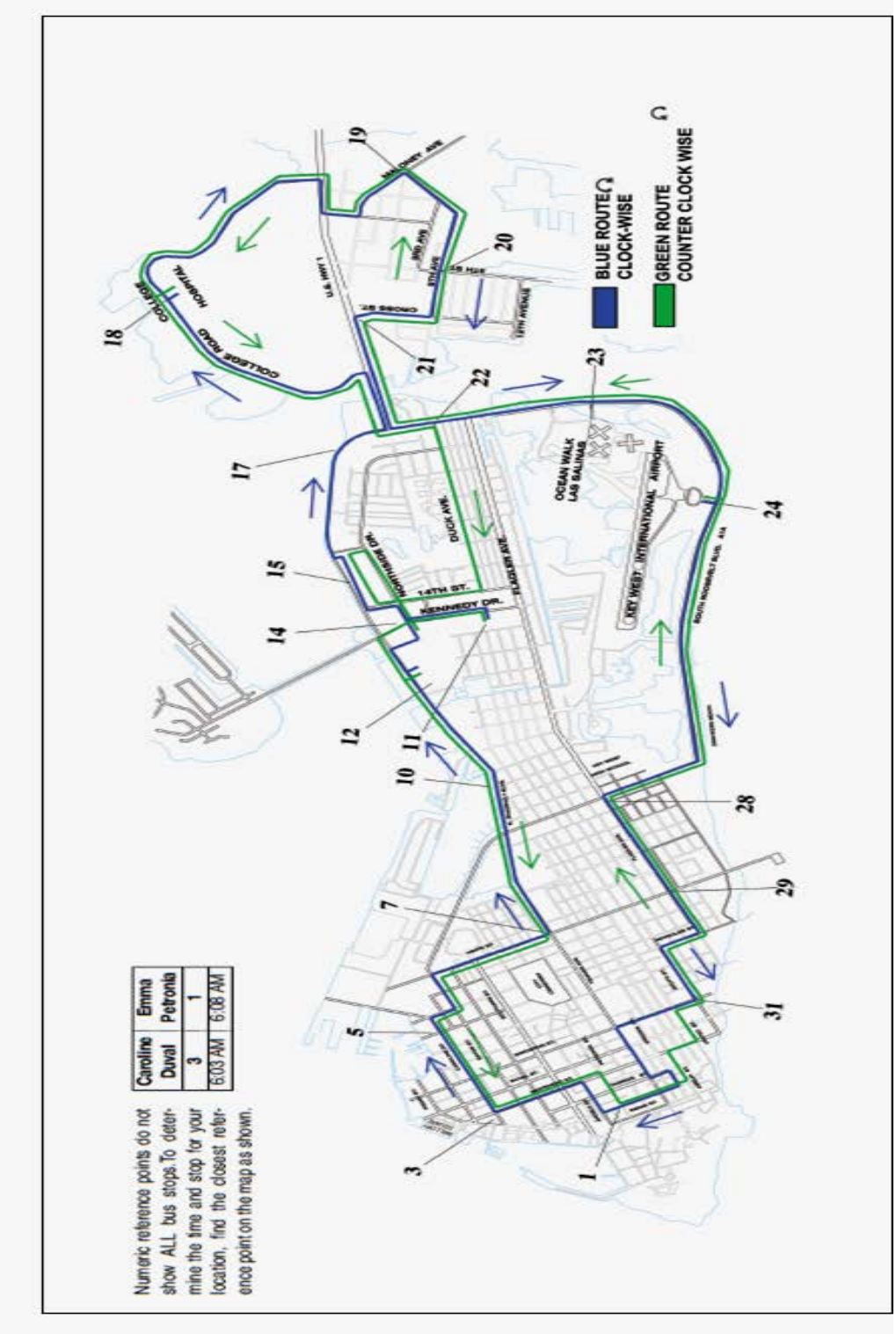


Figure 5.1 – BLUE and GREEN Shuttle Bus Routes, Current Route Map
Source: The City of Key West Transportation Department website – www.keywestcity.com.

The other two (2) routes, the RED and ORANGE Routes, provide connections or transfer opportunities at the three (3) main shopping centers in Key West. **Figure 5.2** presents the current route map (as of March 15, 2010) for the ORANGE and RED Routes.

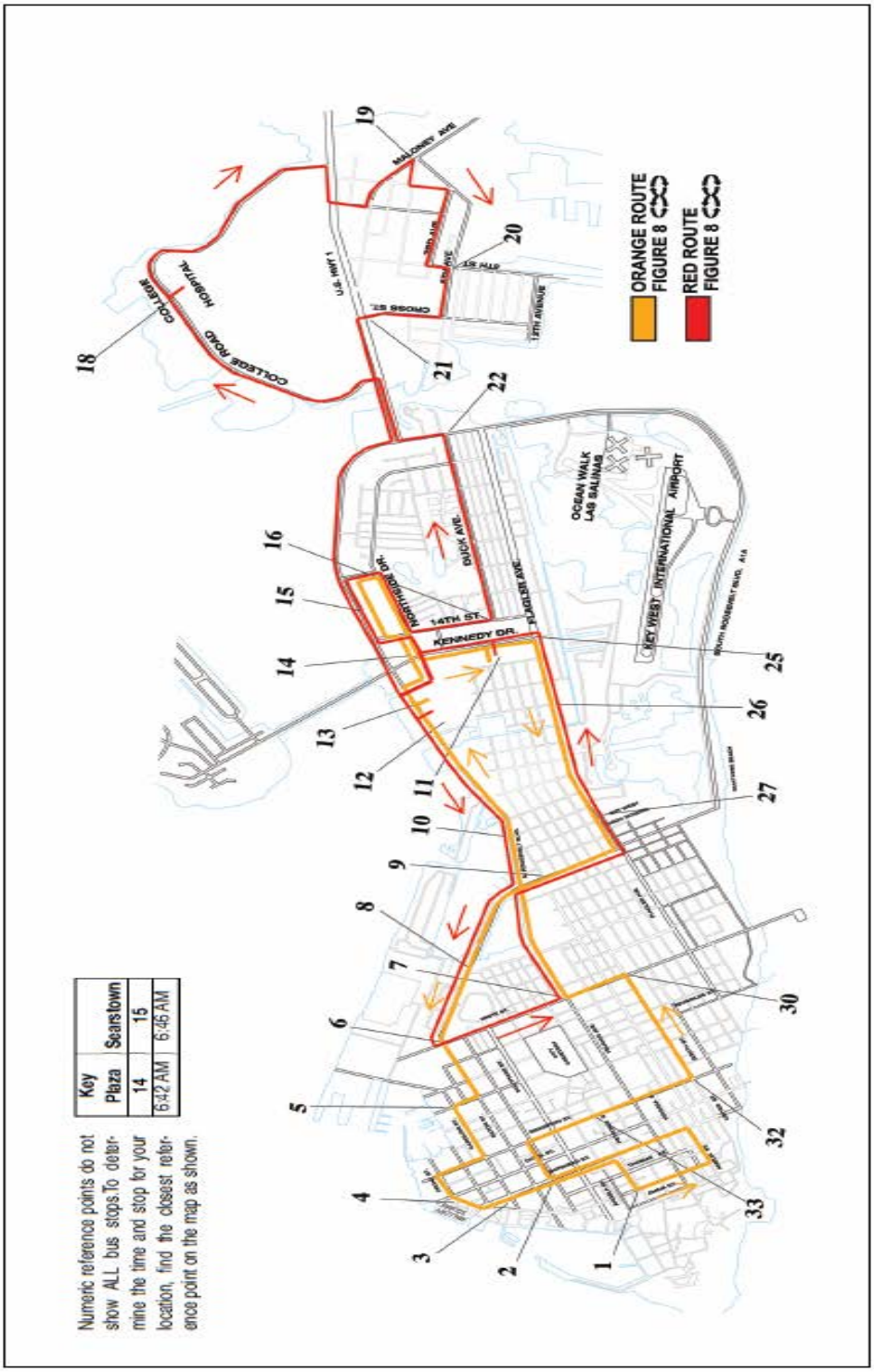


Figure 5.2 – ORANGE and RED Shuttle Bus Routes, Current Route Map
Source: The City of Key West Transportation Department website – www.keywestcity.com.

The ORANGE Route serves the Old Town Key West areas to the shopping centers while the RED Route serves the Stock Island communities with service to the shopping centers. The ORANGE Route does not travel beyond the shopping center areas to Stock Island; whereas, the RED Route does not service Old Town, Downtown Key West area. Both the ORANGE and RED routes provide ten (10) trips each per day as corridor service routes.

The ORANGE and RED Routes operate 6-days per week. The Orange Route's daily operations extend from 6:15 AM to 6:18 PM; whereas, the daily operations for the GREEN Route extend from 6:00 AM to 10:09 PM. The service headways on the ORANGE Route range from 73 minutes to 88 minutes; whereas, headways on the RED Route range from 72 to 87 minutes.

The basic full fare for a one-way trip on the City route buses is $2.00. Reduced ($1.00) and senior citizen fares ($0.50) are available, as well as, 7-day ($3.75 to $8.00) and 31-day fares $15.00 to $25.00). Reduced monthly fares are offered to seniors, students, military and the disabled for $15.00. Children five and under may ride for free with a paying passenger. The City of Key West operates a website that provides up-to-date information on the City Shuttle schedules and routes (www.KeyWestCity.com).

KWDOT 's "BOB", Bikes On Buses Program, allows customers to take a bicycle on any of the Key West buses by securing it onto a bicycle rack, attached to the front of every city bus. Based on ridership data from the KWDOT, the 12-month ridership from January 2009 through December 2009 is 325,014 passenger trips.

5.2.2.2 Lower Keys Shuttle Service

The KWDOT also operates the Lower Keys Shuttle along U.S. 1 between Key West and Marathon (see **Map Series 5-1**). The KWDOT obtained Federal Transit Administration (FTA) and FDOT financial assistance for the implementation of this shuttle bus service. This route connects with the Dade-Monroe Express (Route #301) in Marathon to provide bus service from Key West to Florida City (mainland Miami). Scheduled stops are made at various points throughout the length of the route including Key West, Boca Chica, Big Coppitt, Bay Point, Sugarloaf, Cudjoe Key, Summerland Key, Big Pine Key, and Marathon.

The Lower Keys Shuttle operates seven days a week, from 5:40 a.m. to 11:55 p.m (PINK - Key West Based) and 6:00 a.m to 11:36 p.m (LIME - Marathon Based). A total of 9 round trip runs are scheduled during the day. Headways range from 58 minutes to 200 minutes on the northbound trajectory and from 62 minutes to 85 minutes on the southbound trajectory. Both Lower Keys Shuttles now extend into Old town/Downtown Key West and up to 109th Street between Walgreens and Office Depot in Marathon.

The Lower Keys Service fares are as follows:

2011 Lower Keys Service Fares

Fare Type	Full	Reduced	Senior
One way	$4.00	$2.00	$1.50
7 Day Pass	$25.00	$15.00	$15.00
31 Day Pass	$75.00	$45.00	$45.00

Reduced fares require proper ID and applies to students under 21, the disabled, active and retired military, and seniors aged 60 years or more. Children aged five years and under may ride for free with a paying passenger.

The Lower Keys Shuttle provides daily mass transit, fixed route service between Key West and Marathon daily, with forty-two (42) service points along both sides of U.S. 1. Eighteen (18) of these service points are solar powered bus shelters provided via contract with Anderson Advertising and the City of Key West. Another seven (7) electric powered shelters within the Lower Keys Shuttle area are provided by Monroe County. Many of the remaining service points consist of simple bus stop signs and posts with eight (8) locations consisting of solar powered safety lighting and beacon light I-Stop units.

Table 5.3 presents the location of the KWDOT owned and installed bus shelters, as well as, the Monroe County shelters. The local agencies plan to install 20 more shelters in the Lower Keys area within the next two (2) year period. This process will include the reevaluation and re-issuing of the service contracts, where applicable.

The Lower Keys Shuttle does not provide bicycle racks. However, folding portable bicycles are allowed on the Lower Keys Shuttle. These compact bikes can be folded and carried alongside a rider without taking up precious space on the sometimes busy shuttle.

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Table 5.3 – Lower Keys Shuttle Bus Stop Shelters

Shelter ID	Direction: Northbound (EAST)	Approximate MM
1	Sears (Northside Drive)	3.0
2	Stock Island (U.S. 1 & 3rd Street)	n/a
3	Bay Point (Baby's Coffee)	15.0
F	**Saddlebunch (Bluewater Drive)**	**14.3**
4	Sugarloaf (Across from Mangrove Mama's)	16.0
5	Cudjoe Key (Evie's Subs)	22.5
A	**Little Torch (Dolphin Marina/MC)**	28.5
6	Big Pine Key (NAPA)	n/a
7	Big Pine Key (Industrial Road)	33.5
8	Bahia Honda (Park Entrance)	n/a
B	**Marathon (11th St./MC)**	48.0
9	Marathon (Park & FKAA)	49.0
10	Marathon (Kmart & Publix)	50.0
Shelter ID	**Direction: Southbound (WEST)**	**Approximate MM**
11	Marathon (FHP)	49.0
C	**Marathon (USCG/MC)**	48.0
12	Bahia Honda (Across Entrance)	n/a
13	Big Pine Key (Dions)	33.5
14	Big Pine Key (CVS)	n/a
D	**Big Pine Key (Medical Center/MC)**	29.7
15	Summerland (Across Bank)	n/a
16	Summerland (Across Mote)	n/a
17	Cudjoe Key (Coco's)	21.5
18	Sugarloaf (School)	17.0
E	**Rockland Key (Calle Uno/MC)**	9.4

Notes and Sources:
Shelters 1-18: City of Key West DOT (under contract with Anderson Advertising).
Shelters **A–F**: Monroe County.

5.2.2.3 Bus Ridership and System Performance

Table 5.4 presents annual ridership and performance indicators for the KWDOT service between 2003 and 2008. The ridership and operational data were obtained from the *Key West, Florida, Transit Development Plan (TDP), 2010-2019* report dated January 2010. The TDP was prepared as a requirement by FDOT for receipt of Public Transit Block Grants (PTBG). Grant recipients must submit a 10-year TDP with yearly updates.

The TDP is a planning tool used to identify future needs for transit service, define the community's goals and develop a program of improvements. The submission cycle as defined by Florida Statutes is to perform a major update to the TDP every fifth year. The last major update for the KWDOT was performed in 2005. The 2010 TDP develops new goals and objectives and other relevant data to reflect current year through 2019-2020. The performance indicators are used to present the data that are reported in the National Transit Database (NTD) reports and relate to overall system performance.

Table 5.4 - KWDOT Transit Performance Indicators

Performance Indicator	Fiscal Year					Percent Change 2003-2008
	2003-2004	2004-2005	2005-2006	2006-2007	2007-2008	
Passenger Trips	310,736	319,088	519,673	505,885	515,729	66%
Revenue Miles	258,425	358,728	742,869	764,303	795,749	208%
Total Operating Expenses (000's)	$1,143	$1,443	$3,212	$3,218	$3,323	191%
Operating Revenue (000's)	$272	$347	$932	$974	$1,418	421%
Vehicles/ Maximum Service	6	6	8	8	8/9	33%
Net Expenses/ Passenger	$3.67	$4.41	$4.39	$4.44	$3.69	0.5%

Source: Key West, Florida, Transit Development Plan (TDP), 2010-2019, January 2010

Annual ridership on the KWDOT system increased 66 percent between 2003 and 2008. While expenses and revenue saw significant increases since 2003-2004, by 2007-2008 the system was able to reduce expenses per passenger trips to about the same level as it was in 2003-2004. ($3.69 per passenger trip in 2007-2008 versus $3.67 per passenger trips in 2003-2004.)

During the time period indicated, the system underwent several service related changes. The Lower Keys Shuttle was added in 2005-2006 and several changes in route structures were made. In addition, prior to November 2009, the system operated six city routes (Blue, Green, Orange, Red, Gold, and Purple) instead of the present four routes. The information

in **Table 5.4** also includes data from the Park-N-Ride Garage Shuttle which is no longer in service.

Based on latest ridership data from the KWDOT, the 12-month ridership from October 2008 through September 2009 is estimated at 503,115. The Lower Keys Shuttle accounts for approximately 109,087 to 116,070 annual passenger trips.

5.2.2.4 Key West Transit Bus Ridership Forecasts

Table 5.5 presents the 2010-2020 forecasted KWDOT annual transit ridership as developed for the 2010 TDP. The forecasts are based on the maintenance of the current four city routes and the Lower Keys Shuttle with expected budget restrictions and service reductions. Overall annual ridership is expected to increase from approximately 396,390 in 2009 to 451,130 in 2020, an increase of 13.8 percent.

5.3 Public Transit Level of Service

Transportation services between communities can be just as important as services within communities, especially for areas where medical, educational, and other services may not be readily available. Intercity transportation services, whether bus, train, or ferry, help to fill these mobility needs by linking smaller communities to larger communities and to other transportation models[1].

The LOS thresholds for intercity scheduled transit services are presented in **Table 5.6**. The corresponding LOS for each of the transit routes are summarized in **Table 5.7** and **Map Series 5-2.**

As shown in the table, the Dade-Monroe Express #301, which serves the northern region of the County, has varying LOS per segment based on the number of buses serving each segment. The segments between Florida City and Tavernier have LOS of A. The segment between Tavernier and Islamorada has a LOS of B; whereas, the segment to Marathon has a LOS of D. The Lower Keys Shuttle has an intercity bus LOS of B.

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[1] *Highway Capacity Manual Chapter 27 – Transit Methodology*

Table 5.5 - KWDOT Transit Annual Ridership Forecasts, 2010 - 2020

Year	Forecasted Passenger Boardings per Transit Route					
	Blue	Green	Orange	Red	Lower Keys Shuttle	Total Year
Base 2009	82,490	82,125	47,450	68,255	116,070	396,390
2010	100,451	88,225	53,199	46,260	120,276	408,411
2011	101,455	89,107	53,731	46,723	121,479	412,495
2012	102,470	89,998	54,268	47,190	122,694	416,620
2013	103,494	90,898	54,811	47,662	123,921	420,786
2014	104,529	91,807	55,359	48,139	125,160	424,994
2015	105,575	92,725	55,913	48,620	126,412	429,245
2016	106,630	93,652	56,472	49,106	127,676	433,536
2017	107,697	94,589	57,037	49,597	128,953	437,873
2018	108,774	95,535	57,607	50,093	130,242	442,251
2019	109,861	96,490	58,183	50,594	131,545	446,673
2020	110,960	97,455	58,765	51,100	132,850	451,130

Source: Key West, Florida, Transit Development Plan (TDP), 2010-2019, January 2010

Table 5.6 - Intercity Transit Level of Service Thresholds

LOS	Vehicles per Day	Comments
A	>15	Numerous trips throughout the day
B	12-15	Midday and frequent peak-hour services
C	8-11	Midday or frequent peak-hour services
D	4-7	Minimum service to provide choice of travel times
E	2-3	Round trip in one day is possible
F	0-1	Round trip in one day is not possible

Source: 2000 Highway Capacity Manual (HCM), Exhibit 27-3

Table 5.7 – Monroe County Intercity (MDT and KWDOT) Transit Level of Service

Public Transit Service	Ridership by Route	Route Segment		Vehicles per day[1]	LOS[2]
		From	To		
Dade-Monroe Express #301	235,167[3]	Florida City	Key Largo MM 98	17	A
		Key Largo MM 98	Tavernier MM 87	16	A
		Tavernier MM 87	Islamorada MM 74	13	B
		Islamorada MM 74	Marathon MM 50	6	D
Card Sound Express #302	25,555[3]	Florida City	Key Largo/ Ocean Reef	6	D
Lower Keys Shuttle	103,864[4]	Key West	Marathon	12	B

Sources: Miami-Dade Transit and City of Key West Department of Transportation.
Notes:

1. Bus round trips based on current schedule as provided by Miami-Dade Transit.
2. Level of Service determined by Exhibit 27-3 from the Highway Capacity Manual 2000.
3. 2009 Ridership data from January 2009 through December 2009. Source: Miami-Dade Transit.
4. Ridership total for the 12-month period from January 2009 to December 2009.

5.4 Additional Transportation Services

5.4.1 Monroe County Transit's Paratransit Service

The County operates a county-wide paratransit service known as Monroe County Transit (MCT). As noted on the MCT website, this service provides mobility for those with special transportation needs. In Section 427.011 (9), Florida Statutes, "paratransit" is defined as those elements of public transit which provide service between specific origins and destinations selected by the individual user with such service being provided at a time that is agreed upon by the user and provider of the service. Paratransit can be provided by taxis, limousines, "dial-a-ride", buses and other demand-responsive operations that are characterized by their non-scheduled non-fixed route nature.

The MCT Paratransit service is a door-to-door service designed for people who need transportation. Anyone can ride, especially the elderly and/or disabled individuals who

are unable to access regular fixed route or commuter bus service. The mission statement of the MCT "is to operate a safe, dependable and effective paratransit network that enables Monroe County's elderly, disabled and transportation disadvantaged citizens the mobility necessary to improve their quality of life and provide the means of remaining independent allowing them to have useful and productive lives."

MCT provides paratransit transportation within the Florida Keys, available between MM 0 in Key West through MM 113 in Key Largo as well as Ocean Reef. MCT offers services Monday through Friday (excluding County holidays), from 8:00 a.m. to 5:00 p.m. Each one-way trip is $2.00.

As a demand-response operation, potential passengers must call the main office to register and schedule a pick up. An advance reservation of at least 24-hours is required. On the dates of the reserved trips, the bus operators pick up the passengers at their addresses and transport them to their destinations.

The MCT meets the requirements of the Americans with Disabilities Act (ADA) and provides door-to-door service to those individuals who qualify based on the following criteria:

- Those who because of visual, physical or mental impairment cannot recognize destinations or cope with the physical requirements of the regular bus service.

- Those who would use regular bus service if the buses could accommodate their necessary mobility aids such as wheelchairs, scooters, etc.

- Those who have impairments or impairment-related conditions, which prevent them from getting to or waiting at a regular bus stop.

Generally, the Key West residents will utilize the fixed route, City of Key West bus system, if they live within ¾ of a mile to the fixed route system.

Service frequency for paratransit service is called access time, and is defined as the minimum amount of time from when a passenger requests service to the time a pick up can be guaranteed to occur. **Table 5.8** provides the LOS thresholds for paratransit service based on service frequency. Because the service requires one day's advance notice for reserving and obtaining a ride, the MCT is considered to be operating at LOS E. Higher LOS would require service to be provided the day it is requested.

Table 5.8 – Service Frequency Level of Service (LOS) for Paratransit Service

LOS	Access Time (Hours)	Comments
A	0.0 – 0.5	Fairly prompt response
B	>0.5 – 1.0	Acceptable response
C	>1.0 – 2.0	Tolerable response
D	>2.0 – 4.0	Poor response, may require advance planning
E	>4.0 – 24.0	Requires advance planning
F	>24.0	Service not offered every weekday or at all

Source: 2000 Highway Capacity Manual (HCM), Exhibit 27-2

5.4.2 Monroe County Transportation Disadvantaged Service

Public transportation within Monroe County is primarily limited to Key West with extended service to the Lower Keys, which contains less than half the county's population. Therefore, more than half of Monroe County's residents have no access to structured public transportation services. Lack of access to public transportation for majority of the residents coupled with various other local challenges creates a great need for Transportation Disadvantaged services in the area.

Chapter 427 of the Florida Statutes establishes the Florida Commission for the Transportation Disadvantaged (CTD) and directs the CTD to "accomplish the coordination of transportation services provided to the transportation disadvantaged". In accomplishing its purpose, the CTD approves a Community Transportation Coordinator (CTC) for each county of the state which is charged with arranging cost-effective, efficient, unduplicated, and unfragmented transportation disadvantaged services within its respective service area. Additionally, a designated official planning agency (DOPA) is approved by the CTD and charged with creating the Local Coordinating Board (LCB) and providing technical assistance to the LCB. The LCB acts as an advisory board and as such provides guidance, monitors, evaluates and supports the transportation activities of the CTC.[2]

[2] Source: Monroe County Transportation Disadvantaged Service Plan 2008, prepared for The Commission for Transportation Disadvantaged, The Guidance Clinic of the Middle Keys and The Health Council of South Florida. Approved by the Monroe County Local Coordinating Board for Transportation Disadvantaged on July 31, 2008.

The Health Council of South Florida has served as DOPA since the spring of 1993 and created the Monroe County LCB the same year. The Guidance/Care Center, Inc. – GCC -- (formerly Guidance Clinic of the Middle Keys – GCMK) has served as Monroe County's CTC since the fall of 1997 and provides majority of TD trips in Monroe County. The remainder of trips are offered by six contracted providers together with incidental use of taxicabs.

As of fiscal year 2009-2010, the CTC has a reported annual operating expense of over $2 million funded by state and county grants, client fees, third party payers and grants. The CTC and its coordinated contractors have over one hundred employees including approximately 84 full and part-time drivers.

The GCC is a private non-profit organization founded in 1973 in response to the need identified by community leaders for a community facility to provide mental health services to local residents. Since then it has since then it has grown into a multi-service community mental health center providing inpatient, outpatient, residential, day treatment and case management services as well as transportation services. It has a staff of over 100, of these, 5 are full or part-time drivers.

The GCC as CTC currently contracts with the following organizations:

- The Florida Keys Children's Shelter in Tavernier serves at-risk children and families and offers a community-based counseling program. It contracts with the CTC and provides sponsored trips to the residents of its facility. The address is 73 High Point Road, Tavernier, Florida 33070. Hours of operation: 24 hours a day.

- Florida Keys Outreach Coalition for the Homeless in Key West provides homeless outreach and residential services. It utilizes TD funds to purchase monthly bus passes on Key West transit for residents of the Coalition's transitional residential facility. The address is 2221 Patterson Road, Key West, Florida 33040. Hours of operation: Monday through Friday from 8:30 a.m. to 5:30 p.m.

- The Monroe Association for ReMARCable Citizens, Inc. (MARC) is a non-profit agency that serves adult clients within Monroe County who have developmental disabilities. The address is 1401 Seminary Street, Key West, FL, Florida 33040. Hours of operation: Monday through Friday from 8:00 a.m. to 4:00 p.m.

- Center for Independent Living of the Keys is a non-profit organization that provides supportive services to the elderly and disabled. The address is 103400 Overseas Highway, Suite 243, Key Largo, Florida 33036.

- Samuel's House is a safe haven for women, and women with children, for up to 90 days to allow them a new beginning. Any woman in need, of any age, anywhere in Monroe County is welcomed. The address is 1614 Truesdell Court, Key West, FL 33040. Hours of operations: Monday through Friday from 9:00 a.m. to 5:00 p.m.

- US Fellowship of Florida, Inc. is an agency that offers residential housing for adults with mental illness and provides non-sponsored trips for residents of their group home seven days a week. The address is 1320 Coco Plum Drive, Marathon, Florida 33050. Hours of operation: Monday through Friday from 8:00 a.m. to 11:00 p.m.

- The Monroe County Social Services Transportation provides sponsored trips throughout the keys with vans located in Key West, Big Pine, Marathon and Tavernier. Residents are transported within these areas, but not between them. The address is 1100 Simonton Street, Room 1-181, Key West, Florida 33040. Hours of operation: Monday through Friday from 8:00 a.m. to 5:00 p.m. (Transportation and Reservations can be made between these hours).

The GCC provides scheduled weekday services throughout the Keys as demonstrated in **Table 5.9**.

Table 5.9 – The Guidance/Care Center, Inc. Transportation Schedule

Day and Service Area	Departure	Returning Trip
Monday		
Middle to Upper Keys (Up to Key Largo)	6:30 am	8:30 am
	2:30 pm	4:00 pm
Middle to Lower Keys	6:30 am	8:30 am
	10:30 am	12:00 pm
	2:30 pm	4:00 pm
Tuesday		
Middle to Upper Keys (Marathon to Marathon)	9:30 am	10:00 am
	2:30 pm	4:00 pm
Middle to Lower Keys	6:30 am	8:30 am
	2:30 pm	4:00 pm
Wednesday		
Middle to Upper Keys (Up to Key Largo)	6:30 am	8:30 am
	2:30 pm	4:00 pm
Middle to Lower Keys	6:30 am	8:30 am
	10:30 am	12:00 pm
	2:30 pm	4:00 pm
Thursday		
Middle to Upper Keys (Marathon to Marathon)	9:30 am	10:00 am
	2:30 pm	4:00 pm
Middle to Lower Keys	6:30 am	8:30 am
	2:30 pm	4:00 pm

Table 5.9 – The Guidance/Care Center, Inc. Transportation Schedule (continued)

Friday		
Middle to Upper Keys (Up to Key Largo)	6:30 am	8:30 am
	2:30 pm	4:00 pm
Middle to Lower Keys	6:30 am	8:30 am
	10:30 am	12:00 pm
	2:30 pm	4:00 pm

The set stops for the GCC Transportation Services between Marathon and Key West are located at:

- Guidance/Care-Center - 3000 41st Street, Ocean, Marathon;
- Peacock Apartments - 1624 Spalding Court, Key West;
- Dion's Quick Mart – 30989 Avenue A, Big Pine Key;
- Veterans' Administration Clinic - 1300 Douglas Circle, Key West;
- Burger King - 5400 Overseas Highway, Stock Island;
- Near former Waterfront Market - William and Caroline Streets;
- Corner of Truman and White Streets;
- St. Clare's Clinic - 2700 Flagler Avenue, Key West; and
- K Mart (Sears town) - 2928 North Roosevelt Boulevard, Key West.

Between Marathon and Key Largo, the set stops are:

- Islamorada Library - 81830 Overseas Highway, Islamorada,
- San Pedro's Church - MM 89, and
- Guidance/Care-Center - 3000 41st Street, Ocean, Marathon.

The current fare structure (as of March 2011) is presented in **Table 5.10**.

Table 5.10 – Middle Keys Transportation Fares Per One-Way Trip

From Marathon southbound to:		From Key West northbound to:	
Big Pine	$1.00	Big Coppitt	$1.00
Summerland Key	$2.00	Sugarloaf Key	$2.00
Sugarloaf Key (Cudjoe Key)	$3.00	Summerland Key	$3.00
Big Coppitt	$4.00	Big Pine Key	$4.00
Key West	$5.00	Marathon	$5.00
From Marathon northbound to:		**From Key Largo southbound to:**	
Grassy Key	$1.00	Tavernier	$1.00
Long Key	$2.00	Islamorada	$2.00
Islamorada	$3.00	Long Key	$3.00
Tavernier	$4.00	Grassy Key	$4.00
Key Largo	$5.00	Marathon	$5.00

During the 2009-2010 fiscal year, the CTC System operated a total of 52 vehicles, of which 44 percent were wheelchair accessible.

The annual operating report for 2009-2010 for the Monroe County Transportation Disadvantaged program revealed a 35 percent increase in unduplicated riders with approximately 700 more riders than in the previous year, indicative of a higher level of need in the county. The Coordinated System provided a total of 107,517 trips up from 104,587 in the previous year.[3]

Table 5.11 illustrates Monroe County TD population projections from 2008 through 2012. During fiscal year 2006-2007, about 40% of the county's population (35,509) was designated Potential TD population while an additional 7,472 were designated TD population. Based on the aforementioned Monroe County TD Service Plan 2008, at the end of fiscal year 2006-2007, Monroe County had invested over $2.5 million to provide 119,987 trips to about 2000 TD persons, representing approximately 6% of the county's Potential TD population. Currently, the funding allocated to serve the TD population is not sufficient to meet the existing demand for services. Additionally, the steady rise in TD populations demonstrates a need for concurrent increases in funding and other resources to meet the rising demand.

Table 5.11 – 5 Year Forecast of TD Population in Monroe County, 2008-2012

	2008	2009	2010	2011	2012
Potential TD Population	35,509	36,354	37,225	38,123	39,050
TD Population	7,617	7,765	7,919	8,075	8,237

Source: Center for Urban Transportation Research, University of South Florida, 2008

5.4.3 Greyhound Bus Line

Greyhound Bus Line provides the County with both intercity and interstate service and connectivity. The Greyhound terminal is located at 3535 South Roosevelt Boulevard, Key West.

Greyhound has two daily scheduled services each way. The service to and from Miami includes stops at Key Largo, Islamorada, Marathon, Big Pine Key and Key West. The two southbound trips from Miami depart at 11:10 a.m. and 5:15 p.m. The two daily northbound trips depart Key West at 8:15 a.m. and 6:00 p.m.

[3] Source: FLCTD Annual Operations Report, 2010.

5.5 Major Public Transit Trip Generators and Attractors

The major public transit trip generators and attractors are graphically depicted on **Map Series 5-3**. Their location is denoted by MM in the County, where appropriate. They generally include commercial, government, residential, medical, education, and State parks sites within the County. The existing characteristics of these sites depend upon the type of use. Trips generated by schools include peak traffic demand in the morning (when pupils and staff arrive) and afternoons (when pupils and staff depart). During the morning peak period, traffic associated with the school coincides with the typical morning home-to-work commute. However, the peak afternoon traffic period associated with schools occurs earlier than the typical work-to-home commute.

The trip generation characteristics of governmental facilities, such as the Government Centers and the U.S. Post Office, are influenced by both the facilities' employees and customers. Most employees arrive in the morning and leave in the evening. Peak hours for retail customers and restaurants may vary depending upon the hours of operation and the clientele to which the service is oriented.

5.6 Existing Intermodal Deficiencies and Needs

As previously noted, the County is currently served by three main intercity transit routes: the Dade-Monroe Express (MDT #301) in the northern region between Florida City, Key Largo and Marathon; the Card Sound Express (MDT #302) between Florida City and Ocean Reef Club (Key Largo); and the Lower Keys Shuttle in the southern region of the County between Key West and Marathon. Because of the geographical and physical conditions and constraints of the over 100-mile long U.S. 1 Corridor which defines the restrictive development and mobility limitations of the County, the public transit service provided is similar to intercity buses, and provides some degree of service the entire length of the County.

While there is no official transfer station for the aforementioned transit services, the bus stop at U.S. 1 and Sombrero Beach Road (MM 50) does serve as a midway point at which riders can transfer to/from the Lower Keys Shuttle and the Miami-Dade Express #301 route.

Overall, these services currently lack adequate signage alerting passengers to the location of this "transfer" stop at MM 50. Presently, there is no indication of a transfer location at the Sombrero Beach Road bus stop or on any of the vehicles. Also, there is no indication on the fare ticket or at the point of sale for the ticket displaying the "transfer" stop. With differing scheduling procedures, there is a potential for extended wait times to transfer to the connecting transit system. It should be noted, however, that information detailing this transfer stop is available on the Lower Keys Shuttle's website.

Another important aspect of the connectivity of the north and south sections of the U.S. 1 Corridor is the need to better coordinate the schedule of the two systems. The scheduling of the routes could be adjusted to ensure more efficient transfers.

Another observed deficiency is the limited number of designated bus stops and shelters (signed, with or without amenities) throughout the U.S. 1 Corridor. This is especially significant in the Upper Keys, north of Marathon. Passengers must hail the buses to stop whether or not they are located at one of the bus shelters. The bus drivers, on the other hand, cannot stop just anywhere and must be cognizant of safe areas to pick up and discharge passengers.

Currently, there are no other deficiencies identified in the County concerning terminals, other connections, HOV lanes, or Park-and-Ride facilities.

CHAPTER 5.0 – MASS TRANSIT – COMMENT RESPONSES

Commenter: Carolyn Haia, Key West Department of Transportation
Date Received: June 9, 2011

Location	Comment	K&S Action
Section 5.2.2.2	1. Substitute text as provided by Carolyn Haia: 5.2.2.2 Lower Keyes Shuttle Service The KWDOT also operates the Lower Keys Shuttle along U.S. 1 between Key West and Marathon (see Map Series 5-1). …… (Second paragraph) The Lower Keys Shuttle operates seven days a week, from 5:40 a.m. to 11:55 p.m (PINK - Key West Based) and 6:00 a.m to 11:36 p.m (LIME - Marathon Based). A total of 9 round trip runs are scheduled during the day. Headways range from 58 minutes to 200 minutes on the northbound trajectory and from 62 minutes to 185 minutes on the southbound trajectory. Both Lower Keys Shuttles now extend into old town / downtown Key West and up to 109th Street between Walgreens and Office Depot in Marathon. The Lower Keys Service fares are as follows: Lower Keys Service 2011 Full Reduced Senior One way $ 4.00 $ 2.00 $ 1.50 7 Day Pass $25.00 $15.00 31 Day Pass $75.00 $45.00 ~~$15.00~~ $45.00	1. Replaced most of original text with suggested text as well as various corrections and/or modifications. Revised Table 5.3.

		Reduce Fare requires proper ID and applies to Students under 21, disabled, active and retired military, and Seniors 60+. Children five and under may ride for free with a paying passenger. The Lower Keys Shuttle provides mass transit, fixed route service between Key West and Marathon daily - with forty -two (42) service points on each side of US #1 - serving the East and West directions of travel of the service area. Eighteen (18) of these service points are solar powered bus shelters provided via contract with Anderson Advertising and the City of Key West (as part of the Interlocal Agreement of all three agencies) - another 5 shelters are shared with the MC School Board transportation service and City of Key West but are maintained and under contract via Monroe County BOCC and Clear Channel Advertising. Many of the remaining service points consist of simple bus stop signs and posts with eight (8) locations consisting of solar powered safety lighting and beacon light I-Stop units. Table 5.3 presents the location of the KWDOT owned and installed bus shelters, as well as, the five MCSB shelters. Currently, the local agencies plan to install 20 more shelters in the Lower Keys area within the next two (2) year period. Those who Key West because of visual, physical or mental impairment cannot recognize destinations or cope with the physical requirements of the regular bus service.	

Commenter: Judith S. Clarke, P.E., Director, Monroe County Engineering
Date Received: May 2011

Location	Comment	K&S Action
Section 5.2.1.1	1. Section 5.2.1.1, Page 3: Last paragraph: Bus shelters were not installed (installed) by School Board; Monroe County Public Works/Engineering installed them. 2. Section 5.2.1.1, Page 5: First paragraph and Table 5.2 The bus shelters managed by the County were not installed by the school board as school bus shelters. The list of locations is changing and in May 2011 Clear Channel advised us that they no longer want to service Monroe County. They are in the process of removing their shelters and the County is in the process of 1) rolling the shelters within the Lower Keys Shuttle Service Area into the shelter program managed by KWDOT and 2) negotiating a new contract for company to manage the shelters in the Upper Keys (north of Marathon). I am attaching a current list of shelters; some may have already been removed by clear channel but the locations represent where we intend to replace them with another contractor. 3. Section 5.2.1.1, Page 6, First paragraph: Fix spacing.	1. Paragraph text changed to read: "Some of the safe areas include a number of bus passenger shelters along the U.S. 1 corridor that have been installed by the Monroe County Public Works Department (see Table 5.2). " 2. Paragraph text changed to read: " Previous to May 2011, Clear Channel Outdoor, Inc. installed and maintained a number of bus passenger shelters along U.S. 1, under contract to Monroe County. Earlier in 2011, this company chose not to renew its contract with Monroe County, which was set for expiration on May, 17, 2011. As of June 2011, Monroe County was in the process of (1) incorporating the shelters within the Lower Keys Shuttle Service Area into the shelter program managed by KWDOT and (2) negotiating a new contract for a company to manage the shelters in the Upper Keys (north of Marathon). The current Monroe County bus passenger shelters (as of June 2011) are presented in Table 5.2." Table 5.2 revised with new input and title changed to "Table 5.2 - U.S. 1 Corridor Monroe County Bus Passenger Shelters as of June 2011." Section 5.2.2.2, Table 5.3, page 11 revised with new shelter input. 3. Correction made.
Section 5.2.2.1 Key West Shuttle Bus System	1. Section 5.2.2.1, Page 6, First paragraph: Add website address.	1. Website information added. 2. Text moved to Section 5.2.2.2, Page 10.

	2. Section 5.2.2.1, Page 9, Fourth paragraph: This part should be moved to the section below as it pertains to the Lower Keys Shuttle, "The Lower Keys Shuttle does not provide bicycle racks. However, folding portable bicycles are allowed on the Lower Keys Shuttle. These compact bikes can be folded and carried alongside a rider without taking up precious space on the sometimes busy shuttle."	
Section 5.2.2.2 Lower Keys Shuttle Service	1. Section 5.2.2.2, Page 10: Monroe County has seven shelters in the Lower Keys Shuttle area.	1. Section 5.2.2.2 revised to reflect input from Carolyn Haia, Key West Department of Transportation and Judith S. Clarke, Monroe County Engineering.
Section 5.4.1 Monroe County Transit's Paratransit Service	1. Section 5.4.1, Page 16, Fourth paragraph: "The residents outside of Key West meet the requirements, and those who live in Key West follow the following guidelines:" This sentence doesn't seem clear; it implies that anyone living outside of Key West qualifies for service; is that correct?)	1. Entire paragraph revised to read: " The MCT meets the requirements of the Americans with Disabilities Act (ADA) and provides door-to-door service to those individuals who qualify based on the following criteria:"
Section 5.4.2 Monroe County Transportation Disadvantaged Service	1. Section 5.4.2, Page 20: These stops should have street addresses associated with them. Today's Burger King could be a Wendy's tomorrow. • Peacock Apartments; (Where is this?) • Waterfront Market; (This no longer exists) • St. Clare's; ... (Where is this?) 2. Section 5.4.2, Page 21, Second paragraph: "The annual operating report for 2009-2010 for the Monroe County Transportation Disadvantaged program revealed a 35 percent in unduplicated riders..." A 35% what? Decrease? 3. Section 5.4.2, Page 21, Third paragraph: "At the end of fiscal year 2006- 2007, ..."	1. Addresses added to all GCC Transportation Services stop locations. 2. Sentence corrected to state ""The annual operating report for 2009-2010 for the Monroe County Transportation Disadvantaged program revealed a 35 percent **increase** in unduplicated riders..." 3. The information presented is derived from the FLCTD Annual Operations Report, 2010. This report has not been updated as of the date of the preparation of this section.

	No more recent data than this?	
Section 5.5 Major Public Transit Trip Generators and Attractions	1. Section 5.5, Page 23, First paragraph: "... Map Series 5-3." Not included in my copy.	1. Comment noted.

PORTS, AVIATION AND RELATED FACILITIES
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6.0 PORTS, AVIATION AND RELATED FACILITIES
[9J-5.019(1), (2), and (3)]

The Ports, Aviation and Related Facilities Element of the Monroe County (County) Comprehensive Plan addresses the data inventory requirements of 9J-5.019(1), (2), and (3) of the Florida Administrative Code (F.A.C.).

6.1 Introduction

Pursuant to Rule 9J-5.019, F.A.C., local governments not located within the urban area of a Metropolitan Planning Organization (MPO) with population in excess of 50,000, shall adopt a traffic circulation, mass transit, and ports, aviation, and related facilities elements consistent with the provisions of this rule and Chapter 163, Part II, F.S. The County is not located within an urban area of a MPO, but has a population in excess of 50,000. This Element is prepared in furtherance of that requirement.

6.2 Existing Facilities

6.2.1 Aviation [9J-5.019(2) (a), F.A.C.]

Within the County, there are eight airport facilities. One of these, Key West International Airport (KWIA) is the only commercial airport currently serving the community. The Florida Keys Marathon Airport (FKMA) provides only general aviation services, although non-scheduled air taxi service is provided. There are also four private airports or airstrips, one seaplane facility, and one military aviation facility: the U.S. Naval Air Station Key West (NAS Key West). The KWIA and the Naval Air Station are situated in the Lower Keys. The FKMA is located in the Middle Keys. The seaplane facility is located on Stock Island. The four private airstrips are located throughout the Florida Keys (The Keys).

Map Series 6-1 shows the location of the airport facilities.

6.2.1.1 Key West International Airport

6.2.1.1.1 Airport Operations

KWIA includes approximately 258 acres of land and is located within the limits of the City of Key West, in the southeast quadrant of the city. The airport is the southernmost airport in the continental United States.

KWIA is owned by the County and is operated by the Monroe County Board of County Commissioners (BOCC) as a separate enterprise fund of the County. The BOCC exercises management of the airport through the County Administrator, the Director of Airports and the Airport Manager, who oversees the day to day operation of the airport.

Based on the U.S. Department of Transportation (USDOT), Federal Aviation Administration (FAA) Airport Master Record for KWIA[1], in calendar year (CY) 2009, there were 45 based aircraft and 56,694 operations consisting of:

- 6,841 Air Carrier;
- 12,676 Air Taxi;
- 8,563 General Aviation – Local;
- 28,323 General Aviation – International; and
- 291 Military.

In Calendar (CY) 2009, there were 234,322 revenue passenger enplanements, an increase of 1.29 percent from the 231,339 enplanements recorded in CY 2008[2]. **Table 6.1** presents the historic enplanements of KWIA between CY 2000 and CY 2009.

Table 6.1 - Historic Enplanements at Key West International Airport (2000-2009)

Calendar Year	Enplanements
2000	292,580
2001	261,809
2002	272,440
2003	299,193
2004	298,790
2005	314,075
2006	294,047
2007	270,781
2008	231,339
2009	234,322

Source: Air Carrier Activity Information System (ACAIS).

The CY 2009 enplanements reflect a decrease of -25.4 percent since the high mark of 314,075 enplanements in 2005. The CY 2009 enplanement total is also the second lowest yearly total experienced between 2000 and 2009.

Table 6.2 presents the historic annual operations at KWIA between CY 2000 and CY 2009. In CY 2009, there were approximately 55,663 total annual aircraft operations, of which 47,257 were itinerant operations and 8,406 were local operations. Overall, the number of total operations dropped significantly from a high of 97,517 operations in 2001 to 55,663 operations in 2009, a reduction of -42.9 percent. The rate of decline for the same period is -7.0 percent per year.

[1] "*Airport Master Record*", September 23, 2010, Federal Aviation Administration (FAA).
[2] Air Carrier Activity Information System (ACAIS).

Table 6.2 - Historic Operations: Key West International Airport, Fiscal Years 2000 2009

Fiscal Year	Itinerant Operations					Local Operations			Total Operations
	Air Carrier	Air Taxi & Commuter	General Aviation	Military	Total Itinerant	Civil	Military	Total Local	
2000	1,268	34,169	40,251	3,044	78,732	11,568	1,696	13,264	91,996
2001	2,032	34,562	37,938	946	75,478	11,557	10,482	22,039	97,517
2002	2,616	33,108	32,542	832	69,098	9,971	9,892	19,863	88,961
2003	5,444	30,144	36,807	1,408	73,803	12,426	7,513	19,939	93,742
2004	5,086	28,729	36,753	369	70,937	8,905	7,849	16,754	87,691
2005	5,374	30,169	36,292	644	72,479	14,914	6,779	21,693	94,172
2006	7,336	22,512	32,730	1,032	63,610	12,688	7,335	20,023	83,633
2007	6,796	23,415	31,479	789	62,479	12,460	13,741	26,201	88,680
2008	5,536	23,983	29,090	7,646	66,255	11,799	1,738	13,537	79,792
2009	6,511	12,268	28,260	218	47,257	8,209	197	8,406	55,663

Source: Federal Aviation Administration: APO Terminal Area Forecast Detail Report, December 2009

Table 6.3 presents the cargo activity recorded at KWIA for the first eight months of FY 2010 (October 2009 – April 2010). The total landings were 6,463 and total weight was approximately 215.2 million pounds.

Table 6.3 - KWAI Cargo: Landings and Weights, FY 2010

Month	Number of Landings	Total Weight (Million Pounds)
October 2009	686	18.9
November 2009	716	20.7
December 2009	817	26.6
January 2010	915	33.0
February 2010	831	29.3
March 2010	896	31.6
April 2010	830	28.7
May 2010	772	26.4

Source: Key West International Airport/URS, Inc.

Based on the *Key West International Airport Master Plan Update* (*Master Plan*) dated June 2003, the airport service area for KWIA is considered to encompass all points between Key West and Vaca Key. Further, the demand for air travel in Key West is extremely seasonal.

Typically, the peak activity month occurs during the first quarter of the year, with March being the peak month. Approximately 40 percent of the airport's annual enplanements occur during this three month period.

Based on the Master Plan, operational procedures within KWIA are subject to certain conditions due to its proximity to NAS Key West. NAS Key West and KWIA have adjoining airspace, and operations within the two airspaces are coordinated by the NAS Key West air traffic control tower. In addition, a Warning Area exists adjacent to the joint airspace.

This Warning Area includes the Air Defense Identification Zone (ADIZ), the United States Defense Area, and numerous other warning areas outside of FAA jurisdiction. Air traffic from the north and northeast are routinely routed clear of the Warning Area. The U.S. Navy has indicated that some Warning Areas are used for high-speed aerial combat training including surface-to-air and air-to-air missile firings and anti-aircraft gunnery.

6.2.1.1.2 Existing Facilities

KWIA consists of a single runway (Runway 9/27) that is 4,801 feet long and 100 feet wide. The runway is paved with asphalt materials and has shoulders that are 10 feet wide on the north and south sides of the runway. The north and south side shoulder is stabilized marl (a mixture of limerock and limesilt.)

The runway can support 75,000 pounds single gear, 125,000 pounds dual gear, and 195,000 pounds dual tandem gear.[3] The runway is marked for non-precision approaches from each direction and it is also equipped with medium intensity runway lights (MIRL) approximately 10 feet from the edge of the runway pavement. Current environmental restrictive barriers, such as mangroves at the east end and a salt pond on the west end, impede the ability to extend the airport's present-day runway length.

The airfield has one parallel taxiway (Taxiway A) that extends the full length of Runway 9/27. Taxiway A has a width of 50 feet and is located 315 feet south of the centerline of Runway 9/27. Taxiway A is equipped with medium intensity taxiway lights. There are also several connector taxiways designated as Taxiway B through E. The taxiways' pavement consists of asphalt and concrete.

The airfield's aprons include a commercial terminal apron, a general aviation (GA) apron, and two smaller recently built aprons. The commercial aircraft parking apron is located east of the centerline of Taxiway D and consists of approximately 41,000 square yards of asphalt pavement. The apron is adjacent to the passenger terminal building and the Federal Inspection Station (FIS). The apron is marked for 12 aircraft parking spaces including one reserved for United States Customs inspections. The commercial apron has lighting provided by high mast floodlights. An additional 8,000 square yards of commercial apron is located in front of the FedEx Building and provides aircraft parking for up to four cargo aircraft.

[3] Runway Data, Airport GIS, Federal Aviation Administration, Effective July 29 – September 23, 2010.

The General Aviation aircraft parking apron comprises approximately 33,000 square yards, with the ability to accommodate up to 55 aircraft, and is located west of the commercial aircraft parking apron. It consists of asphalt concrete pavement and has cable aircraft tie downs and lighting provided by high mast floodlights.

A remote west aircraft apron, for up to 36 aircraft, is located south of Taxiway A and west of the hangars. A recently added smaller apron, for up to 10 aircraft, is located south of Taxiway A in front of the hangars.

A non-standard, 400 feet wide Runway Safety Area (RSA) is currently under construction (as of September 2010) along the length of the runway, except for approximately 2,000 feet at the center of the runway where the north boundary of the RSA will be 150 feet north of the runway centerline. A non-standard RSA, 600 feet long, is under construction at the west end of the runway. With the exception of the Engineered Materials Arrestor System (EMAS) arrestor bed, the new RSA sections will be constructed of compacted fill material and be maintained in a grassed condition. The RSA's are expected to be operational by June 2011.

Adjacent to the RSA is an area known as the Runway Object Free Area (ROFA). This is an area intended to enhance safety by keeping unnecessary objects out of the area around the RSA that could damage the aircraft or its engines if an airplane were to inadvertently need to use the RSA. Objects related to navigational aids and aircraft ground maneuvering are permitted within the ROFA. The standard dimensions of the ROFA for. This area is known as the Runway Object Free Area (OFA). For runways servingthat serve aircraft in approach Categoriescategories C and D are , the OFA is 800 feet wide andwith a length of 1,000 feet beyond the end of the runway. The existing ROFA at KWIA does not meet this standard.

Obstructions within 25 nautical miles of the airport include a strobe lighted and marked balloon up to 14,000 feet northeast of the airport; and several towers located east, north, and west of the airport. These towers are situated at elevations ranging from 143 feet to 611 feet.

Since the preparation of the *Master Plan*, all of the 14 trees identified as obstructions as per FAR Part 77 have been removed as recommended.[4] **Figure 6-1** shows the runway safety area dimensions. The KWIA airport space plan is presented in **Figure 6-2**.

[4] URS, Inc., September 2010.

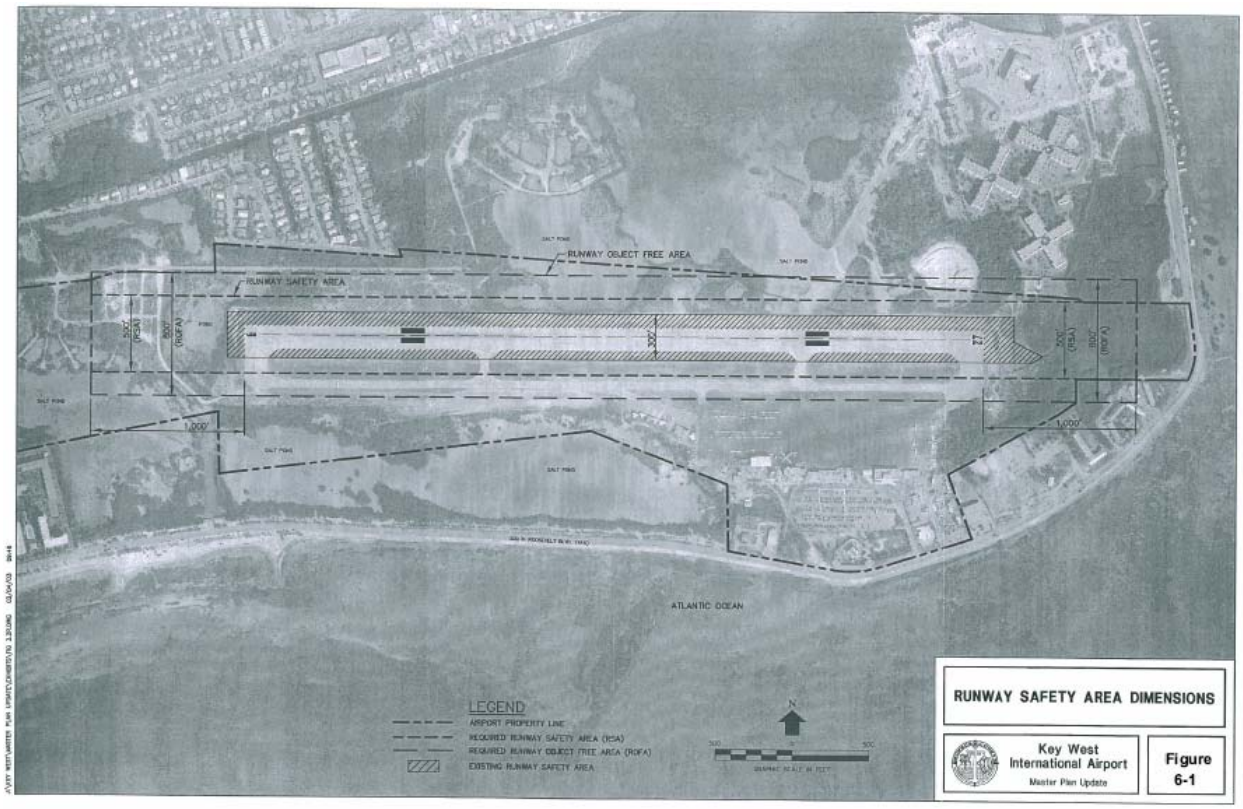


Figure 6-1 - Key West International Airport Runway Safety Dimensions

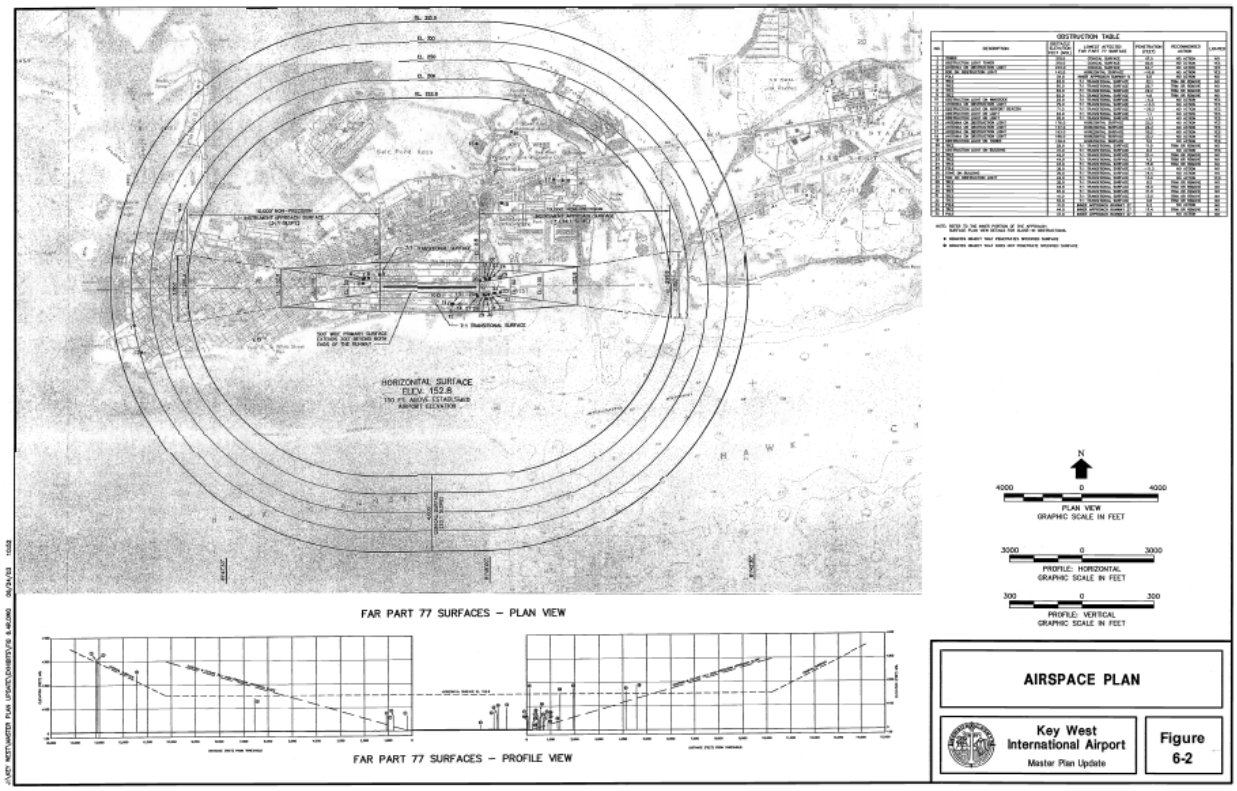


Figure 6-2 - Key West Airspace Plan

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The existing Airport's building facilities are described below:

- Passenger Terminal: The recently completely (2009) two-level passenger terminal building (Terminal) is approximately 127,000 square feet in size. The lower level, approximately 96,000 square feet, includes public and non-public space. The upper level, departures, consists of about 31,000 square feet. The Terminal houses Airport management offices, public and airline areas, food, beverage, and retail areas.

- Adam Arnold Annex: The Adam Arnold Annex consists of approximately 6,600 square feet of space and houses four tenants. These tenants are the United States Custom Service, Greyhound Bus, Cape Air and the Monroe County Sheriff's Office.

- Fixed Base Operator Facilities: Fixed Base Operator (FBO) Facilities, which became operational in 2005, include an FBO shop hangar of about 7,800 square feet, FBO offices of about 1,140 square feet, and a fuel farm which has three 12,000 gallon above-ground fuel storage tanks. Two of these tanks contain Jet A fuel and the third contains aviation gasoline (AVGAS). The facilities also include 47 parking spaces.

- Individual Aircraft Storage Facilities: There are 20 individual aircraft storage hangars located on the Airport. These are either owned by the County and leased to individual aircraft owners or privately owned and built on land leased from the Airport/County.

- Aircraft Rescue and Firefighting Building: A new Aircraft Rescue and Firefighting (ARFF) building was constructed adjacent to the west end of the Terminal building and became operational in 2001. The facility has three bays for firefighting vehicles and equipment. Eleven parking spaces are also provided.

- Air Traffic Control Tower: The Airport's Air Traffic Control Tower (ATCT) is located to the west of the ARFF building and is operational daily. 7:00 a.m. to 9:00 p.m. Six parking spaces are provided at this facility.

- FedEx Cargo Building: FedEx occupies a 3,000 square foot cargo building in connection with its overnight parcel delivery services.

- Rental Car Facilities: There are two rental car service facility buildings located on the Airport property. One, which is currently leased by Avis Rent A Car System, Inc., is approximately 1,180 square feet, on approximately 0.7 acres. The other service facility is approximately 950 square feet, on approximately 0.6 acres and is leased by Dollar Rent A Car System, Inc.

- Highway Patrol Building: The Florida Highway Patrol leases a building of approximately 3,780 square feet located on Airport property. The building was renovated in 2003 and is currently being used by the Drivers License Bureau.

- Other Miscellaneous Buildings and Systems: Various other buildings and weather systems located on the Airport include: the Teenage Center of Key West building; the Island Aeroplane Tours building; the Monroe County Department of Public Works building; the East Martello Gallery and Museum, Fort Garden; and an Automated Surface Observation System (ASOS).

- Roads and Parking: Access to the Airport is provided via South Roosevelt Boulevard. South Roosevelt Boulevard is a four lane, undivided State highway (SR A1A). Access to parking facilities, the Terminal, rental car lots and the general aviation facilities located on Airport property is provided via Faraldo Circle.

  A recently built 400-space parking garage is located on the south side of the Terminal. This garage provides 95 short-term spaces, 150 long-term spaces, and 155 parking spaces for car rentals. A total of 13 curb spaces are provided for taxis. There is also an employee parking lot (Lot A) with 86 parking spaces. There are 28 parking spaces in the remote parking lot (Lot B).

There are currently no major programmed and/or budgeted projects planned for the near future at KWIA.

Public transit service to the KWIA is provided by the Blue and Green routes of the City of Key West Shuttle system. As mentioned earlier, Greyhound Lines, Inc. also has an office and passenger service station in the Adam Arnold Annex building at the airport.

6.2.1.2 The Florida Keys Marathon Airport

6.2.1.2.1 Airport Operations

The Florida Keys Marathon Airport (FKMA) is located at MM 51.5 on Vaca Key. Based on the FAA's Airport Master Record, dated July 29, 2010, the airport aviation activity consisted of 65 based aircraft and 65,944 general aviation operations between June 1, 2008 and May 31, 2009, consisting of:

- 3,907 Air Taxi;
- 34,654 General Aviation – Local;
- 27,227 General Aviation – Itinerant;
- 156 Military.

In FY 2009, there were 1,183 revenue passenger enplanements at Marathon Airport, a significant 44-fold increase from the 41 enplanements recorded in CY 2008. **Table 6.4** presents the historic enplanements of KWIA between CY 2000 and CY 2009. The highly irregular enplanement data is the result of various situations, including but not limited to, short-lived commercial air services and possible inconsistent data reporting. As of July 2010, there have been no regularly scheduled commercial air service operations at FKMA.

Table 6.4 - Historic Enplanements at the Florida Keys Marathon Airport, (2000-2009)

Fiscal Year	Enplanements
2000	13,442
2001	184
2002	55
2003	187
2004	1,096
2005	404
2006	71
2007	4,956
2008	41
2009	1,183

Source: Federal Aviation Administration: APO Terminal Area Forecast Detail Report, Forecast Issued December 2009

Table 6.5 presents the historic annual operations at FKMA between CY 2000 and CY 2009. In CY 2009, there were 65,246 reported total annual aircraft operations, of which 29,740 were itinerant operations and 35,506 were local operations. Overall, the number of total operations has risen slowly from 62,145 operations in 2000 to 65,246 operations in 2009, an increase of 5.0 percent. The rate of growth for the same period is 0.54 percent per year.

Table 6.5 - Historic Operations: The Florida Keys Marathon Airport, Fiscal Years 2000 – 2009

Fiscal Year	Itinerant Operations					Local Operations			Total Operations
	Air Carrier	Air Taxi & Commuter	General Aviation	Military	Total Itinerant	Civil	Military	Total Local	
2000	0	7,862	23,649	156	31,667	30,478	0	30,478	62,145
2001	0	5,000	24,160	156	29,316	30,750	0	30,750	60,066
2002	0	5,078	24,560	156	29,794	31,259	0	31,259	61,053
2003	0	5,157	24,961	156	30,274	31,769	0	31,769	62,043
2004	0	5,235	25,358	156	30,749	32,274	0	32,274	63,023
2005	0	3,705	25,759	156	29,620	32,783	0	32,783	62,403
2006	0	3,754	26,118	156	30,028	33,241	0	33,241	63,269
2007	0	3,805	26,483	156	30,444	33,705	0	33,705	64,149
2008	212	1,370	27,513	244	29,339	35,017	0	35,017	64,356
2009	212	1,388	27,896	244	29,740	35,506	0	35,506	65,246

Source: Federal Aviation Administration: APO Terminal Area Forecast Detail Report, December 2009

6.2.1.2.2 Existing Facilities

The airport consists of a single, east-west runway (Runway 7/25) that is 5,008 feet long with 400-foot long overruns at each end. It is 100 feet wide and lighted with medium intensity light. The sole runway will support a 75,000 pound aircraft with single-wheel gear, a 129,000-pound aircraft with dual-wheel gear, and a 191,000-pound aircraft with dual-tandem gear[5]. In 1983, the FAA approved reductions in the separations between the runway centerline and the taxiway centerline, aircraft parking area, and building restriction line to its present 200-foot separation distance. The runway is marked for non-precision approaches from each direction and is also equipped with MIRL approximately 10 feet from the edge of the runway pavement.

The FKMA currently employs a non-directional beacon approximately 2.1 miles southeast of the runway. It also uses a GPS, straight-in approach, as well as a four-light Precision Approach Path Indicator that is designed to facilitate the transition from instrument flying to visually locating the runway[6].

The passenger terminal building is 19,000 square feet consisting of ticketing, baggage claim, car rental, waiting areas, advertising, manager's office, phone booth, vending machines, restrooms, and a public parking lot accommodating 184 vehicles. A 46-space parking lot for rentals is also provided.

Fixed base operators are located in hangars and provide jet and aviation fuel. The Marathon Flying Club is located in the Runway Protection Zone at the east end of the runway, in violation of FAA airport design standards. The Marathon Volunteer Fire Department, which directly accesses the airport and U.S. 1, provides crash, fire, and rescue services. **Figure 6-3** shows the airport space plan.

Recent additions to FKMA include the following[7]:

- Monroe County Sheriff's hangar and apron;
- Expansion of the Grant Air (FBO) apron and hangar;
- Construction of 32 "T-Hangars";
- Coast (FBO) apron;
- Antique Air Hangar;
- Relocated four-bay shade hangars to the northeast sector;
- Construction of the Mosquito Control Facility at the east end of the airport; and
- New Airport Rescue and Fire Fighting (AARF) Building.

[5] Airport Narrative Layout Plan for Florida Keys Marathon Airport, February 2009
[6] Ibid
[7] URS, Inc., September 2010.

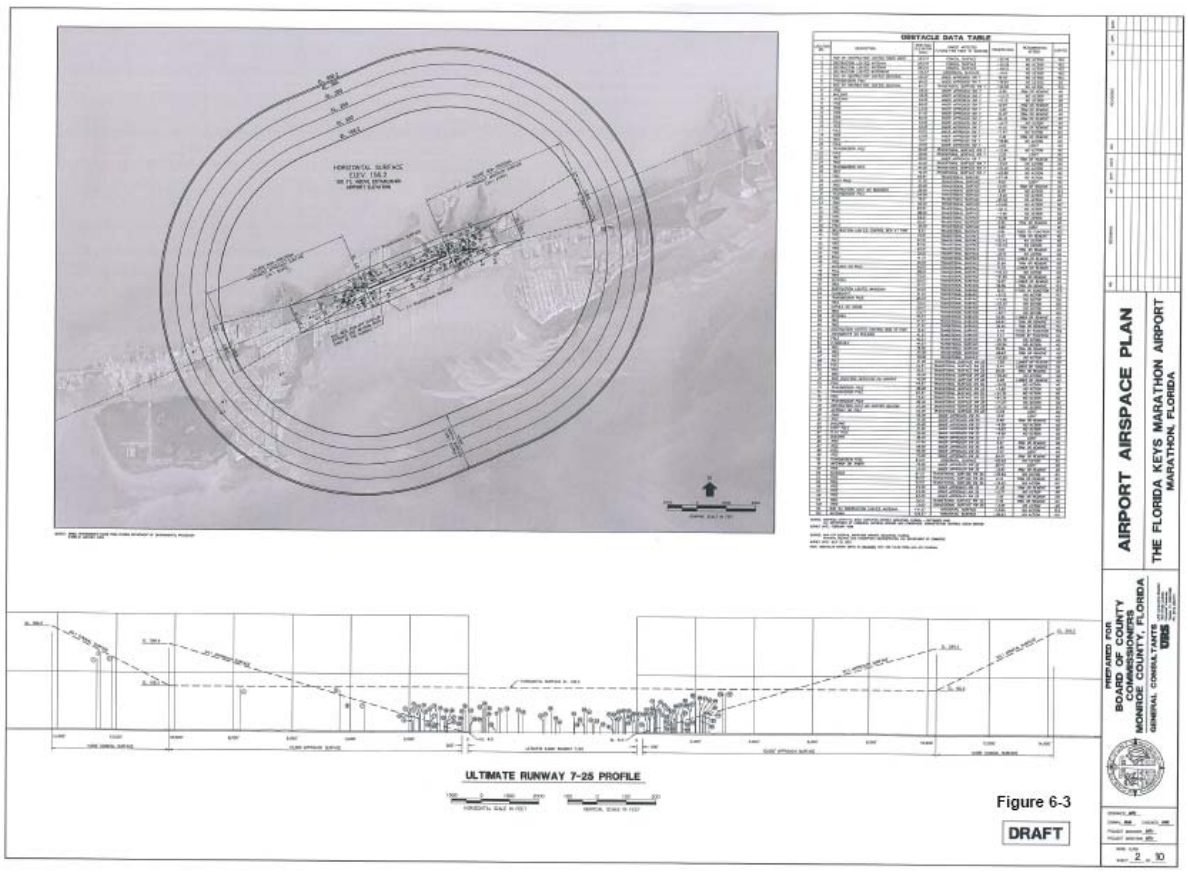


Figure 6-3 - Florida Keys Marathon Airport

There are currently two proposed future airport enhancements: (1) a new hangar adjacent to the existing Coast FBO Hangar, and (2) a new Emergency Operations Center (EOC) Facility. While these two facilities are planned for future implementation, neither are currently programmed or budgeted.[8]

6.2.1.3 U.S. Naval Air Station Key West[9]

6.2.1.3.1 Description and Operations

Naval Air Station Key West (NAS) consists of approximately 5,800 acres with facilities located in 13 different areas of the lower Florida Keys. Boca Chica Field, NAS Key West's primary site and airfield, is located on Boca Chica Key. Boca Chica Field is approximately 3 miles east of the City of Key West and consists of approximately 4,700 acres encompassing nearly the entire key. Other facilities include:

- Truman Annex: port operations, housing, visitor quarters, beach patio, and several tenant activities;
- Trumbo Point and Peary Court Annexes: diverse operational uses and housing;
- Fleming Key: accommodates functions requiring isolation; and
- Sigsbee Park Annex: central hub for family housing, community support, and recreation facilities.

The Navy purchased over 617 acres of undeveloped land on Boca Chica and Geiger Keys in the 1980's and early 1990's. The Navy also has a compatible development agreement over a privately owned area on the northwest end of Boca Chica Key. **Figure 6-4** shows the NAS Key West location. NAS Key West's national security mission supports operational and readiness requirements for Department of Defense, Department of Homeland Security, National Guard units, Federal Agencies, and Allied forces. As such, NAS Key West is known as the Navy's premier East Coast transient pilot training facility for tactical aviation squadrons.

NAS Key West (Boca Chica Field) airfield consists of three asphalt runways with concrete turn-up areas. All runways are accessible by taxiways. Runway 7/25 is 10,000 feet by 200 feet. Runway 03/21 and 13/31 are both 7,000 feet by 150 feet. Normal airfield operating hours are 7:00 a.m. to 10:00 p.m., 7 days per week. However, when operational requirements arise, air operations later in the night and earlier in the morning do occur frequently.

NAS Key West is an integral part of Key West and the County. NAS Key West contributes directly to the local economy in three major ways: jobs, expenditures by squadrons that visit the Air Station for training, and expenditures for ongoing operations and improvement projects. It is the largest employer in the Lower Keys.

[8] Ibid
[9] AICUZ Update for NAS Key West, Monroe County, Florida, March 2007

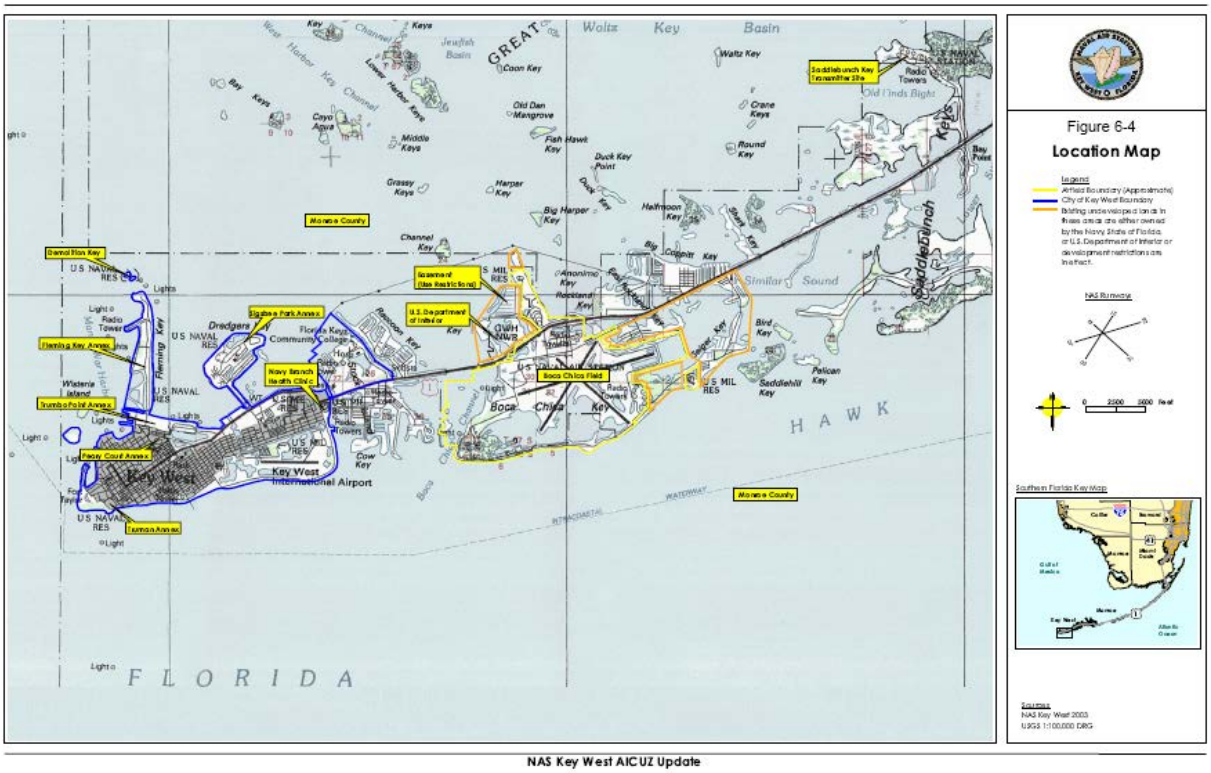


Figure 6-4 - NAS Key West Location Map

The on-site military and civilian employment population at NAS Key West is approximately 900 personnel. In addition to NAS Key West personnel, approximately 1,100 persons are employed by NAS Key West tenants. As such, the Department of Defense (DOD) needs to ensure the continued capability of NAS Key West to support mission requirements while promoting the compatible growth and development of the surrounding community.

The Navy spends approximately $32 million annually in operations and maintenance funds to keep the Air Station facilities in good condition. Additional spending occurs on a case-by-case basis for military construction projects. In recent years, spending for major military construction has included projects for harbor maintenance dredging, airfield lighting, restoration of clear zones and drainage at Boca Chica Field, and utility privatization. A $15.7 million fire station project also is planned for the Air Station. Additional socioeconomic benefit is realized from mutual aid agreements for law enforcement, fire, and emergency services; continuing education support; environmental stewardship; and large-scale contingency capabilities such as hurricane recovery.

Table 6.6 lists the reported overall annual operations (military and civil) for CY 1990 through CY 2006. Since CY 1993, operations have ranged from approximately 46,000 to

93,000 operations per year. In 2009, there were approximately 34,000 annual operations (take-offs and landings).[10]

Table 6.6 - Historic Reported Annual Flight Operations Summary NAS Key West (1990-2006)

Calendar Year	Total Military and Civil Operations
1990	177,675
1991	157,872
1992	164,553
1993	152,535
1994	69,306
1995	90,626
1996	46,997
1997	59,705
1998	46,086
1999	55,886
2000	51,553
2001	60,924
2002	58,102
2003	89,105
2004	48,849
2005	53,577
2006	92,896

Source: Aircraft Traffic Activity Reports NAS Key West; 2007 NAS Key West AICUZ Update.

6.2.1.3.2 Compatible Land Use and Development Coordination

Background

In the 1970s and 1980s, the Navy implemented an Air Installations Compatible Use Zones (AICUZ) program at NAS Key West (Boca Chica Field) to encourage, through local cooperation, compatible development in and around the Navy airfield in the County. The purpose of the AICUZ program is to:

- Protect public health, safety, and welfare;
- Ensure the continued viability of the Air Station; and
- Promote development of compatible land use in high noise and accident potential zones.

[10] *"Fact Sheet",* Public Scoping Open House Meetings, May 26 and 27, 2010; Naval Air Station Key West Airfield Operations Environmental Impact Statement, May 2010

The AICUZ program's objective is to balance the requirement for adequate aircraft training capabilities at airfields with community concerns over aircraft noise and accident potential generated by training. The Navy's AICUZ program is focused on promoting land use compatibility between air installations and surrounding communities. The program recognizes the local government's responsibility to protect the public health, safety, and welfare through land use control tools like zoning ordinances, building codes, subdivision regulations, building permits, and fair disclosure statements.

In 1986 Monroe County codified in their Land Development Code (LDC) the 1977 NAS Key West AICUZ Map, taken from the 1977 AICUZ study **(Figure 6-5)**. In 2004, the Florida Legislature enacted SB 1604 that amended Florida's Growth Management Act to require more active communication between local governments and military bases to avoid potential conflicts between future developments and military base installations. The act requires that each county in which a military base is located and each affected municipality notify a military base's commanding officer of a proposed change to the government's comprehensive plan and land development regulations that would affect the land use adjacent to the military base. Additionally, the amendment requires that the County add a representative of the military installation as an ex officio, nonvoting member of the County's Planning Commission.

In 2010, HB 7129 was enacted by the Florida Legislature, which further amended Section 163.3175 F. S., to add the following provisions:

1. A requirement that the County transmit to the Commanding Officer of NAS Key West any: a) change to its Comprehensive Plan (Plan); b) proposed Plan amendments; or c) change to the LDC which would affect intensity, density or use of land adjacent to or in close proximity to NAS Key West.

2. Upon request of the Commanding Officer of NAS Key West, require the County to transmit and allow comments on any Development Order requesting a variance or waiver from height or lighting restrictions or noise attenuation reduction requirements within a zone of influence.

3. Any comments received from the Commanding officer of NAS Key West shall be transmitted to the State Land Planning Agency (DCA).

4. The County shall include a representative of NAS Key West acting on behalf of the installation as an ex officio nonvoting member of the County's land planning agency (Planning Commission).

5. By June 30, 2012 the County shall adopt criteria and address compatibility of lands adjacent to or closely proximate to NAS Key West within the Future Land Use Element of its Plan or go to mediation with County, NAS, DCA, RPC, private land owner reps.

County Position

In April of 2003 the Navy published the *Environmental Assessment for Fleet Support and Infrastructure Improvements – Naval Air Station Key West* (EA). In 2004, the Navy prepared an updated CY 2007 AICUZ map for NAS Key West. The 2007 AICUZ map encompassed a substantially larger area compared to the 1977 AICUZ map.

The environmental impacts of all of the planned and current aircraft were not evaluated by the Navy's EA in accordance with the National Environmental Policy Act (NEPA). For example, the EA purported to evaluate the impacts of the Super Hornet aircraft, however, evidence of this is not found in the report. Specifically, the Super Hornet aircraft was mentioned in only three pages of the 232-page EA and those three pages did not discuss the noise or other environmental impacts. Further, the Draft EA was distributed to the public and reporting agencies for input and this input was the basis for the final comments published in the April 2003 EA. None of the public or agency comments mention the Super Hornet aircraft, thereby creating the assumption neither the public nor the 11 reporting agencies have evaluated the impacts of the Super Hornet aircraft at NAS Key West.

The County continues to coordinate with the Navy regarding the AICUZ and the ongoing EIS the Navy is now (July, 2011) undertaking.

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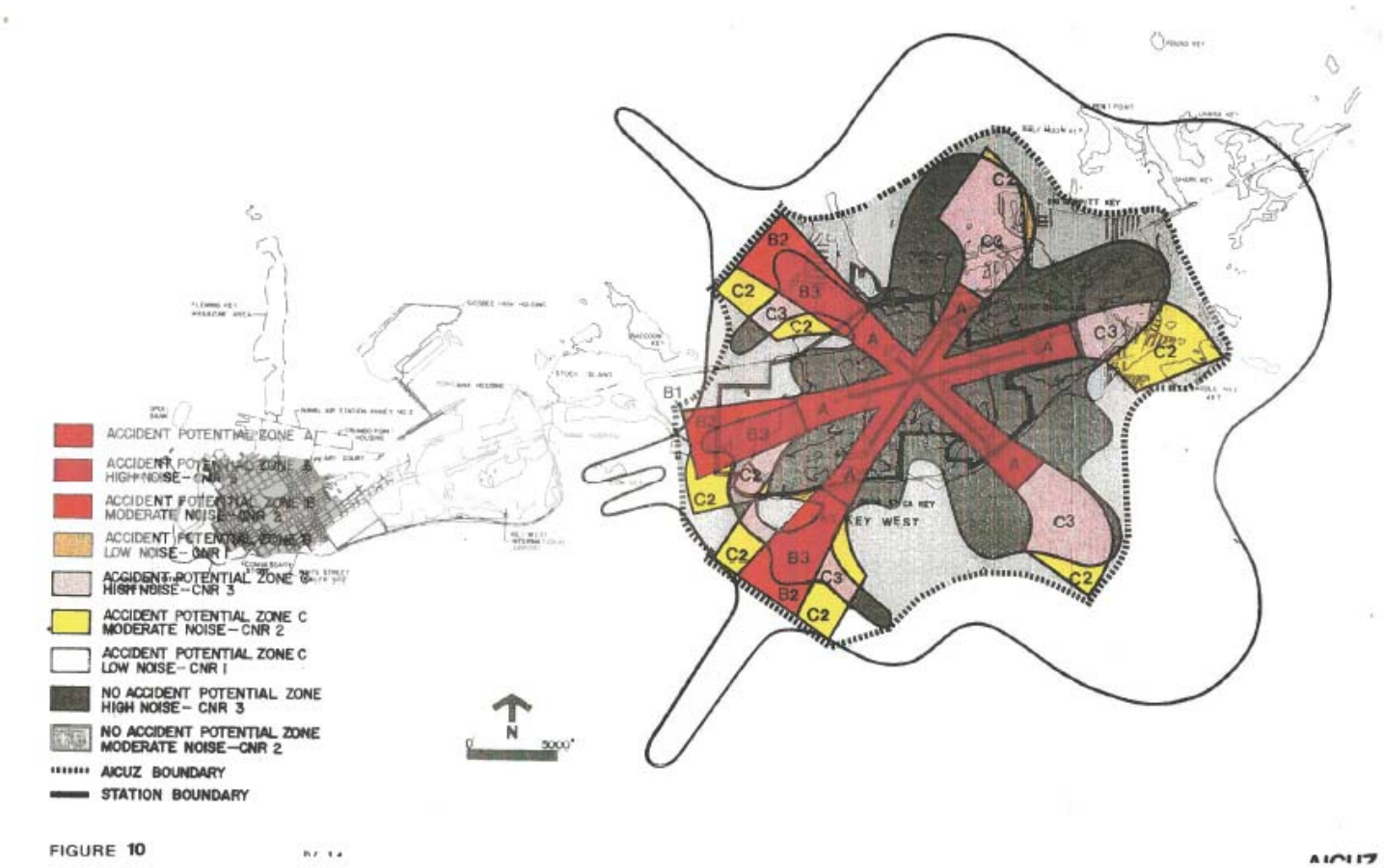


Figure 6-5 (A) - NAS Key West Calendar Year 1977 AICUZ

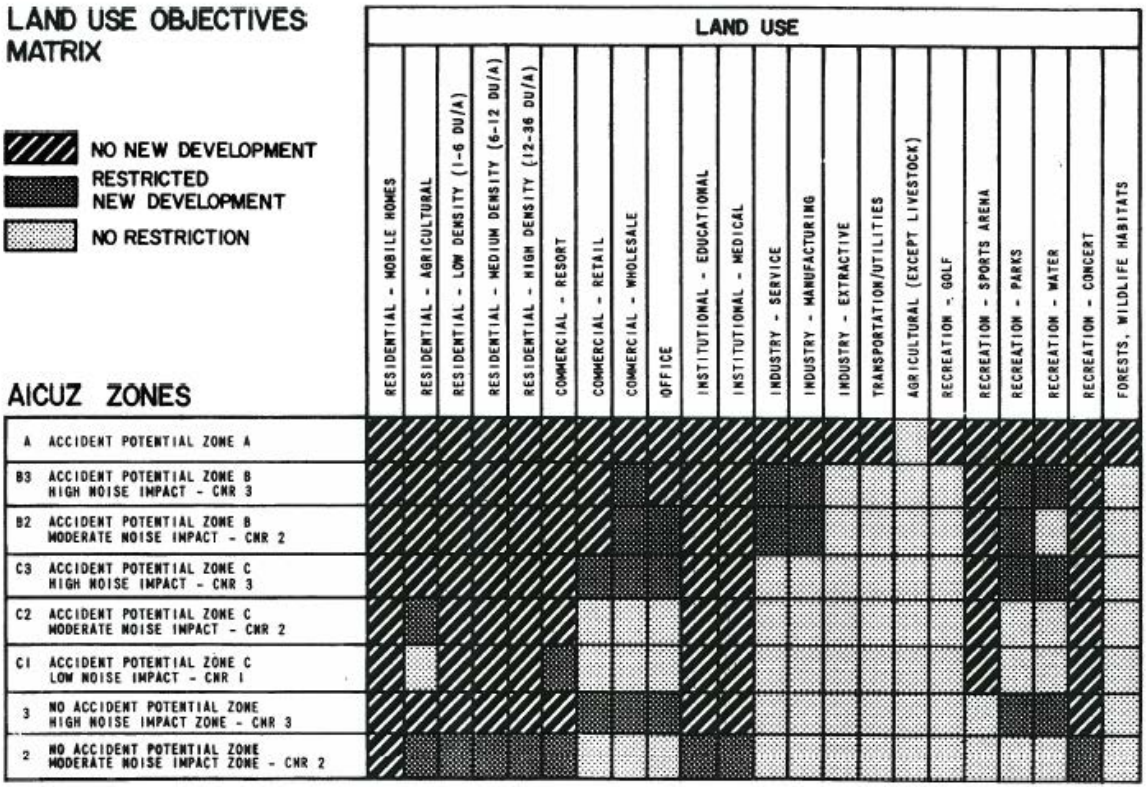


Figure 6-5 (B) - NAS Key West Calendar Year 1977 AICUZ

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The Florida Department of Community Affairs (DCA) has been assisting communities surrounding military bases and the Florida Defense Alliance with planning strategies and land acquisition to protect existing bases. Focusing on strategies to retain Florida's military bases, the DCA developed the following series of recommended best practices for military base-community coordination:

- Conduct economic studies of military installations;
- Map high-noise and potential accident areas and study encroachment impacts;
- Acquire critical properties;
- Modify comprehensive plans and land development regulations to establish compatible land use near military bases;
- Adopt appropriate development standards within land development codes and establish multiple strategies in comprehensive plans to ensure compatible development near military bases;
- Notify the military of comprehensive plan or zoning changes and of proposed development in impact areas;
- Disclose and record hazards prior to the development or sale of land;
- Maintain formal and informal communication and coordination; and
- Respond as a team to inappropriate development requests.

The National Environmental Policy Act (NEPA) is the national charter for promoting productive harmony between man and the environment and minimizing the impacts of federal actions. This law requires all federal agencies to consider potential environmental impacts of their proposed actions and reasonable alternatives in making decisions about those actions. In early 2010, the Navy initiated a NEPA study titled ***Naval Air Station Key West Airfield Operations Environmental Impact Statement (EIS).*** The study is anticipated to last for two years.

The purpose of the study is to address the environmental effects associated with the Navy's proposal to support new aircraft and to modify operation levels as necessary in support of the Fleet Readiness Training Plan (FRTP) while maintaining current baseline operations. More specifically the EIS study will address the aviation training mission for tactical aviation squadrons. In order to maintain NAS Key West as an ideal military aviation training site, it is important to identify potential impacts associated with future airfield operations, and to identify ways to address those potential impacts. The EIS will include a noise study to assess the potential impacts of noise associated with the proposed alternatives on the natural and human environment.

As a point of clarification, the EIS is not the same as the Navy's recently updated (2007) AICUZ study. The EIS focuses on an assessment of the potential impacts of a proposed action on the surrounding environment, while the AICUZ study focuses on making long-term land use recommendations to protect public health, safety, and welfare while ensuring the continued viability of the Air Station. The EIS is also conducted under a different set of guidelines, policies and procedures.

6.2.1.4 *Private Aviation Facilities*

6.2.1.4.1 Stock Island Seaplane

The Key West Seaplane Service is located within the Key West City limits on the north side of Stock Island. This serves primarily as a shuttle for tourists to/from Fort Jefferson National Monument at Dry Tortugas. However, the service also provides a vital link for official visitors and supplies to this remote area.

6.2.1.4.2 Sugarloaf Shores Airstrip

The Sugarloaf Shores Airstrip is located at MM 17 near the Sugarloaf Lodge on Lower Sugarloaf Key. Runway 10/28 is paved and is 2,700 feet long. This facility is used primarily for residents of the area and guests of Sugarloaf Lodge.

6.2.1.4.3 Summerland Key

The Summerland Key Airport has been in place since 1959 and the community has grown up around this facility. This airport primarily serves the pilots and private planes associated with the adjacent residences. In addition, although a private facility, the owners allow regular use by public agencies including the Florida Fish and Wildlife Conservation Commission. In addition, as with most private facilities, this airstrip is available for emergency landings, medical airlifts and hurricane evacuation.

This airport is owned and operated by the Summerland Key Cove Airport Company. Runway 12/30 is paved and 2,510 feet long.

6.2.1.4.4 Tavernaero Airstrip

The Tavernaero Airstrip is located at MM 90 in Plantation Key. The runway is not paved (it is grass), and is approximately 2,100 feet long. Aircraft are based at the facility, but are housed on the aircraft owner's property.

6.2.1.4.5 Ocean Reef

The Ocean Reef airstrip is a privately-owned airport providing service to the Ocean Reef community in Key Largo. Runway 4/22 is paved and is 4,456 feet long.

6.2.2 Port Facilities [9J-5.019(2) (a), F.A.C].

6.2.2.1 Port of Key West

While there is an abundance of coastline in the County, only two areas are considered port facilities. The Port of Key West, which consists of cruise berths and passenger ferries, is located within the northwest quadrant of the city; while the Stock Island port is considered to be the only truly industrial, deep water port in the County. **Map 6-2** depicts the location of the two port facilities.

The Port of Key West is operated by the City of Key West, and consists of cruise berths at the Outer Mole Pier, Mallory Dock (privately), and Pier B, as well as an offshore anchorage area. Passenger ferry operations are handled at the Key West Bight Terminal. The Port of Key West is an exclusive cruise ship and ferry operations port. As such, no cargo activities occur at the port. Cruise ships sail from Port Canaveral, Port Manatee, Port of Tampa, Port of Miami, and Port Everglades to the port, while ferry operations shuttle passengers from Fort Myers and Marco Island (seasonal).

Table 6.7 presents the historic annual Port of Key West cruise ship revenue passengers and port-of-calls from fiscal year 1997/1998 through 2009/2010. The forecasted values for fiscal year 2010/2011 are also displayed. Based on the March 2009 report prepared by the Florida Seaport Transportation and Economic Development Council[11], during fiscal year 2007/2008 the Port of Key West registered 924,411 revenue passengers. This value includes 170,004 ferry passengers. Further, it is reported that the port handles more multi-day cruise ship port-of-call passengers than any other port in the nation[12].

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[11] *A Five-Year Plan to Achieve the Mission of Florida's Seaports, 2008/2009 – 2012/2013",* Florida Seaport Transportation and Economic Development Council, March 2009.

[12] *Harbor Preservation/Redevelopment and Intra-Island Corridor Enhancement Plan, November 2005.*

Table 6.7 - Historic Cruise Ship Revenue Passengers and Port Calls, Port of Key West (Fiscal Years 1997/1998 to 2009/2010)

Fiscal Year[1]	Number of Passengers	Number of Port Calls
1997/1998	585,028	385
1998/1999	625,810	420
1999/2000	670,531	N/A
2000/2001	621,232	331
2001/2002	942,639	497
2002/2003	1,122,197	603
2003/2004	929,790	462
2004/2005	976,761	495
2005/2006	859,089	413
2006/2007	830,954	403
2007/2008	754,407	360
2008/2009	863,767	378
2009/2010[2]	800,656[3]	342[3]
2010/2011[4]	765,747[4]	360[4]

Source: Port of Key West; Port Operations, September 2010.
Notes:
[1] Calendar Year extends from October through September.
[2] Data shown to include September 2010 estimates.
[3] Includes updated/amended budget projection for September 2010.
[4] Forecast based on projected budget.

6.2.2.2 Key West Bight Ferry Terminal

The Key West Bight Ferry Terminal, located at 100 Grinnell Street, Key West, began operations on January 1, 2002 with daily service to Fort Myers Beach and seasonal service to Marco Island. The current ferry service provider, Key West Express, operates up to four boats: the 130 foot Whale Watcher, the 140 foot Atlanticat Catamaran, the 155 foot Big Cat Catamaran, and the 170 foot Key West Express Catamaran. The typical adult fare is $130.00 roundtrip and $78.00 one-way. Children's fares range from $30.00 to $60.00 round trip and from $15.00 to $49.00 one-way. Special senior rates are $120.00 round trip and $78.00 one-way. A $15.00 port and security tax is collected at check-in. **Table 6.8** presents the historic yearly ferry passenger volumes between fiscal years 2004/2005 and 2009/2010.

Table 6.8 - Historic Key West Bight Ferry Terminal Passengers, Fiscal Years 2004/2005 to 2009/2010

Fiscal Year[1]	Number of Passengers
2004/2005	141,590
2005/2006	165,403
2006/2007	193,754
2007/2008	170,268
2008/2009	148,300
2009/2010[1]	107,871[1]

Source: City of Key West, Key West Bight Terminal Operations.
Notes:
[1] Does not include data for September 2010.

6.2.2.3 Stock Island

Consisting of more than 118 acres, the Safe Harbor/Peninsular port area of Stock Island is characterized as a "working waterfront", per the *Harbor Preservation/Redevelopment and Intra-Island Corridor Enhancement Plan* prepared in November 2005. Uses that currently populate Stock Island include boat repair and storage facilities, commercial fishing, and marine activities. These uses are predominantly marine and seafood-related industries and businesses, where the commercial fishing industry represents 20 percent of the land area and is the primary reason for Stock Island ranking 12th in the nation for dockside value of leading ports.

Overall, there are a total of 860 boats or slips in Safe Harbor. These include recreational boats, fishing boats larger than 40 feet in length, shrimp boats, tug boats, and tow boats. In addition, the commercial fishing fleet includes seven seafood establishments serving up to 300 boats during peak season[13].

6.3 Projected Forecasts

6.3.1 Aviation

The global economic downtown experienced during the last few years has impacted both passenger and aircraft activities at KWIA and FKMA. Enplanements and aircraft operations data, especially for commercial airlines, indicate dramatic reductions in service and passenger movements.

Based on the enplanement data found in **Table 6.1,** the recorded enplanements at KWIA between CY 2005 and CY 2009 have declined by approximately 25.4 percent. Similarly,

[13] Ibid

during the same period, aircraft operations have been declined approximately 40.9 percent. The most notable reduction has been in the air taxi/commuter services with a 59 percent reduction between CY 2005 and CY 2009.

6.3.1.1 Terminal Area Forecasts

The Terminal Area Forecast (TAF) system is the official forecast of aviation activity at FAA facilities. These forecasts are prepared to meet the budget and planning needs of FAA and provide information for use by state and local authorities, the aviation industry, and the public. The TAF includes forecasts for:

- FAA towered airports;
- Federally contracted towered airports;
- Nonfederal towered airports; and
- Non-towered airports.

The following sections present the enplanements and operations forecasts from fiscal years 2010 through 2030 for both the Key West International Airport and Marathon Florida Keys Airport.

6.3.1.2 Key West International Airport

Table 6.9 presents the FAA forecasts of KWIA enplanements for fiscal years 2010 through 2030. The forecasted enplanements are 227,695 for FY 2010 and 338,341 for FY 2030. The current economic conditions have been considered in these forecasts.

Enplanement forecasts from the 2003 Key West Airport Master Plan, developed before the global economic downturn, range from 294,019 to 332,454 enplanements for 2006. The lower range value corresponds well with the actual recorded 2006 enplanement value of 294,097. The forecasts for 2011 range from 309,017 to 395,873 enplanements and for 2021 they range from 341,347 to 522,712 enplanements (considerably higher than current estimates).

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Table 6.9 - Enplanement Forecasts: Key West International Airport, Fiscal Years 2010 – 2030

Fiscal Year	Total Enplanements
2010/11	227,695
2011/12	232,249
2012/13	236,894
2013/14	241,631
2014/15	246,464
2015/16	251,394
2016/17	256,422
2017/18	261,550
2018/19	266,781
2019/20	272,117
2020/21	277,559
2021/22	283,111
2022/23	288,773
2023/24	294,548
2024/25	300,439
2025/26	306,447
2026/27	312,576
2027/28	318,828
2028/29	325,204
2029/30	331,708
2030/31	338,341

Source: Federal Aviation Administration: APO Terminal Area Forecast Detail Report, Forecast Issued December 2009

Table 6.10 presents the FAA forecasts of KWIA operations for fiscal years 2010 through 2030. The forecasted itinerant operations are 47,802 for FY 2010 and 56,385 for FY 2030. The total forecasted operations (itinerant plus local operations) are 55,409 for FY 2010 and 68,610 for FY 2030.

The forecast of total aircraft operations from the previous 2003 Key West Airport Master Plan developed for year 2021 was 114,080. The corresponding FAA aircraft operations forecast for 2021 is 62,166, or 45.5 percent less than operations value developed in association with the 2003 Master Plan. The FAA's current 2030 aircraft operations forecast of 68,610 total operations is 40.0 percent of the value forecasted in the 2003 Master Plan target date of 2021.

Table 6.10 - Operations Forecasts: Key West International Airport, Fiscal Years 2010 – 2030

Start Fiscal Year	Itinerant Operations					Local Operations			Total Operations
	Air Carrier	Air Taxi & Commuter	General Aviation	Military	Total Itinerant	Civil	Military	Total Local	
2010	6,511	12,415	28,658	218	47,802	7,410	197	7,607	55,409
2011	6,511	12,564	28,867	218	48,160	7,592	197	7,789	55,949
2012	6,511	12,715	29,112	218	48,556	7,778	197	7,975	56,531
2013	6,511	12,867	29,359	218	48,955	7,968	197	8,165	57,120
2014	6,511	13,022	29,608	218	49,359	8,163	197	8,360	57,719
2015	6,511	13,178	29,859	218	49,766	8,363	197	8,560	58,326
2016	6,511	13,336	30,112	218	50,177	8,568	197	8,765	58,942
2017	6,511	13,496	30,368	218	50,593	8,779	197	8,976	59,569
2018	6,511	13,658	30,626	218	51,013	8,994	197	9,191	60,204
2019	6,511	13,822	30,886	218	51,437	9,214	197	9,411	60,848
2020	6,511	13,988	31,148	218	51,865	9,440	197	9,637	61,502
2021	6,511	14,156	31,412	218	52,297	9,672	197	9,869	62,166
2022	6,511	14,326	31,678	218	52,733	9,909	197	10,106	62,839
2023	6,511	14,498	31,947	218	53,174	10,152	197	10,349	63,523
2024	6,511	14,672	32,218	218	53,619	10,401	197	10,598	64,217
2025	6,511	14,848	32,491	218	54,068	10,656	197	10,853	64,921
2026	6,511	15,026	32,767	218	54,522	10,917	197	11,114	65,636
2027	6,511	15,206	33,046	218	54,981	11,185	197	11,382	66,363
2028	6,511	15,388	33,327	218	55,444	11,459	197	11,656	67,100
2029	6,511	15,573	33,610	218	55,912	11,740	197	11,937	67,849
2030	6,511	15,760	33,896	218	56,385	12,028	197	12,225	68,610

Source: Federal Aviation Administration: APO Terminal Area Forecast Detail Report, Forecast Issued December 2009

The 2003 Key West International Airport Master Plan Update was developed to identify the physical and operational needs of the airport through year 2021. Many of the recommended actions stemming from the Master Plan, such as the new terminal, parking garage, aprons and hangars, have been implemented. No new major improvements are projected or budgeted for the next five years.

As demonstrated in this section, the combination of a much reduced forecasted demand with the recent implementation of many of the principal improvements identified in the 2003 Master Plan, the KWIA will be able to meet the aviation demand through 2030. Nonetheless, the airport's master plan should be updated within the next five years to be consistent with the County's planning horizon of 2030 and to re-assess demand and needs resulting from shifts in the economy and travel habits, and developing trends in aircraft technology.

6.3.1.2 The Florida Keys Marathon Airport

Table 6.11 presents the FAA forecasts of FKMA enplanements for fiscal years 2010 through 2030. The forecasted enplanements are 1,183 for FY 2010 and FY 2030, demonstrating little to no expected growth in passenger movements through the airport.

Table 6.11 - Enplanement Forecasts: The Florida Keys Marathon Airport, Fiscal Years 2010 – 2030

Fiscal Year	Total Enplanements
2010/11	1,183
2011/12	1,183
2012/13	1,183
2013/14	1,183
2014/15	1,183
2015/16	1,183
2016/17	1,183
2017/18	1,183
2018/19	1,183
2019/20	1,183
2020/21	1,183
2021/22	1,183
2022/23	1,183
2023/24	1,183
2024/25	1,183
2025/26	1,183
2026/27	1,183
2027/28	1,183
2028/29	1,183
2029/30	1,183
2030/31	1,183

Source: Federal Aviation Administration: APO Terminal Area Forecast Detail Report, Forecast Issued December 2009

Table 6.12 presents the FAA forecast of FKMA operations for fiscal years 2010 through 2030. The forecasted itinerant operations are 30,148 for FY 2010 and 39,617 for FY 2030. The total forecasted operations (itinerant plus local operations) are 66,150 for FY 2010 and 87,129 for FY 2030.

Table 6.12 - Operations Forecast: Marathon Airport, Fiscal Years 2010 – 2030

Start Fiscal Year	Itinerant Operations					Local Operations			Total Operations
	Air Carrier	Air Taxi & Commuter	General Aviation	Military	Total Itinerant	Civil	Military	Total Local	
2010	212	1,406	28,286	244	30,148	36,002	0	36,002	66,150
2011	212	1,425	28,680	244	30,561	36,504	0	36,504	67,065
2012	212	1,444	29,081	244	30,981	37,013	0	37,013	67,994
2013	212	1,463	29,488	244	31,407	37,530	0	37,530	68,937
2014	212	1,483	29,901	244	31,840	38,054	0	38,054	69,894
2015	212	1,503	30,319	244	32,278	38,586	0	38,586	70,864
2016	212	1,523	30,743	244	32,722	39,125	0	39,125	71,847
2017	212	1,543	31,172	244	33,171	39,672	0	39,672	72,843
2018	212	1,564	31,606	244	33,626	40,226	0	40,226	73,852
2019	212	1,585	32,048	244	34,089	40,787	0	40,787	74,876
2020	212	1,606	32,496	244	34,558	41,357	0	41,357	75,915
2021	212	1,627	32,950	244	35,033	41,934	0	41,934	76,967
2022	212	1,649	33,410	244	35,515	42,520	0	42,520	78,035
2023	212	1,671	33,876	244	36,003	43,113	0	43,113	79,116
2024	212	1,693	34,349	244	36,498	43,715	0	43,715	80,213
2025	212	1,716	34,828	244	37,000	44,326	0	44,326	81,326
2026	212	1,739	35,314	244	37,509	44,946	0	44,946	82,455
2027	212	1,763	35,806	244	38,025	45,574	0	45,574	83,599
2028	212	1,787	36,305	244	38,548	46,211	0	46,211	84,759
2029	212	1,811	36,811	244	39,078	46,857	0	46,857	85,935
2030	212	1,836	37,325	244	39,617	47,512	0	47,512	87,129

Source: Federal Aviation Administration: APO Terminal Area Forecast Detail Report, Forecast Issued December 2009

As described previously, there are two proposed future airport enhancements: (1) a new hangar by the former Paradise Hangar, and (2) a new Emergency Center Operations facility. However, neither project is currently programmed or budgeted. The ultimate FKMA master plan (no year certain) calls for the extension of the existing 5,008 foot runway to 5,800 feet, plus other facilities.

The current airport layout and facilities, coupled with other enhancement and maintenance projects, should be able to sustain operations for several years. Nonetheless, periodic annual reviews and more detailed assessments (every 5 years) of operations should be programmed, especially in light of constant changes in technology and possible future introduction of commercial air service.

6.3.2 Ports

6.3.2.1 Port of Key West

The March 2009 report by the Florida Seaport Transportation and Economic Development Council includes a Strategic Development Program for the Port of Key West. The program identified the following goals and objectives:

- Develop and maintain port-of-call facilities to accommodate the needs of the cruise ship industry and its passengers;
- Link the physical, social, and environmental aspects of the working waterfront to the community fabric;
- Maximize the generation of benefits and revenues emanating from the cruise industry for the City and its tourist-related businesses;
- Manage cruise-related volumes to sustain the island's quality of life, including its environmentally sensitive resources, public amenities, and public waterfront;
- Increase domestic ferry operations in the City of Key West as an alternative to land-based transportation; and
- Maintain and improve Port security.

The referenced report also identified the following capital improvements needed to achieve the Port's mission:

- Incorporate the Truman Waterfront, a former United States Navy property, into the historic fabric of the City by means of improved passenger access to and from the facility to commercial areas in Old Town;
- Maintain and improve the City's Mallory Dock cruise facility and Key West Bight ferry facility, including security improvements, infrastructure upgrades, and berthing improvements;
- Improve passenger services through provision of a passenger shelter at the Mole Pier; and
- Streamline port and security operations through construction of a single port office.

The cruise ship passenger forecast for FY 2013/14 as developed by the port administration is 775,000 passengers. There are currently no cruise ship passenger or port call projections beyond the aforementioned fiscal year. The cruise ship lines normally schedule only a year to 18 months in advance.

The number of cruise ship port visits depends upon several factors such as:

- The national and economic situation and its ability for a timely recovery;
- Port facility capacities including limited berths and narrow channel width;
- Budgetary restraints and funding source limitations;
- The introduction of newer and larger cruise ships with higher passenger capacities; and
- The increase or decrease in cruise ship services and scheduling.

Current port administration understanding with respect to cruise ship passenger demand is that, in the short term (1-5 years), the Port of Key West will be able handle between 800,000 to 850,000 passengers a year. This level of service is considered to be a sustainable "quality of life policy".

As of September 2010, there are no proposed or budgeted major improvements for the Port of Key West. Port administration is committed to develop plans to expand the capacity of Mallory Square. The current Port of Key West Master Plan is considered to be outdated and will need to be renewed in the short term (1-5 years).

6.3.2.2 Key West Bight Ferry Terminal

The privately operated ferry service has suffered a drop in ridership during the last few years as evidenced in **Table 6.6**. The service has been affected by the same conditions impacting the cruise ship operations: poor economy and limited capacity. The ferry service is wholly dependent upon external visitors (from San Marcos Island and Fort Myers Beach); it does not provide local service.

No forecast of passenger volumes is available. However, based on the passenger data presented in **Table 6.6** and the current capacity and operations characteristics of the private sector provider, annual passenger volumes of up to 200,000 are obtainable. Due to the overall economic situation, the service has lost up to 40 percent of its ridership high mark achieved in FY 2006/2007. A detailed evaluation of the ferry operations and physical facilities should be made during the next two-year period. This service should also be included in the next update of the Transit Development Plan.

The City of Key West has included the following two West Bight Ferry Terminal projects into its Five Year Capital Improvement Program, Fiscal Years 2010/2011 – 2015/2016:

- The extension of the Ferry Terminal by 120 feet. This extension will allow greater flexibility in ferry boat operations and allow the dockage of up to four boats at one time without having to stagger the boats. The project, budgeted at $600,000 is scheduled for implementation in FY 2010/2011, pending a grant award; and

- Security Area Enhancements which allow for the installation of permanent security features within the terminal.

6.3.2.3 Stock Island

The December 2005 report of the Stock Island and Key Haven Livable CommuniKeys Master Plan put forth the following Community Vision Statement:

> *In the year 2024 we envision [...]*
> *A diverse island community rich in residential, commercial, cultural, and recreational opportunities; where families and friends live and work together in vibrant neighborhoods. A place that maintains an affordable cost of living for people of all income levels with an emphasis on housing; that fosters a sustainable, local economy consisting of a working waterfront and a distinctive mix of commercial and industrial activities that complement the community; where recreational and community facilities enhance the cultural fabric of the neighborhoods; where its citizens understand the importance of and acknowledge the responsibility to protect our vital natural resources; where a strong sense of civic pride contributes to an ever improving quality of life (emphasis added).*

With respect to preserving commercial fishing on Stock Island, the local community has voiced its opinion that commercial fishing should be preserved in the Safe Harbor/Peninsular "port" area. A variety of uses should be encouraged to attract desirable development and create diverse housing types that can support workers in the commercial fishing industry, reinforcing Stock Island's character as a "fishing village."

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CHAPTER 6.0 - PORTS, AVIATION AND RELATED FACILITIES – COMMENT RESPONSE

Commenter: Denise Werling, Planning Commissioner **Comment Received: January 12, 2011**		
Location	**Comment**	**K & S Action**
Table 6.1 Table 6.2 Table 6.5, page 10	1. On Ports and Aviation Element, Table 6.1 Define "Enplanements". 2. On Ports and Aviation Element, Table 6.2 Define "Itinerant". 3. On Table 6.5, page 10 – Consistency in document. What is defined as military (i.e. Coast Guard, DoD, etc.	1. Note added to Table 6.1. 2. Notes added to Table 6.2 defining all factors in table. 3. See information in Note on Table 6.2. Section 6.2.1.3.1Description and Operations has been revised to include reference to the facilities.
Commenter: Ron Demes, NAS-Key West Comment Received: January 12, 2011		
Location	**Comment**	**K & S Action**
	1. Section 6.2.1.3 – There is a Saddlebunch Annex facility and a Boca Chica NAVY Health facility that should be added or are they already included? 2. Page 14, 2nd paragraph – Revise Base budget, does not include housing allowance. 3. Military housing should be included in the analysis. 4. Section 6.2.2. Page 21 – No reference of Naval Mall(Mole) Pier. No mention of the Truman Annex. Pier B is the private pier. 5. From Section 6.2.2 to 6.3.1 there should be better transition since this section talks about aviation not ports. 6. Comment on Table 6.10, page 28? 7. Section 6.3.2.1 page 30, 2nd paragraph – There will be an update to the facility plan, which is a dredging of the harbor (to come). 8. Section 6.2.1.3 – There is a Saddlebunch Annex facility and a Boca Chica NAVY Health facility that should be added or are they already included? 9. Page 14, 2nd paragraph – Revise Base budget, does not include housing allowance. 10. Military housing should be included in the analysis.	1. No updated NAS budget except for info in Fact Sheet – presented in report. Housing allowance info included in report. 2. Available information for web sources included in the text. 3. Reference added to text – 2nd paragraph, Section 6.2.2.1. 4. Added missing Section Title: 6.3 Projected Forecasts. 5. Text was included in Section 6.3.2.1 regarding the potential widening of the Key West Harbor channel, including reference to the US Corps of Engineers' November 2010 Key West harbor Reconnaissance Report. 6. Note added to Table 6.1. 7. Notes added to Table 6.2 defining all factors in table. 8. See information in Note on Table 6.2. Section 6.2.1.3.1 Description and Operations has

	11. Section 6.2.2. Page 21 – No reference of Naval Mole Pier. No mention of the Truman Annex. Pier B is the private pier. 12. From Section 6.2.2 to 6.3.1 there should be better transition since this section talks about aviation not ports. 13. Comment on Table 6.10, page 28? 14. Section 6.3.2.1 page 30, 2nd paragraph – There will be an update to the facility plan, which is a dredging of the harbor (to come).	been revised to include reference to the facilities.
Commenter: Ron Demes, NAS-Key West Comment Received: May 25, 2011		
	Comment	**K & S Action**
	1. Noted Navy will provide written comments prior to BOCC meeting. 2. Noted Navy "dump" on Geiger or Big Coppitt is owned by the Navy. 3. Expressed concern that not all previous comments were documented. 5. Suggested that the County, NAS-Key West and K&S meet and "…work through this so we truly understand where you're coming from…" 6. Noted the EIS is not a planning document, rather its an "impact document". The AICUZ study is relevant and appropriate data. Cited 9J-5 and Chapter 163 relative to requirements governing military compatibility and "best available data". Concerned the County and NAS-West are "headed for a confrontation" and desires to resolve this together "at a staff level." 7. Expressed desire to work with the County, noted concern regarding the "County Position" statement in the Technical Document.	3. Reviewed previous comments; Mr. Demes comments were attributed to Commissioner Werling; this has now been corrected within this form. 4. County is currently (July 15, 2011) coordinating an appropriate meeting date and time.
Commenter: Ron Demes, NAS-Key West Comment Received: Written comments via Email 6/27/11		
	Comment	**K & S Action**
	Concerned with County Direction related to the 2007 AICUZ; noting material ("selective") used from portion of study, but not the map itself.	

HOUSING
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7.0 HOUSING ELEMENT

[Rule 9J-5.010 F.A.C.]

The Housing Element of the Monroe County Comprehensive Plan addresses the data inventory requirements of 9J-5.0005 (2) of the Florida Administrative Code (F.A.C.). The data inventory requirement will support the development of goals, objectives, policies, and implementation programs for the Housing Element.

7.1 Introduction

The information provided for housing characteristics was retrieved from the Florida Housing Data Clearinghouse (FHDC) in April 2010[1]. The FHDC data is based on Census 2000 and it is the best available data for unincorporated Monroe County analysis. Detailed housing information from the 2010 U.S. Census is scheduled for release in early 2011 and will provide the basis for a refined housing analysis for the planning period. There are limitations to the data presented in the housing inventory and these limitations have been noted where relevant throughout this document. However, until that time permitting data has been used to demonstrate the housing inventory as of 2009. This element also focuses on the housing characteristics, construction activity, and affordable housing issues.

7.1.1 Policy Framework

Below is a summary of federal, state and local government regulations that impact the development of housing:

7.1.1.1 Federal Regulations

- Fair Housing Act:

The Fair Housing Act prohibits housing discrimination on the basis of race, color, religion, sex, disability, familial status, and national origin. Its coverage includes private housing, housing that receives Federal financial assistance, and State and local government housing. It is unlawful to discriminate in any aspect of selling or renting housing or to deny a dwelling to a buyer or renter because of the disability of that individual, an individual associated with the buyer or renter, or an individual who intends to live in the residence. Other covered activities include, for example, financing, zoning practices, new construction design, and advertising.

[1] Accessed through: http://flhousingdata.shimberg.ufl.edu/a/profiles?action=results&nid=4499 on April, 8 2010.

- Section 504:

The Fair Housing Act Section 504 requires owners of housing facilities to make reasonable exceptions in their policies and operations to afford people with disabilities equal housing opportunities. For example, a landlord with a "no pets" policy may be required to grant an exception to this rule and allow an individual who is blind to keep a guide dog in the residence. The Fair Housing Act also requires landlords to allow tenants with disabilities to make reasonable access-related modifications to their private living space, as well as to common use spaces. (The landlord is not required to pay for the changes.) The Act further requires that new multifamily housing with four or more units be designed and built to allow access for persons with disabilities. This includes accessible common use areas, doors that are wide enough for wheelchairs, kitchens and bathrooms that allow a person using a wheelchair to maneuver, and other adaptable features within the units.

7.1.1.2 State Regulations

- HB 697, which amended portions of Chapter 163.3177(6)(f)1, F.S., requires that the Housing Element be amended to include standards, plans, and principles for:

  h) "Energy efficiency in the design and construction of new housing" and
  i) "Use of renewable energy resources."

In order to acknowledge the benefit of renewable resources, such as solar energy, and encourage energy efficiency in building construction, the County will assure there are no obstacles within the County's Comprehensive Plan and/or Monroe County Land Development Code (MCLDC) which may conflict with these requirements.

- The Florida Fair Housing Act:

The Florida Fair Housing Act declares it illegal to discriminate in the sale, rental, advertising, financing, or providing of brokerage services for housing. The Florida Fair Housing Act parallels the Federal Fair Housing Act.

- Community Workforce Housing Innovation Pilot Program:

The 2006 Florida Legislature passed House Bill 1363 (Ch. 2006-69, s. 27, Laws of Fla.), a housing bill focused on addressing some of the affordable housing challenges the State currently faces. HB 1363 includes $50 million for an affordable housing pilot program called the Community Workforce Housing Innovation Pilot Program (CWHIP). Florida Housing will administer CWHIP, and these funds will be awarded on a competitive basis through a Request for Proposals (RFP) process to public-private entities seeking to build affordable housing for Florida's workforce. Monroe County, as a high cost county, is eligible to qualify households making 160 percent of the area median income for affordable housing.

- Florida Landlord/Tenant Law:

Florida's Landlord/Tenant Law Chapter 83, Part II - Florida Statutes explains tenant and landlord rights and responsibilities on rental agreements and disputes.

7.1.1.3 Monroe County Regulations

Rate of Growth Ordinance (ROGO)

Due to the State of Florida limitation on the amount of growth the County could absorb, based on the Carrying Capacity and Hurricane Evacuation Studies, on June 23, 1992, the Monroe County Board of County Commissioners adopted Ordinance 016-1992, thereby implementing the Residential Dwelling Unit Allocation System, today known as the Rate of Growth Ordinance or ROGO. The Ordinance became effective on July 13, 1992, and has been amended through the years based on changing conditions related to infrastructure. ROGO allows development subject to the ability to safely evacuate the Florida Keys (the Keys) within 24 hours.

The ROGO system is a method of prioritizing where growth should be directed based on the fact that the State of Florida currently allocates 197 housing units annually for building permit issuance (**Table 7.1**), MCLDC Art. II Sec. 138-24. The number of allocations has varied throughout the years, depending on the progress the County has made toward achieving State set goals. The annual allocation period, or ROGO year, is the 12-month period beginning on July 13, 1992, (the effective date of the original dwelling unit allocation ordinance), and subsequent one-year periods. Initially, the total number of available allocations was split among the three subareas[2] which included Upper Keys, Middle Keys, and Lower Keys (not to be confused with the Planning Area geographic locations as described in **Section 2.2.1** *"Geographic Location/Planning Areas"*). Environmental issue and community vision plans have further refined the distribution of available allocations.

Efforts to address the development impacts on the habitat of the Key Deer, Lower Keys Marsh Rabbit and the Eastern Indigo Snake on Big Pine Key/No Name Key started in the mid-1980s. The Florida Department of Community Affairs (DCA), the U.S. Fish and Wildlife Service and the Florida Fish and Wildlife Conservation Commission signed a Memorandum of Agreement to develop a Habitat Conservation Plan (HCP) for the Key Deer and other protected species in the project area.

In 1998, Monroe County, the Florida Department of Transportation (FDOT) and the DCA signed a Memorandum of Agreement in which they committed to develop a (HCP) for these two Keys. On June 9, 2006, a Federal Incidental Take Permit (#TE083411-0, ITP) from the U.S. Federal Fish and Wildlife Commission was issued to three (3) permitees: Monroe

[2] Subareas are geographic locations used to distribute ROGO allocations. Subareas are not to be confused with Planning Areas (Lower, Middle and Upper) as defined by Section 2.2.1 *Geographic Location/ Planning Areas* of the Future Land Use Element.

County, Florida Department of Transportation, and the Florida Department of Community Affairs. The ITP ensures that development bears its fair share of required mitigation and that the take of the covered species is minimized and mitigated.

The Livable Communikeys Program (LCP), Master Plan for Future Development of Big Pine Key and No Name Key was adopted on August 18, 2004 under Ordinance 029-2004. The LCP envisioned the issuance of 200 residential dwelling units over 20 year horizon at a rate of roughly 10 per year. A minimum of twenty percent of the 10 units per year are to be set aside for affordable housing development. Today the 197 housing permits are allocated in the Lower, Upper and Big Pine/No Name Keys Subareas, due to municipal incorporation and environmental impact / constraints.

On September 22, 2005, the Monroe County Board of Commissioners adopted Ordinance 025-2005 which revised the ROGO to utilize the Tier Overlay System as the basis for the competitive point system to implement Goal 105 of the 2010 Comprehensive Plan. The ordinance became effective on February 5, 2006, under final Ordinance 009-2006. The Tier System, still a ROGO, made changes such as subarea boundary districts for allocation distribution, basis of scoring applications, and administrative relief. The Ordinance changed the total available allocation number to 197. It also provided vesting provisions to subareas geographically defined as follows and are depicted in the Tier Overlay District Map:

- Upper Keys (Lower and Middle Keys combined): the unincorporated area of the county north of Tavernier Creek and corporate limits of the Village of Islamorada (approximately mile marker 90).

- Lower Keys: the unincorporated area of the County from the corporate limits of the Village of Islamorada (approximately mile marker 72) south to the corporate limits of the City of Key West at Cow Key Bridge on U.S. Highway 1 (approximately mile marker 4), excluding Big Pine Key and No Name Key.

- Big Pine Key/No Name Key: the islands of Big Pine Key and No Name Key within unincorporated the County. Based on the revised 2010 Comprehensive Plan and the adopted Maps as part of the Master Plan for Big Pine Key and No Name Key, they are now evaluated as their own subarea.

Once an application is submitted, it is scored based on which Tier the property is located. The basic process is: 1) applicant applies for residential building permit, 2) if applicant receives all required approvals for residential development then the applicant may submit an application for a residential unit, 3) applicant completes for an allocation award, 4) applicant receives allocation award, then has 60 days to pick up permit. If the applicant does not use the permit then the allocation expires.

The total number of available allocations is split among the three subareas of the County. Each applicant competes against the other applicants located within the same subarea.

There is one exception to this process, applicants for affordable housing. Affordable housing applicants compete against all applicants for affordable housing keys wide; with the caveat that one affordable allocation goes to Big Pine and another one goes to No Name Key. Allocations are awarded each quarter in each subarea with the exception of the Big Pine Key/No Name Key subarea, where allocations are awarded annually. **Table 7.1** depicts the current distribution of available allocations per MCLDC Art. II Sec. 138-24.

There are a limited number of available annual residential ROGO allocations. The number of market rate residential ROGO allocations available in each subarea of the unincorporated County and total number of affordable residential ROGO allocations available countywide on a yearly basis are illustrated in **Table 7.1.** According to MCLDC Art. II Sec. 138-24, the market rate available allocations total 126 and the available affordable housing allocations total 71 units (2 affordable allocations are reserved for the Big Pine/No Name Key Subarea).

In addition, there is a ratio of affordable housing ROGO allocations to market rate ROGO allocations. Prior to October of each year, the Board of County Commission (BOCC) may adopt a resolution changing the ratio of affordable housing to market rate ROGO allocations based upon the recommendations of the planning director and planning commission arising from the annual review of ROGO. This ratio may be amended pursuant to the following:

- The percentage of affordable housing shall never be less than 20 percent of the total ROGO allocations available or the minimum established by rule of the Florida Administration Commission, whichever is greater.

- The increase or decrease in the percentage of affordable housing of the total ROGO allocations available shall not exceed 50 percent of the previous year's ROGO allocations to market rate and affordable housing.

Table 7.1 - Rate of Growth Ordinance (ROGO) Allocations, per MCLDC Art. II Sec. 138-24

Subarea	Number of Dwelling Units
Upper Keys	61
Lower Keys	57
Big Pine and No Name Keys	8
Total Market Rate	**126**
Affordable Dwelling Units	**Number of Dwelling Units**
Very Low, Low, and Median Incomes	36*
Moderate Income	35*
Total Affordable Units	**71**
Total Units a Year	**197**
*Includes one for Big Pine Key and No Name Key.	

MCLDC Art. II Sec. 138-24

The primary basis of the competition is the Tier designation which will award an applicant between 0 and 30 points. Points are intended to discourage development in environmentally sensitive areas (Tier I) and to direct and encourage development to appropriate infill areas (Tier III). Points also recognize that any development can affect the functioning of natural and man-made infrastructure. Points vary depending on whether a proposed development project is located on Big Pine Key or No Name Key or if it is located elsewhere in the unincorporated County.

A penalty is assigned if the project is within a V flood zone. Lot aggregation is the process of combining a contiguous, platted, vacant, and buildable parcel with another and building only one unit. This is a reduction of density. Lot aggregation is only possible in Tier III and Tier III (A) areas, where upland native habitat is not cleared. Additional points may be awarded through lot aggregation, land dedication and land dedication. Payment to land acquisition fund is the process of purchasing points (maximum of 2) by donating to the County fund which allows for the retirement of development rights through the acquisition of property. Land dedication is made prior to issuance of the permit. The primary point assignments system is provided is **Section 3.19.1.1** "*Point System within ROGO".*

A historic account of market rate and affordable ROGO allocations and awards are depicted on **Table 7.2.** A detailed account of number of ROGO allocated and awarded is provided in **Appendix 7-1.** Below is a brief history of the ROGO system.

- During ROGO Year 1-6 a total of 255 allocations (203 market rate and 52 affordable) were allowed each year. During this period, unused affordable housing allocations could be rolled- over to market rate allocations (Ord. 016-1992) in the Lower Keys, Middle Keys and Upper Keys subareas.

- ROGO Years 6-14 allocations were affected by reductions due to Cesspit and Nutrient Credit requirements.

- On December 31, 1997, the Village of Islamorada incorporated, thus reducing the unincorporated allocations by 28 to 227 (182 market rate 45 affordable) for Rogo Year 6 and reducing the Upper Keys subarea boundary.

- During ROGO Year 8 (2000), the City of Marathon incorporated (November 30, 1999), therefore reducing the unincorporated allocations by 24 and modifying the Middle Keys subarea boundary. Also, during ROGO Year 8, the Department of Community Affairs entered into a Memorandum of Understanding with the County to allow 90 affordable housing allocations in exchange of good faith effort to begin the FEMA inspection program.

- For ROGO Year 9 (2001), the Department of Community Affairs reinstated 201 affordable housing allocations (2001). This number includes both market and affordable housing allocations that were lost due the inability to match an allocation with nutrient reduction credits.

- For ROGO Year 10 (2002), the Lower Keys subarea lost 25 allocations due to nutrient credit requirements.

- Beginning in ROGO Year 11 (2003), affordable allocations can be grouped into a single pool for countywide allocations.

- During ROGO Year 14 (2004), Ord. 009-2006 was enacted changing the allocation number to 197 (126 market rate 71 affordable) pursuant to Rule 28-20.110, F.A.C. The same rule also returned 165 allocations to the County to be used for affordable housing.

- By ROGO Year 15 (2005), the new Big Pine/No Name Key subarea was created. Of the 197 allocations, 8 market rate and 2 affordable allocations are assigned to this subarea. Cesspit requirements end during the first quarter of this ROGO year.

As seen in **Table 7.2,** from ROGO Year 1 to 17, of the grand total of available market rate allocations of 2,755, 2,804 were awarded. The excess of awards may be due in part to the rollover of affordable allocations that went unused from ROGO Year 1-6 into market rate and the reuse of expired allocations from one ROGO quarter to another and from one ROGO year to another ROGO year. These expired allocations were awarded to the next applicant or "reused." Of the 1,242 available affordable housing allocations, 977 were awarded. Between ROGO Years 1-17, an average of 222 ROGO allocations were awarded each year. Of the allocations awarded, affordable housing awards represent 25 percent of the total award. A detailed historical account of the number allocations available and awarded is provided in **Appendix 7-1.**

As seen in **Table 7.3**, there were 49 market rate allocations that expired which were tracked, recaptured and reused by the County. Therefore, at this point in time, there are zero market rate allocations remaining. As seen in **Table 7.3**, there were 167 affordable allocations that were rolled over to market rate (ROGO Years 2-6); 10 affordable allocations expired; and 100 affordable allocations went unused. Therefore, a grand total of 110 affordable allocations are available.

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Table 7.2 - Unincorporated County Market Rate and Affordable ROGO Year 1-17

ROGO Year	Market Rate ROGO Allocations	Market Rate ROGO Awarded	Affordable Housing ROGO Allocations	Affordable Housing ROGO Awarded
Year 1 (July 14, 1992 –July 13, 1993)	204	204	52	11
Year 2 (July 14, 1993 –July 13, 1994)	243	231	52	9
Year 3 (July 14, 1994 –July 13, 1995)	246	249	52	10
Year 4 (July 14, 1995 –July 13, 1996)	245	263	52	40
Year 5 (July 14, 1996 –July 13, 1997)	215	218	52	23
Year 6 (July 14, 1997 –July 13, 1998)	211	197	77	56
Year 7 (July 14, 1998 –July 12, 1999)	101	102	30	9
Year 8 (July 13, 1999 –July 14, 2000)	127	136	109	66
Year 9 (July 13, 2000 –July 14, 2001)	127	129	224	203
Year 10 (July 14, 2001 –July 15, 2002)	102	102	31	58
Year 11 (July 16, 2002 –July 14, 2003)	127	127	31	31
Year 12 (July 13, 2003–July 14, 2004)	127	127	31	21
Year 13 (July 14, 2004 –July 13, 2005)	96	96	29	16
Year 14 (July 14, 2005 –July 13, 2006)	126	126	236	271
Year 15 (July 14, 2006 –July 13, 2007)	126	129	49	17
Year 16 (July 14, 2007 –July 13, 2008)	126	126	68	100
Year 17 (July 14, 2008 –July 13, 2009)	206	242	67	36
TOTALS	**2,755**	**2,804**	**1,242**	**977**

Source: Monroe County Growth Management, Data provided on May 02, 2011.

Table 7.3 - Summary Table of Awarded and Allocated for Market and Affordable ROGO (Year 1-17)

Market Rate ROGO Year 1-17 (all sub-areas combined)				Affordable ROGO Year 1-17 (all sub-areas combined)				
Total Market Rate Allocations	Total Market Rate Allocations Awarded	Total Expired Market Rate Allocations (Allocations that were Re-Used)	**Total Allocations Remaining**	Total Affordable Allocations	Total Affordable Housing Allocations Awarded	Remaining Affordable Allocations Rolled-Over To Market Rate For Rogo Years 2-6	Total Expired Affordable Housing Allocations (Allocations that can be re-used)	**Total Allocations Remaining**
2,755	2,804	49	**0**	1,242	977	-167	10	**110**

Source: Monroe County Growth Management, Data provided on May 02, 2011.

As seen in **Table 7.4** below, there are zero remaining market rate allocations. A detailed account of number of available allocations and the number of awarded is provided in **Appendix 7-1.**

Table 7.4 - Residual Market Rate ROGO Allocations by Subarea

ROGO Subareas	Market Rate ROGO		
	Available-Awarded[3]	Expired (not including reused)[4]	Total
Lower (after Yr 15 includes Middle)	-24	41	17
Middle (until Yr 15)	22	3	25
Upper	-47	4	-43
Big Pine/No Name (starts in Yr 15)	0	1	1
Total Remaining Market Allocations			**0**

Source: Monroe County Growth Management, Data provided on May 02, 2011.

As seen in **Table 7.5,** there are 111 remaining affordable allocations. A detailed account of number of available allocations and the number of awarded is provided in **Appendix 7-1.**

Table 7.5 – Residual Affordable ROGO Allocations by Subarea

ROGO Subareas	Affordable ROGO		
	Available-Awarded	Expired (not including reused)	Total
Lower (until Yr 10)	23	2	25
Middle (until Yr 10)	22	0	22
Upper (until Yr 10)	7	6	13
Big Pine/ No Name (starts in Yr 15)	5	1	6
Countywide (Yr 11-17 and 29 in Yr 8 from agreement)	43	2	45
Total Remaining Affordable Allocations			**111**

Source: Monroe County Growth Management, Data provided on May 02, 2011.

[3] Total market rate allocations available minus total market rate allocations awarded.
[4] Expired market rate allocations minus recaptures and reused allocations

Affordable allocations are currently grouped into two pools: Countywide and Big Pine/No Name Sub-area and 1 pool with affordable allocations available Countywide. Again, there are 111 residual affordable ROGO allocations of which 6 belong to the Big Pine/No Name Key Subarea

Table 7.6 - Residual Affordable Allocations Distribution by Subarea

Subarea	Remaining Allocations
Countywide	105
Big Pine/No Name Subarea	6
Combined Total	**111**

Source: Monroe County Growth Management, Data provided on May 02, 2011.

7.1.2 Residential Land Use Characteristics

As evidenced in *Chapter 2.0 Future Land Use Element* the County has 4,988.2 acres of residential land. This makes up 6.8 percent of the land use. The residential land use distribution is 52.1 percent in the Upper Keys Planning Area (UKPA), 4.0 percent in the Middle Keys Planning Area (MKPA), and 43.8 percent in the Lower Keys Planning Area (LKPA).

Density and intensity is determined by Policy 101.4.21 of the 2010 Monroe County Comprehensive Plan (1995). However, Property Appraiser's data provides the current status of actual density and intensity by land acreage and number of dwelling units. As of January 2010, the current density for single-family homes was 2.2 units per acre, 0.71 for mobile homes, and 7.5 in average for all multi-family type (i.e. multifamily, condominium, etc.), according to the Property Appraiser data. These are illustrated in **Appendix 2-2** of the Future Land Use Element.

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7.2 Existing Housing Stock Characteristics

An inventory of existing housing is necessary to analyze the present housing situation in unincorporated Monroe County and to determine future housing needs. To obtain a count of existing housing in unincorporated Monroe County, two resources are combined: FHDC, and building permits and demolitions of housing from April 1, 2000 to April 1, 2010. The latter is discussed in **Section 7.2.12** *"Residential Construction Activity".*

Mainland Florida accounts for 90 percent of the land mass of the County; the majority of this land is located within the Everglades National Park and is under federal jurisdiction. Only 41 year-round households are located on the Mainland portion of the County, with virtually no demand for additional units projected, and no private lands available for development. Therefore, this element will focus primarily on lands within the unincorporated Lower, Middle, and Upper Planning Areas, as identified below, and illustrated on **Map Series 2.1**:

- Lower Keys Planning Area (LKPA): West boundary of Stock Island to the eastern limit of the Seven Mile Bridge. The Marquesas Keys, located 30 miles west of Key West and the Dry Tortuga Keys, located 70 miles west of Key West are also included within this planning area;

- Middle Keys Planning Area (MKPA): Eastern limit of the City of Marathon to the western limit of the Village of Islamorada, including Lignumvitae Key and Shell Key. It excludes the incorporated City of Layton, City of Marathon, City of Key Colony Beach and Village of Islamorada; and

- Upper Keys Planning Area (UKPA): Western limit of the Village of Islamorada to the northern County line.

7.2.1 Type of Housing
[Rule 9J-5.010 (1)(a) F.A.C.]

Table 7.7 provides housing units by type countywide for 1990 and 2010, which includes the municipalities within the County. Overall, the total housing stock countywide increased by 13.4 percent or 6,135 dwelling units from 1990 to 2000. Major changes are noted in single family attached units with a 79 percent increase. Duplex units and mobile home/trailer/other decreased by 24.9 percent and 5.2 percent respectively.

Table 7.7- Countywide Housing Units by Type 1990-2000

	1990		2000		Change 1990-2000	
Unit Type	Number of Units	% Dist.	Number of Units	% Dist.	Number of Units	% Dist.
Single-Family (Detached)	19,773	43.3%	24,212	46.7%	4,439	22.4%
Single-Family (Attached)	2,348	5.1%	4,203	8.1%	1,855	79.0%
Duplex (2-units)	3,369	7.4%	2,531	4.9%	-838	-24.9%
Multi-Family (3+ units)	8,812	19.3%	10,078	19.5%	1,266	14.4%
Mobile Home/Trailer/Other	11,359	24.9%	10,772	20.8%	-587	-5.2%
Total Year-Round Units	**45,661**	**100.0%**	**51,796**	**100.0%**	**6,135**	**13.4%**

Source: Florida Housing Data Clearinghouse, April 2010; 1990 data-U.S. Bureau of the Census

Table 7.8 provides housing units by type for unincorporated County for 2000. Based on 2000 Census (dated April 1, 2000), more than half of the unincorporated County's 24,595 year-round[5] housing units were single-family units; 10.4 percent were multi-family units, 2.7 percent were duplex units, and another 30.9 percent were mobile homes/trailers/other.

Table 7.8 - Unincorporated Housing Units by Type 2000-2010

	2000		2010	
Unit Type	Number of Units	% Dist.	Number of Units	% Dist.
Single-Family (Detached)	12,847	52.2%		
Single-Family (Attached)	920	3.7%		
Duplex (2-units)	669	2.7%		
Multi-Family (3+ units)	2,561	10.4%		
Mobile Home/Trailer/Other	7,598	30.9%		
Total Year-Round Units	**24,595**	**100.0%**		

Source: Florida Housing Data Clearinghouse, April 2010. 2010 data will be provided once published by the Census.

7.2.1.1 Hotel/Motel Transient Units

Section 101-1 of the County LCD defines housing as, "lawfully established hotel rooms, campground spaces, mobile homes, transient residential units, institutional residential units (except hospital rooms) and live-aboards".

Historically the number of hotel/motel transient units has declined in the last years. In 2003 the Florida Department of Business and Professional Regulation reported 9,373

[5] The U.S. Census number of dwelling units excludes seasonal population, live aboards, etc.

hotel/motel rooms countywide. In 2010 there were 7,967. By March 14, 2011 there were 3,632 countywide.

The County has adopted a series of ordinances regarding hotel/motel transient units:

1) The Board of County Commissioners (BOCC) adopted Ordinance No. 47-1999 on November 10, 1999, creating Sec. 9.5-120.5, which established that new transient residential units, such as hotel/motel rooms, or campground, recreational vehicle or travel trailers spaces, would not be eligible for residential ROGO allocations until January 1, 2002.

2) The BOCC extended the moratorium on new transient units from January 1, 2002 to December 31, 2006, through Ordinance No. 001-2002. The BOCC adopted Ordinance No. 001-2007 to extend the moratorium on new transient units to December 31, 2008. The moratorium was then set to expire on July 31, 2010.

3) According to the *Economic Trends and Opportunities in Unincorporated Monroe County* report, the number of licensed hotel/motel[6] rooms in unincorporated County was 2,199 and 8,680 countywide. According to the Monroe County Tourist Development Report dated March 2010, the County excluding Key West, had 56.3, percent occupancy as of January 2010. Key Largos occupancy rate was at 57.9 percent and Key West at 78.4 percent during the same period.

4) At their July 21, 2010 meeting, the BOCC extended the prohibition of new transient residential units including hotel or motel rooms, campground spaces or spaces for parking or recreational vehicle or travel until December 31, 2011 (Ord. 023-2010 and MCLDC Section 138.23).

7.2.2 Occupancy and Tenure [Rule 9J-5.010 (1)(a) F.A.C.]

As indicated in **Table 7.9**, occupied units dominated the County's housing market in 2000, accounting for 64.0 percent of all units; vacancy was reported at 36.0 percent. Owner occupancy predominates at 70.4 percent; whereas, renter occupancy was reported at 29.6 percent. The MKPA had the highest vacancy rate at 71.9 percent when compared to the other planning areas; this percentage exceeds that of the County (36.0 percent). Of the dwelling units that were occupied in the MKPA, at the time of the 2000 Census, 81.6 percent were occupied by owners.

As seen in **Table 7.9**, the geographic distribution was assessed through Geographic Information System (GIS) from the U.S. Census. Analysis was performed at the block level in order to carve out the unincorporated County planning areas. The Lower and Upper Keys

[6]Number of rooms from licensed hotel/motel acquired from Economic Trends and Opportunities in Unincorporated Monroe County by Fishkind and Associates, Inc. February 23, 2011 report.

Planning Areas have the highest dwelling unit distribution with 47.3 and 46.9 percent, respectively, of the housing stock. In comparison, the MKPA has the lowest percentage of housing stock at 5.8 percent.

According to the *2008 Hurricane Evacuation Model Report* by Reid Ewing, for the County as a whole, occupancy rates for permanent dwelling units appear to have declined by about 20 percent between the 2000 Census and the 2007 American Community Survey (ACS). Therefore, it is estimated that the occupancy rate for the unincorporated County of 64.0 percent, as reported by the 2000 Census, has decreased to 51.2 percent.

Table 7.9 - Unincorporated Housing Inventory by Occupancy Status and Tenure, 2000

	Lower Keys		Middle Keys		Upper Keys		Total	
	Number Units	Percent	Number Units	Percent	Number Units	Percent	Number Units	Percent
Owner	6,159	71.9	328	81.6	4,847	71.5	11,334	70.4
Renter	2,413	28.1	74	18.4	1,934	28.5	4,421	29.6
Vacant	3,033	26.2	1,029	71.9	4,734	41.1	8,799	36.0
Occupancy	8,572	73.8	402	28.1	6,781	58.9	15,755	64.0
Total	**11,605**	**47.3**	**1,431**	**5.8**	**11,515**	**46.9**	**24,554***	**100.0**

Source: Florida Housing Data Clearinghouse, April 2010
*41 dwelling units located in the Mainland according to Census Block GIS analysis.
Note: Will be updated with Census 2010 upon data release scheduled for April 1st 2011.

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7.2.3 Vacancy Status
[Rule 9J-5.010(1)(a) F.A.C.]

At the time of the 2000 Census, the vacant homes were classified as 79.1 percent seasonal, recreational or occasional use; 7.4 percent was categorized as "Other Vacant"; and 6.2 percent of the vacant homes were for rent. The remaining units were classified as for sale, rented or sold, not occupied, and for migrant workers. This is illustrated on **Table 7.10**.

Table 7.10 - Vacancy Status, 2000

2000 Occupancy Status	Occupied	15,788	64.2%
	Vacant	8,807	32.8%
	Total Units	24,595	100.0%
2000 Vacancy Status	For Rent	548	6.2%
	For Sale Only	430	4.9%
	Rented or Sold Not Occupied	203	2.3%
	Seasonal, Recreational or Occasional Use	6,967	79.1%
	For Migrant Workers	6	0.1%
	Other Vacant	653	7.4%

Source: Florida Housing Data Clearinghouse, April 2010
Note: Will be updated with Census 2010 upon data release scheduled for April1st 2011.

As a comparison, **Table 7.11** provides the Vacancy Status from 1990. It is important to note that at the time the 1990 data was collected, the City of Marathon and the Village of Islamorada were not incorporated. Therefore, 1990 unincorporated numbers will be higher when compared to those of unincorporated 2000.

Table 7.11 - Vacancy Status, 1990

1990 Occupancy Status	Occupied	22,564	69.0%
	Vacant	10,133	31.0%
	Total Units	32,697	100.0%
1990 Vacancy Status	For Rent	1,065	10.5%
	For Sale Only	731	7.2%
	Rented or Sold Not Occupied	1,316	13.0%
	Seasonal, Recreational or Occasional Use	7,021	69.3%

Source: "Housing Element" of the Technical Document, Table 7.2 of the *2010 Monroe County Comprehensive Plan*
Note: "For Migrant Workers" and "Other Vacant" not available; and the City of Marathon and the Village of Islamorada was not incorporated in 1990.

In recent years Census 2000 and ACS from 2005-2008 have shown a substantial amount of home units are held for seasonal use. The data indicates the number of seasonal units has risen from 12,628 in 2000 to 15,262 in 2005 to 19,195 in 2008. This is an increase of 6,567 seasonal units. During the same period, permanently occupied units have fallen from

35,086 to 29,084, or about 6,002 units. Based on the ACS and Census data, the loss in permanent population is approximately equivalent to the gain in seasonal population since year 2000.

Contributing to the declining permanently occupied units is the rate of foreclosed homes and the increasing rate of non-homesteaded units. During the 2000-2009 period total homesteaded units increased from 16,005 to 16,698 units, a net increase of 693 units. During the same period, non-homesteaded units moved from 20,784 to 22,197, a net increase of 1,413 units. In general, non-homesteaded properties represent seasonal vacant, second homes, or for rent units. Population in these should be distinguished from short-term tourist visitors. However, in times of high foreclosure rates, a shift to non-homestead may represent a temporary loss in permanent population.

This compares with the 3,431 foreclosures from 2005-2009, recognizing it is likely as much as half of the foreclosed units may have been resold since the initial foreclosures which began in 2005, and some tendency for those units to return to a homesteaded status. By 2009, after speculative investing ceased, the share of non-homesteaded properties went back down, falling to 2003 levels.

The non-homestead rate for all units is now 57.1 percent (2010). This is essentially the same rate both pre and post bubble. Single family non-homestead rates began to move up more closely in concert with rising foreclosures; therefore, a considerable portion of permanent population losses may be attributable to foreclosures arising from the speculative housing bubble, and thus temporary. The expectation is some permanent population may return to these units over the course of the planning horizon – thus permanent population may increase over this period in substantially greater numbers than the growth in new housing units.

There has been an increase in vacant units from 2005-2009. During this period both the Census and BEBR indicated permanent population loss. From 2005 to 2008 the ACS indicated an increase in seasonal vacancy of 3,457 units. During the 2005-2009 period, foreclosure data indicated there were 3,431 foreclosures, as noted earlier. Thus, the ACS data indicates, on net, the permanent population losses and associated housing vacancy is being shifted into seasonal units. Further, it is believed that vacant units are associated with seasonal (non-permanent population) population. With a reported permanent population growth in 2009 and increasing homestead exemptions in 2009 on one hand and coinciding numbers of foreclosures and seasonal increase through ACS, it is equally possible that permanent population loss is temporary and due as much to the end of the housing bubble, foreclosures and rising unemployment, as it is due to a shift from permanent to seasonal residency. It is likely both conditions exist and are occurring.

7.2.4 Age of Housing
[Rule 9J-5.010 (1)(a) F.A.C.]

At the time of the 2000 Census, 19.2 percent of the housing stock is estimated to be 30 or more years old, or built before 1970. The number of structural problems generally reflects housing conditions and usually increases with the age of the housing stock. This is illustrated on **Table 7.12**.

Table 7.12 - Distribution of Housing Units by Age, 2000

1999-March 2000	686	2.8%
1995-1998	1,892	7.7%
1990-1994	3,180	12.9%
1980-1989	7,300	29.7%
1970-1979	6,829	27.8%
1960-1969	2,874	
1950-1959	1,318	
1940-1949	2,90	
1939 or Earlier	226	
		19.2%
Total	**24,595**	**100.0%**

Source: Florida Housing Data Clearinghouse, April 2010
Note: Will be updated with Census 2010 upon data release scheduled for April 2011.

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7.2.5 Price/Rent Characteristics and Affordability [Rule 9J-5.010 (1)(a) F.A.C.]

7.2.5.1 Introduction

The availability of affordable housing is one of the most challenging issues facing Florida - and around the nation. A few of the barriers to creating affordable housing in the County are the high cost of land; a limited number of affordable ROGO allocations; and competition for a finite amount of subsidies. Affordable housing may be defined as the "ability" of a household to purchase a home. As defined by the U.S. Department of Housing and Urban Development (HUD), affordable housing is one which cost does not exceed 30 percent of a household's gross income. If it exceeds 30 percent of the households gross income the household is considered to be cost burdened. There are two major factors that define whether a dwelling unit is affordable: household income and cost. Two primary affordable housing indicators are the affordability index and the number of cost burdened households.

The affordability index measures the ability of the median income household in an area to afford a median priced house. In addition to the median income and median house price in an area, the index construction requires the current mortgage interest rate, assumptions about the down payment required to purchase the median price dwelling unit, and the maximum percentage of household income that can be spent on housing. An index of 100 indicates the typical (median) family in the area has sufficient income to purchase a single-family dwelling unit selling at the median price.

The Shimberg Center for Housing Studies developed an affordability index for all Florida counties in a 2004 study. Median house prices were calculated from the Florida Department of Revenue county property appraiser datasets. Median household incomes come from the 2000 decennial US Census. Although important, median sale prices in a county or Metropolitan Statistical Area (MSAs) do not alone determine housing affordability. A second important factor is the income of area residents. The highest household incomes in Florida are generally in the coastal counties that also contain many high priced housing units. However, median household incomes and single-family house prices in an area are only moderately correlated, which can lead to significant differences in housing affordability across counties and MSAs. According to the Shimberg Center study, the County has the lowest affordability index with the least affordable homes. However, the affordability index focuses only on the average incomes and housing prices and does not consider the lowest income householders that would typically rent.

Cost burden is another method of evaluating housing affordability and probably more reliable because it accounts for all income including those that would buy and those that would rent. As mentioned, a household that is cost burdened is one that is paying more than 30 percent of their gross income in housing cost (30 percent is established by HUD as a parameter for an affordable home). Housing cost includes taxes and insurance for owners and utility costs for owners and renters. The Shimberg Study concluded that while 20 percent of owners in the State of Florida are cost burdened, 41.6 percent of renters are

cost burdened or paying more than 30 percent of their income towards housing cost. The cost burdened topic in the County is further elaborated in **Section 7.2.7** *"Cost to Income Ratio".*

7.2.5.2 Monroe County Affordable Housing Defined

As defined in Sec 101-1, of the MCLDC, affordable housing is considered to be one which:

1) Meets all applicable requirements of HUD minimum property standards as to room sizes, fixtures, landscaping and building materials, when not in conflict with applicable laws of the county; and

2) Monthly rent, not including utilities, does not exceed 30 percent of that amount which represents either 50 percent (very low income) or 80 percent (low income) or 100 percent (median income) or 120 percent (moderate income) of the monthly median adjusted household income for the County.

3) Affordable Rental Housing

   - Very low income - a rental dwelling unit which monthly rent, not including utilities, does not exceed 30 percent of the amount that represents 50 percent of the monthly median adjusted household income for the county.

   - Low income- a rental dwelling unit which monthly rent, not including utilities, does not exceed 30 percent of the amount that represents 80 percent of the monthly median adjusted household income for the county.

   - Median income - a rental dwelling unit which monthly rent, not including utilities, does not exceed 30 percent of the amount that represents 100 percent of the monthly adjusted median household income for the county.

   - Moderate income - a rental dwelling unit which monthly rent, not including utilities, does not exceed 30 percent of the amount that represents 120 percent of the monthly median adjusted household income for the county.

4) Owner Occupied Affordable Housing

   - Very Low Income - a dwelling unit occupied only by a household whose total household income does not exceed 50 percent of the median monthly household income for the county.

   - Low Income - a dwelling unit occupied only by a household whose total household income does not exceed 80 percent of the median monthly household income for the county.

- Median Income - a dwelling unit occupied only by a household whose total household income does not exceed 100 percent of the median monthly household income for the county.

- Moderate Income - a dwelling unit occupied only by a household whose total household income does not exceed 160 percent of the median monthly household income for the county.

The County's low paying jobs in the service and tourism industry have failed to keep up with the increasing housing cost even before the recession. Typically, the moderate income range for qualifying for affordable housing assistance is 120 percent of the area median income; however, since the housing prices in the County are disproportionately high, the County and the State allows households making 160 percent of the area median income to qualify for affordable housing assistance (House Bill 1363 Ch. 2006-69, s. 27, Laws of Fla.) for home purchase.

7.2.5.3 Housing Value and Affordability

As seen in **Table 7.13**, the median value of specified owner-occupied units, for the County as a whole, according to the 2000 Census, was $241,200. This is an increase of nearly 60 percent from 1990. As seen in the ACS for 2006-2008, the 2000 median house value increased by 154 percent in 2008 ($613,900). According to the Shimberg Institute, the average home sales price in 2009 declined to $572,607. The 2009 decline in selling price reflects the economic recession.

Table 7.13 - Historic Median Housing Value for Monroe County

Year	Value	Percent Change
1970	$16,500	--
1980	$62,200	276.9%
1990	$151,200	143.1%
2000	$241,200	59.5%
2008	$613,900	154.5%
2009	$572,607	-6.7%

Source: U.S. Census, 1970, 1980, 1990, 2000, American Community Survey 2006-2008, and Shimberg Center for 2009 average home sales price.

According to HUD data, the County's area median income in 2010 was $68,400. **Table 7.14** depicts the household income levels qualifying for affordable housing based on assumed family size for households with a single income provider working 40 hours for both renter and owner housing. This is the best available data and is provided by the County Growth Management Division.

Table 7.14 - Qualifying Incomes for Single Income Provider (40 hours)

Unit Size	Household size	Owner/ Tenant Very Low (50 % of AMI)	Owner/ Tenant Low (80 % of AMI)	Owner/ Tenant Median (100 % of AMI)	Tenant Moderate (120% of AMI)	Owner Moderate (160% of AMI
Efficiency	1 Person	$24,085	$38,535	$48,169	$57,803	$77,070
1 bedroom	2 Persons	$27,581	$44,129	$55,161	$66,194	$88,258
2 bedroom	3 Persons	$30,811	$49,297	$61,622	$73,946	$98,595
3 bedroom	4 Persons	$34,200	$54,720	**$68,400**[7]	$82,080	$109,440

Source: Monroe County Growth Management, 2010, MCLDC Sec 101-1

For a household comprised of adults related by marriage or domestic partnership registered with the County, only the highest 60 hours of the combined employment hours are counted, and considered to be 75 percent of the adjusted gross income. The income of dependents regardless of age is not counted in calculating a household's income (MCLDC Sec. 130.161). Income levels for domestic partnerships are illustrated on **Table 7.15** and are the best available data as provided by the County Growth Management Division.

Table 7.15 - Qualifying Incomes for Married or Domestic Partnership Households (60 hours)

Unit Size	Household size	Owner/ Tenant Very Low (50 % of AMI)	Owner/ Tenant Low (80 % of AMI)	Owner/ Tenant Median (100 % of AMI)	Tenant Moderate (120% of AMI)	Owner Moderate (160% of AMI
Efficiency	1 Person	$32,112	$51,380	$64,225	$77,070	$102,760
1 bedroom	2 Persons	$36,774	$58,838	$73,548	$88,258	$117,677
2 bedroom	3 Persons	$41,081	$65,729	$82,162	$98,594	$131,459
3 bedroom	4 Persons	$45,600	$72,960	$91,200	$109,440	$145,920

Source: Monroe County Growth Management, 2010, MCLDC Sec. 130.161

[7] Area median income based on HUD.

To compute the monthly maximum rental rates, 30 percent of the household income is divided by 12 (months). **Table 7.16** illustrates the maximum rental rates by income level in 2010 for single income providers.

Table 7.16 - Tenant Maximum Rental Rates for Single Income Provider

Unit Size	Very Low (50 % of AMI)	Low (80 % of AMI)	Median (100 % of AMI)	Moderate (120% of AMI)
Efficiency	$602	$ 963	$1,204	$1,445
1 bedroom	$646	$1,033	$1,292	$1,550
2 bedroom	$772	$1,235	$1,543	$1,852
3 bedroom	$883	$1,413	$1,766	$2,119
4 bedroom	$990	$1,584	$1,980	$2,376

Source: Monroe County Growth Management, 2010.

To compute the monthly maximum rental rates, 30 percent of the household income is divided by 12 (months). **Table 7.17** illustrates the maximum rental rates by income level in 2010 for married or domestic partnership households.

Table 7.17 - Tenant Maximum Rental Rates for Married or Domestic Partnership Households

Unit Size	Very Low (50 % of AMI)	Low (80 % of AMI)	Median (100 % of AMI)	Moderate (120% of AMI)
Efficiency	$803	$1,285	$1,606	$1,927
1 bedroom	$861	$1,378	$1,722	$2,067
2 bedroom	$1,029	$1,646	$2,058	$2,469
3 bedroom	$1,177	$1,884	$2,355	$2,826
4 bedroom	$1,320	$2,112	$2,640	$3,168

Source: Monroe County Growth Management, 2010.

Maximum selling price for an affordable housing unit based on the 2010 median income of $68,400 is illustrated in **Table 7.18.** As defined by the MCLDC 101-01, the maximum sales price, for an owner occupied affordable housing unit, means a price not exceeding 3.75 times the annual median household income for the County for a one bedroom or efficiency unit, 4.25 times the annual median household income for the County for a two bedroom unit, and 4.75 times the annual median household income for the County for a three or more bedroom unit.

Table 7.18 - Maximum Selling Price for Affordable Units in 2010

Unit Size	Multiplier	Max Sales Price
Efficiency/1 Bedroom	3.75	$256,500
2 Bedroom	4.25	$290,700
3 Bedroom	4.75	$324,900

Source: Monroe County Growth Management, 2010.

For a median income households made up of two person income providers related by marriage or domestic partnership, the income would be approximately $73,548, as seen in **Table 7.15**. For this household, it would be difficult to purchase a market rate home. Typically, the ability to purchase a dwelling unit is calculated by the household income multiplied by three. Therefore, the same household of two income providers would be able to afford a $220,644 market rate home. However, the average market rate price in 2009 was recorded at $572,607 **(Table 7.13)**. This is an affordability gap of 351 thousand dollars. Affordability gap is calculated by subtracting the housing price ($572,607) by the purchase ability ($220,644).

If the same family were to be qualified to purchase an affordable dwelling unit, and were to purchase efficiency or 1 bedroom apartment, the selling price would have to be no greater than $275,806, applying the 3.75 multiplier as seen in **Table 7.18**.

7.2.5.3.1 Owner Occupied Housing Value

As required by Rule Chapter 9J-5 F.A.C., the distribution of specified owner-occupied units within the County and the median value trends are shown in **Table 7.19** and are based on unincorporated County data acquired an April 2010 from the Florida Housing Data Clearinghouse (FHDC) The FHDC provides public access to data about housing in Florida. Data for unincorporated County was acquired from the FHDC and is based on 2000 Census data.

Table 7.19 - Distribution of Owner-Occupied Housing by Value, 2000

Housing Value	Number of Units	Percent Distribution
<$50,000	31	0.4%
$50,000-$99,999	350	4.9%
$100,000-$149,999	1,240	17.2%
$150,000-$199,999	1,470	20.4%
$200,000-$299,999	1,874	26.0%
$300,000-$499,999	1,447	20.1%
$500,000-$999,999	495	6.9%
>$1,000,000	291	4.0%
Total	**7,198**	**100.0%**

Source: Florida Housing Data Clearinghouse, April 2010
Note: Excluding mobile homes

The 2000 data in **Table 7.19** indicates that less than one percent of units were valued below $50,000 according to the Florida Housing Data Clearinghouse; less than five percent were valued below $99,999; approximately 94 percent of units were valued at over $100,000. When comparing owner occupied housing cost to the 2000 median value, there were approximately 42.9 percent of the owner occupied housing that fall below the median value ($241,200).

As a comparison, the distribution of specified owner-occupied units within the County and the median value trends for 1990, are as reported in the "Housing Element" of the Technical Document of the *2010 Monroe County Comprehensive Plan* as adopted in1995, are shown in **Table 7.20**. It is important to note that at the time the 1990 data was collected, the City of Marathon and the Village of Islamorada were not incorporated; therefore unincorporated 1990 totals will be higher when compared to unincorporated 2000 totals.

Table 7.20 - Distribution of Owner-Occupied Housing by Value, 1990

Housing Value	Number of Units	Percent Distribution
<$59,999	609	5.0%
$60,000-$99,999	2,441	20.2%
$100,000-$149,999	2,914	24.2%
$150,000-$199,999	2,346	19.5%
>$200,000	3,749	31.1%
Total	**12,059**	**100.0%**

Source: "Housing Element" of the Technical Document, Table 7.5 of the *2010 Monroe County Comprehensive Plan* taken from the U.S. Census Bureau 1990. Note: This excludes mobile homes.

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7.2.5.3.2 Monthly Cost of Owner-Occupied Units

Table 7.21 and **Table 7.23**, presents the distribution of specified owner-occupied housing cost in the County by mortgage status and non-mortgage status for year 2000. According to the FDCH, in 2000, about 57.1 percent of renters paid between $1,000 and $1,999 per month.

Only 8.7 percent of the owners with non-mortgage status paid more than $1,000 per month. About 45.7 percent of non-mortgage status owners paid between $400 and $699 per month.

It is important to mention that mortgage status and non-mortgage status are collected from a 1-in-6 sample and weighted to represent the total population and thus totals will not equal the 11,334 unit shown in **Table 7.9.**

Table 7.21- Mortgage Status and Selected Monthly Owner Costs[8] Unincorporated Monroe County, 2000

Range	Number of Units	Percent Distribution
Less than $299	7	0.2%
$300 - $399	0	0.0%
$400 - $499	27	0.6%
$500 - $599	59	1.4%
$600 - $699	170	3.9%
$700 - $799	188	4.3%
$800 - $899	247	5.7%
$900 - $999	294	6.8%
$1,000 - $1,249	756	17.4%
$1,250 - $1,499	839	19.3%
$1,500 - $1,999	887	20.4%
$2000-$2499	373	8.6%
$2500-$2999	239	5.5%
$>$3000	253	5.8%
Total[9]	**4,339**	**100.0%**

Source: Florida Housing Data Clearinghouse, April 2010

As a comparison, the 1990 mortgage status and selected monthly owner costs for Monroe County, are as reported in the "Housing Element" of the Technical Document of the *2010 Monroe County Comprehensive Plan* as adopted in 1995, are shown in **Table 7.23**. It is important to note that at the time the 1990 data was collected, the City of Marathon and the Village of Islamorada were not incorporated.

[8] Selected monthly owner costs, such as mortgage payments and utilities, are a measure of the cost of homeownership. When combined with income, selected monthly owner costs offer an excellent measure of affordability and excessive shelter costs.

[9] Sample data or collected from a 1-in-6 sample and weighted to represent the total population.

Table 7.22 - Mortgage Status and Selected Monthly Owner Costs Monroe County, 1990

Range	Number of Units	Percent Distribution
Less than $299	188	2.8%
$300 - $399	189	2.9%
$400 - $499	288	4.3%
$500 - $599	414	6.3%
$600 - $699	615	9.3%
$700 - $799	553	8.4%
$800 - $899	587	8.9%
$900 - $999	640	9.7%
$1,000 - $1,249	1,174	17.8%
$1,250 - $1,499	688	10.4%
$1,500 - $1,999	540	8.2%
$2,000 or more	730	11.0%
Total	6,606	100.0%

Source: "Housing Element" of the Technical Document, Table 7.6 of the *2010 Monroe County Comprehensive Plan*

Table 7.23 - Non Mortgaged Status and Selected Monthly Owner Costs, Unincorporated Monroe County, 2000

Range	Number of Units	Percent Distribution
<$100	23	0.8%
$100-$149	61	2.1%
$150-$199	90	3.1%
$200-$249	131	4.6%
$250-$299	138	4.8%
$300-$349	282	9.9%
$350-$399	254	8.9%
$400-$499	599	21.0%
$500-$599	411	14.4%
$600-$699	295	10.3%
$700-$799	173	6.1%
$800-$899	131	4.6%
$900-$999	23	0.8%
>$1,000	248	8.7%
Total [10]	**2,859**	**100.0%**

Source: Florida Housing Data Clearinghouse, April 2010.

[10] Sample data or collected from a 1-in-6 sample and weighted to represent the total population. It will not equate to the housing unit count in Table 7.5.

7.2.5.3.3 Rental Rates

The FHDC provides the distribution of units by contract rent. Contract rent is the monthly rent agreed to, or contracted for, regardless of any furnishings, utilities, or services that may be included. The distribution of specified renter-occupied units is illustrated in **Table 7.24**.

Table 7.24 - Distribution of Renter Occupied Units by Contract Rent Range, 2000

Rent Range	Number of Units	Percent Distribution	Price Comparison
<$200	68	1.5%	
$200-$299	121	2.7%	
$300-$499	456	10.3%	**14.5%**
$500-$749	1,159	26.1%	
$750-$999	1,247	28.1%	
$1,000-$1,499	841	18.9%	
$1,500 or More	228	5.1%	
No Cash Rent	325	7.3%	**85.5%**
Total	**4,445**	**100.0%**	**100.0%**

Source: Florida Housing Data Clearinghouse, April 2010.

As a comparison, the 1990 mortgage status and selected monthly owner costs for Monroe County, are as reported in the "Housing Element" of the Technical Document component of the *2010 Monroe County Comprehensive Plan* as adopted in 1995, are shown in **Table 7.25**. It is important to note that at the time the 1990 data was collected, the City of Marathon and the Village of Islamorada were not incorporated. Therefore, 1990 numbers of units will be higher.

Table 7.25 - Distribution of Renter Occupied Units by Contract Rent Range, 1990

Rent Range	Number of Units	Percent Distribution	Price Comparison
<$199	2,533*	20.2%	
$200-$299	681	5.4%	
$300-$499	3,323	26.4%	**52.0%**
$500-$699	3,559	28.3%	
>$700	2,482	19.7%	**48.0%**
Total	**12,578**	**100.0%**	

Source: "Housing Element" of the Technical Document, Table 7.7, *2010 Monroe County Comprehensive Plan.*
*includes No Cash Rent

As a comparison, it is evident from **Table 7.24** and **Table 7.25**, that the percent distribution of rental price below $500 has deceased for more than half from 1990 to 2000. In 1990 rental price below $500 distribution was 52.0 percent and 14.5 percent in 2000.

7.2.6 Cost to Income Ratios [Rule 9J-5.010 (1)(a) F.A.C.]

7.2.6.1 Rent-to-Income Ratios

According to the HUD, the threshold for affordable housing is a rent-to-income ratio of 30 percent. In other words, when gross monthly housing cost exceeds 30 percent of monthly household income, the household is considered to be paying too much for housing versus other essential living expenses. This is known as a household that is cost burdened.

Based on the 30 percent cost burdened threshold, the general trend is that the lower the household income range (less than $10,000 on **Table 7.26**), the higher the degree of being cost burdened. 92 percent of households making an income below $10,000 are cost burdened. In the other spectrum, at the income range of $75,000 or more, the rate of households that were cost burdened was only 6.3 percent. This trend is consistent with the exception of income range $50,000 - $74,999, where all renter households were cost burdened. Renter households, with annual incomes below $34,999, accounted for 59 percent of total renter households, but represented 75 percent of households being cost burdened. Of the 3,310 renter household sample, 54.0 percent was cost burdened. These trends are depicted in **Table 7.26**.

Table 7.26 - Rent-to-Income for Renter-Occupied Units, 1999

Gross Rent as a % of Household Income	< $10,000	$10,000-$19,999	$20,000-$34,999	$35,000 - $49,999	$50,000 - $74,999	$75,000 or more
< 29%	32	95	352	648	0	403
30 – 34.9%	0	28	115	100	46	27
35% or More	378	594	356	107	29	0
Total	410	717	823	855	75	430
Not Computed	166	78	69	0	45	19
Percent Cost Burdened	**92.2%**	**86.8%**	**57.2%**	**24.2%**	**100.0%**	**6.3%**

Source: Florida Housing Data Clearinghouse accessed April 2010
Note: Data will be updated once the Census 2010 is available, estimated to occur on April 2011.

As a comparison, the 1989 Rent-to Income for Renter-Occupied Units, are as reported in the "Housing Element" of the Technical Document component of the *2010 Monroe County Comprehensive Plan* as adopted in 1995, are shown in **Table 7.27**. The trend of the lower income being the most cost burdened when compared the 1999. However, renters at the various income ranges were less cost burdened back in 1989. Of the 11,183 renter households in 1989, 47.0 percent was cost burdened. This represents a five percent increase of cost-burdened renters in 1999. This restates the affordable housing need.

Table 7.27- Rent-to-Income for Renter-Occupied Units, 1989

Gross Rent as a % of Household Income	< $10,000	$10,000-$19,999	$20,000-$34,999	$35,000 - $49,999	$50,000 – and more
< 29 %	210	489	2,070	1576	1,192
30 – 34.9%	81	319	474	121	34
35% or More	1,197	1,927	894	169	0
Total	1,488	2,735	3,438	1,866	1,226
Not Computed	340	361	681	233	195
Percent Cost Burdened	**85.9%**	**82.1%**	**39.8%**	**15.5%**	**2.8%**

Source: "Housing Element" of the Technical Document, Table 7.8 of the *2010 Monroe County Comprehensive Plan* taken from the U.S. Census Bureau 1990.

7.2.6.2 Owner-to-Income Ratios

Based on the HUD threshold of households paying more than 30 percent of their income as being cost burdened, the same trend is observed for owners. Lower income owner occupied households (with incomes below $10,000) were the most cost burdened at 92 percent. In contrast, at the $75,000 or more income range, 11.4 percent of households were cost burdened. Owner households with annual incomes below $34,999 accounted for 29 percent of total owner occupied households, but represent 66 percent of households which were cost burdened. 2,356 of the 7,412 owner households or 32 percent of the owner households were cost burdened. Owner-to-income ratios are shown on **Table 7.28**.

Table 7.28 - Monthly Owner Cost by Income, 1999

Mortgage Payment as % of Household Income	< $10,000	$10,000 $19,999	$20,000 $34,999	$35,000 $49,999	$50,000 $74,999	$75,000 or more
< 29%	21	211	388	636	1,218	2,256
30 – 34.9%	0	7	74	87	183	94
35% or More	237	402	484	374	219	195
Total	258	946	946	1,097	1,620	2,545
Not Computed	112	0	0	0	0	0
Percent Cost Burdened	**91.9%**	**66.0%**	**59.0%**	**42.0%**	**24.8%**	**11.4%**

Source: Florida Housing Data Clearinghouse, April 2010

When comparing renter cost to income (**Table 7.26**) and owner cost to income (**Table 7.28**), it is evident that the lowest income households are the most cost burdened, more so for renters. Also, all renters at the $50,000 - $74,999 income range are cost burdened in comparison to only a quarter of those who own in that same income range. It is evident that renters are in more need of affordable housing assistance.

7.2.7 Structural Condition of Housing Stock [Rule 9J-5.010 (1)(c) F.A.C.]

Substandard housing is defined as units without complete kitchen facilities; units lacking some or all plumbing facilities (hot and cold piped water, flush toilets, no bathtub or shower); or units designated as deteriorating or dilapidated because of other structural deficiencies. Another characteristic of substandard housing are those that are overcrowded. Housing conditions are available for those lacking complete plumbing facilities, complete kitchens, central heat and over crowdedness and are illustrated in **Table 7.29**.

According to FHDC, which provides the latest available detail concerning structural conditions of housing, there were 139 units or about 0.6 percent of the unincorporated County's housing stock that lacked complete plumbing and could, therefore, be considered "substandard". Other factors, such as the lack of complete kitchen facilities, indicate a substandard unit; these units account for 0.8 percent of the total housing inventory. Approximately 6.1 percent of the County's occupied housing units had more than 1.01 persons per room.

Although these conditions are the norm for accessing substandard housing, the County may consider conducting an onsite survey to truly depict the severity of deteriorating and substandard structures. In particular, given that the housing stock is aging as indicated on **Table 7.12.**

Table 7.29 - Inventory of Housing by Specified Condition, 2000

Condition	Number of Units	Percent Distribution
Lacking Complete Plumbing	139	0.6%
Lacking Complete Kitchens	191	0.8%
Lacking Central Heat*	2,815	17.8%
Overcrowded Housing*	822	6.1%

*Share of occupied units
Source: Florida Housing Data Clearinghouse accessed on April 1st 2010
Will be updated with Census 2010 upon data release scheduled for April 2011.

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7.2.8 Subsidized Housing Developments [Rule 9J-5.010(1)(d) F.A.C.]

7.2.8.1 Housing Delivery Programs

Below is a list of programs that deal with the provision of subsidized and affordable housing.

7.2.8.1.1 Federal Programs

- The Community Development Block Grant (CDBG): This program has been in existence since 1974. The program is a significant source of funds for affordable housing; however, this is not the sole focus of such grants. CDBG funds can be used for a variety of community development initiatives, including affordable housing construction, home repair assistance for existing low-income homeowners, and economic development initiatives designed to spur business investment and economic growth in distressed neighborhoods. Funding is awarded according to a formula that attempts to quantify the amount of need in a community compared with other communities, using several economic and demographic measures. Communities receiving grants are required to solicit and encourage citizen participation, particularly from the proposed beneficiaries, in developing a final plan for using the funds.

- Home Investment Partnerships (HOME): This is a block grant program administered by HUD designed to provide flexible funding support for affordable low-income housing in the affordable housing solutions for low-income families. HOME funds can be used to acquire and renovate deteriorated properties or construct new housing for rent or sale. The funds can also be used for down payment assistance grants to individual homebuyers, as well as to other programs. The beneficiaries of HOME-funded programs must have incomes below 80 percent of the HUD-determined area median family income, and most uses of HOME funds have more specific income guidelines. The flexibility of the HOME program is designed to empower communities to find the best available uses for the money, and requires significant interagency cooperation. HOME funds must be matched with a 25 local contribution, which can take the form of cash from municipal bond issues or donated labor and construction materials from the private sector. Another form of local contribution can be vacant or abandoned properties-donated by private donors or the city-which after HOME-funded renovation and/or construction, would be sold to low-income homebuyers. Additionally, jurisdictions receiving HOME funding are required to commit at least 15 percent of funding to projects which will be owned or developed by experienced, local, community-based nonprofit organizations called Community Housing Development Organizations (CHDOs) by HUD, but often known as Community Development Corporations (CDCs). HOME-funded housing is required to remain affordable for low-income residents for at least 5 to 20 years, depending on the type of project and proportion of funding provided by HOME.

- The American Dream Down Payment Initiative: This is a corollary program to HOME designed specifically to aid low-income first-time homebuyers with funds for closing costs and a down payment. Families meeting the criteria are eligible for up to $10,000 or 6 percent of the purchase price (whichever is greater) of a home. Some of the funds may also be used for remedying health hazards such as lead-based paint in the home prior to occupancy. The ADDI program is administered in conjunction with the HOME program, but allocations are figured separately, and different rules apply.

- The Housing Opportunities for Persons with AIDS (HOPWA): This program provides special housing assistance for low-income persons diagnosed with HIV or AIDS. Assistance ranges from short-term rental assistance aimed at preventing homelessness, to ongoing longer-term rental assistance, to the acquisition, construction, and provision of supporting housing, which provides integrated services for health care, mental health, chemical dependency, and general case management. According to HUD, HOPWA funds are an important catalyst for partnerships; on average, approximately $2 is leveraged for every $1 provided by HOPWA. Baseline HOPWA funds are awarded based on a statutory formula program, but additional funds are available based on a competitive grant process awarding additional funds to highly successful or innovative programs.

- The Emergency Shelter Grants (ESG): This program provides federal funding for homeless shelters through HUD grants to local governments, which then disburse the grant monies to local nonprofits. ESG funds are required to be locally matched dollar for dollar. The matched funds are most likely to be found in the form of private fundraising by the recipient nonprofit organizations, but can also include other federal, state, and local grants as well as in-kind donations of real estate and volunteer time. ESG funds are also granted to state governments, but different rules apply.

- Federal Emergency Management Agency (FEMA): FEMA provides grants and assistance programs to local governments, such as the Disaster-Specific Assistance Program; Hazard-Related Grants and Assistance Programs, and Non-Disaster Programs.

- Section 8 Voucher Program: A voucher may be either "project-based" (where its use is limited to a specific apartment complex; public housing agencies (PHAs) may reserve up to 20 percent of its vouchers) or "tenant-based" (where the tenant is free to choose a unit in the private sector, is not limited to specific complexes). Under the voucher program, individuals or families with a voucher find and lease a unit (either in a specified complex or in the private sector) and pay a portion of the rent (based on income, but generally no more than 30 percent (40 percent being the maximum at time of lease-up) of the family's income).

7.2.8.1.2 Florida Programs[11]

- State Housing Initiatives Partnership (SHIP): State housing initiatives partnership SHIP is the first-and only-permanently funded, state housing program in the nation to provide funds directly to local governments to increase affordable housing opportunities in their communities. The program channels 69 percent of the documentary stamp tax revenues created by the Sadowski Act directly to counties and entitlement cities in Florida on a noncompetitive basis. Designed as an incentive for the formation of public-private partnerships for building, rehabilitating and preserving affordable housing, the SHIP program provides a financial means to develop and implement housing programs that are locally designed.

  SHIP funds may be used to provide emergency repairs to very low, low and moderate income households following a natural disaster as declared by the President of the United States, Governor of the State of Florida or by the Monroe County Board of County Commissioners. Funds can be used to purchase emergency supplies to weatherproof damaged home; interim repairs to avoid further damage; tree and debris removal required to make the individual housing unit habitable; construction of wells or repair of existing wells where public water is not available; post disaster assistance with non-insured repairs; and soft costs required to process assistance applications. The program is only implemented after a natural disaster.

  SHIP funds may be also used as part of the local contribution for programs that construct multi-family special needs rental housing. The SHIP funds that are used in these types of projects will be in the form of a deferred payment loan for 15 years at a one percent to five percent interest rate, depending upon cash flow of the project.

- State Apartment Incentive Loan (SAIL) Program: SAIL stimulates production of affordable, multi- and single-family rental housing for very low-income individuals and families in Florida. SAIL is a development incentive program, which leverages state loan funds, local government contributions, developer equity, and private bond financing. The State Apartment Incentive Loan program (SAIL) provides low-interest loans on a competitive basis to affordable housing developers each year. This money often serves to bridge the gap between the development's primary financing and the total cost of the development. SAIL dollars are available to individuals, public entities, not-for-profit or for-profit organizations that propose the construction or substantial rehabilitation of multifamily units affordable to very low income individuals and families.

- Florida Homeownership Assistance Program (HAP): Down payment Assistance Loan Program: This helps individuals and families with low incomes purchase their own homes by providing $2,500 in 0 percent interest, non-amortizing, second mortgage loans for down payments and closing costs. The following are:

11"Of Ships and Sails: Affordable Housing Financing Programs In Florida" (Foresight, Fall 1997)

Permanent Loan Program - This provides 0 percent interest, non-amortizing, second mortgage loans covering 25 percent of the purchase price of a home. These loans assist qualified borrowers with down payment/closing costs and reduce the principal on their first mortgage.

Construction Loan Program-A nonprofit developer or sponsor is eligible to borrow the lesser of either the total funds available in an application cycle, or 33 percent of the cost of the project to construct or substantially rehabilitate a minimum of four homes. At least 30 percent of the units must be set aside for low-income borrowers and 30 percent for very low-income borrowers.

- Predevelopment Loan Program (PLP): This program provides financial assistance for predevelopment costs, site acquisition, and development of land for housing affordable to individuals or families with very low and low incomes.

- Florida Affordable Housing Guarantee Program: This program provides guarantees on taxable loans and tax-exempt loans to stimulate innovative, private sector lending for multi- and single-family affordable housing.

1. Low-Income Rental Housing Tax Credit (LIHTC) Program: This program gives developers federal tax credits in exchange for acquisition and substantial rehabilitation for substantially rehabilitating or for new construction of rental housing projects for low or very low income rental housing units must be set aside for individuals or families.

2. Multi-Family Mortgage Revenue Bond Program: This program uses taxable and tax-exempt bonds to provide below-market interest rate loans to non-profits and for profits for developers of apartment units that set aside at least 20 percent of the units for households earning 50 percent or less of the AMI or forty percent for households earning 60 percent of the AMI.

3. Single-Family Mortgage Revenue Bonds (MRB) Program: This uses the proceeds from mortgage revenue bonds from statewide qualified lending institutions to offer below-market mortgage loans to first-time home buyers with low, moderate and or middle incomes. (FAC Rule 67-25)

7.2.8.1.3 Monroe County Programs

There are various County agencies with a role in affordable housing development[12]; these are:

[12] Monroe County Division of Housing and Community Development, 2007, *Monroe County Affordable and Workforce Housing.*

- Monroe County Planning and Environmental Resources Department: This Department works with property owners to develop and preserve Affordable Housing in unincorporated Monroe County. This department recommends and provides Comprehensive Plan amendments and MCLDCs relating to affordable housing.

- Monroe County Land Authority (MCLA): The MCLA is a land acquisition agency created pursuant to Section 2-397 of the MCLDC, Section 380.0661 of the Florida Statutes, and the Florida Keys and Key West Area of Critical State Concern designations. The agency is empowered to acquire and dispose of property for a range of public purposes, including recreation, affordable housing, environmental protection, and the protection of private property rights. As of September 30, 2009, the Monroe County Land Authority has expended $21 million on site acquisition, $28.5 million for affordable housing (Source: MCLA).

- Monroe County Housing Authority: The Housing Authority is responsible for low income and affordable rental apartments throughout the County, and oversees the SHIP program which provides 2nd mortgages to income-qualified home buyers.

As per the Monroe County Housing Authority, a variety of housing programs provide for subsidized housing in unincorporated Monroe County. These programs include State Apartment Incentive Loan Program (SAIL), Monroe County Land Authority Program (MCLA), Low Income Tax Housing Tax Credit (LIHTC), Federal Emergency Management Agency Program (FEMA) and other U.S. Housing and Community Development programs (HUD).

A total of 470 dwelling units are subsidized by several programs in unincorporated Monroe County, which are listed in **Table 7.30** and **7.31**. A total of 85 units are scheduled to be built. All of the units and developments listed in this section are rental.

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Table 7.30 - Subsidized Housing Developments, 2010

Development Name	Program Jurisdiction	Number of Units	Location
H. Bethel Apartments	FEMA/MCLA	18	Stock Island
Stock Island Apartments	LIHTC/SAIL	130	Stock Island
Meridian West	LIHTC/SAIL/MCLA	102	Stock Island
Flagler Village (a)	LIHTC	49	Stock Island
Atlantic Pines	LIHTC/SAIL	14	Big Pine Key
Scattered Sites	FEMA/MCLA	5	Big Coppitt Key
Blue Water (a)	LIHTC/MCLA	36	Tavernier
Newport Village	HUD	50	Key Largo
Tradewinds Hammocks	LIHTC/SAIL/MCLA	66	Key Largo
Total		**470**	**--**

Source: Monroe County Housing Authority, 2010
(a) To be built.
FEMA - Federal Emergency Management Agency
MCLA - Monroe County Land Authority
LIHTC - Low Income Housing Tax Credit Program
SAIL - State Apartment Incentive Loan Program
HUD - U.S. Department of Housing and Urban Development

Section 8 federal funds are used to subsidize housing through cash vouchers in lieu of rent payments, loan assistance programs, rental rehabilitation aid, and other general assistance programs. A total of 143 dwelling units in the County are funded through this program, as shown in **Table 7.31.**

Table 7.31 - Section 8 Subsidized Housing Developments, 2010

Development Name	Program Jurisdiction	Number of Units	Location
Section 8 Choice Vouchers	HUD	56	Lower Keys
Section 8 Choice Vouchers	HUD	87	Upper Keys
Total		**143**	**--**

Source: Monroe County Housing Authority, 2010

7.2.8.2 Subsidized Housing and the Rate of Growth (ROGO) Process

The process of receiving a building permit in Monroe County is a competitive process. ROGO is a tool utilized by the County to control growth throughout the Keys. However, additional consideration is given to affordable housing permit applications. ROGO is a

point based system that allows applicants applying for a new residential building permit to compete against other applicants for the limited number of allocations issued each year. The number of allocations available is determined through the adoption of an administrative rule on the State level. The number of allocations is based on the progress Monroe County has made toward achieving state set goals such as a central wastewater system being available keys wide. The total number of available allocations is split among the three subareas of Monroe County. The Upper Keys, Lower Keys and the Big Pine/No Name Key subareas. Each applicant competes against the other applicants located within the same subarea. There is one exception to this process, applicants for affordable housing. Affordable housing applicants compete against all applicants for affordable housing permits keys wide. Allocations are awarded each quarter in each subarea with the exception of Big Pine Key and No Name Key where allocations are awarded annually.

7.2.9 Group Homes
[Rule 9J-5.010 (1)(e) F.A.C.]

The Florida Department of Children & Families licenses one group home within the County. It is a Residential Child Caring Agency in Key West, Florida, with a capacity of six children, ages 11 to 17.

7.2.10 Mobile Home Parks
[Rule 9J-5.010 (1)(f) F.A.C.]

The vast majority of mobile home parks are located on the Municipalities. An account for both unincorporated and incorporated mobile home parks as accessed through the Florida Department of Business and Professional Regulation file name mhmailings.csv is provided in **Table 7.32**. A total of 1,378 units are located in the mobile home parks in the count as a whole.

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Table 7.32 - Mobile Home Parks

Unincorporated		
Name	**Location**	**Units**
Coco Palms	Cudjoe Key	18
Captain Jax RV Resort	Key Largo	24
Largo Lively Inc	Key Largo	58
Paradise Point Mobile Home Park	Key Largo	15
Waters Edge Colony Mobile Home Park	Stock Island	66
Sugarloaf Mobile Home Resort	Sugar Loaf Key	22
Summerland Palms Trailer Park	Summerland	22
Driftwood Trailer Park	Tavernier	15
Total Unincorporated		**240**
Incorporated		
Name	**Location**	**Units**
Coconut Grove Mobile Home Park	Key West	33
Island Life Village	Key West	106
Liz's Trailer Park	Key West	19
Poinciana Mobile Home Park Inc	Key West	79
Stadium Mobile Home Park	Key West	278
Sunset Harbor Manufactured Home Community	Key West	86
Tropic Palms Mobile Home Park	Key West	25
Galway Bay Mobile Home Park	Marathon	70
Jolly Roger Travel Park & Motel	Marathon	88
Sundance Trailer Village & Efficiencies	Marathon	35
Terra Marine Trailer Park	Marathon	23
Trailerama Mobile Home Park	Marathon	117
Ocean Breeze Park West	Marathon	47
Grassy Key RV Park & Resort	Grassy Key	18
Peaceful Palms	Islamorada	15
San Pedro Trailer Park	Islamorada	14
Seabreeze Mobile Home Park	Islamorada	35
Village Mobile Park Inc	Islamorada	32
WINDLEY KEY Trailer Park	ISLAMORADA	18
Total Incorporated		**1,138**
Countywide Total		**1,378**

Source: Florida Department of Business and Professional Regulation file name mhmailings.csv accessed through http://www.myfloridalicense.com/dbpr/sto/file_download/public-records-CTMH.html on February 24, 2011.
Note: Approved or acknowledged mobile home parks and owners. Terminated, rejected or withdrawn projects are not included

7.2.11 Historically Significant Housing [Rule 9J-5.010 (1)(g) F.A.C.]

The State Historic Preservation Office (SHPO) is the entity that maintains the Florida Master Site File (FMSF) inventory for the County, and for coordinating the review of historic resource nominations to the National Register of Historic Places. Historic housing in the Keys is most often associated with Key West, which contains 2,406 historic homes according to the (FMSF). However, historic houses, notable for their simple vernacular styles, are also found in the unincorporated County.

Although the Florida Master Site File (FMSF) contains 391 listings of historic resources in unincorporated Monroe County, 185 of the listings are historic houses. As seen in **Table 7.33** and **Table 7.35**, there are 19 houses that are potentially eligible for listing on the National Register, and 16 of them are located in Tavernier **(Table 7.35)**. Other structures and sites (excluding those eligible or listed on the Register, and those in the Tavernier Historic District) listed on the FMSF, are shown on **Table 7.34.** Structures on the FMSF which are located in the Tavernier Historic District are shown separately on **Table 7.36.**

The National Register of Historic Places lists 52 historic places. The only historically significant housing in unincorporated Monroe County listed on the National Register of Historic Places, are the buildings on Pigeon Key (FMSF #1260). The Pigeon Key camp housed workers of the Overseas Railroad bridges and highway projects until 1941. The camp was used as a retreat, and recently as a marine research facility. Now managed by the Pigeon Key Foundation, Pigeon Key is a public cultural resource and is unlikely to be renovated for future housing uses.

The Pigeon Key Marine Science Camp (PKMSC) is a 501(c) 3 not-for-profit organization whose mission is to provide educational experiences in a history rich environment located on a 5-acre island. Our programs are for all ages - elementary school to post graduate – and are designed and endorsed by some of the most respected marine scientists in the United States. The Teaching Team located on Pigeon Key are truly dedicated to the preservation of our natural resources through hands-on educational and leadership development programs for today's students and tomorrow's leaders.

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Table 7.33 - Florida Master Site File, Historic Houses Potentially Eligible for Listing in the National Register of Historic Places

Historic Houses Potentially Eligible for Listing on The National Register of Historic Places			
Site ID	**Name**	**Location**	**Use**
MO03692	55 OCEANA DR (Key Largo Lodge)	KEY LARGO	Private residence
MO01256	Rigby House		Private residence
MO03711	81 SOUTH CONCH AVENUE, CONCH KEY	81 S CONCH AVE	Private residence

Source: Florida Master Site File, January 2010

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Table 7.34 - Florida Master Site File Housing

SITE ID	NAME	KEY	USE
LOWER KEYS PLANNING AREA			
MO03622	ARENSON	BIG PINE KEY	Private residence
MO03733	31131 AVENUE D	BIG PINE KEY	Private residence
MO03734	31336 AVENUE E	BIG PINE KEY	Private residence
MO03735	TACKLE AND BAIT SHOP	BIG PINE KEY	Private residence
MO03736	30371 POINCIANA ROAD	BIG PINE KEY	Private residence
MO03737	30457 PALM DRIVE	BIG PINE KEY	Private residence
MO03738	30423 OLEANDER BOULEVARD	BIG PINE KEY	Private residence
MO03739	30434 OLEANDER BOULEVARD	BIG PINE KEY	Private residence
MO03740	30458 OLEANDER BOULEVARD	BIG PINE KEY	Private residence
MO03741	423 BARRY AVENUE	LITTLE TORCH KEY	Private residence
MO03742	433 BARRY AVENUE	LITTLE TORCH KEY	Private residence
MO03743	580 BARRY AVENUE	LITTLE TORCH KEY	Private residence
MO03744	1257 WARNER ROAD	LITTLE TORCH KEY	Private residence
MO03745	1269 MILLS ROAD	LITTLE TORCH KEY	Private residence
MO03746	1263 MILLS ROAD	LITTLE TORCH KEY	Private residence
MO03747	26936 SHANAHAN ROAD	RAMROD KEY	Private residence
MO03748	24915 HORACE STREET	SUMMERLAND KEY	Private residence
MO03749	24945 CENTER STREET	SUMMERLAND KEY	Private residence
MO03750	25063 CENTER STREET	SUMMERLAND KEY	Private residence
MO03751	13 CENTER STREET	SUMMERLAND KEY	Private residence
MO03752	HORACE AND CENTER STREETS	SUMMERLAND KEY	Private residence
MO03754	637 2ND STREET	SUMMERLAND KEY	Private residence
MO03755	25044 45TH STREET	SUMMERLAND KEY	Private residence
MO03757	60 DOBIE STREET	SUMMERLAND KEY	Private residence
MO03758	21074 OVERSEAS HIGHWAY	CUDJOE KEY	Private residence
MO03760	81 JOHNSON ROAD	SUGARLOAF KEY	Private residence
MO03761	71 JOHNSON ROAD	SUGARLOAF KEY	Private residence
MO03762	19556 NAVAJO STREET	SUGARLOAF KEY	Private residence
MO03763	19580 MAYAN STREET	SUGARLOAF KEY	Private residence
MO03764	19674 INDIAN MOUND DRIVE	SUGARLOAF KEY	Private residence
MO03765	19591 AZTEC DRIVE	SUGARLOAF KEY	Private residence

Table 7.34 - Florida Master Site File Housing (continued)

SITE ID	NAME	KEY	USE
LOWER KEYS PLANNING AREA			
MO03798	521 AVENUE D	BIG COPPITT KEY	Private residence
MO03799	540 AVENUE D	BIG COPPITT KEY	Private residence
MO03800	531 AVENUE D	BIG COPPITT KEY	Apartment
MO03801	530 AVENUE C	BIG COPPITT KEY	Apartment
MO03802	310 AVENUE B	BIG COPPITT KEY	Private residence
MO03803	21 1ST STREET	BIG COPPITT KEY	Private residence
MO03804	46 1ST STREET	BIG COPPITT KEY	Private residence
MO03805	44 1ST STREET	BIG COPPITT KEY	Private residence
MO03806	45 1ST STREET	BIG COPPITT KEY	Private residence
MO03807	47 1ST STREET	BIG COPPITT KEY	Private residence
MO03808	410 AVENUE A	BIG COPPITT KEY	Private residence
MO03812	20 4TH STREET	BIG COPPITT KEY	Private residence
MO03813	217 AVENUE G	BIG COPPITT KEY	Private residence
MO03814	200 AVENUE G	BIG COPPITT KEY	Private residence
MO03815	101 AVENUE G	BIG COPPITT KEY	Private residence
MO03818	218 SHORE AVENUE	BIG COPPITT KEY	Private residence
MO03819	204 SHORE AVENUE	BIG COPPITT KEY	Private residence
MO03821	231 COPPITT ROAD	BIG COPPITT KEY	Private residence
MO03823	519 PALM DRIVE	EAST ROCKLAND KEY	Private residence
MO03824	557 PARK DRIVE	EAST ROCKLAND KEY	Private residence
MO03825	578 HAMMOCK DRIVE	EAST ROCKLAND KEY	Private residence
MO03829	6400 2ND STREET	STOCK ISLAND	Private residence
MO03830	6408 2ND STREET	STOCK ISLAND	Apartment
MO03831	MCKILLUP RENTALS	STOCK ISLAND	Apartment
MO03832	LOPEZ APARTMENTS	STOCK ISLAND	Apartment
MO03834	5339 5TH AVENUE	STOCK ISLAND	Apartment
MO03835	5331 5TH AVENUE	STOCK ISLAND	Private residence
MO03836	5 6TH AVENUE	STOCK ISLAND	Private residence
MO03837	19 6TH AVENUE	STOCK ISLAND	Private residence
MO03838	315 CROSS STREET	STOCK ISLAND	Private residence
MO03839	311 CROSS STREET	STOCK ISLAND	Private residence
MO03840	309 CROSS STREET	STOCK ISLAND	Private residence
MO03841	303 CROSS STREET	STOCK ISLAND	Private residence
MO03842	408 BALIDO STREET	STOCK ISLAND	Private residence
MO03843	404 BALIDO STREET	STOCK ISLAND	Private residence
MO03844	400 BALIDO STREET	STOCK ISLAND	Private residence

Table 7.34 - Florida Master Site File Housing (continued)

SITE ID	SITE ID	NAME	KEY
LOWER KEYS PLANNING AREA			
MO03845	397 BALIDO STREET	STOCK ISLAND	Private residence
MO03846	399 BALIDO STREET	STOCK ISLAND	Private residence
MO03847	403 BALIDO STREET	STOCK ISLAND	Private residence
MO03848	405 BALIDO STREET	STOCK ISLAND	Private residence
MO03849	407 BALIDO STREET	STOCK ISLAND	Private residence
MO03850	409 BALIDO STREET	STOCK ISLAND	Private residence
MO03851	411 BALIDO STREET	STOCK ISLAND	Private residence
MO03852	410 BALIDO TERRACE	STOCK ISLAND	Private residence
MO03853	404 BALIDO STREET	STOCK ISLAND	Private residence
MO03854	402 BALIDO TERRACE	STOCK ISLAND	Private residence
MO03855	400 BALIDO TERRACE	STOCK ISLAND	Private residence
MO03856	424 COUNTY ROAD	STOCK ISLAND	Private residence
MO03857	420 COUNTY ROAD	STOCK ISLAND	Private residence
MO03858	410 COUNTY ROAD	STOCK ISLAND	Private residence
MO03859	400 COUNTY ROAD,	STOCK ISLAND	Private residence
MIDDLE KEYS PLANNING AREA			
MO03701	35 SEAVIEW AVE	CONCH KEY	Private residence
MO03702	44 SEAVIEW AVE	CONCH KEY	Private residence
MO03703	55 SEAVIEW AVE	CONCH KEY	Private residence
MO03704	85 SEAVIEW AVE	CONCH KEY	Private residence
MO03705	42 N CONCH AVE	CONCH KEY	Private residence
MO03706	52 N CONCH AVE	CONCH KEY	Private residence
MO03707	63 N CONCH AVE	CONCH KEY	Private residence
MO03708	73 N CONCH AVE	CONCH KEY	Private residence
MO03709	97 N CONCH AVE	CONCH KEY	Private residence
MO03710	120 W CONCH AVE	CONCH KEY	Private residence
MO03712	61 S CONCH AVE	CONCH KEY	Private residence
MO03713	30 S CONCH AVE	CONCH KEY	Private residence
MO03714	20 S CONCH AVE	CONCH KEY	Private residence
UPPER KEYS PLANNING AREA			
MO01982	PARSONAGE	148 ATLANTIC CIRCLE DR	Private residence
MO02078	U.S. HWY 1, MILE MARKER 97.6 (A)	U.S. 1, MILE MARKER 97.6	Commercial and residence
MO02079	U.S. HWY 1, MILE MARKER 97.6 (B)	U.S. 1, MILE MARKER 97.6	Private residence

Table 7.34 - Florida Master Site File Housing (continued)

SITE ID	SITE ID	NAME	KEY
UPPER KEYS PLANNING AREA			
MO03649	162 JO JEAN DRIVE, TAVERNIER	162 JO JEAN DR	Private residence
MO03650	192 HARBORVIEW DRIVE, TAVERNIER	192 HARBOR VIEW DR	Private residence
MO03651	140 STERLING STREET, TAVERNIER	140 STERLING ST	Private residence
MO03653	130 STERLING STREET, TAVERNIER	130 STERLING ST	Private residence
MO03654	149 STERLING STREET, TAVERNIER	149 STERLING ST	Private residence
MO03657	94400 OVERSEAS HIGHWAY, TAVERNIER	94400 OVERSEAS HWY	Private residence
MO03658	97260 OVERSEAS HIGHWAY, KEY LARGO	97260 OVERSEAS HWY	Private residence
MO03659	MM97.8 OVERSEAS HIGHWAY, KEY LARGO	MM97.8 OVERSEAS HWY	Private residence
MO03663	99314 OVERSEAS HIGHWAY, KEY LARGO	99314 OVERSEAS HWY	Private residence
MO03665	104 PALMETTO STREET, TAVERNIER	104 PALMETTO ST	Private residence
MO03666	15 SEASIDE AVENUE, TAVERNIER	15 SEASIDE AVE	Private residence
MO03667	113 NORTH BAY HARBOR ROAD, KEY LARGO	113 N BAY HARBOR RD	Private residence
MO03668	150 SOUTH BAYVIEW DRIVE, KEY LARGO	150 S BAYVIEW RD	Private residence
MO03669	239 SOUTH BAY HARBOR DRIVE, KEY LARGO	239 S BAY HARBOR RD	Private residence
MO03670	116 SOUTH COCO PLUM DRIVE, KEY LARGO	116 S COCO PLUM DR	Private residence

Source: Florida Master Site File, January 2010

7.2.11.1 Locally Designated Historically Significant Housing or Neighborhoods

The Tavernier Historic District, as recommended by Tavernier Livable CommuniKeys Plan (LCP), is bounded on the north by the U.S. 1, on the west by the Tavernier Creek, on the south by the Atlantic Ocean, and on the east by Mile Marker 92. The general location of Tavernier's local historic district is shown on **Map Series 2.1** of the map atlas. Of the 222 listings of historic housing in unincorporated Monroe County, 53 are located in the Tavernier Historic District.

The *2008 Tavernier Historic District Intensive-Level Survey and Publication* by GAI Consultants, Inc. takes inventory of the significantly historic housing in Tavernier and are also reflected in **Tables 7.35** and **7.36**.

On February 5, 2010, the Florida Department of State, Division of Historic resources determined that the Tavernier Historic District is potentially eligible for listing on the National Register of Historic Places.

Table 7.35 - Tavernier Historic Housing Potentially Eligible for Listing on the National Register of Historic Places

SITEID	NAME	ADDRESS	USE
MO01889	200 Beach Road	200 Beach RD	Private residence
MO01984	WOODS, O M HOUSE	189 BEACH RD	Private residence
MO01985	STATION MASTERS HOUSE	198 BEACH RD.	Private residence
MO01990	180 LOWE ST	180 LOWE ST	Private residence
MO01992	RED CROSS HOUSE	184 LOWE ST	Private residence
MO01993	LOWE, ALICE HOUSE	224 OCEAN TRIAL	Private residence
MO01994	131 OCEAN VIEW DRIVE	131 OCEAN VIEW DR	Private residence
MO01997	ALBURY, MERLIN HOUSE	91731 OVERSEAS HWY	Private residence
MO01999	ALBURY, WILLARD HOUSE	91991 OVERSEAS HWY	Private residence
MO02004	CARPENTER, CLIFF HOUSE	114 SUNRISE DR	Private residence
MO02009	ALBURY, CHARLES HOUSE	132 TAVERN DR	Private residence
MO02010	WILKINSON HOUSE	159 TAVERNIER TRAIL	Private residence
MO02013	ALBURY, RODNEY HOUSE	200 ALBURY LN	Private residence
MO03630	190 ATLANTIC CIRCLE DRIVE, TAVERNIER	190 ATLANTIC CIRCLE DR	Private residence
MO03633	ROBERTS HOUSE	140 S SUNRISE DR	Private residence
MO03715	165 TAVERNIER TRAIL, TAVERNIER	165 TAVERNIER TRAIL	Private residence

Source: Florida Master Site File, January 2010

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Table 7.36 - Tavernier Historic Housing

SITE ID	NAME	ADDRESS	USE
OTHER			
MO01891	163 Coconut Row	163 Coconut Row NA	Private residence
MO01892	240 Lincoln Ave	240 Lincoln Avenue AVE	Private residence
MO01893	204 Ocean Blvd.	204 Ocean BLVD	Private residence
MO01894	137 Sunrise Dr.	137 Sunrise DR	Private residence
MO01983	166 ATLANTIC CIRCLE	166 ATLANTIC CIRCLE DR	Private residence
MO01986	GEIGER PACKING HOUSE	91495 OVERSEAS HWY	Commercial and residence
MO01987	129 COCONUT ROW	129 COCONUT ROW	Private residence
MO01988	110 LOWE ST	110 LOWE ST	Private residence
MO01989	114 LOWE ST	114 LOWE ST	Private residence
MO01991	181 LOWE ST	181 LOWE ST	Private residence
MO02001	118 SUNRISE DRIVE	118 SUNRISE DR	Private residence
MO02002	120 SUNRISE DRIVE	120 SUNRISE DR	Private residence
MO02003	ALLEN, ROBERT PORTER HOUSE	133 SUNRISE DR	Private residence
MO02006	256 TARPON DRIVE	256 TARPON ST	Private residence
MO02007	114 TAVERNIER DRIVE	114 TAVERNIER DRIVE	Private residence
MO02008	120 TAVERNIER DRIVE	120 TAVERNIER DR	Private residence
MO02011	136 TAVERNIER DR	136 TAVERNIER DR	Private residence
MO02012	140 TAVERNIER DR	140 TAVERNIER DR	Private residence
MO03628	143 ATLANTIC CIRCLE DRIVE, TAVERNIER	143 ATLANTIC CIRCLE DR	Private residence
MO03629	186 ATLANTIC CIRCLE DRIVE, TAVERNIER	186 ATLANTIC CIRCLE DR	Private residence
MO03631	128 TAVERNIER DRIVE, TAVERNIER	128 TAVERNIER DR	Private residence
MO03632	126 TAVERNIER DRIVE, TAVERNIER	126 TAVERNIER DR	Private residence
MO03634	162 SOUTH SUNRISE DRIVE, TAVERNIER	162 S SUNRISE DR	Private residence
MO03635	149 SOUTH SUNRISE DRIVE, TAVERNIER	149 S SUNRISE DR	Private residence
MO03636	114 TAVERNIER DRIVE, TAVERNIER	114 TAVERNIER DR	Private residence

Source: Florida Master Site File, January 2010

Table 7.36 - Tavernier Historic Housing (continued)

SITEID	NAME	ADDRESS	USE
MO03637	122 LOWE STREET, TAVERNIER	122 LOWE ST	Private residence
MO03638	124 LOWE STREET, TAVERNIER	124 LOWE ST	Private residence
MO03639	130 LOWE STREET, TAVERNIER	130 LOWE ST	Private residence
MO03640	157 LOWE STREET, TAVERNIER	157 LOWE ST	Private residence
MO03641	185 LOWE STREET, TAVERNIER	185 LOWE ST	Private residence
MO03642	195 LOWE STREET, TAVERNIER	195 LOWE ST	Private residence
MO03643	178 BEACH ROAD, TAVERNIER	178 BEACH RD	Private residence
MO03644	181 COCONUT ROW, TAVERNIER	181 COCONUT ROW	Private residence
MO03645	115 COCONUT ROW, TAVERNIER	115 COCONUT ROW	Private residence
MO03716	153 TAVERNIER TRAIL, TAVERNIER	153 TAVERNIER TRAL	Private residence
MO03717	137-141 SOUTH SUNRISE DRIVE, TAVERNIER	137-141 S SUNRISE DR	Apartment
MO03718	139 COCONUT ROW, TAVERNIER	139 COCONUT ROW	Private residence

Source: Florida Master Site File, January 2010

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7.2.12 Residential Construction Activity [Rule 9J-5.010 (1)(h) F.A.C.]

Residential permit activity represents the best available information for estimating the change in the housing stock since the 2000 Census. As indicated in **Table 7.8** there were a total of 24,595 dwelling units in unincorporated County when 2000 Census data was collected. However, it is important to note that although the Census is held as the best available data source, the Census counts may not be a true reflection of the number of dwelling units given the particular residential environment in the County. That is to say, the Census counts may not include non docked boats that serve as houses, RV's that serve as dwelling units located in camp grounds, and alternative housing (e.g. granny flats) which may have not been counted.

However, a base of 24,595 is established as the best available data up to April 1, 2000 (when census 2000 was collected). To arrive at a grand total of dwelling units by year 2010, an evaluation of units that received a certificate of occupancy, housing demolitions and housing replacements from April 1, 2000 to the end of 2010 is performed.

7.2.12.1 Building Permits and Certificates of Occupancy

As seen in **Table 7.37**, according to the Growth Management Division data received on March 25, 2011, there were 2,067 dwelling units that received a building permit from April 1st, 2000 to end of 2010. Of the permitted units, approximately 80 percent were single family homes and 16 percent were mobile homes and recreational vehicles. An average of 190 new and replacement dwelling units were permitted from 2001 to 2010. Of the 2,067 dwelling unit permits issued, 1,172 were the result of obtaining a ROGO allocation. Of the 2,067 dwelling units permits issued, a total of 1,229 dwelling units received a certificate of occupancy. An analysis of residential building permits that received certificate of occupancy brings the dwelling unit total to 25,824.

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Table 7.37- Residential Building Permit Activity, April 1st 2000 – December 31, 2010

Year	Single Family 07	Duplex 10	Multi Family 23	Mobile Home/Rv 30&31	Hotel/ Motel 83	Total Permits Issued	Permits Issued Under ROGO	Received CO
2000	92	0	35	32	7	166	92	165
2001	151	0	13	55	1	220	118	157
2002	193	0	25	81	0	299	181	162
2003	235	0	0	44	0	279	161	152
2004	126	0	0	47	0	173	105	175
2005	295	0	0	29	0	324	160	111
2006	377	0	2	14	0	393	198	92
2007	106	0	0	13	0	119	103	118
2008	46	0	3	11	0	60	45	61
2009	24	0	0	3	0	27	4	29
2010	5	0	0	2	0	7	5	7
TOTAL	**1,650**	**0**	**78**	**331**	**8**	**2,067**	**1,172**	**1,229**

Source: Monroe County Growth Management, March 25, 2011.

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7.2.12.2 Housing Demolition and Replacement

As seen in **Table 7.38**, according to the Monroe County Growth Management Division data received on March 25, 2011, a total of 706 dwelling units were demolished from the last decennial census to 2010. The highest demolition rate occurred in years 2005 and 2006 with 353 units demolished. This accounts for about 50 percent of units demolished from 2001 to 2010. An average of 70 dwelling units was demolished per year between 2001 and 2010. At this time it is not possible to determine, whether a demolition was for a single family, a mobile home, etc. An analysis of demolition activity reduces the total housing stock to 25,118.

Table 7.38 - Residential Demolitions, April 1st 2000 – December 31, 2010

Year	Demolition
2000	2
2001	17
2002	24
2003	32
2004	80
2005	169
2006	184
2007	79
2008	52
2009	40
2010	22
TOTAL	**706**

Source: Monroe County Growth Management, March 25, 2011.

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As seen in **Table 7.39**, the number of replacement units is reported from April 1, 2000 until the end of 2010. A total of 642 mobile homes were replaced with a single family dwelling unit; 229 single family homes were replaced with a single family unit; and 294 mobile homes were replaced with a mobile home. A total of 1,165 replacement units received a certificate of occupancy from April 1, 2000 to end of 2010. An average of 106 replacement units received a certificate of occupancy from 2001-2010.

Table 7.39 - Replacement Units Receiving Certificate of Occupancy, April 1st, 2000 – December 2010

Year	MH to SFR	MH to MH	SFR to SFR	RV Replacement	Park Model Replacement	Total Units Receiving a CO
2000	21	55	21	0	0	97
2001	11	41	14	0	0	66
2002	14	47	18	0	0	79
2003	27	34	26	0	0	87
2004	85	27	19	0	0	131
2005	90	28	19	0	0	137
2006	136	22	18	0	0	176
2007	143	12	30	0	0	185
2008	54	18	23	0	0	95
2009	30	7	24	0	0	61
2010	31	3	17	0	0	51
Total	**642**	**294**	**229**	**0**	**0**	**1,165**

Source: Monroe County Growth Management, March 25, 2011.
MH (mobile home)
SFR (single family)
CO (certificate of occupancy)

It is important to highlight that in the last ten years (2001-2010) a total of 936 mobile home units were replaced. Of the 936 mobile home units replaced, 642 were replaced for single family unit. The replacement of mobile home units to single family units represents a 68.5 percent loss of mobile homes to single family units, in the last ten years. It is clear that there is an increasing demand for single family homes and groups that are more able to afford them. The shifting trend of mobile homes to single family units may reiterate the shifting trend of permanent to seasonal population, whom are typically more affluent. Also, as mobile homes are replaced by a single family structure, there is less housing stock that is affordable for those income levels that are in need of assistance. An analysis of projected unit by type is provided in **Section 7.3.4.1** *"Housing Supply by Type".*

An analysis of replacement units that received certificate of occupancy from April 1st 2000 to the end of 2010 (1,165) brings the grand total of dwelling units to 26,283 by the end of 2010. **Table 7.40** illustrates the residential building activity starting from the base, Census 2000, until end of 2010.

Table 7.40 – Summary of Construction Activity April 1st, 2000 - 2010

Construction Activity	Total 2010
Base housing number from Census 2000	24,595
Residential building activity receiving a certificate of occupancy	+1,229
Demolitions	-706
Replacement with certificate of occupancy	+1,165
TOTAL	**26,283**

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7.3 Housing Demand Analysis [Rule 9J-5.010 (2) F.A.C.]

The housing demand component of the Comprehensive Plan update is of primary importance in order to plan for the needed housing stock given population growth. This element derives from population estimates and projections as required per [Rule 9J-5.005(2)(e) F.A.C]. Population projections methodology and details are explained in *Chapter 2.0 Future Land Use Element*.

Housing Demand is defined as the needed number of dwelling units that will accommodate population growth. Given the County's location and the economic climate, housing affordability has become an increasing problem. This section also provides the data inventory necessary to support the policy recommendations given the population estimates trend housing need and also addresses some of the issues related to affordable housing demand and supply. Only unincorporated County data is presented in this analysis.

7.3.1 Population Projections and Approach [Rule 9J-5.005(2)(e) F.A.C and Rule 9J-5.010(2)(a) F.A.C]

The Unincorporated Monroe County Population Projections form the basis for household need calculations. Population is identified according to LKPA, UKPA and MKPA. The methodology derives from a permanent population[13] forecast and a seasonal population[14] forecast at the County level. The sum of permanent and seasonal forecast is referred to as the functional population for the unincorporated County as a whole. With the exception the housing demand analyses are based upon projects functional population.[15] Affordable housing demand is based upon only the permanent population and permanent households because the County's regulations require those obtaining affordable allocations to be permanent residents.

The permanent population projection series is based on the latest published data by the University of Florida, Bureau of Economic and Business Research (BEBR), published in March 2010, for permanent population estimates. In as much as ROGO has been in place since 1993, BEBR population projections reflect a growth trend constrained by ROGO's implementation. This means permanent population growth projections implicitly assume the continuation of the ROGO constraint and the effects of its implementation.

The seasonal population series is based on the Florida Keys Aqueduct Authority (FKAA) data series from August 24, 2004. This series includes estimates of seasonal residences, recreational vehicles, hotel/motel, camps, boat live aboards, mobile home, and other. The DCA required the projections herein to use the FKAA series for the purposes of estimating the seasonal population component, with appropriate updates to the methodology.

[13] Permanent population is referred to as the residents whose primary place of residency is in the County.
[14] Seasonal population is referred to as the residents whose primary place of residence outside of the County and their residences are non-homesteaded.
[15] Functional population is the sum of permanent and seasonal population

The best available data suggest a loss in permanent population with likely replacement through an increase of seasonal residents.

7.3.2 Projected Number of Households[16] *[Rule 9J-5.010 (2)(a) F.A.C]*

7.3.2.1 Number of Households for Permanent Population

Permanent population is one component of functional population. Loss of permanent population is thought to have occurred as a result of the recent recession, a rise in foreclosures, depletion of affordable housing and increased unemployment. Nearly 3,500 units have been foreclosed throughout the Keys since 2005. The rise in home prices and threat of hurricanes has also contributed to some permanent population loss. Losses associated with some of these conditions may be temporary, resulting in renewed growth after the recession.

The ROGO based permanent population series is used as one component of the functional population. At the county level, for control totals, the DCA has recommended using the latest BEBR annual estimates and the BEBR Medium series population, published March 2010 for permanent population estimates.

The BEBR annual population estimates for municipalities and unincorporated areas indicates permanent population fell in the Keys from 2006-2008, with some a return to growth evidenced in 2009. The effect of the short term decline is to drive the long term population projections down. Thus, both recent history and future projections from BEBR suggest a downward trend in permanent population.

The estimated average household size according to BEBR in 2009 was 2.2 persons per household. This estimate is used to project the number of permanent households out to 2030. The estimated number of households generated by permanent population from 2010 to 2030 is shown on **Table 7.41.** These projections reflect the ROGO restriction on growth.

It is projected that permanent population households will decline by 1.8 percent from 2010 (16,076) to 2030 (15,786).

[16] As defined by the US Census, a household includes all the people who occupy a dwelling unit as their usual place of residence. Dwelling units or housing is referred to as the structure which may be occupied or vacant.

Table 7.41 - Permanent Household Estimates and Projections, 2010-2030

Year	Permanent Population				Households [17]	Household Percent Change
	Lower Keys	Middle Keys	Upper Keys	Total		
2010	19,877	1,061	14,430	35,368	16,076	--
2015	20,061	1,071	14,564	35,696	16,225	0.93%
2020	19,880	1,061	14,433	35,374	16,079	-0.90%
2025	19,699	1,052	14,301	35,052	15,933	-0.91%
2030	19,518	1,042	14,170	34,730	15,786	-0.92%
Household Percent Change from 2010 to 2030					-1.8%	

Source: Fishkind & Associates, Inc., February 2011, *Unincorporated Monroe County Population Projection.* BEBR, 2009, *Number of Households and Average Household Size in Florida:* April 1, 2009.

7.3.2.2 Number of Households for Seasonal Population

Seasonal population is another component of functional population. There is evidence of population shifting from permanent to seasonal. For instance, of all the new single family housing growth in Monroe County since 1999, nearly 70 percent has been in non-homesteaded units. Most likely, this is a combination of both growth in seasonal population as well as permanent population loss. Loss of permanent population may cause once occupied units to become non-homesteaded. In addition, a comparison of the ACS 2008 and the Census 2000 data, illustrated that the number of seasonal units had risen.

The estimated number of households generated by seasonal population from 2010 to 2030 is shown on **Table 7.42**. Seasonal population numbers are derived from the FKAA, seasonal series. Seasonal numbers include estimates of seasonal residences, recreational vehicles, hotel/motel, camps, boat live aboards, mobile home, and other. It is estimated that seasonal households have a higher person per household or household size due to the increasing size of newly built units. Therefore, the figure of 2.7 persons per household is used to calculate the number of seasonal households and is supported by the FKAA methodology.

It is projected that households for seasonal population will increase by 10.7 percent from 2010 (13,126) to 2030 (14,529). Seasonal households are expected to increase at an average rate of 2.57 percent every five years during the planning period.

[17] Estimates for permanent households are based on the BEBR estimated average household size of 2.2 as of April 1, 2009.

Table 7.42 - Seasonal Household Estimates and Projections, 2010-2030

Year	Seasonal Population				Households[18]	Household Percent Change
	Lower Keys	Middle Keys	Upper Keys	Total		
2010	19,768	1,122	14,550	35,440	13,126	--
2015	20,120	1,141	14,806	36,067	13,358	1.77%
2020	20,712	1,173	15,235	37,120	13,748	2.92%
2025	21,304	1,204	15,665	38,173	14,138	2.84%
2030	21,896	1,236	16,095	39,227	14,529	2.76%
Household Percent Change from 2010 to 2030					10.7%	

Source: Fishkind & Associates, Inc., 2010, *Unincorporated Monroe County Population Projections*

7.3.2.3 Number of Households for Functional Population

Functional population is the sum of seasonal and permanent population estimates and form the basis for this analysis; however, only when referring to affordable housing permanent population and household numbers.

As seen in **Table 7.43**, the 2010 estimated population for unincorporated Monroe County is 70,808 (2010) and by 2030 it is projected to increase by 3,149 additional persons. This is an increase of 157.5 persons per year through the twenty year planning horizon. As illustrated in **Table 7.43**, the number of households for the estimated 2010 functional population (29,202) is projected to increase by 1,113 households (3.8 percent) in 2030 to 30,315.

Table 7.43 - Functional Household Estimates and Projections, 2010-2030

Year	Functional Population				Households[19]	Household Percent Change
	Lower Keys	Middle Keys	Upper Keys	County Total		
2010	39,645	2,183	28,980	70,808	29,202	--
2015	40,181	2,212	29,370	71,763	29,584	1.31%
2020	40,592	2,234	29,668	72,494	29,827	0.82%
2025	41,003	2,256	29,966	73,225	30,071	0.82%
2030	41,414	2,278	30,265	73,957	30,315	0.81%
Household Percent Change from 2010 to 2030					3.8%	

Source: Fishkind & Associates, Inc., 2010, *Unincorporated Monroe County Population Projections*
BEBR, February 2010, *Number of Households and Average Household Size in Florida: April 1, 2009*

[18] The number of seasonal households is based on seasonal population projection from the FKAA. The FKAA estimates were originally based on the *Monroe County Population Estimates and Forecast 1990-2015.* The average household size of 2.7 is used to estimate and project the number of household.
[19] Functional households is the sum of seasonal and permanent households

It is important to mention that while permanent population decreases at an average rate of less than one percent every five years, seasonal population increases at an average rate of 2.57 percent every five years; resulting in an obvious shift in population from permanent to seasonal. Overall, functional population or total population for the unincorporated County will increase at an average rate of less than one percent, every five years, in the twenty year planning period.

7.3.3 Projected Number of Households by Size [Rule 9J-5.010 (2)(a) F.A.C]

In order to obtain the estimated and projected household by size the Shimberg Center of Affordable Housing (SCAH) database was assessed. The SCAH creates a set of population projections based on BEBR estimates, which are then divided into households. Then the SCAH allocates households across size and projects them by assuming the year 2000 proportions across the entire planning horizon. For the purpose of this analysis, SCAH percentage allotment is used in combination with the unincorporated County functional population projections to calculate the number household by size. Therefore, the best available data are SCAH ratios in combination with the estimated functional household numbers.

As seen in **Table 7.44** by the year 2030, 72.5 percent of households will consist of one or two persons. The number of persons per household having five persons or more is estimated at 5.6 percent for the same year. However, as explained in ***Section 7.3.2.2*** *"Number of Households for Seasonal Population",* it is estimated that seasonal households have a higher person per household or household size, due to the increasing size of newly built units.

Table 7.44 - Functional Population Households by Size, 2010-2030

Household Size	2010		2015		2020		2025		2030	
	# of house holds	%of Total	# of house holds	%of Total	# of house holds	%of Total	# of house holds	%of Total	# of house holds	%of Total
1-2 Persons	21,008	71.9%	21,340	72.1%	21,555	72.3%	21,785	72.4%	21,979	72.5%
3-4 Persons	6,571	22.5%	6,601	22.3%	6,610	22.2%	6,615	22.0%	6,647	21.9%
≥5 Persons	1,624	5.6%	1,643	5.6%	1,662	5.6%	1,671	5.6%	1,689	5.6%
Total	29,202	100.0%	29,584	100.0%	29,827	100.0%	30,071	100.0%	30,315	100.0%

Source: Shimberg Center for Affordable Housing, 2010; Fishkind & Associates, Inc., 2010, *Unincorporated Monroe County Population Projections*

Note: Calculations are based on Shimberg Center for Affordable Housing percent allotment and distribution of functional population households.

7.3.4 Projected Number of Households by Income [Rule 9J-5.010 (2)(a) F.A.C]

Household income is a critical factor when determining if a household would qualify for affordable housing assistance. In order to obtain the estimated and projected household by

income, the Affordable Housing Needs Assessment (AHNA) of the Shimberg Center of Affordable Housing (SCAH) was evaluated. The SCAH creates a set of population projections based on BEBR estimates, which are then divided into households. Then the SCAH allocated households across income groups and projects them by assuming the year 2000 proportions across the entire planning horizon. For the purpose of this analysis, SCAH percentage allotment is used in combination with the functional unincorporated County population projections to calculate the number of households by income.

Household by income is a two-part analysis. The first analysis is prepared for functional (total) households as an illustration of unincorporated Countywide household, thereby including seasonal and permanent households. In order to illustrate the number of households that would qualify for affordable housing assistance, the second analysis is exclusive to permanent households. It is important to mention that the SCAH definition of "moderate income" groups does not parallel that of the County. Moderate income is emphasized since households at this income range or below are the households qualifying for affordable housing assistance. The SCAH classifies income groups in the following manner:

- Extremely Low Income – households making 0-30 percent of AMI
- Very Low Income - households making 30.1-50 percent of AMI
- Low Income - households making 50.1-80 percent of the AMI
- Moderate Income - households making 80.01-120 percent of the AMI
- Above Moderate Income - households making over 120 percent of the AMI

In contrast, as indicated in **Section 7.2.5.2** *"Monroe County Affordable Housing Defined"*, moderate incomes are the households whose total income does not exceed 120 percent of the area median income (for renters) and households whose total income does not exceed 160 percent of the median income of the County (for owners). With the County definition of moderate income, in particular for owners, it is not possible to determine which households will be making up to 160 percent of the area median income, given that SCAH lumps into the "above moderate income" those in the 121 to 160 percentage of the area median income. Therefore, some households in the above moderate income range would qualify for assistance but it is not possible to determine how many.

7.3.4.1 Households by Income - Functional Population

Table 7.45 shows the estimated and projected functional households by income from 2010 to 2030. For the year 2010, 60.9 percent of the total households in the unincorporated County are estimated to have incomes in the moderate income range or below (120 percent of less as defined by the SCAH). Conversely, households in the above moderate income range (120 percent or more of the area median income) is 39.1 percent. For the year 2030, the percentage of households making below the moderate range increases by 1.5 percent. This may indicate that more households could become cost burdened. This income analysis illustrates where households for the unincorporated County, as a whole,

fall in relationship to the various income groups. This analysis is not meant for the purpose of drawing conclusions on affordable housing need.

Table 7.45 - Functional Population Estimated and Projected Households by Income, 2010-2030

Household Income Level	2010		2015		2020		2025		2030	
	# of house holds	%of Total	# of house holds	%of Total	# of house holds	%of Total	# of house holds	%of Total	# of house holds	%of Total
Extremely Low Income (0-30% AMI)	3,033	10.4%	3,207	10.8%	3,354	11.2%	3,427	11.4%	3,497	11.5%
Very Low Income (30.1-50% AMI)	3,345	11.5%	3,187	10.8%	3,328	11.2%	3,461	11.5%	3,556	11.7%
Low Income (50.1-80% AMI)	4,588	15.7%	4,737	16.0%	4,812	16.1%	4,873	16.2%	4,929	16.3%
Moderate Income (80.01-120% AMI)	6,809	23.3%	6,908	23.4%	6,907	23.2%	6,909	23.0%	6,929	22.9%
Above Moderate Income (>120% of AMI)	11,427	39.1%	11,544	39.0%	11,426	38.3%	11,401	37.9%	11,403	37.6%
Total	29,202	100.0%	29,584	100.0%	29,827	100.0%	30,071	100.0%	30,315	100.0%

Source: Shimberg Center for Affordable Housing, 2010; Fishkind & Associates, Inc., 2010, *Unincorporated Monroe County Population Projections*

Note: Calculations are based on Shimberg Center for Affordable Housing percent allotment and distribution of functional population households.

7.3.4.2 Households by Income - Permanent Population

Affordable housing programs are targeted to permanent residents whose income is between the extremely low income and moderate income ranges. In the County, in order to receive an ROGO allocation for an affordable unit, the occupants of that dwelling unit must be permanent residents. For these reasons, it is important to illustrate the number of permanent households by income levels to gauge the affordable housing need.

Families with incomes below the moderate range are likely to be more limited in their ability to afford a house and other goods. As a result, extremely low income, very low income, low income and moderate income (as defined by HUD and as used by the SCAH) are the income groups that would typically qualify for affordable housing assistance programs. The areas shaded in gray on **Table 7.46** denote the number of permanent resident households that would qualify for affordable housing assistance based on permanent residents and as defined by HUD income classifications. It is then estimated that in the year 2010 about 60.9 percent of permanent residents will need affordable housing. As the planning period extends to 2030, the need for affordable housing will increase to 62.4 percent of the permanent resident households. This is indicative that for the greater population of permanent residents, housing affordability will continue to be an issue in the County.

It is important, however, to restate that the County's moderate income range is set at 160 percent of the area median income, for owner occupied housing; therefore, the numbers in

Table 7.46 underestimate the affordable housing need. In other words, some of the households in the above moderate income range (making above 120 percent of the area median income) would also qualify for affordable housing assistance, if they were home owners.

Affordable housing need is further elaborated in **Section 7.3.5.3** *"Affordable Housing Need"*. The table below is meant to illustrate the number of households in the various income groups of the permanent population that would qualify for affordable housing assistance. It is not meant for estimating future median income.

Table 7.46 - Permanent Population Estimated and Projected Households by Income, 2010-2030

Household Income Level	2010		2015		2020		2025		2030	
	# of house holds	%of Total	# of house holds	%of Total	# of house holds	%of Total	# of house holds	%of Total	# of house holds	%of Total
Extremely Low Income (0-30% AMI)	1,670	10.4%	1,759	10.8%	1,808	11.2%	1,816	11.4%	1,821	11.5%
Very Low Income (30.1-50% AMI)	1,841	11.5%	1,748	10.8%	1,794	11.2%	1,834	11.5%	1,852	11.7%
Low Income (50.1-80% AMI)	2,526	15.7%	2,598	16.0%	2,594	16.1%	2,582	16.2%	2,567	16.3%
Moderate Income (80.01-120% AMI)	3,749	23.3%	3,789	23.4%	3,723	23.2%	3,661	23.0%	3,608	22.9%
Above Moderate Income (>120% of AMI)	6,291	39.1%	6,332	39.0%	6,160	38.3%	6,041	37.9%	5,938	37.6%
Total	16,076	100.0%	16,225	100.0%	16,079	100.0%	15,933	100.0%	15,786	100.0%
Number and Percent Needing Affordable Housing	9,786	60.9%	9,894	61.0%	9,919	61.7%	9,892	62.1%	9,848	62.4%

Source: Shimberg Center for Affordable Housing, 2010; Fishkind & Associates, Inc., 2010, *Unincorporated Monroe County Population Projections (Permanent population numbers)*
Note: Calculations are based on Shimberg Center for Affordable Housing percent allotment and distribution of functional population households.

7.3.5 Projected Housing Need [Rule 9J-5.010 (2)(b), F.A.C.]

7.3.5.1 Unincorporated County Housing Need

To determine the number of dwelling units needed, the estimates must account for occupancy rates. The average hotel occupancy from 2003-2010 is 70 percent according to Smith Travel Research, Fishkind & Associates, Inc. This figure is used to generate the number of dwelling units for seasonal households.

The occupancy rate for permanent households in 2008, according to the ACS, was 89.7 percent. This figure is used to derive the number of dwelling units needed for permanent

population. Functional dwelling units, which is the sum of the seasonal and permanent dwelling units constitutes the basis for the housing need.

An additional 1,680 dwelling units are needed during the next twenty years. The number of dwelling units needed by year 2030 is an additional 1,680 dwelling units.

Table 7.47 - Functional Population Dwelling Units Need for Unincorporated County 2015-2030

	Seasonal		Permanent		Functional		Housing Need (functional only)
	# of households	Dwelling Units[20]	# of households	Dwelling Units[21]	# of households	Dwelling Units[22]	
2010	13,126	18,751	16,076	17,922	29,202	36,674	--
2015	13,358	19,083	16,225	18,089	29,584	37,172	498
2020	13,748	19,640	16,079	17,925	29,827	37,566	394
2025	14,138	20,197	15,933	17,762	30,071	37,960	394
2030	14,529	20,755	15,786	17,599	30,315	38,354	394
Total Need	**--**	**2,004**	**--**	**-323**	**--**	**1,680**	**1,680**

Fishkind & Associates, Inc., 2010, *Unincorporated Monroe County Population Projections;* Smith Travel Research; American Community Survey 2008

It is important to differentiate between the numbers of dwelling units estimated in 2010 per population projections (36,674) and the number of dwelling units estimated to have been constructed by 2010 as accounted in **Section 7.2.12** "*Residential Construction Activity*" (total of 26,283).

The number of dwelling units documented in **Section 7.2.12** "*Residential Construction Activity*", were based upon the Census 2000 unit count, adding the dwelling units that received a certificate of occupancy since April 1, 2000, subtracting the demolition of units and then adding the replacement units. This exercise should have brought the number of existing dwelling units up to date. However, the Census 2000 number may not be a true reflection of the number of dwelling units given the particular County housing characteristics. That is to say, the Census counts do not take into account the whole housing environment in the Florida Keys. There are non-docked boats that serve as shelters; recreational vehicles that serve as dwelling units located in camp grounds; and accessory dwelling units or secondary suites that are associated with the primary residence. All of these types of housing particular to the Florida Keys may not counted by the Census.

On the other hand, the number of estimated dwelling units generated by the population projection in 2010 is different because it is driven by population projections and number of people per household.

[20] Seasonal Dwelling units are households times the occupancy rate of 70 percent
[21] Permanent dwelling units are households times the occupancy rate of 89.7 percent.
[22] Functional dwelling units are the sum of seasonal and permanent dwelling units.

7.3.5.2 Housing Need by Planning Area

As stated previously, an additional 1,680 dwelling units will be needed for the anticipated functional population of the County by year 2030. The analysis below illustrates the location of the needed units in relationship to the three planning areas, where growth is anticipated. It is important to note that more (56.3 percent) of the dwelling units will be concentrated in the LKPA primarily because this planning area will experience the most growth in population. To meet this projection, in the twenty year horizon, an average of 84 new units per year will be needed for the unincorporated County as a whole. This is less than the number of yearly ROGO allocations of 197, as currently established in Article II, Section 138-24 of the MCLDC.

Table 7.48 illustrates the number of dwelling units needed from 2015 to 2030 by planning area given functional population growth. Between the years 2020 to 2030 the dwelling unit need remains constant.

Table 7.48 - Functional Population Housing Need by Planning Area 2015-2030

Year	2015	2020	2025	2030	Total	Percent
Lower Keys	279	222	222	222	945	56.3%
Middle Keys	15	12	12	12	51	3.0%
Upper Keys	204	160	160	160	684	40.7%
Total	498	394	394	394	1,680	100.0%

Fishkind & Associates, Inc., 2010, *Unincorporated Monroe County Population Projections;* Smith Travel Research; American Community Survey 2008

7.3.5.3 Affordable Housing Need

As previously discussed the availability of affordable housing is one of the most challenging issues in Florida and around the nation. There is resounding documentation of the housing affordability problems the County is facing. As reported by the *Monroe County Affordable and Workforce Housing Report*, dated November 2007, the County is the most cost burdened small-county in the nation and has the most expensive single family homes and condominiums in the State. According to a recent *Harvard University Joint Center for Housing Studies*, the proportion of Americans spending more than half their incomes (severely cost burdened) on housing increased from 12 percent in 2000 to 16 percent in 2008.

According to the *Monroe County Affordable and Workforce Housing* report, the County has the highest affordability gap of all counties in Florida. The "affordability gap" is the difference between the buying power of a median income household and the median sales price of a single family home. The County's median income is $68,400 (HUDuser.org 2010); assuming a 40 hour per week, 50 week year, this translates into an hourly salary of $34.20. Based on the 2010 median income, a one income earner family would be able to afford a monthly

payment of a mortgage or rent of $1,710 (no more than 30 percent of income). A customary measure of how much home a family can afford is the family income multiplied by three. Therefore, a household which income is $68,400 would be able to afford a $205,200 priced dwelling unit. In contrast, the median value in 2009 according to the Shimberg Center was $572,608. This is an affordable gap of 370 thousand dollars.

The *Monroe County Affordable and Workforce Housing* report further states that 34.8 percent of home-owning Monroe County families are cost burdened, meaning they pay 30 percent of their income for housing, exclusive of insurance and taxes. Of the households that are cost burdened (34.8 percent), 17.4 percent of families are severely cost burdened, meaning they pay more than 50 percent of their income for housing. These trends exemplify the need to increase opportunities for affordable housing options. With the market crash more houses have been foreclosed and more permanent residents are moving out of the County with a population shift of permanent residents to seasonal who are able to afford pricier homes.

As seen in **Table 7.46**, the affordable housing need is assigned to the households making 0 to 120 percent of the area median income for permanent population only. As a requirement for receiving an affordable housing ROGO allocation, the residents occupying that affordable unit must be permanent County residents. The following analysis looks at affordable housing need by planning area only for the permanent residents.

7.3.5.3.1 Permanent Population Affordable Housing Need by Income Level

Based on the SCAH, the number of households in the various income levels has been projected. The tables below are meant for illustration of households in the various income groups to determine the number of households that would need affordable housing assistance or those that would be making 120 percent of the area median income or less. Tables are not meant for estimating of future area median income. It is important to restate that the estimated affordable housing need is correlated to the ROGO allocations and permanent population. Therefore, permanent population is utilized in this analysis.

Lower Keys

As shown in **Table 7.49**, an average of 5,545 households would need and qualify for affordable housing assistance in the Lower Keys. Based on SCAH in 2010, 60.9 percent of households would qualify for affordable housing assistance. By the year 2030 the percentage will increase to 62.4 percent. These percentages may be understated since for owner occupied housing, the qualifying income in the County is 160 percent of the area median income. It is not possible to determine how many households in the above moderate income range (incomes above 120 of the area median income) would qualify. Some of the households that fall in the above moderate income range may qualify for affordable housing, if they were owners.

Table 7.49 - Estimated Number of Households Needing Affordable Housing by Income Level – Lower Keys Planning Area

Income Level	2010		2015		2020		2025		2030	
	HH	%	HH	%	HH	%	HH		HH	%
Extremely Low (0-30% AMI)	938.4	10.4%	988.5	10.8%	1,016.0	11.2%	1,020.5	11.4%	1,023.4	11.5%
Very Low (30.1-50% AMI)	1,034.9	11.5%	982.4	10.8%	1,008.3	11.2%	1,030.6	11.5%	1,040.8	11.7%
Low Income (50.1-80% AMI)	1,419.6	15.7%	1,460.1	16.0%	1,457.7	16.1%	1,450.9	16.2%	1,442.6	16.3%
Moderate Income (80.01-120% AMI)	2,106.7	23.3%	2,129.5	23.4%	2,092.3	23.2%	2,057.2	23.0%	2,028.0	22.9%
Above Moderate Income (>120% of AMI)	3,535.4	39.1%	3,558.5	39.0%	3,461.6	38.3%	3,394.8	37.9%	3,337.2	37.6%
HH needing affordable housing assistance	5,499.6	60.9%	5,560.5	61.0%	5,574.4	61.7%	5,559.2	62.1%	5,534.8	62.4%

Source: Shimberg Center for Affordable Housing, 2010; Fishkind & Associates, Inc., 2010, *Unincorporated Monroe County Population Projections*

Note: Calculations are based on Shimberg Center for Affordable Housing percent allotment and distribution of permanent population households.

Middle Keys

As shown in **Table 7.50**, an average of 296 households would qualify for affordable housing assistance in the Middle Keys. Based on SCAH in 2010, 60.9 percent of households would qualify for affordable housing assistance; by the year 2030, the percentage will increase to 62.4 percent. These percentages are understated since for owner occupied housing, the qualifying income in the County is 160 percent of the area median income. It is not possible to determine how many households in the above moderate income range (Incomes above 120 percent of the area median income) would qualify. Some of the households that fall in the above moderate income range may qualify for affordable housing, if they were owners.

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Table 7.50 - Estimated Number of Households Needing Affordable Housing by Income Level – Middle Keys Planning Area

Income Level	2010		2015		2020		2025		2030	
	HH	%	HH	%	HH	%	HH		HH	%
Extremely Low (0-30% AMI)	50.1	10.4%	52.8	10.8%	54.2	11.2%	54.5	11.4%	54.7	11.5%
Very Low (30.1-50% AMI)	55.2	11.5%	52.5	10.8%	53.8	11.2%	55.0	11.5%	55.6	11.7%
Low Income (50.1-80% AMI)	75.7	15.7%	78.0	16.0%	77.8	16.1%	77.5	16.2%	77.1	16.3%
Moderate Income (80.01-120% AMI)	112.4	23.3%	113.7	23.4%	111.6	23.2%	109.8	23.0%	108.3	22.9%
Above Moderate Income (>120% of AMI)	188.6	39.1%	190.0	39.0%	184.6	38.3%	181.2	37.9%	178.3	37.6%
HH needing affordable housing assistance	293.4	60.9%	297.0	61.0%	297.0	61.6%	296.7	62.1%	295.6	62.4%

Source: Shimberg Center for Affordable Housing, 2010; Fishkind & Associates, Inc., 2010, *Unincorporated Monroe County Population Projections*
Note: Calculations are based on Shimberg Center for Affordable Housing percent allotment and distribution of permanent population households.

Upper Keys

As shown in **Table 7.51**, an average of 4,026 households would qualify for affordable housing assistance in the Upper Keys. Based on SCAH in 2010, 60.9 percent of households that would qualify for affordable housing assistance; by the year 2030 the percentage will increase to 62.4 percent. These percentages are understated since for owner occupied housing, the qualifying income in the County is 160 percent of the area median income. It is not possible to determine how many households in the above moderate income range (above 120 percent of the area median income) would qualify. Some of the households that fall in the above moderate income range may qualify for affordable housing, if they were owners.

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Table 7.51 - Estimated Number of Households Needing Affordable Housing by Income Level – Upper Keys Planning Area

Income Level	2010		2015		2020		2025		2030	
	HH	%	HH	%	HH	%	HH		HH	%
Extremely Low (0-30% AMI)	681.2	10.4%	717.6	10.8%	737.6	11.2%	740.8	11.4%	743.0	11.5%
Very Low (30.1-50% AMI)	751.3	11.5%	713.2	10.8%	732.0	11.2%	748.2	11.5%	755.6	11.7%
Low Income (50.1-80% AMI)	1030.6	15.7%	1060.0	16.0%	1058.3	16.1%	1053.3	16.2%	1,047.3	16.3%
Moderate Income (80.01-120% AMI)	1529.4	23.3%	1545.9	23.4%	1519.0	23.2%	1493.4	23.0%	1,472.3	22.9%
Above Moderate Income (>120% of AMI)	2566.5	39.1%	2583.3	39.0%	2513.1	38.3%	2464.4	37.9%	2,422.7	37.6%
HH needing affordable housing assistance	3992.5	60.9%	4036.7	61.0%	4046.9	61.6%	4035.6	62.1%	4,018.3	62.4%

Source: Shimberg Center for Affordable Housing, 2010; Fishkind & Associates, Inc., 2010, *Unincorporated Monroe County Population Projections*
Note: Calculations are based on Shimberg Center for Affordable Housing percent allotment and distribution of functional population households.

In essence, in year 2010 the number of household requiring affordable housing assistance is 60.9 percent; by the year 2030 the percentage will increase to 62.4 percent, based on the SCAH.

7.3.5.3.2 Permanent Population Estimated Cost Burdened Households

As explained in **Section 7.2.7** "*Price Rent Characteristics and Affordability*", an indicator of affordable housing need is the number of households that are cost burdened (paying more than 30 percent of their income in housing cost) as established by HUD. In other words, when gross monthly housing cost exceeds 30 percent of monthly household income, the household is considered to be paying too much for housing versus other essential living expenses. The households presented in this analysis pertain to permanent population given that in order to qualify for affordable housing the occupants need to be permanent residents. The percent allotment is derived from the SCAH. As seen in **Table 7.52**, the cost burdened household is approximately 36 percent and are distributed as shown below.

Table 7.52 - Permanent Population Cost Burdened Households 2010-2030

Cost Burdened	2010		2015		2020		2025		2030	
	# of house holds	%of Total	# of house holds	%of Total	# of house holds	%of Total	# of house holds	%of Total	# of house holds	%of Total
Paying 30.01-50%	3,071	19.1%	3,050	18.8%	2,991	18.6%	2,932	18.4%	2,889	18.3%
Paying 50+%	2,813	17.5%	2,839	17.5%	2,814	17.5%	2,772	17.4%	2,747	17.4%
Total Cost Burdened HH	5,884	36.6%	5,890	36.3%	5,805	36.1%	5,704	35.8%	5,636	35.7%
Total HH	16,076	100.0%	16,225	100.0%	16,079	100.0%	15,933	100.0%	15,786	100.0%

Source: Shimberg Center for Affordable Housing, 2010; Fishkind & Associates, Inc., 2010, *Unincorporated Monroe County Population Projections*
Note: Calculations are based on Shimberg Center for Affordable Housing percent allotment and distribution of permanent population households.

The following tables illustrate were cost burdened households are distributed in relationship to the planning areas.

Lower Keys

Of the households generated by permanent population in the LKPA, 36.6 percent are cost burdened according to SCAH. By the year 2030 the cost burdened household decreases to 35.7 percent. The decrease may be due in part to a shift in population from permanent to seasonal. A distribution of households paying more than 30 percent of their income in housing is shown in **Table 7.53.**

Table 7.53 - Permanent Population Cost Burdened Households 2010-2030 - Lower Keys Planning Area

Cost Burdened	2010		2015		2020		2025		2030	
	# of house holds	%of Total	# of house holds	%of Total	# of house holds	%of Total	# of house holds	%of Total	# of house holds	%of Total
Paying 30.01-50%	1,726	19.1%	1,713	18.80%	1,681	18.60%	1,648	18.40%	1,624	18.30%
Paying 50+%	1,581	17.5%	1,595	17.50%	1,581	17.50%	1,558	17.40%	1,544	17.40%
Total Cost Burdened HH	3,307	36.6%	3,308	36.3%	3,262	36.1%	3,206	35.8%	3,167	35.7%
Total HH	9,035	100.0%	9,113	100.0%	9,036	100.0%	8,954	100.0%	8,872	100.0%

Source: Shimberg Center for Affordable Housing, 2010; Fishkind & Associates, Inc., 2010, *Unincorporated Monroe County Population Projections*
Note: Calculations are based on Shimberg Center for Affordable Housing percent allotment and distribution of permanent population households.

Middle Keys

Of the households generated by permanent population in the MKPA 36.6 percent are cost burdened according to SCAH. By the year 2030 the cost burdened household decreases to 35.7 percent. The decrease may be due in part to a shift in population from permanent to seasonal. A distribution of households paying more than 30 percent of their income in housing is shown in **Table 7.54.**

Table 7.54 - Permanent Population Cost Burdened Households 2010-2030 - Middle Keys Planning Area

Cost Burdened	2010		2015		2020		2025		2030	
	# of house holds	%of Total	# of house holds	%of Total	# of house holds	%of Total	# of house holds	%of Total	# of house holds	%of Total
Paying 30.01-50%	92	19.1%	92	18.80%	90	18.60%	88	18.40%	87	18.30%
Paying 50+%	84	17.5%	85	17.50%	84	17.50%	83	17.40%	82	17.40%
Total Cost Burdened HH	176	36.6%	177	36.3%	174	36.1%	171	35.8%	169	35.7%
Total HH	482	100.0%	487	100.0%	482	100.0%	478	100.0%	474	100.0%

Source: Shimberg Center for Affordable Housing, 2010; Fishkind & Associates, Inc., 2010, *Unincorporated Monroe County Population Projections*
Note: Calculations are based on Shimberg Center for Affordable Housing percent allotment and distribution of functional population households.

Upper Keys

Of the households generated by permanent population in the UKPA 36.6 percent are cost burdened according to SCAH. By the year 2030 the cost burdened household decreases to 35.7 percent. The decrease may be due in part to a shift in population from permanent to seasonal. A distribution of households paying more than 30 percent of their income in housing is shown in **Table 7.55.**

Table 7.55 - Permanent Population Cost Burdened Households 2010-2030 - Upper Keys Planning Area

Cost Burdened	2010		2015		2020		2025		2030	
	# of house holds	%of Total	# of house holds	%of Total	# of house holds	%of Total	# of house holds	%of Total	# of house holds	%of Total
Paying 30.01-50%	1,253	19.1%	1,245	18.80%	1,220	18.60%	1,196	18.40%	1,179	18.30%
Paying 50+%	1,148	17.5%	1,159	17.50%	1,148	17.50%	1,131	17.40%	1,121	17.40%
Total Cost Burdened HH	2,401	36.6%	2,403	36.3%	2,368	36.1%	2,327	35.8%	2,299	35.7%
Total HH	6,559	100.0%	6,620	100.0%	6,560	100.0%	6,500	100.0%	6,441	100.0%

Source: Shimberg Center for Affordable Housing, 2010; Fishkind & Associates, Inc., 2010, *Unincorporated Monroe County Population Projections*

Note: Calculations are based on Shimberg Center for Affordable Housing percent allotment and distribution of functional population households.

In summary, the County should seek to encourage affordable housing options for households which are cost burdened. In year 2010, 36.6 percent of the households are cost burdened. The trend slightly lowers in the year 2030.

7.3.5.4 Need for Rural and Farm Worker Households

The County and its municipalities are either urbanized or under Conservation protection. According to the 2007 *Census of Agriculture*, the number of farming acres is 187 or 0.25 percent of land. There are no existing rural areas or farm worker households and there is no future need for those households. Therefore, this requirement does not apply.

7.3.5.5 Special Housing Need

The provision of adequate sites in residential areas or areas of residential character for group homes and foster care facilities is referenced is **Section 7.2.9** *"Group Homes"*. Only one facility currently exists in unincorporated Monroe County. These facilities are allowed in the Mixed Use District (MU) and Military Facility District (MF).

7.3.5.6 Replacement of Housing Units

Replacement of housing units due to deterioration is not a problem in the County. As seen **Section 7.2.12.2** "*Housing Demolitions and Replacement*", an average of 70 dwelling units were demolished from 2001 - 2010. An average of 106 replacement units received a certificate of occupancy from 2001-2010.

Most of the dwelling units replaced were mobile homes. Of the mobile homes replaced, 68.5 percent were replaced by a single family unit. This represents an increasing demand or preference for single family homes. This may also reflect the shifting of population from permanent to seasonal, which may be better able to afford a single family home.

Pursuant to Section 163.3191, F.S., due to Coastal High Hazard Area designation, no additional mobile home parks are permitted in the County. Further, a moratorium for new recreational vehicles and camp grounds is in place as illustrated in **Section 7.2.1.1. "***Hotel/Motel Transient Units"***.** A projection by housing type for the planning horizon considering shift of mobile homes to single family is provided in **Section 7.3.7.1** *"Housing Supply by Type".*

Where housing units are removed as part of a federal housing program, such as the Community Development Block Grant, households will be relocated and the units will be replaced as per the program requirements; however, where individual housing units are removed by private owners, replacement is at the discretion of the owner.

7.3.5.7 Maintenance of an Adequate Vacancy Rate

As previously shown in **Table 7.9**, the inventory of vacant units is based on the U.S. Census 2000 vacancy rate of 36.0 percent for unincorporated Monroe County. As previously discussed in **Section 7.3.1** *"Population Projections and Approach",* the number of seasonal dwelling units is increasing and the number of permanently occupied dwelling units is declining. This correlates with the increase on non-homesteaded units (seasonal residents). Functional dwelling units (sum of permanent and seasonal) are used to account for vacancy rates.

The number of vacant units is calculated by the occupancy factor. Occupancy factors were applied to seasonal (70 percent) and permanent households (89.7 percent) to then obtain the number of dwelling units. Dwelling units minus the number of occupied households equate the number of vacant dwelling units.

There should be no problem for the County in maintaining an adequate vacancy rate. The number of dwelling units projected be vacant is shown on **Table 7.56**.

Table 7.56 - Vacant Dwelling Units (functional)

	2010	2015	2020	2025	2030
Dwelling Units	7,471	7,588	7,738	7,889	8,039

Source: Fishkind & Associates, Inc., 2010, *Unincorporated Monroe County Population Projections* (functional population). Smith Travel Research, Fishkind and Associates, Inc., and American Community Survey 2008

7.3.6 Land Requirements for Housing Needs [Rule 9J-5.010(2)(c), F.A.C.]

The data and analysis in **Section 2.7.4.4** "*Vacant Land Analysis within a Tier, Density and Intensity*" (*Chapter 2.0 Future Land Use Element*), is used to determine the land available to accommodate the housing need as calculated in **Table 7.48** (total of 1,680) by planning area**.**

Housing can be accommodated in Tiers II, III and IIIA. Affordable housing can be accommodated in Tier III and IIIA. The tables below reflect the vacant land that is located within Tier III only since this is where the County encourages development. The following analysis shows the maximum allowed density or "theoretical density" given the underlying future land uses in vacant Tier III. As seen in the tables below, there is sufficient vacant land to accommodate the total new (1,680) housing units for the County within each of the planning areas.

NOTE: The following theoretical density and intensity analyses in this section are for illustrative purposes only; conditions specific to the individual parcel, including physical size, environmental sensitivity, zoning and tier designation and other regulatory constraints, such as ROGO and NROGO are the final determinant of development potential.

Lower Keys

As previously shown in **Table 7.48,** an additional 954 dwelling units are needed to accommodate functional residents by 2030 in the LKPA . Evaluating the vacant land located under Tier III (**Section 2.7.4.4** of *Chapter 2.0 Future Land Use Element*), the theoretical density allows the 954 new dwelling units to be built. According to **Table 7.57** a total of 1,428 single family units and 506 multifamily units would be allowed, in theory, in the LKPA. The shaded areas in gray represent the affordable housing or multifamily opportunities for this planning area.

NOTE: The following theoretical density and intensity analyses in this section are for illustrative purposes only; conditions specific to the individual parcel, including physical size, environmental sensitivity, zoning and tier designation and other regulatory constraints, such as ROGO and NROGO are the final determinant of development potential.

Table 7.57 - Vacant Land in Tier III and Residential Density by Type – Lower Keys Planning Area

Future Land Use	Vacant Acres in Tier III	Max. Allowed Dwelling Units
Residential Low	25.9	13.0
Residential Medium	176.9	1,415.4
Total Single Family Theoretical Density	**--**	**1,428.4**
Mixed Use/Commercial	45.8	274.8
Mixed Use/Commercial Fishing	2.5	20.2
Residential High	13.2	211.2
Total Multi-Family Theoretical Density	**--**	**506.2**

Source: Monroe County Growth Management, 2010, Geographic Information File "MC_ELU_510"
Monroe County Growth Management, 2010, Geographic Information File "MC_FLUM_510"

Middle Keys

As previously shown in **Table 7.48,** an additional 51 dwelling units are needed to accommodate functional residents by 2030 in the MKPA. Evaluating the vacant land located under Tier III (**Section 2.7.4.4** of *Chapter 2.0 Future Land Use Element*), **Table 7.58** shows that there would be enough land availability to accommodate the 51 dwelling units, in theory, in the MKPA. The shaded areas in gray represent the affordable housing or multifamily opportunities for this planning area.

NOTE: The following theoretical density and intensity analyses in this section are for illustrative purposes only; conditions specific to the individual parcel, including physical size, environmental sensitivity, zoning and tier designation and other regulatory constraints, such as ROGO and NROGO are the final determinant of development potential.

Table 7.58 - Vacant Land in Tier III and Residential Density by Type – Middle Keys Planning Area

Future Land Use	Vacant Acres in Tier III	Max. Allowed Dwelling Units
Residential Medium	56.4	451.0
Total Single Family Theoretical Density	**--**	**451.0**
Mixed Use/Commercial	4.1	24.5
Mixed Use/Commercial Fishing	1.4	11.4
Total Multi-Family Theoretical Density	**--**	**35.9**

Source: Monroe County Growth Management, 2010, Geographic Information File "MC_ELU_510"
Monroe County Growth Management, 2010, Geographic Information File "MC_FLUM_510"

Upper Keys

As previously shown in **Table 7.48,** an additional 684 dwelling units are needed to accommodate functional residents by 2030 in the UKPA. Evaluating the vacant land located under Tier III (**Section 2.7.4.4** of *Chapter 2.0 Future Land Use Element*) **Table 7.59** shows that there would be enough land availability to accommodate the 684 dwelling units, in theory, in the UKPA. The shaded areas in gray represent the affordable housing multifamily opportunities for this planning area.

NOTE: The following theoretical density and intensity analyses in this section are for illustrative purposes only; conditions specific to the individual parcel, including physical size, environmental sensitivity, zoning and tier designation and other regulatory constraints, such as ROGO and NROGO are the final determinant of development potential.

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Table 7.59 – Vacant Land in Tier III and Residential Density by Type – Upper Keys Planning Area

Future Land Use	Vacant Acres in Tier III	Max. Allowed Dwelling Units
Residential Medium	108.5	867.8
Total Single Family Theoretical Density	**--**	**867.8**
Mixed Use/Commercial	50.7	304.1
Mixed Use/Commercial Fishing	3.1	25.1
Residential High	26.6	425.9
Total Multi Family Theoretical Density	**--**	**755.2**

Source: Monroe County Growth Management, 2010, Geographic Information File "MC_ELU_510"
Monroe County Growth Management, 2010, Geographic Information File "MC_FLUM_510"

It is evident that there is enough vacant land in Tier III to accommodate the 1,680 dwelling units needed for the planning horizon. The tables in this analysis demonstrate that there is more vacant land in Tier III to accommodate single family homes than vacant land available to accommodate multi-family units. However, as in previous sections, the affordable housing need based on the SCAH is about 60 percent. Of the 1,680 dwelling units needed for the planning horizon, the County should consider the vast majority of this housing to be developed as multi-family to provide affordable housing options to the 60 percent of households needing assistance.

Table 7.60 is a summary the amount of vacant land in Tier III for unincorporated County as a whole. It appears that the County has an excess of land to accommodate the needed dwelling units. This analysis is based on Tier III vacant land only. However, theoretical density and intensity analyses are for illustrative purposes only; conditions specific to the individual parcel, including physical size, environmental sensitivity, zoning and tier designation and other regulatory constraints, such as ROGO and NROGO are the final determinant of development potential.

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Table 7.60 - Vacant Land in Tier III and Residential Density by Type - Unincorporated County

Future Land Use	Vacant Acres in Tier III	Max. Allowed Dwelling Units
Residential Low	25.9	13.0
Residential Medium	341.8	2,734.2
Total Single Family Theoretical Density	367.7	2,747.2
Mixed Use/Commercial	100.6	603.4
Mixed Use/Commercial Fishing	7.0	56.7
Residential High	39.8	637.1
Total Multi Family Theoretical Density	147.4	1,297.2
Total Dwelling Units Allowed		4,044.4

Source: Monroe County Growth Management, 2010, Geographic Information File "MC_ELU_510"
Monroe County Growth Management, 2010, Geographic Information File "MC_FLUM_510"

7.3.7 Private Sector Provision of Housing [Rule 9J-5.010(2)(d), F.A.C.]

It is expected that all of the future housing needs identified in this analysis can and will be met by the private sector. The demand for homes on coastal lands makes construction of such homes economically attractive to builders and developers.

A developer must first apply for a ROGO allocation in order to develop a dwelling unit. Then the applicant must apply for a building permit. Of the total ROGO allocations awarded, no less than 20 percent are assigned for affordable units. The County can award up to 197 ROGO allocations a year including 71 for affordable allocations. Between ROGO Years 1-17, an average of 222 ROGO allocations was awarded each year. Of the allocations awarded, affordable housing awards represent 25 percent of the total award. A detailed historical account of the number allocations available and awarded is provided in **Appendix 7-1.**

An important component of provision of housing is the number that will be needed for families that are cost burdened and in the qualifying incomes need affordable housing. Since the affordable housing analysis indicates that there is a need for affordability for 60 percent, at a minimum, developers should continue to receive incentives for providing affordable housing.

7.3.7.1 Housing Supply by Type

The estimated and projected housing units by type are depicted in **Table 7.61**. In order to obtain the estimated and projected household by type, the percent allotment from the South Florida Regional Council 2008 estimates are used in combination with the number of functional dwelling units projected. Additionally, the mobile home replacement for single family dwelling units trend from 2001-2010 and as shown in **Table 7.39**, is integrated into the projection. It is then estimated, that 311 mobile homes will be replaced by a single family unit every five years.

For the purpose of this analysis, the projected household numbers only reflects the single family, multi-family and mobile homes (not to be confused with mobile home parks) since:

- Section 163.3191, F.S. prohibits new mobile home parks in the Coastal High Hazard Area; and

- Development of new hotel/motel units, campgrounds and recreational vehicle spaces requires a residential ROGO allocation. The County has declared a moratorium on the allocation of ROGO for these types of use. There is currently a moratorium on ROGO designation for these units until December 31, 2011. The County is contemplating extending the moratorium date.

Table 7.61 - Dwelling Units by Type, 2010-2030

[redacted]	2010		2015		2020		2025		2030	
	#	%	#	%	#	%	#	%	#	%
Single Family	22,921	62.5%	23,599	63.5%	24,201	64.4%	24,805	65.3%	25,410	66.2%
Multi Family	8,178	22.3%	8,309	22.4%	8,412	22.4%	8,513	22.4%	8,614	22.5%
Mobile, Boat, RV	5,574	15.2%	5,263	14.2%	4,952	13.2%	4,641	12.2%	4,330	11.3%
Total	36,674	100.0%	37,172	100.0%	37,566	100.0%	37,960	100.0%	38,354	100.0%

Source: Fishkind & Associates, Inc., 2010, *Unincorporated Monroe County Population Projections*; South Florida Regional Planning Council 2008, *Housing Type Projections for 2008*; Monroe County Building Department, 2010, *Mobile Home Replacement 2000-2009 data.*

As seen in **Table 7.61**, above, there is a decreasing trend for mobile homes given the mobile home replacements by single family homes. It is estimated that 311 mobile homes are replaced for a single family structure every 5 years. There is a dichotomy when it comes to addressing affordable housing issues. Although mobile homes are being replaced by single family units, mobile homes offer a solution to providing affordable housing. Then again, no new mobile home parks are allowed given the County's CHHA designation. The County may consider evaluating mechanisms for retaining mobile home parks and encouraging mobile homes as affordable housing options.

7.3.7.2 Projected Number of by Tenure

In order to obtain the estimated and projected household by tenure, SCAH demographics were assessed. The SCAH creates a set of population projections based on BEBR estimates, which are then divided into households. Then households are allocated across tenure classes. The methodology assumes that household formation rates and the distribution of household characteristics remain constant in their year 2000 proportions across the entire planning horizon. For the purpose of this analysis, the SCAH percentage allotment is used in combination with the unincorporated Monroe County functional population households.

As seen in **Table 7.62**, the general trend is that by the year 2030, 74.5 percent of households will be occupied by owners and 25.5 percent of households will be occupied by renters. This is a 1.2 increase for owners when compared to year 2010.

Table 7.62 - Estimated and Projected Households by Tenure, 2010-2030

Tenure	2010		2015		2020		2025		2030	
	# of house holds	%of Total	# of house holds	%of Total	# of house holds	%of Total	# of house holds	%of Total	# of house holds	%of Total
Owner	21,393	73.3%	21,811	73.7%	22,037	73.9%	22,340	74.3%	22,577	74.5%
Renter	7,809	26.7%	7,773	26.3%	7,790	26.1%	7,731	25.7%	7,738	25.5%
Total	29,202	100.0%	29,584	100.0%	29,827	100.0%	30,071	100.0%	30,315	100.0%

Source: Shimberg Center for Affordable Housing, 2010; Fishkind & Associates, Inc., 2010, *Unincorporated Monroe County Population Projections*

Note: Calculations are based on Shimberg Center for Affordable Housing percent allotment and distribution of functional population households.

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7.3.7.3 Projected Need by Cost

To determine the projected cost, the historic average median incomes from 1999 to 2010 were assessed through HUD via www.huduser.org. It is estimated that the average median income for the County will increase by 3.4 percent every year. This is based strictly on historic area median income and does not take into consideration market forces, market crash or current recession. Using the affordable housing cost spreadsheets generated by the County Growth Management Division, which calculate affordable price by 30 percent of income, the affordable monthly rent are projected for the planning horizon on **Table 7.63.**

Table 7.63 - Affordable Maximum Monthly Rental Rates per AMI projections 2015-2030

Unit Size	Incomes			
	Very Low	Low	Median	Moderate
2015 – AMI $80, 846 (est.)				
Efficiency	$712	$1,139	$1,423	$1,708
1 Bedroom	$763	$1,221	$1,527	$1,832
2 Bedroom	$912	$1,459	$1,824	$2,189
3 Bedroom	$1,044	$1,670	$2,087	$2,505
4 Bedroom	$1,170	$1,872	$2,340	$2,809
2020 – AMI $ 95,557 (est.)				
Efficiency	$841	$1,346	$1,682	$2,019
1 Bedroom	$902	$1,444	$1,804	$2,165
2 Bedroom	$1,078	$1,725	$2,156	$2,587
3 Bedroom	$1,234	$1,974	$2,467	$2,961
4 Bedroom	$1,383	$2,213	$2,766	$3,320
2025 – AMI $ 112,944 (est.)				
Efficiency	$994	$1,591	$1,988	$2,386
1 Bedroom	$1,066	$1,706	$2,133	$2,559
2 Bedroom	$1,274	$2,039	$2,548	$3,058
3 Bedroom	$1,458	$2,333	$2,916	$3,499
4 Bedroom	$1,635	$2,616	$3,270	$3,924
2030 – AMI $ 133,496 (est.)				
Efficiency	$1,175	$1,880	$2,350	$2,820
1 Bedroom	$1,260	$2,017	$2,521	$3,025
2 Bedroom	$1,506	$2,409	$3,012	$3,614
3 Bedroom	$1,723	$2,757	$3,447	$4,136
4 Bedroom	$1,932	$3,092	$3,865	$4,638

Source: www.HUDuser.org for estimating AMI. Monroe County Growth Management, 2010, *AFH matrix future cost.xls,* for cost calculations.

As seen in **Table 7.64** the affordable selling prices are projected for the County. As defined by MCLDC 101-01 the maximum sales price, owner occupied affordable housing unit, means a price not exceeding 3.75 times the annual median household income for the county for a one bedroom or efficiency unit, 4.25 times the annual median household income for the county for a two bedroom unit, and 4.75 times the annual median household income for the county for a three or more bedroom unit.

Table 7.64 - Affordable Maximum Selling Price 2015-2030

2015 – AMI $80, 846 (est.)		
Unit Size	**Multiplier**	**Max Sales Price**
Efficiency/1 Bedroom	3.75	$303,173
2 Bedroom	4.25	$343,596
3 Bedroom	4.75	$384,019
2020 – AMI $ 95,557 (est.)		
Efficiency/1 Bedroom	3.75	$358,339
2 Bedroom	4.25	$406,117
3 Bedroom	4.75	$453,896
2025 – AMI $ 112,944 (est.)		
Efficiency/1 Bedroom	3.75	$423,540
2 Bedroom	4.25	$480,012
3 Bedroom	4.75	$536,484
2030 – AMI $ 133,496 (est.)		
Efficiency/1 Bedroom	3.75	$500,610
2 Bedroom	4.25	$567,358
3 Bedroom	4.75	$634,106

Source: www.HUDuser.org for estimating AMI. Monroe County Growth Management, 2010, *AFH matrix future cost.xls,* for cost calculations.

7.3.7.4 Projected Need by Income Range

Income ranges are discussed in **Section 7.3.4** *"Projected Number of Households by Income"* and the analysis is based on SCAH data. Analysis was done two ways, for functional population and permanent population. Permanent population was analyzed separate since it is permanent population who would receive affordable housing assistance. In summary, at least 60.9 percent of households in 2010 will be at or below the moderate income range (80.01 to 120 percent of the area median income). By the year 2030, the number of households at or below the moderate income range will be at 62.4 percent (as provided earlier in **Tables 7.45** and **7.46**).

7.3.8 Private Sector Housing Delivery Process [Rule 9J-5.010(2)(e), F.A.C.]

While the private sector finances and builds the housing units, local governments issue building permits and perform inspections of the units based on health and safety issues

established in and through the Florida Building Code. Building permits are issued in compliance with local land development regulations.

Land

There are currently 2,338 acres of vacant land in unincorporated Monroe County of which 1,294 (55 percent) are designated for Residential Low, Residential Medium and Residential High. If developed under the current designations, the acreage could theoretically support an additional 7,701 dwelling units. Refining the analysis to vacant acreage in Tier III, where the County encourages infill development, the theoretical number of housing that could be developed is 4,044. To be more precise this would be a breakdown of 2,747 single family homes and 1,297 multifamily or affordable units. There is ample vacant land to meet the need and future demand. However, due to the limited population growth (157 persons a year), the increasing vacancy rate, and the high price of land in a coastal community, there is no significant demand for new residential development from developers.

There are private-public partnerships for the provision of land acquisition and government support for affordable housing projects.

Finance

Financing affects the purchaser and builder's cost as well. Although the high cost of land in the County tends to limit the development of public housing and public housing programs, the County does participate in the affordable housing programs such as Community Development Block Grant (CDBG) and the HOME Investment Partnerships (HOME) programs to facilitate financing for private purchasers in lower income ranges.

Services

All services are provided by the County, with the exception of potable water, which is supplied by the Florida Keys Aqueduct Authority (FKAA). These services are discussed in more detail in the *Potable Water, Solid Waste, Sanitary Sewer and Drainage Elements*.

As a part of development, the County charges several fees for services rendered, and for impacts on the existing facilities. The County also charges various fees for site plan review, and redevelopment or building permits. As of November 2010, impact fees for development are outlined as follows:

Parks/Recreation - $340.00
Sewer connection - $70 per connection
Transportation - $633
Sheriff - $150 per SFR
Fire - $105 per SFR
Library - $242 per SFR
Solid Waste - $64 per SFR

ROGO Application for SFR - $748 + $20 research fee = $768.00
NROGO Application - $774
Mobile home to SFR - $305

7.3.9 Means of Accomplishing Affordable Housing, Group Homes and Eliminating Substandard Conditions [Rule 9J-5.010(2)(f), F.A.C.]

Topic 1: [Rule 9J-5.010(2)(f)1., F.A.C]

The provision of housing with supporting infrastructure for all current and anticipated future residents of the jurisdiction with particular emphasis on the creation or preservation of affordable housing to minimize the need for additional local services and avoid the concentration of affordable housing units only in specific areas of the jurisdiction.

The infrastructure currently in place is adequate to meet the projected population to meet the future needs of County functional population in an effective, economical manner. Were only 84 dwelling units are anticipated each year from 2010 to 2030, the supporting infrastructure will continue to be maintained to provide the adopted level-of-service standards throughout the community. The County does scheduled maintenance and repair of infrastructure facilities for which it is responsible. The County will maintain an appropriate millage rate to pay for services provided to residents. The County provides the same level, amount, and quality of infrastructure to all residents in all areas without regard to income levels.

Each Livable CommuniKeys Plans includes objectives to maintain housing opportunities for all segments of the population while maintaining the availability of affordable housing and workforce housing for local residents, while preserving the character of the community.

The County relies entirely on the private sector, supplemented by outside government programs, to ensure the provision of adequate housing. There is a need for affordable housing for those permanent households that are making up to 120 percent of the area median income for renters and up to 160 percent of the area median income for owners. According to the SCAH **(Table 7.46)**, a minimum of 60 percent of the permanent population will need affordable housing assistance or will be making incomes at or below the 120 percent of the area median income.

Currently the County can award up to 71 ROGO allocations for affordable housing; however, not all of them are being used due to the high cost of land and time and cost of the ROGO application process. Low-cost housing is difficult to provide. However, there is a number of housing assistance programs available to the residents of the County, including Section 8 and low interest loans; and the County participates in the Community Development Block Grant program and the HOME Investment Partnerships program. The County will, additionally, take the actions available (e.g., various residential densities,

waiver of fees) to encourage the development of very-low, low, and moderate income housing, where the need for it is identified.

Topic 2: [Rule 9J-5.010(2)(f)2., F.A.C]

The elimination of substandard housing conditions and for the structural and aesthetic improvement of housing;

Table 7.29 denotes the housing that is considered substandard according to the Census 2000. This is however, not a true inventory of substandard units at the County. The County should consider taking an inventory of mobile homes on individual sites and mobile homes in camp grounds and parks that need structural improvements.

Where existing housing units are identified and substandard, the County relies on code enforcement to ensure that housing is repaired or rehabilitated to meet codes. New housing units must meet the Florida Building Code; local building inspections are performed to ensure that code provisions are met.

Topic 3: [Rule 9J-5.010(2)(f)3., F.A.C]

The provision of adequate sites for housing for very-low, low, and moderate income households, and for mobile homes.

The provision of adequate land for affordable housing is stated in **Section 7.3.6** *"Land Requirements for Housing Need"*. In summary, there is a surplus of acreage in Tier III (infill areas) that would allow for the needed affordable housing.

Given that mobile homes provide an affordable option, the County may want to consider continuing providing the land sites where mobile home development is located and determine if this is a financially feasible option.

Topic 4: [Rule 9J-5.010(2)(f)4., F.A.C]

The provision of adequate sites in residential areas or areas of residential character for group homes and foster care facilities licensed or funded by the Florida Department of Children and Family Services.

The provision of adequate sites in residential areas or areas of residential character for group homes and foster care facilities is referenced is **Section 7.2.9** *"Group Homes".* Only one facility currently exists in unincorporated Monroe County. Group homes or institutional homes are specifically allowed in the Mixed Use (MU) and Military Facilities (MF) zoning districts.

Topic 5: [Rule 9J-5.010(2)(f)5., F.A.C]

The identification of conservation, rehabilitation or demolition activities, and historically significant housing or neighborhoods.

The identification of conservation, rehabilitation or demolition activities, and historically significant housing or neighborhoods is further identified in **Section 7.2.11** *"Historically Significant Housing".*

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Bibliography

Florida Housing Data Clearinghouse http://flhousingdata.shimberg.ufl.edu/

Harvard University Joint Center for Housing Studies

Monroe County Land Development Code

Monroe County, 2000, *Monroe County Population Estimates and Forecast 1990-2015.*

Monroe County Division of Housing and Community Development, 2007, *Monroe County Affordable and Workforce Housing.*

Monroe County, Ship Local Housing Assistance Plan (LHAP) Fiscal Years Covered 2007-2008/ 2008-2009/2009-2010

Shimberg Center for Housing Studies http://www.shimberg.ufl.edu/

State of Florida Department of Business and Professional Regulation
(Mobile Home Parks, Condominium and Subdivisions data)
http://www.myfloridalicense.com/dbpr/sto/file_download/public-records-CTMH.html

State of Florida, State Historic Preservation Office (SHPO)

U.S. Census 2000

U.S. Department of Housing and Urban Development
Monroe County Area Median Incomes from 1999 to 2010:
www.huduser.org/portal/datasets/il/fmr00/hud00fl.txt
www.huduser.org/Datasets/IL/FMR01/hud01fl.pdf
www.huduser.org/Datasets/IL/FMR02/hud02fl.pdf
www.huduser.org/Datasets/IL/FMR03/hud03fl.pdf
www.huduser.org/Datasets/IL/IL04/hud04fl.pdf
www.huduser.org/Datasets/IL/IL05/fl_FY2005.pdf
www.huduser.org/Datasets/IL/IL06/fl_FY2006.pdf
www.huduser.org/Datasets/IL/IL07/fl_FY2007.pdf
www.huduser.org/Datasets/IL/IL08/fl_FY2008.pdf
www.huduser.org/Datasets/IL/IL09/fl.pdf
www.huduser.org/Datasets/IL/IL10/fl.pdf

Geographic Information System

Monroe County Growth Management, 2010, *MC_ELU_510* (Existing Land Use GIS layer received May 2010)

Monroe County Growth Management, 2010, *MC_FLUM_510* (Future Land Use GIS layer received May 2010)

Monroe County Growth Management, 2010, *Tier 0110* (Tier Overlay)

Florida State Historic Preservation Office, 2000, *Historic Structures*

Appendix 7-1: ROGO History, Year 1-17

				Market Rate Allocations												Affordable Allocations										
ROGO Year	General Notes		Location	Market Rate Allocations (includes reduction due to incorporations)	Total Reduction of Allocations Due to Cess Pit Requirements	Unused Market Rate allocations rolled-over into Market Rate	Unused Affordable allocations rolled-over into Market Rate*	Allocations provided by Agreements	Allocations borrowed from Future Market Rate Allocations	Deducted Allocations borrowed in previous year	TOTAL Market Rate Allocations	Total Market Rate Allocations Awarded	Total Market Rate Allocations Available minus Total Market Rate Allocations Awarded	Expired Market Rate Allocations	Expired Market Rate Allocations that were Recaptured and Re-Used	Total Expired Allocations minus Re-Used (Expired) Allocations	Affordable Allocations (includes reduction due to incorporations)	Total Reduction of Allocations Due to Cess Pit Requirements	Reduction from Available Allocations Due to Reservations for Affordable Projects	Unused Affordable allocations rolled-over into Affordable	Allocations provided by Agreements or Rule	Allocations borrowed from the Future	Deducted Allocations that were borrowed in previous year	TOTAL Affordable Allocations	Total Affordable Housing Allocations Awarded	Remaining Affordable Allocations rolled-over to Market Rate for ROGO Years 2-6	Total Affordable Allocations minus Total Affordable Allocations Awarded	Expired Affordable Housing Allocations
Year 1 (July 14, 1992 –July 13, 1993)	Dwelling Unit Allocation System adopted by Ordinance 016-1992. During ROGO Years 1-5 unused affordable housing allocations could be rolled-over to market rate allocations. Original ordinance includes a discrepancy within the Lower Keys sub-area allocation breakdown. For ROGO Years 1-5 include three sub-areas: Lower Keys sub-area: MM2 to the south side of the Seven Mile Bridge; Middle Keys sub-area: Seven Mile Bridge to MM72; and Upper Keys sub-area: MM72 to Ocean Reef Beginning on Quarter 4, Year 5 Cess Pit Credits are Required. Requirement ends on Quarter 1, Year 15.	ORD 016-1992 255 allocations consisting of 203 Market Rate & 52 Affordable allocations	Total of three sub-areas & Countywide allocations	203	0	0	0	0	1	0	204	204	0	4	0	4	52	0	0	0	0	0	0	52	52	0	0
			Lower Keys Sub-area	91	0	0	0	0	0	0	91	91	0	2	0	2	24	0	0	0	0	0	0	24	5	-19	0	0
			Middle Keys Sub-area	33	0	0	0	0	0	0	33	33	0	1	0	1	8	0	0	0	0	0	0	8	1	-7	0	0
			Upper Keys Sub-area	79	0	0	0	0	1	0	80	80	0	1	0	1	20	0	0	0	0	0	0	20	5	-15	0	0
Year 2 (July 14, 1993 –July 13, 1994)		ORD 016-1992 255 allocations consisting of 203 Market Rate & 52 Affordable allocation	Total of three sub-areas & Countywide allocations	203	0	0	41	0	0	-1	249	231	12	14	9	5	52	0	0	0	0	0	0	52	52	0	0	0
			Lower Keys Sub-area	91	0	0	19	0	0	0	110	109	1	4	5	-1	24	0	0	0	0	0	0	24	1	-23	0	0
			Middle Keys Sub-area	33	0	0	7	0	0	0	40	27	13	2	2	0	8	0	0	0	0	0	0	8	0	-8	0	0
			Upper Keys Sub-area	79	0	0	15	0	0	-1	93	95	-2	8	2	6	20	0	0	0	0	0	0	20	5	-12	0	0
Year 3 (July 14, 1994 –July 13, 1995)		ORD 016-1992 255 allocations consisting of 203 Market Rate & 52 Affordable allocation	Total of three sub-areas & Countywide allocations	203	0	14	43	0	0	0	246	249	-3	1	10	-9	52	0	0	0	0	0	0	52	52	0	0	0
			Lower Keys Sub-area	91	0	1	23	0	0	0	114	119	-5	0	1	-1	24	0	0	0	0	0	0	24	1	-23	0	0
			Middle Keys Sub-area	33	0	13	8	0	0	0	41	34	7	0	2	-2	8	0	0	0	0	0	0	8	0	-8	0	0
			Upper Keys Sub-area	79	0	0	12	0	0	0	91	96	-5	1	7	-6	20	0	0	0	0	0	0	20	9	-11	0	0
Year 4 (July 14, 1995 –July 13, 1996)		ORD 016-1992 255 allocations consisting of 203 Market Rate & 52 Affordable allocation	Total of three sub-areas & Countywide allocations	203	0	20	42	0	0	0	245	263	-18	9	15	-6	52	0	0	0	0	0	0	52	49	0	3	3
			Lower Keys Sub-area	91	0	0	23	0	0	0	114	114	0	2	2	0	24	0	0	0	0	0	0	24	20	-4	0	2
			Middle Keys Sub-area	33	0	20	8	0	0	0	41	47	-6	5	1	4	8	0	0	0	0	0	0	8	2	-6	0	0
			Upper Keys Sub-area	79	0	0	11	0	0	0	90	102	-12	2	12	-10	20	0	0	0	0	0	0	20	18	-2	0	1
Year 5 (July 14, 1996 –July 13, 1997)		ORD 016-1992 255 allocations consisting of 203 Market Rate & 52 Affordable allocation	Total of three sub-areas & Countywide allocations	203	0	14	12	0	0	0	215	218	-3	5	6	-1	52	0	0	0	0	0	0	52	50	-20	2	2
			Lower Keys Sub-area	91	0	0	4	0	0	0	95	93	2	2	0	2	24	0	0	0	0	0	0	24	30	-14	0	0
			Middle Keys Sub-area	33	0	14	6	0	0	0	39	39	0	1	2	-1	8	0	0	0	0	0	0	8	1	-7	0	0
			Upper Keys Sub-area	79	0	0	2	0	0	0	81	86	-5	2	4	-2	20	0	0	0	0	0	0	20	32	-8	0	2
Year 6 (July 14, 1997 –July 13, 1998)	During ROGO Year 6 unused affordable housing allocations could be rolled-over to market rate allocations. Village of Islamorada incorporates on December 31, 1997. Upper Keys sub-area is modified due to incorporation. Incorporated area includes from the West end of the Channel Two bridge (approx. MM 72.5) to the West end of the Tavernier Creek Bridge (approx. MM 90.8). Cess Pit Credits Required	ORD 016-1992 255 allocations consisting of 203 Market Rate & 52 Affordable allocation Total allocations reduced by 28 to 227 due to the incorporation of the Village (22 Market Rate and 6 Affordable).	Total of three sub-areas & Countywide allocations	182	0	16	29	0	0	0	211	197	14	12	8	4	45	0	0	0	0	32	0	77	55	0	22	1
			Lower Keys Sub-area	92	0	2	14	0	0	0	106	92	14	7	2	5	23	0	0	0	0	0	0	23	10	0	13	0
			Middle Keys Sub-area	33	0	14	7	0	0	0	40	33	7	1	1	0	8	0	0	0	0	0	0	8	0	0	8	0
			Upper Keys Sub-area	57	0	0	8	0	0	0	65	72	-7	4	5	-1	14	0	0	0	0	32	0	46	45	0	0	1
Year 7 (July 14, 1998 –July 12, 1999)	Cess Pit Credits Required	ORD 047-1999 227 allocations consisting of 182 Market Rate & 45 Affordable allocation	Total of three sub-areas & Countywide allocations	182	-77	0	0	0	0	-4	101	102	-1	2	0	2	45	-7	0	0	0	0	-8	30	31	0	-1	1
			Lower Keys Sub-area	92	-42	0	0	0	0	0	50	50	0	0	0	0	23	-4	0	0	0	0	0	19	5	0	14	0
			Middle Keys Sub-area	33	-22	0	0	0	0	0	11	11	0	0	0	0	8	0	0	0	0	0	0	8	0	0	8	0
			Upper Keys Sub-area	57	-13	0	0	0	0	-4	40	41	-1	2	0	2	14	-3	0	0	0	0	-8	3	4	0	-1	1
Year 8 (July 13, 1999 –July 14, 2000)	City of Marathon incorporates on November 30, 1999. Middle Keys sub-area is modified due to incorporation. Allocation total reduced by 20% pursuant to Rule 28-20.110, F.A.C. (227x20% = 182) Cess Pit Credits Required MOU with DCA to allow 90 affordable housing ROGO allocations in exchange for good faith effort to begin FEMA illegal downstairs enclosures inspection program	ORD 047-1999 227 allocations consisting of 182 Market Rate & 45 Affordable allocation Total allocations reduced by 24 due to the incorporation of the Marathon (19 Market Rate and 5 Affordable).	Total of three sub-areas & Countywide allocations	163	-36	2	0	0	0	0	127	130	-3	4	12	-8	40	-5	0	0	50	0	-12	73	67	0	29	0
			Countywide Affordable Allocations from agreement								0					0					50			50	63	0	29	0
			Lower Keys Sub-area	92	-18	0	0	0	0	0	74	80	-6	1	8	-7	23	-5	0	0	0	0	0	18	4	0	14	0
			Middle Keys Sub-area	14	-7	2	0	0	0	0	7	6	1	0	1	-1	3	-1	0	0	0	0	0	2	0	0	2	0
			Upper Keys Sub-area	57	-11	0	0	0	0	0	46	50	-4	3	3	0	14	-3	0	0	0	0	-12	-1	1	0	0	1
Year 9 (July 13, 2000 –July 14, 2001)	Allocation total reduced by 20% pursuant to Rule 28-20.110, F.A.C. (227x20% = 182) Cess Pit Credits Required MOU with DCA reinstating 201 affordable ROGO allocations. This number represents both market and affordable allocations that had been lost due to the inability to match the allocation with nutrient reduction credits.	ORD 047-1999 227 allocations consisting of 182 Market Rate & 45 Affordable allocation Total allocations reduced due to the incorporation of the Marathon.	Total of three sub-areas & Countywide allocations	163	-36	0	0	0	0	0	127	125	-2	0	1	-1	40	-5	0	32	201	0	-8	260	261	0	-1	0
			Countywide Affordable Allocations from agreement								0					0					201			201	201	0	0	0
			Lower Keys Sub-area	92	-18	0	0	0	0	0	74	76	-2	0	1	-1	23	-5	0	27	0	0	0	45	27	0	18	0
			Middle Keys Sub-area	14	-7	0	0	0	0	0	7	7	0	0	0	0	3	-1	0	5	0	0	0	7	5	0	2	0
			Upper Keys Sub-area	57	-11	0	0	0	0	0	46	46	0	0	0	0	14	-3	0	0	0	0	-8	3	2	0	1	0

Appendix 7-1: ROGO History, Year 1-17 (continued)

				Market Rate Allocations													Affordable Allocations											
ROGO Year	General Notes		Location	Market Rate Allocations (includes reduction due to incorporations)	Total Reduction of Allocations Due to Cess Pit Requirements	Unused Market Rate allocations rolled-over in to Market Rate	Unused Affordable allocations rolled-over into Market Rate[a]	Allocations provided by Agreements	Allocations borrowed from Future Market Rate Allocations	Deducted Allocations borrowed in previous year	TOTAL Market Rate Allocations	Total Market Rate Allocations Awarded	Total Market Rate Allocations Available minus Total Market Rate Allocations Awarded	Expired Market Rate Allocations	Expired Market Rate Allocations that were Recaptured and Re-Used	Total Expired Allocations minus Re-Used (Expired) Allocations	Affordable Allocations (includes reduction due to incorporations)	Total Reduction of Allocations Due to Cess Pit Requirements	Reduction from Available Allocations Due to Reservations for Affordable Projects	Unused Affordable allocations rolled-over into Affordable	Allocations provided by Agreements or Rule	Allocations borrowed from the Future	Deducted Allocations that were borrowed in previous year	TOTAL Affordable Allocations	Total Affordable Housing Allocations Awarded	Remaining Affordable Allocations rolled-over to Market Rate for ROGO Years 2-6	Total Affordable Allocations minus Total Affordable Allocations Awarded	Expired Affordable Housing Allocations
Year 10 (July 14, 2001 –July 15, 2002)	Cess Pit Credits Required Lower Keys sub-area has a additional nutrient credit reduction of 25 allocations	ORD 047-1999 227 allocations consisting of 182 Market Rate & 45 Affordable allocation Total allocations reduced due to the incorporation of the Marathon.	Total of three sub-areas & Countywide allocations	163	-61	0	0	0	0	0	102	102	0	2	1	1	40	-9	0	54	0	0	0	85	54	0	31	0
			Lower Keys Sub-area	92	-43	0	0	0	0	0	49	48	**1**	0	0	0	23	-5	0	45	0	0	0	18	54	0	-36	0
			Middle Keys Sub-area	14	-7	0	0	0	0	0	7	7	**0**	0	0	0	3	-1	0	7	0	0	0	2	0	0	2	0
			Upper Keys Sub-area	57	-11	0	0	0	0	0	46	47	**-1**	2	1	**1**	14	-3	0	2	0	0	0	11	4	0	7	0
Year 11 (July 16, 2002 –July 14, 2003)	Pursuant to Comp Plan Policy 101.2.15, affordable allocations can be grouped into a single pool for countywide allocation. Cess Pit Credits Required	ORD 047-1999 227 allocations consisting of 182 Market Rate & 45 Affordable allocation Total allocations reduced due to the incorporation of the Marathon.	Total of three sub-areas & Countywide allocations	163	-36	0	0	0	0	0	127	127	0	4	0	4	40	-9	0	30	0	0	0	61	31	0	0	0
			Lower Keys Sub-area	92	-18	0	0	0	0	0	74	74	**0**	3	0	**3**	40	-9	0	30	0	0	0	31	31	0	0	0
			Middle Keys Sub-area	14	-7	0	0	0	0	0	7	7	**0**	0	0	**0**												
			Upper Keys Sub-area	57	-11	0	0	0	0	0	46	46	**0**	1	0	**1**												
Year 12 (July 13, 2003–July 14, 2004)	Cess Pit Credits Required **Rule Challenge** Pursuant to Comp Plan Policy 101.2.15, affordable allocations can be grouped into a single pool for countywide allocation.	ORD 047-1999 227 allocations consisting of 182 Market Rate & 45 Affordable allocation Total allocations reduced due to the incorporation of the Marathon.	Total of three sub-areas & Countywide allocations	163	-36	0	0	0	0	0	127	127	0	2	0	2	40	-9	0	30	0	0	0	61	21	0	10	0
			Lower Keys Sub-area	92	-18	0	0	0	0	0	74	74	**0**	1	0	**1**	40	-9	0	30	0	0	0	31	21	0	10	0
			Middle Keys Sub-area	14	-7	0	0	0	0	0	7	7	**0**	0	0	**0**												
			Upper Keys Sub-area	57	-11	0	0	0	0	0	46	46	**0**	1	0	**1**												
Year 13 (July 14, 2004 –July 13, 2005)	Cess Pit Credits Required **Rule Challenge** Pursuant to Comp Plan Policy 101.2.15, affordable allocations can be grouped into a single pool for countywide allocation.	ORD 047-1999 227 allocations consisting of 182 Market Rate & 45 Affordable allocation Total allocations reduced due to the incorporation of the Marathon.	Total of three sub-areas & Countywide allocations	163	-67	0	0	0	0	0	96	96	0	1	0	1	40	-11	0	21	0	0	0	50	29	0	21	1
			Lower Keys Sub-area	92	-36	0	0	0	0	0	56	56	**0**	0	0	0	40	-11	0	21	0	0	0	29	16	0	13	1
			Middle Keys Sub-area	14	-9	0	0	0	0	0	5	5	**0**	0	0	0												
			Upper Keys Sub-area	57	-22	0	0	0	0	0	35	35	**0**	1	0	**1**												
Year 14 (July 14, 2005 –July 13, 2006)	Ordinance 009-2006 challenged and allocations made pursuant to Rule 28-20.110, F.A.C. (197 total allocations). Cess Pit Credits Required Pursuant to Comp Plan Policy 101.2.15, affordable allocations can be grouped into a single pool for countywide allocation.	ORD 009-2006 197 allocations consisting of 126 Market Rate & 71 Affordable allocation	Total of three sub-areas & Countywide allocations	126	0	0	0	0	0	0	126	126	0	9	0	9	71	0	0	13	165	0	0	249	271	0	-35	0
			Lower Keys Sub-area	73	0	0	0	0	0	0	73	73	**0**	7	0	**7**	71	0	0	13	165	0	0	236	271	0	-35	0
			Middle Keys Sub-area	7	0	0	0	0	0	0	7	7	**0**	0	0	**0**												
			Upper Keys Sub-area	46	0	0	0	0	0	0	46	46	**0**	2	0	**2**												
Year 15 (July 14, 2006 –July 13, 2007)	New Big Pine Key sub-area. Affordable allocations are provided for countywide allocation except for Big Pine/No Name Keys. Cess Pit requirement ends Quarter 1, Year 15.	ORD 009-2006 197 allocations consisting of 126 Market Rate & 71 Affordable allocation	Total of three sub-areas & Countywide allocations	126	0	0	0	0	0	0	126	129	-3	9	0	9	71	0	-22	0	0	0	0	49	15	0	34	0
			Lower Keys Sub-area	50	0	0	0	0	0	0	50	53	**-3**	6	0	6	56	0	-22	0	0	0	0	34	13	0	21	0
			Middle Keys Sub-area	7	0	0	0	0	0	0	7	7	**0**	2	0	**2**												
			Upper Keys Sub-area	46	0	0	0	0	0	0	46	46	**0**	1	0	**1**												
			Big Pine/No Name Sub-area	23	0	0	0	0	0	0	23	23	**0**	0	0	**0**	15	0	0	0	0	0	0	15	4	0	**11**	0
Year 16 (July 14, 2007 –July 13, 2008)	Upper Keys sub-area: the unincorporated area of the county north of Tavernier Creek and corporate limits of the Village of Islamorada (approx. MM90). Lower Keys sub-area: the unincorporated area of the county from the corporate limits of the Village of Islamorada (approx. MM72) south to the corporate limits of the City of Key West at Cow Key Bridge on U.S. 1 (approx. MM4). Excludes Big Pine Key and No Name Key. Big Pine/No Name Key sub-area: the islands of Big Pine Key and No Name Key within unincorporated county.	ORD 009-2006 197 allocations consisting of 126 Market Rate & 71 Affordable allocation *8 allocations for Big Pine borrowed from ROGO Year 21	Total of three sub-areas & Countywide allocations	126	0	0	0	0	0	0	126	126	0	26	0	26	71	0	-15	32	0	12	0	100	82	0	-6	1
			Lower Keys Sub-area (includes former Middle Keys Sub-area)	57	0	0	0	0	0	0	57	57	**0**	21	0	**21**	69	0	-15	26	0	2	0	82	82	0	-26	1
			Upper Keys Sub-area	61	0	0	0	0	0	0	61	61	**0**	5	0	**5**												
			Big Pine/No Name Sub-area	8	0	0	0	0	0	0	8	8	**0**	0	0	**0**	2	0	0	6	0	10	0	18	18	0	**-6**	0
Year 17 (July 14, 2008 –July 13, 2009)		ORD 009-2206 197 allocations consisting of 126 Market Rate & 71 Affordable allocation	Total of three sub-areas & Countywide allocations	126	0	0	0	30	0	0	206	242	-36	35	28	7	71	0	-2	0	0	0	-2	67	36	0	31	1
			Lower Keys Sub-area	57	0	0	0	31	0	0	88	114	**-26**	24	20	**4**	69	0	0	0	0	0	-2	67	36	0	31	0
			Upper Keys Sub-area	61	0	0	0	49	0	0	110	120	**-10**	10	8	**2**												
			Big Pine/No Name Sub-area	8	0	0	0	0	0	0	8	8	**0**	1	0	**1**	2	0	-2	0	0	0	0	0	0	0	0	1
TOTALS				**2861**	**-349**	**66**	**167**	**80**	**1**	**-5**	**2755**	**2804**	**-49**	**139**	**90**	**49**	**874**	**-63**	**-39**	**212**	**456**	**44**	**-30**	**1242**	**977**	**-167**	**100**	**10**

Footnotes:

During ROGO Years 1-6 unused affordable housing allocations were rolled-over as market rate allocations.

ROGO Years 6-14 have inbalances of allocations due to the addition and subtraction of allocations available from year to year due to the Cesspit/Nutrient Credit reductions requirements.

ROGO Years 12-13 have inbalances due to reduction requirements of Nutrieint Credits. There was an appeal and Monroe County won the appeals and, as a result, allocations were later added back into the system.

During ROGO Year 8 the Department of Community Affairs enters into a Memorandum of Understanding with County to allow 90 affordable housing allocations in exchange of good faith effort to begin FEMA inspection Program (year 2000).

During ROGO Year 9 the Department of Community Affairs reinstates 201 affordable housing allocations (year 2001). This number represent both market and affordable housing allocations that were lost due to the inability to match an allocation with nutrient reduction credits.

The Monroe County BOCC transferred 142 affordable housing allocations to the City of Marathon from ROGO Year 11 (4 allocations) and the pool of 201 allocations returned to County in 2001 (138 allocations). These numbers are included in the table above.

The Affordable Housing totals in a given year show allocations made in a given year via a reservation and allocations borrowed from the future.

The expired allocation totals have an imbalance due to amendments to the LDRs for ROGO Year 17 - the amended Tier Criteria allowed the re-use of expired permits.

Allocations that expired in the first three quarters of a ROGO Year may have been re-used and placed back into system after the quarter shown to expire. Allocations that expired in the fourth quarter may have been used in the following ROGO Years.

The expired allocations represent mainly market rate allocations but some may be from affordable housing allocations because for ROGO Years 1-6, affordable allocations were rolled-over to market rate.

CHAPTER 7.0 – HOUSING - COMMENT RESPONSES

Commenter: Jim Cameron, PC Meeting
Date Received: 1/12/11 and Markups document from the 12/22/10 submittal

Location	Comment	K&S Response
1/12/11	Why the three (3) Planning Areas?	
1/12/11	Consider looking at the association of Realtors (MLS) for housing numbers.	K&S consulted the Association of Realtors in Florida and found average selling process for select jurisdiction. Monroe County was not included as one of the select jurisdictions.
1/12/11	Update 2000 Census data with 2010.	Demographics have been updated to reflect 2010. Housing data is scheduled to be released later in the year.
Pg. 7	Table 7.2 issue with numbers	Data us currently being revised by County Staff and entails a revision.
Pg. 13	Construction Activity – Shark Key	Data us currently being revised by County Staff and entails a revision.
Pg. 14	Why only 1,208 replacements	Data as sent by County. Data us currently being revised by County Staff and entails a revision of the whole section on construction activity.
Pg. 27	Highlands County	Text has been revised.
Pg. 35	Table 7.29 – Mobile Home Parks	Data is reported as County delivered it, dated 2002. However, data has been updated to reflect mobile home parks licensed by Florida dept. of Business Regulations.
Pg. 36	Tables have the wrong number	Will be revised.

Commenter: Ron Dames, NAVY
Date Received: PC Meeting 1/12/11

Location	Comment	K&S Response
1/12/11	Add military housing to Housing Element. Housing allowance of 2,000 for lowest paid sailor. 75 % lives in the base.	The Monroe County Comprehensive Plan Update is for unincorporated County. No necessity to evaluate federal housing.

Commenter: Public Comment **Date Received:**		
Location	**Comment**	**K&S Response**
1/12/11	Mr. Miller – Where did the 2,000 ROGO allocations in the last 10 years go?	County Staff is currently investigating this matter.
Commenter: Tiffany Stankiewicz **Date Received: 2/14/11 (from 12/22/10 submittal**		
Location	**Comment**	**K&S Response**
Pg. 3	What is the problem that became apparent with ROGO	"problem" has been revised as per Christine Hurley comments, it now reads "The Ordinance became effective on July 13, 1992, and has been amended through the years based on changing conditions related to infrastructure.
Pg. 3	The number of allocations is "not always" based on achieving state goals such a centralized wastewater system.	Correct. This was intended as an example of one of the factors that influences the number of allocations.
Pg. 3	Delete Planning Areas (PA).	Agreed, revised as suggested. However, the *Layman's guide to ROGO* should be corrected to reflect this correction. A statement distinguishing subareas for the purpose of ROGO and Planning Aras for the purpose of land planning has been provided in narrative.
Pg. 3	Delete, last sentence in paragraph 3. "Allocations are awarded each quarter in each subarea with the exception of the Big Pine Key/No Name Key subarea, where allocations are awarded annually"	Language came directly from the *Layman's guide to ROGO.*
Pg. 3	Several ordinances should be listed.	Please provide Ordinances as agreed on our 2/15/11 phone conference meeting.
Pg. 4	Delete Map Series 2-3 reference to the Tier Maps.	Agreed, revised as suggested. The map series is not part of Map Atlas.
Pg. 4	Delete second paragraph starting with , " In 1998, the Florida Dept of Transportation"	This section was added by Kathy Grasser. No deletion has been made. However, ROGO section has been reorganized as to provide more detail and rearranged to place history in chronological order.
Pg. 4	Verify with?	Please clarify comment on left side of margin. Paragraph has been relocated.

Location	Comment	K&S Response
Pg. 4	Delete firth paragraph starting with "On June 9, 2006…"	This section was added by Kathy Grasser. No deletion has been made. However, ROGO section has been reorganized as to provide more detail and rearranged to place history in chronological order.
Pg. 4	7th paragraph starting with "Once an application" Delete sentence starting with "Mandatory sewer connection areas…."	Sentence written by Kathy Grasser on comments dated 11/19/10. Please verify internally.
Pg. 4	8th paragraph starting with "A penalty is assigned…." Delete sentence starting with "Land dedication is the donation…."	Agreed, revised as suggested. Paragraph has been reorganized within this section.
Pg. 4	8th paragraph, replace "fund donation" with payment to land acquisition fund"	Agreed, revised as suggested. Paragraph has been reorganized within this section.
Pg. 4	8th paragraph, change/edit last sentence.	Agreed, revised as suggested. Paragraph has been reorganized within this section.
Pg. 5	Add the word "available".	Agreed, revised as suggested. Paragraph has been reorganized within this section.
Pg. 5	Add the words "available affordable allocations".	Agreed, revised as suggested. Paragraph has been reorganized within this section.
Pg. 5	Circles and question mark on ratio of affordable and market available allocations	Agreed, revised as suggested. Paragraph has been reorganized within this section.
Pg. 5	Move environmental section to page 4	Sections have been rearranged for flow of text.
Pg. 5	Place asterisk on affordability ROGOs on table 7.1	Agreed, revised as suggested.
Pg. 6-7	Changes to table 7.2	This table was created with data provided by County Staff. Per the 2/15/11 phone conference meeting Christine Hurley requested that Table 7.2 is revamped to reflects ROGO allocations, ROGO awarded, ROGO CO'd and rollovers for unincorporated County for each ROGO year for unincorporated County as a whole and then by subarea: Table 7.3 Upper Keys, Table 7.4 Middle Keys, Table 7.5 Lower Keys, and Table 7.6 Big Pine/No Name Keys. We are currently awaiting such data to be sent in the table templates provided.
Pg. 8	Section 7.1.2 Issues with reference to "Planning Areas".	Planning Areas (PA) are the geographic locations for planning purposes as defined in Section 2.2.1 Geographic Location of the Future Land Use Element. Not to be confused with "subareas" for the purpose of ROGO allocations. No changes.

Location	Comment	K&S Response
Pg. 8	Property Appraiser does not determine density.	Agreed, the Property Appraiser does not determine density. Density is mandated by Policy 101.4.21 of the *Monroe County 2010 Comprehensive Plan* (1995) for each of the future land uses. However, Property Appraiser data is used to measure acres and dwelling unit distribution by housing type as seen, in Table 2.17. Modifications added to text for clarity.
Pg. 12-13	Circles on words "ROGO system" and number of units that received a CO not under the ROGO system from April 1st, 2000 to Dec 31, 2000 - "21" Circles on "923" and "849"	Data generated as provided by County Growth Management. Data will be revised given revisions per Christine Hurley at the 2/15/11 housing conference meeting.
Pg. 13	Some of the Shark Key was exempt because of settlement. Other lots in Shark Key are subject to ROGO	Data generated as provided by County Growth Management. Data will be revised given revisions per Christine Hurley at the 2/15/11 housing conference meeting.
Pg. 19	May 2010 median income from HUD is $68,400, provide update to table 7.16 based on 2010 median income.	Agreed, revised as suggested.
Pg. 19	Do we want old data? We use family size for income married, single, tenant 120% AMI owner 160% AMI.	Agreed, revised as suggested per table sent by the County via email. Section 7.2.6.3 Housing Value and Affordability depicts income levels, household size, and affordable price tables sent by County.
Pg. 19	Florida Housing Data Clearinghouse?	The comment or questions is unclear. The Florida Housing Data Clearinghouse (FHDC) provides public access to data about housing needs and supply, subsidized rental housing and household demographics in Florida communities. Data for unincorporated county was acquired from FHDC and is based on Census data.
Pg. 32	Change planning area to subarea.	Agreed, revised as suggested.
Pg. 32	Delete, last sentence in paragraph 1st paragraph. "Allocations are awarded each quarter in each subarea with the exception of the Big Pine Key/No Name Key subarea, where allocations are awarded annually"	Language came directly from the *Layman's guide to ROGO.*
Pg. 32-34	Section 7.2.1 - Mobile home parks	Per [Rule 9J-5.010 (1)(f) F.A.C.] we are to report mobile home parks, number of units, and general location. Table 7.29 was data send by County Staff. It was resolved at the 2/15/11 phone conference meeting that K&S would report Mobile Home Parks ONLY as provided in the Florida Department of Business and Professional Regulation. Data was revised to reflect findings in the "mhmailings.csv" file as acquired on 2/24/11

Commenter: Kathy Grasser
Date Received: 1/19/11 (from 12/22/10 submittal

Location	Comment	K&S Response
Pg. 2	Section 7.1.1.2 Removed period and added word "and"	Agree, revised as suggested.
Pg. 2	Add "Comprehensive" and spell out LDC	Agree, revised as suggested.
Pg. 4	Capitalize word "goal"	Agree, revised as suggested.
Pg. 5	Add parenthesis to # 2	Agree, revised as suggested.
Pg. 5	Paragraph realignment	Agree, revised as suggested.
Pg. 9	1st paragraph, add word "were"	Agree, revised as suggested.
Pg. 9	1st paragraph, last sentence "and other"	Please clarify comment
Pg. 11	2nd paragraph and ORD and LDC numbers	Agree, revised as suggested.
Pg. 12	Remove space	Agree, revised as suggested.
Pg. 18	Table 7.14, "Census update"	2010 Census data is scheduled to be released on April 1, 2011.
Pg. 18	Comment: "What about the economic crash"	Economic crash is reflected on the newly added median price of a house in 2009. This is a price decrease from 2008. Section 7.3.11 discusses foreclosures as a reflection of population shifts occurring in the County. There is also a discussion on Section 7.3.2.3 Affordable Housing Need.
Pg. 19	Table 7.16, Is this income or house prices?	The table and section has been modified to reflect qualifying incomes for single income provider, married or domestic partnership, maximum rental rates and maximum selling prices. The tables derive from the excel spreadsheet sent by Tiffany Stankiewicz via email.
Pg. 20.	This is the Housing Element?	Sentence has been revised to reflect the intended reference to the Housing Element Technical Document of the Comprehensive Plan 2010, as approved in 1995.
Pg. 20	Table 7.18, "Census update"	2010 Census data is scheduled to be released on April 2011.
Pg. 21	Table 7.19, "Census update"	2010 Census data is scheduled to be released on April 2011.
Pg. 21	This is the Housing Element, which element?	Sentence has been revised to reflect the intended reference to the Housing Element Technical Document of the Comprehensive Plan 2010, as approved in 1995.
Pg. 23	Expand Table 7.22 in order to provide percentage distribution	Agree, revised as suggested. Added narrative.
Pg. 23	Expand Table 7.23 in order to provide percentage distribution	Agree, revised as suggested. Added narrative.

Location	Comment	K&S Response
Pg. 23	Where are these numbers?	Tables 7.22 and 7.23 have been modified to reflect the decreasing distribution of rental rate below $500. An explanation is provided in the narrative.
Pg. 24	What is cost burdened?	Affordability is determined by cost and household income. Cost to income ratios is a way of determining if a house is affordable to a household. As determined and defined by HUD, if a household is paying more than 30% of the household gross income towards rent or mortgage, the household is cost burdened. Text has been revised for clarity.
Pg. 24	Can you explain this better?	Agree, revised as suggested.
Pg. 25	Update to 2010 Census	2010 Census data is scheduled to be released on April 2011.
Pg. 25	Can you explain this better?	Agree, revised as suggested.
Pg. 27	Change verb conjugation	Agree, revised as suggested.
Pg. 27	(email) see attached email	Looking for email
Pg. 27	Is Highlands County relevant	Revised to read "Monroe County"
Pg. 27	Notation on County SHIP reports	Section is mean to depict a summary of programs.
Pg. 29	Replace top three bullets with material on email dated 1/19/11	Agree, revised as suggested.
Pg. 29	Delete bullet regarding the Division of Housing and Community Development	Agree, revised as suggested.
Pg. 29	Move last sentence of bullet regarding the Division of Housing and Community Development to following bullet.	Agree, revised as suggested.
Pg. 32	No survey has been completed since 2002.	Table 7.29 which was an inventory from 2002 sent by County Growth Management Division, was deleted and has been replaced with data from the Florida Department of Business and Professional Regulation file Condo_MD.csv, Condo_conv.csv, and Coopmailing.csv accessed on February 24, 2011 through: http://www.myfloridalicense.com/dbpr/sto/file_download/public-records-CTMH.html
Pg. 37	Only 3 houses potentially eligible for listing in the National Register of Historic Places	Yes, according the Florid Master Site File, Published in January 2010.

Commenter: Kathy Grasser
Date Received: 1/19/10 on document itself

Location	Comment	K&S Response
Pg. 2-5	Section 7.1.1.3 Monroe County Regulations: Additions to ROGO text	Agree, revised as suggested with additional edits from Christine Hurley and Tiffany Stankiewicz.
Pg. 6	Table 7.2 Done	Data to complete table was sent indeed. However, per 2/15/11 phone conference meeting, Christine Hurley requested for this data to be revised (REDO).
Pg. 7	7.1.2 Residential Land Use Characteristics: Property Appraiser data dated _____ ?	January 2010. Agree, revised as suggested.
Pg 8	Add "planning area" to first bullet	Agree, revised as suggested.
Pg 8	Section 7.2.1 Type of Housing: "Housing units classified as mobile homes, trailers, and other decreased by 30 percent" This is not a sentence.	Agree, revised as suggested. However, paragraphs and tables in this section have shifted per the 2/15/11 phone conference meeting and as requested by Christine Hurley.
Pg 10	Section 7.2.1.1 Hotel/Motel Transient Units: Should incorporate new LDC#	Agree, revised as suggested. Ord. 023-2010 and LDC Section 138.23 are reflected on last bullet/number.
Pg 12	Section 7.2.3 Residential Construction Activity: Previously sent updated construction activity and CO data to Rosil	Data was sent, indeed. However, data and tables in this section will shift given 2/15/11 phone conference meeting and as requested by Christine Hurley and pending data review by County Staff (REDO)
Pg 12	Section 7.2.3 Residential Construction Activity: See the 2010 report – slated to go to the BOCC on December 15th as a bulk item.	Data from 2010 does not provide the breakdown of building permits issued by housing type as does the 2007 report. No updates from 2010 are performed on this section. However, data and tables in this section will shift given 2/15/11 phone conference meeting and as requested by Christine Hurley and pending data review by County Staff (REDO)
Pg16	Section 7.2.4 Vacant Status: What about the American Community Survey report estimates from the Census? Would that give a better stat, especially with the incorporation of the cities?	Data will be updated once 2010 Census is released estimated on April 2011. If the ACS all the data required by 9J-5.010 (housing type, housing age, etc) would not be available for the same year as the ACS.
Pg 17	Section 7.2.5 Age of Housing: Delete – "It is important to note here that the County's ROGO was adopted in 1992"	Agree, revised as suggested.

Location	Comment	K&S Response
Pg 17	FHDC: Spell out please	FHDC stands for Florida Housing Data Clearing house, which is explained spelled out once and then abbreviated throughout the document (see Page 1 of this element)
Pg 19	Missing part of the above footnote, please check next page.	Agree, revised as suggested.
Pg. 20	Table 7.18 - Is there updated data from somewhere else to reflect current stats? National Association of Realtors…?	Although previous Census data is not required by 9J-5.010, 1990 was provided per Christine Hurley's request for comparison purposes. 2010 data will be provided once Census 2010 data is published estimated to occur on April 2011.
Pg 26	Community Planning and Development Program Formula Allocations for FY 2010: See this web page: http://www.hud.gov/offices/cpd/about/budget/budget10/index.cfm	In reviewing the spreadsheet, there was no information available for incorporated municipality, unincorporated town, or Monroe County.
Pg 27	This might not be active anymore. I could only find stats from 2007	Comment noted.
Pg 28	Maybe reference this office that is located in Key West in this section.	Not necessary to mention location of office, this section is for purposes of stating programs available.
Pg 28	Regarding SAIL program add: (The State Apartment Incentive Loan program (SAIL) provides low-interest loans on a competitive basis to affordable housing developers each year. This money often serves to bridge the gap between the development's primary financing and the total cost of the development. SAIL dollars are available to individuals, public entities, not-for-profit or for-profit organizations that propose the construction or substantial rehabilitation of multifamily units affordable to very low income individuals and families.	Agree, revised as suggested.
Pg. 31	This is duplicate information from above – please merge additional information to the appropriate spot (like SAIL programs below to SAIL programs above) Maybe add the chart below the program explanation.	Agree, revised as suggested.
Pg. 33	7.2.8.2 Subsidized Housing and the Rate of Growth (ROGO) Process: Delete "commercial"	Agree, revised as suggested.

Location	Comment	K&S Response
Pg. 37	7.2.12 Historically Significant Housing : Add "PKMSC (Pigeon Key Marine Science Camp) is a 501(c) 3 not-for-profit organization whose mission is to provide educational experiences in a history rich environment located on a 5-acre island. Our programs are for all ages - elementary school to post graduate – and are designed and endorsed by some of the most respected marine scientists in the United States. The Teaching Team located on Pigeon Key are truly dedicated to the preservation of our natural resources through hands-on educational and leadership development programs for today's students and tomorrow's leaders"	Agree, revised as suggested.

Commenter: Christine Hurley
Date Received: 2/7/11 (from 12/22/11 submittal)

Location	Comment	K&S Response
Pg. 2	Quote exact requirements.	This section is mean to provide the NEW requirement on 163.3177(6)(f)1 given HB 697 not to site the whole requirements of 163.3177.
Pg. 3	"See my comment on the FLU element"	Comments in the FLU regarding ROGO have been added to the *7.0 Housing Element.*
Pg. 5	Comment for Tiffany, please help on braking down the allocations per Tier.	This table is meant to explain the allocated ROGO permits as it appears on LDC Art. II Sec. 138-24. No Tier info is required at this time Christine Hurley placed this request on hold on the 2/15 housing phone conference meeting. However, we are still waiting on the historic account of ROGO(template tables to be filled in)
Pg. 6	Add dates to the ROGO years.	On 2/23/11 K&S requested verification of the ROGO dates. It is our understanding that ROGO starts July 13 and goes for a period of 12 months. However is studying the MC facility Plans some dates have discrepancies (this was noted by email). We requested confirmation of the ROGO year and dates on the tables sent on 2/23/11

Location	Comment	K&S Response
Pg 6-7	Per phone conference with County Staff on 2/15/11, request was made to change Table 7.2 to the following: Provide overall ROGO history by year, allocated by DCA, awarded and CO'd. Then break down by sub-area and add a table per sub area.	In response to Christine Hurley's request, tables to be filled in were sent to Kathy Grasser and Tiffany Stankiewicz. It was noted by Tiffany Stankiewicz that sub-areas were Upper, Middle and Lower and that by October 2007 the subareas changes to Upper, Lower Big Pine/ No Name Key. In turn, K&S sent 5 tables to be filled in with the requested information by the County: 1) Rogo history as a whole 2) Upper Keys sub area, 3) Middle Keys sub area, 4) Lower Keys sub area and 5) Big Pine/No Name Key subarea. Tables were due on 3/1/11.
Pg . 8	Spell out FHDC	FHDC is spelled out on the first page of this document. No action.
Pg. 9	Is this backwards?	No, it is not backwards. In regards to table **Table 7.3 now Table 7.4**, Since comparisons were requested for years 1990 and 2000 for unincorporated County we tried explaining that unincorporated data 1990 includes Marathon and Islamorada versus 2000 unincorporated data given that the two municipalities were incorporated after 1990. That is why 1990 number of housing is higher. In order to resolve confusion, Christine Hurley recommended (at the 2/15/11 phone meeting) that the two municipalities are carved out of the 1990, through Census analysis, in order both 1990 and 2000 unincorporated table would have the same geographic data. Upon evaluation of Census 1990 data, it is not possible to do this based on Census Block Group Data (smallest unit of analysis available for this data) since data overlaps with other unincorporated and incorporated areas (i.e. Key Colony Beach) Therefore, it is resolved that unincorporated data is presented for 2000 only. However, data will be updated once 2010 data is available.
Pg. 9	Although absolute #'s of this housing type are low.	Comment noted. No revision needed.
Pg. 10	Move table 7.4 to precede table 7.3, since table 7.4 is countywide (comment from 2/15/11 housing phone meeting)	Agree, revised as suggested.
Pg. 10	Add 2010 to table 7.4	Census 2010 data will be released April 2011. Data will be updated once released.
Pg. 10	Need introduction because MC has such a limited number of housing units that can be issued annually because of the ACSC designation, permits for hotel/motel transient units have been limited.	What in particular did the County have in mind as far as an introduction to the Hotel/Motel Transient Unit section? If there is anything else besides the sited ordinances that we should reference, please provide.

Location	Comment	K&S Response
Pg .10	Provide 2010 data for housing by type	Data is to be released on April 2011.
Pg. 10	Where did this come from?	The moratorium language to be continued until the average occupancy rate exceeds 90 % was provided by Staff. Upon our phone conference with Christine Hurley 2/15/11 it became apparent that this had not been approved. Issue resolved by taking bulled (language) off.
Pg. 11	Need to take average annual occupancy 1990, 2000, 2010.	This is meant to give a scope of most current affairs, which latest available data is dated 2010. Please provide 1990 and 2000 numbers is average of these years is still desired. Latest table will be provided as an Appendix.
Pg. 11	The # of licensed hotel/motel rooms in the entire county including incorporated cities was X.	Agree, revised as suggested. Also updated to 3/14/11.
Pg. 11	Wow.	Comment noted.
Pg. 12	Add "Unincorporated" to Table7.5 title	Agree, revised as suggested.
Pg. 12	Just do not get 1990 # of dwelling units is higher than 2000	We were asked to provide 1990 data for comparative purposes. 1990 numbers are higher than 2000. For clarity, Table 7.6 is being deleted, since there is no way data for 1990 can be carved out to take out Marathon and Village of Islamorada data. Data will however be updated with 2010 Census, when it becomes available estimated to occur on April 2011.
Pg. 12	During the 2/15/11 phone conference meeting, it was determined that Table 7.6 is no longer needed.	Agree, revised as suggested.
Pg. 12	Discussion on 2/15/11 phone conference meeting to relocate *Residential Construction Activity*.	*Residential Construction Activity* has been relocated to the last section of the existing conditions in order maintain the 9J-5 flow, which will be easier reviewed by DCA. Christine Hurley agreed to this edit.
Pg. 12	Are you saying that between 2000 and 2010 only 100 units were CO'd?	No. The text reads "A total of 100 units received a certificate of occupancy in the remainder of 2000 under the ROGO system. A total of 21 certificates of occupancy were issued after April 1, 2000 outside the ROGO system; all were located in Ocean Reef." This data was provided in order to account for the units in the remainder of year 2000 (after April 1st), when the Census was conducted.

Location	Comment	K&S Response
Pg. 12	Big Question " When we look at 1990 – 2000 decrease, what did the Carrying Capacity report say the Keys cold sustain as maximum # of housing units.	Again, when looking at a decrease of unincorporated 1990 and 2000 dwelling number it is due to the incorporation of Marathon and Islamorada prior to Census 2000. In others, words 1990 numbers are higher because unincorporated County in 1990 occupied a greater land mass. In essence, more accurate data on housing numbers is depicted in Countywide numbers, this data has been provided.
Pg. 12-15	Residential Construction Activity	As agreed on the 2/15/11 phone conference meeting, Text is being relocated to end of existing conditions (right before housing need).
Pg. 13	Kathy, we did a report in December	It is true that a Public Facilities Capacity Assessment Report was created in December 2010. However, the report does not breakdown the data by housing type as does the 2007 report (Table 7.7). If building permits issued for 2007, 2008, 2009 and 2010 by type need to be part of the Technical Document, please provide us with the data. Data was requested on our 2/15 phone conference meeting. Data has been modified to reflect tables received on 3/25/11
Pg. 13	How is it that there were recreational vehicles permitted while a moratorium was in place as of 1999.	We cannot address this question. Data is reported as received by Staff.
Pg. 13	Table 7.7 - why is this separate from 2007-2009 data?	This was due to the way data was delivered to K&S. In order to consolidate tables 7.7 and 7.8 data was requested at our 2/15 phone conference meeting. Tables have been consolidated
Pg. 13	Per our 2/15/11 phone conference, Table 7.7 is to include data for the remainder of year 2000 (after April 1t 2000).	Agreed, data has been revised per tables received 3/25/11
Pg. 14	So what is the grand total of dwelling units?	26,283
Pg. 14	Maybe grand total table here?	Agree, revised a suggested
Pg. 29	Per 2/15/11 phone conference meeting delete paragraph on MC Division of Housing and Community and Development.	Agree, revised a suggested.
Pg. 29	Per 2/15/11 phone conference meeting, the Land Authority is acquiring land for lease. Narrative needs to be provided once Brenady, Kathy and Cat send excel spread sheet with data which will take a while, according to Christine Hurley. Data may be sent to K&S in the month of May.	Comment noted.

Location	Comment	K&S Response
Pg. 34	Per 2/15/11 phone conference meeting, where did the tables come from?	Tables were provided by County Staff. We have researched and updated the mobile home parks data per the Florida Department of Business and Professional Regulation dated 2/24/11
Commenter: Christine Hurley **Date Received: 1st round of review, received 8/18/10**		
Location	**Comment**	**K&S Response**
Pg. 1	2nd Paragraph:	Agree, revised as suggested.
Pg. 1	Insert Map	Map Series will be part of the *Map Atlas.* No change.
Pg. 2	Note: "41 units in Mainland"	Yes, as noted in 1st page of element.
Pg. 2	Add tables for unincorporated areas housing type.	Agree, revised as suggested.
Pg. 3	Add 1990 to compare trends: "Is vacancy going up? Are we loosing permanent housing? "	Agree, revised as suggested. Included response through analysis done by Reid Ewing Hurricane Model Report.
Pg. 3	Regarding Occupancy rates: "Check Hurricane Model" (by Reid Ewing)	Agree, revised as suggested showing reduction of occupancy rate.
Pg. 3	"Move occupancy down"	Agree, revised as suggested.
Pg. 3	Spell out MKPA	Agree, revised as suggested.
Pg. 3	Regarding relevancy of Middle Keys PA units	The data is reported, relevancy is immaterial here.
Pg. 3	Typo	Revised 4.6.8 to 46.8
Pg. 4	Vacancy status: add 1990 data for comparison	Agree, revised as suggested
Pg. 4	Regarding age of housing: "How did you get to 19%?"	Agree, shaded the cells that were totaled and added another row in the table to clarify.
Pg. 4	What year did ROGO start	1992
Pg. 6	Is it for unincorporated or county as a whole	County as a whole, it is sample data.
Pg. 6	Add "up from $151,200"	Agree, revised as suggested.
Pg. 6	Integrate data from ACS values ad $613, 900 for year 2006-2008 to establish trend.	Agree, revised as suggested.
Pg. 6	" I'd like to see 1990 too"	Agree, revised as suggested for comparison.
Pg. 6	Delete paragraph starting with "As illustrated in Table 7.2.7"	Agree, revised as suggested.

Location	Comment	K&S Response
Pg. 6	We need to state what the value of affordable house was in 1990 and 2000 and percent above and below affordable.	Will not address now. Information will be provided in the needs assessment. However, the 2007 is assessed and compared to median housing price.
Pg. 6	Bottom of page: "After you add 1990 what is the trend?"	It's difficult to answer this since Marathon and Islamorada were included in the 1990 numbers.
Pg. 7	In 2000 what was considered the affordable monthly rent by HUD?	Will not address now. Information will be provided in the needs assessment.
Pg. 7	Add note: "In 2000 57.1 percent pay between $1000 – $1999 per month"	Agree, revised as suggested.
Pg. 7	Add 1990 for mortgage status and selected monthly owner cost unincorporated table	Agree, revised as suggested.
Pg. 7	"The 4,339 (mortgaged monthly owner cost totals table 7.2.8) and the 2,859 (non-mortgaged monthly owner cost totals table 7.2.9) does not add to 11,334 in table 7.2.2"	An explanation for why this is so has been provided in text
Pg. 8	Add the percentages of ranges $400-$699 to narrative	Agree, revised as suggested.
Pg. 8	Fix error in table 7.2.10.	Agree, revised as suggested.
Pg. 8	For table 7.2.10, add 1990 data.	Agree, added as suggested.
Pg. 9	Is the rent to income ratio reported for year 1999 rather than 2000?	Yes. No change needed.
Pg. 9	Table 7.2.11 "Total units rented"	No revision because total units rented is irrelevant to this section. For total units rented see the Occupancy and Tenure Section. When renter data is extrapolated for rent-to-income as in table 7.2.11, it is taken from a sample and thus representative of population.
Pg. 9	Add 1989 data to 7.2.11 for comparison purposes.	Agree, revised as suggested.
Pg. 10	Table 7.2.12 "Total units"	No revision because total owner units is irrelevant to this section. For total units that are owner occupied see the Occupancy and Tenure Section. When owner data is extrapolated for monthly owner cost by income as in table 7.2.12, it is taken from a sample and thus representative of population (1 in 6).
Pg. 11	Write a description of the subsidized housing programs	Agree, revised as suggested.
Pg. 11	Separate Section 8 housing since they are rental	Agree, revised as suggested.
Pg. 11	What about ROGO affordable housing units – how do they work	Agree, revised as suggested.
	Add narrative on the Housing Authority	Agree, revised as suggested.

Location	Comment	K&S Response
Pg. 13	Add the 1991 mobile home numbers to table 7.2.14	What purpose will this serve, with Marathon and Islamorada data included in the 1991 numbers since they were not yet incorporated? This would be very confusing. No change.
Pg. 22	Not sure what is being requested regarding the Map Series	Map Series will be part of the *Map Atlas.* No change.
Pg. 22	Move *Residential Construction Activity* between Occupancy and Tenure and Geographic Distribution	Agree, revised as suggested.
Pg. 22	Clarify where the additional 91 units from April 2000 till end year came from.	Agree, revised as suggested in *Section 7.2.3 Residential Construction Activity*
Pg. 22	Typo change was for were	Agree, revised as suggested
Pg. 22	How does construction activity compare to 2001 – 2006 numbers?	Agree, revised as suggested for these years.
Pg. 23	None on table 7.2.17 "May not mean anything for construction, since a lot of ROGO are being held!"	The number of dwelling units reported on this table are for ROGO allocations that in fact, received a certificate of occupancy, and therefore were constructed.
Pg. 23	"Recreate a table 7.2.1 with additional units to get grand total."	Cannot account for constructed dwelling units at this time. Dwelling units that received a building permit and a certificate of occupancy outside of the ROGO system needs to be explored. This information was requested to Mary Tucker on April, 2010.
Pg. 23	"Add hotels motels/ transient section and trends and moratorium issues"	Agree, revised as suggested. This was added to the *Section 7.2.1 Type of Housing*. However, a more exhaustive research with Monroe County is needed to sort out transient units.
Pg. 23	"Add ROGO analysis: number of allocations awarded, used, and held"	Number has been provided from 2001 to 2007. Future analysis is needed for years since program started in next iteration.

Commenter: Kathy Grasser
Date Received: via email, 6/17/11

Location	Comment	K&S Response
7.2.2	Spell out "ACS"	Agree, revised as suggested.
7.2.5.3.3	Clarify Technical Document is not adopted.	Agree, revised to reflect that the Tech Document is a component of the adopted Comprehensive Plan
7.2.6.1	Clarify Technical Document is not adopted.	Agree, revised to reflect that the Tech Document is a component of the

		adopted Comprehensive Plan
7.3.5.4	Revised to delete “fully” and leave it as “urbanized”	Agree. Revised as suggested.
Tables 7.5.7-7.60	Please specify in footnotes these are GIS files.	Agree. Revised as suggested.

POTABLE WATER
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8.0 POTABLE WATER ELEMENT

[Rule 9J-5.011, F.A.C]

The Potable Water Element of the Monroe County (County) Comprehensive Plan addresses the data inventory requirements of 9J-5.005(2) of the Florida Administrative Code (F.A.C.). The data inventory requirements will support the development of goals, objectives, policies, and implementation programs for the Potable Water Element.

The purpose of the Potable Water Element of the Comprehensive Plan is to provide principles and guidelines for infrastructure requirements supporting future and existing land uses.

8.1 Introduction

The Potable Water Element serves as a guide on the existing and future potable water systems based on the problems and needs associated with those facilities. Several considerations in the development of the Potable Water Element include: an analysis of existing data, identification of present and potential problems, needs and their solutions, and projection of future potable water issue and needs for planning purposes. For the purpose of the County's Comprehensive Plan, potable water is defined as water of sufficient quality to serve as drinking water.

The Florida Keys (the Keys) are in a unique situation with regard to the supply of potable water. With virtually no freshwater rivers, lakes or streams, and few freshwater lenses, residents have had to rely on man-made collection and distribution systems in order to survive. In 1937, the Florida Legislature, aware that cisterns and container water could not adequately support the development of the Keys, created the Florida Keys Aqueduct Commission (FKAC). The Commission was formed to develop potable water facilities for the County. Until 1940, no centralized public water supply system existed; residents relied, as they had for more than a century, on the unpredictable source of rainwater collected from roofs into cisterns. Private wells supplemented this source, but could only be tapped in the few areas where freshwater lenses exist.

The FKAC reached an agreement with the United States Navy to share in the cost of a water main from the mainland. Water was pumped from the Biscayne Aquifer, and an 18-inch main was constructed from well fields near Florida City along the entire length of the Keys to Key West. The Florida Keys Aqueduct Authority (FKAA) replaced the FKAC in the 1970's and assumed responsibility for the water system. In 1981, FKAA, with financial assistance from the Farmer's Home Administration, commenced construction of major improvements to the system.

8.2 Sources of Water

There are no significant sources of fresh surface water in the populated Florida Keys portions of the County. Two sources of groundwater underlie the County - the Floridan Aquifer System, and the Biscayne Aquifer. **Table 8.1** illustrates the relative positions and productivities of these hydrogeologic units.

The Floridan Aquifer System (FAS) is a confined artesian aquifer. In the Keys, wells tapping the FAS will flow at land surface at rates ranging from 75 to 1,000 gallons per minute (gpm). Although available in significant quantities, Floridan water requires desalination treatment before it is suitable for either potable or irrigation use. Chloride concentrations in the FAS range from 1,600 to 20,000 milligrams per liter (mg/l), with concentrations generally increasing to the south.

Table 8.1 - Ground Water Systems in Monroe County

Hydrogeologic System	Hydrogeologic Unit	Water Resource Potential
Surficial Aquifer System	Biscayne Aquifer	Largely saline, a lens of relatively freshwater floats above the saltwater on some of the larger keys. Must be desalinated for potable use. No additional withdrawals will be permitted. Vulnerable to spills and contamination.
Intermediate Confining Unit	Hawthorn Confining Beds	Very low permeability, confining unit for the Floridan Aquifer System.
Floridan Aquifer System	Floridan Aquifer	Wells yield from 75 to 1,000 gallons of saline water per minute. Requires desalination for all uses. Some zones may be suitable for Aquifer Storage Recovery (ASR) applications.

Source: South Florida Water Management District

The Biscayne Aquifer is the largest supplier of freshwater in southeast Florida. In the Keys, water from the Biscayne Aquifer ranges from brackish to chloride levels associated with seawater and requires desalination for potable use. Some Monroe County residents provide their own water supply for landscape irrigation using home Reverse Osmosis (RO) plants to desalinate Biscayne Aquifer water or collecting rain water in cisterns. However, due to the limited availability of fresh groundwater, its vulnerability to saltwater intrusion and its importance to wildlife, only a limited number wells have been permitted in this shallow aquifer since February 1986.

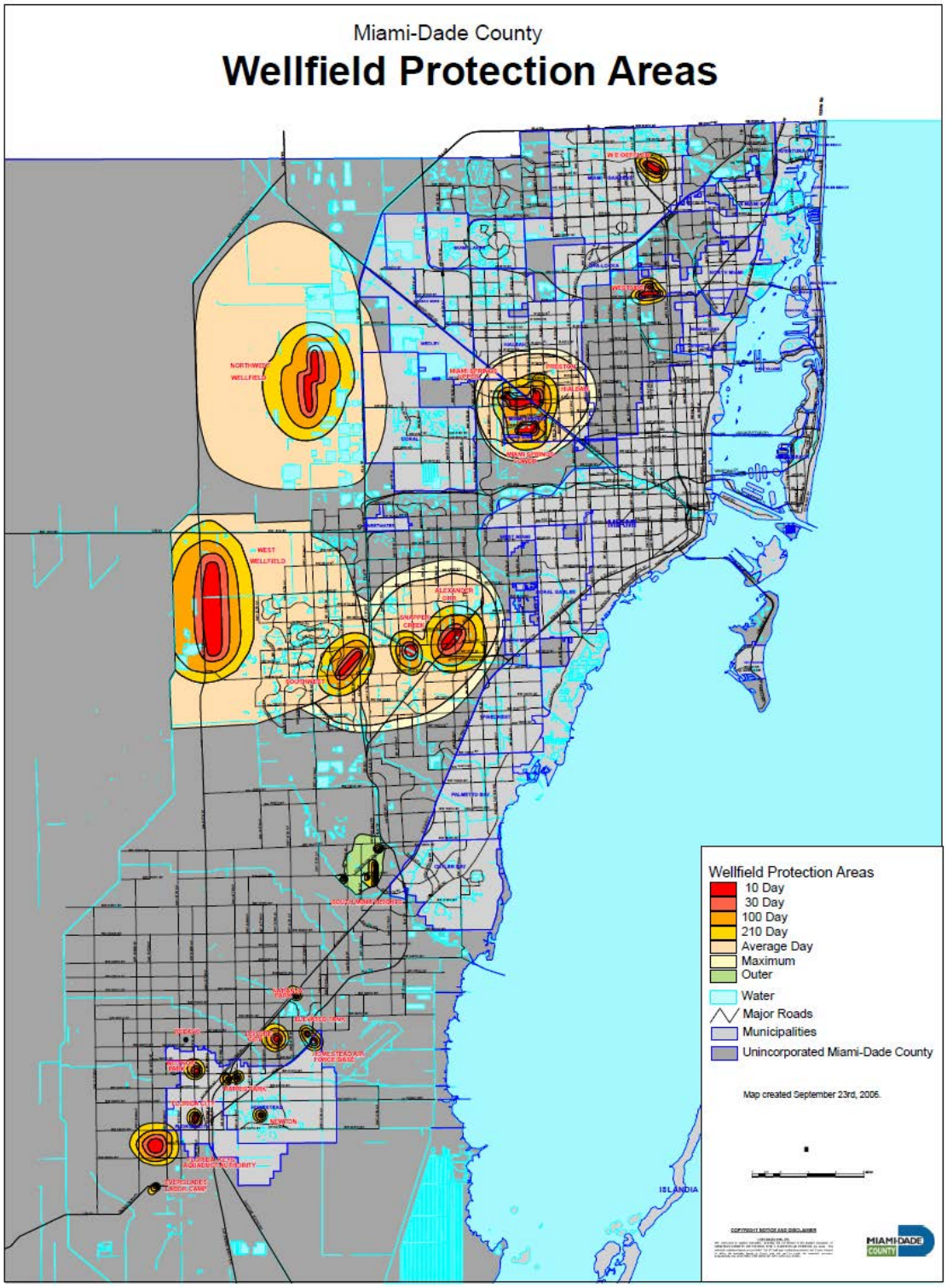
On some of the larger keys, a lens of freshwater floats above the saltwater. The largest of these freshwater lenses occur on Key West and Big Pine Key. Limited quantities also occur on Cudjoe and Sugarloaf Keys. Chloride levels in these lenses are too high for human consumption, but are suitable for most irrigation purposes, and provide the major source of drinking water for wildlife.

Today, the FKAA remains the sole supplier of centralized potable water to the Keys, and the vast majority of the County residents receive their potable water, supply and distribution, from the FKAA system. Therefore, the County, being a retail customer of FKAA, does not have any local responsibility for potable water supply or distribution to its citizens. The primary source of water to the Keys is from the FKAA's Florida City wellfield, which pumps water from the Biscayne Aquifer and the Floridan Aquifer System in southeastern Miami-Dade County (see **Figure 8.1).**

There are alternative potable and non-potable water supplies in use in the Keys.; They include private cisterns, private wells (See Natural Groundwater Aquifer Recharge element for listing), home desalinization systems, and bottled water. Most users of these alternative sources rely on them only as supplements to the FKAA water. Cistern and well water, are often reserved for irrigation and other non-potable uses. A few residents of mainland Monroe County are served by private wells and cisterns.

In order to ensure the availability of an adequate quantity and quality of potable water, an intricate framework of federal, state and local regulations controls the process of supplying water to the Keys. After a brief discussion of regulatory system, existing facilities and planned improvements are described. A discussion of water conservation programs is included, followed by a discussion on the status of the FKAA system. Finally, a needs assessment and levels of service (LOS) standards are presented.

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Source: Miami-Dade County

Figure 8.1 – Miami-Dade County Wellfield Protection Areas

8.3 Regulatory

*[Rule 9J-5.011 (1)(*h*), F.A.C]*

8.3.1 Federal Regulations

U.S. Public Law 104-182, "Safe Drinking Water Act" (SDWA) was originally passed in 1974 and amended in 1986 and 1996 to protect public health by regulating the nation's public drinking water supply. The act requires the U.S. Environmental Protection Agency (EPA) to develop criteria for selecting critical aquifer protection areas and gives the EPA authority to set national health based standards for drinking water. The program calls for state and local governments to map those areas and develop protection plans, subject to EPA review and approval. Once a plan is approved, EPA may enter into an agreement with the local government to implement the plan.

In 2010, EPA published proposed, "Water Quality Standards for the State of Florida's Lakes and Flowing Waters" 40 CRF 131 which describes numeric nutrient water quality criteria to protect aquatic life in lakes and flowing waters, including canals, within the State of Florida and proposing regulations to establish a framework for Florida to develop ``restoration standards'' for impaired waters.

8.3.2 State Regulations

The Safe Drinking Water Act provides for the protection of public water system wellfield and aquifers used as the sole source of a community drinking water supply. Amendments provide for wellfield protection which requires states to work with local governments through the planning process to identify and to protect wellhead areas.

In accordance with federal guidelines, the Florida Safe Drinking Water Act (Sections 403.850-403.864, F.S.) has been adopted, which designates the Florida Department of Environmental Protection (DEP) as the state agency responsible for the regulation of drinking water. The DEP has therefore promulgated rules classifying and regulating public water systems, including mandatory water treatment criteria (Chapter 62-528. F.A.C.) The DEP enforces both the primary (health) and secondary (aesthetics) water quality standards for public water supplies in Florida.

In addition to the direct regulation of water distributed in public water supply systems, DEP establishes standards for various designated uses of natural waters, including potable water. Under DEP's classification system, Class 1 waters are designated for use as public potable water supplies. These waters are regulated under standards specifically designed to protect the public health. The DEP also regulates the use of certain alternative water supply systems, such as Reverse Osmosis (RO) plants.

The South Florida Water Management District (SFWMD) is responsible for managing water resources for a large region which extends from Kissimmee Valley to Key West and spans the territories of over eighty local governments. Through the consumptive use permitting process, SFWMD allocates water supplies among public utilities and other users to be distributed to consumers. The SFWMD can issue Consumptive Use Permits (CUPs) for up to a 20-year period. The CUPs authorize annual allocations, and can include a number of limiting conditions that address issues such as maximum daily withdrawals, water level monitoring, maintenance, and emergency procedures. An important addition to this permitting process is the water conservation requirement. Since 1988, SFWMD requires CUP applicants requesting 100,000 gallons per day (gpd) or greater to submit a water conservation plan that meets SFWMD Guidelines. The FKAA updated its most recent plan as part of its Permit renewal approved in March 2008.

8.3.3 Local Regulations

The provision of potable water in unincorporated Monroe County is affected primarily by the regulations and policies of two governmental bodies, the FKAA and Monroe County, and peripherally by a third, Miami-Dade County. The FKAA, actually an independent special district, serves as an autonomous corporate and political body whose primary function is to obtain, supply, and distribute an adequate water supply for the Florida Keys. As the only centralized public water source, the FKAA requires, with a few exceptions to be described later, that all entities desiring a potable water supply may connect to the FKAA facilities if and when distribution lines are available. FKAA was created by Chapter 76-441, Laws of Florida and is subject to the provisions of Chapter 120, F.S. and the Florida Administrative Procedures Act.

The FKAA is governed by a Board of Directors, which appoints an Executive Director to manage the day-to-day operations and the field, administrative, technical and legal staff. FKAA's basic operating regulations are outlined in their *Policy and Procedure Handbook*, Chapter 48, which is available online and upon request. These policies cover the detailed organizational rules, provision of water service, service fees, engineering requirements, service area limitations, and alternative supplies.

Besides managing the centralized public water supply system, FKAA has "the authority to regulate all potable water supplies within its boundaries." (FKAA, Chapter 48-8.001(1), F.A.C.) The FKAA therefore has authority over the installation and operation of alternative water supplies. Single family and duplex residences using alternative systems, and water supply systems used solely for domestic purposes are exempt from FKAA permitting requirements. However, any other entity wishing to construct or operate a well, cistern, RO system or other alternative supply system must comply with FKAA's conditions for approval (FKAA, Chapter 48-8.004, F.A.C.)

Although the FKAA has primary responsibility for the potable water supply, the County has some jurisdiction over supply sources and distribution, especially with regard to land use and single family or duplex residential development. In compliance with FKAA regulations, the Monroe County Code requires "sufficient" potable water from an approved and permitted

source. The Code recognizes alternative water sources, such as wells and cisterns, in addition to FKAA's distribution system. Section 114-16 of the Monroe County Land Development Code (MCLDC) states that, "…individual wells shall only be permitted where there is no public supply of water feasible." Residents are allowed to continue the use of existing wells; yet, cisterns and other types of, "independent water systems shall be encouraged whenever permitted" (Sec. 114-46). The County has also incorporated water efficiency standards to augment SFWMD and FKAA programs as defined in the 2007 Florida Building Code provided in **Table 8.2**.

Table 8.2 – Maximum Flow Rates and Consumption for Plumbing Fixtures and Fixture Fittings

Plumbing Fixture or Fixture Fitting	Maximum Flow Rate or Quantity [b]
Lavatory, private	2.2 gpm at 60 psi
Lavatory, public, (metering)	0.25 gallon per metering cycle
Lavatory, public (other than metering)	0.5 gpm at 60 psi
Shower head [a]	2.5 gpm at 80 psi
Sink Faucet	2.2 gpm at 60 psi
Urinal	1.0 gallon per flushing cycle
Water closet	1.6 gallons per flushing cycle

Source: 2007 Florida Building Code
For SI: 1 gallon = 3.785 L, 1 gallon per minute (gpm) = 3.785 L/m,
1 pound per square inch (psi) = 6.895 kPa.
a. A hand-held shower spray is a shower head
b. Consumption tolerances shall be determined from referenced standards.

8.4 Wellfields

[Rule 9J-5.011 (1)(g), F.A.C]

8.4.1 Wellfield Conditions

The capacity of the FKAA's Florida City wellfield was evaluated in a report prepared by F.W. Meyer of the U.S. Geological Survey in 1974. In this report water levels in southern Miami-Dade County, the potentiometric surface of the aquifer, and chloride levels at USGS monitoring wells were evaluated. Current and planned surface water conveyance systems in the vicinity were also reviewed.

The potentiometric surface of the Biscayne Aquifer as measured during the 1974 study showed that, during the period 1960-1971, the average water table elevation at the FKAA wellfield was 3.75 feet above Mean Sea Level (MSL). The lowest yearly elevation was slightly below MSL and the average for highest year was slightly higher than five feet above MSL.

In 1984, the United States Geologic Survey (USGS) conducted another survey of the potentiometric surface of the Biscayne Aquifer. These surveys, one conducted immediately following the wet season (October 1984) and the other conducted following the dry season (May 1984), can be used to evaluate regional water levels within the Biscayne Aquifer. From the surveys, the wet season potentiometric surface at the wellfield was estimated at 3 feet above MSL and the dry season at 1.5 feet above MSL.

The regional potentiometric surface is affected by groundwater withdrawals, recharge from conveyance canals, rainfall, and evapotranspiration. The apparent small effect of increased withdrawals on the aquifer can be attributed to an extremely high transmissivity and storage coefficient. Consultants to FKAA have asserted that the aquifer could sustain withdrawals of up to 18 million gallons per day (MGD) average daily flow (ADF) without significant effect on regional water levels.

Recent data from the USGS water level records indicates that the aquifer has sustained a mean surface elevation of approximately 2.5 feet above National Geodetic Vertical Datum (NGVD). This is cited as evidence of minimal effect of increased pumpage on the water table.

The FKAA wellfield could potentially be impacted by salt water intrusion and/or development in the surrounding area. Presently, the FKAA, in cooperation with the USGS and Miami-Dade County Environmental Resource Management maintains a ground and surface water monitoring network around the well field to provide sufficient warning in the event of serious salt water intrusion. Chlorides average approximately 45 mg/l or less at the surface water monitoring points.

8.4.2 Miami-Dade County Wellfield Protection Program

Wellfield protection of the FKAA Florida City Wellfield is accomplished through the provisions of the Miami-Dade County Potable Water Supply Well Protection Ordinance (Miami-Dade County Code 24-43). This Code contains the following provisions regarding the protection of the County's water supply service: Septic Tanks, Sanitary Sewers, Stormwater Disposal Methods, Prohibition of Hazardous Materials within Wellfield Protection Areas, Excavation, Pipelines for Hazardous Materials and Prohibition of Resource Recovery and Management Facilities with Wellfield Protection Areas.

8.4.3 Septic Tanks

The Ordinance provides for regulation of septic tanks within the wellfield cone of influence as defined by Section 24-43 by requiring that the Miami-Dade County Department of Environmental Resources Management (DERM) find that the placement of septic tanks and septic tank drainfields are installed on a parcel of land as far away as is reasonably possible from potable water supply wells and by establishing specific septic tank sewage loading standards. In addition, the Ordinance requires that for septic tanks or septic tank drainfields located within the maximum day wellfield protection area, a minimum separation from the

nearest public utility potable supply well equivalent to ten days travel time be provided. The specific distance of the ten-day travel time is dependent upon the transmissivity of the aquifer.

8.4.4 Sanitary Sewers

Section 24-43 establishes the following sewage loading restrictions and facilities construction requirements for all sanitary sewers installed within the wellfield protection area:

- Residential land use - No gravity sanitary sewer shall have an exfiltration rate greater than 50 gallons per inch pipe diameter per mile per day. Sewer lateral lines located in the public right-of-way shall be a minimum of six inches in diameter.

- Nonresidential land use - No gravity sanitary sewer shall have an exfiltration rate greater than 20 gallons per inch pipe diameter per mile per day. Sewer lateral lines located in the public right-of-way shall be a minimum of six inches in diameter.

All sanitary sewer force mains shall be constructed of either ductile iron or reinforced concrete pressure sewer pipe. No such ductile iron sanitary sewer force main shall exfiltrate at a rate greater than the allowable leakage rate specified in American Water Works Association Standard C600-82 at a test pressure of 100 pounds per square inch. No such reinforced concrete pressure sanitary sewer force main shall exfiltrate at a rate greater than one-half the allowable leakage rate specified for ductile iron pipe in American Water Works Association Standard C600-82 at a test pressure of 100 pounds per square inch.

Notwithstanding the provisions of Section 24-43 (4)(b), all gravity sanitary sewers with invert elevations above the average surrounding water table elevation and all sanitary sewer force mains shall be tested to ensure compliance with the aforementioned exfiltration rate standards.

A registered professional engineer shall provide written certification of the exfiltration rate for all manhole/gravity sewer pipe systems installed, in equivalent gallons per inch pipe diameter per mile of pipe per day (24 hours), and the exfiltration rate for all sanitary sewer force mains in gallons per hour per 1,000 feet of sanitary sewer force main installed. Existing gravity sanitary sewers with pipe diameters of eight inches or more shall be visually inspected by television every five years by the responsible utility or property owner to ensure both structural and pipe joint integrity. Existing manholes shall be visually inspected for both structural and incoming pipe connection integrity every five years.

Certified test and inspection results and repair logs shall be submitted to the department of environmental resources management within 30 days after completion of the particular test, inspection, or repair.

8.4.5 Stormwater Disposal Methods

Stormwater disposal methods which are required by the Wellfield Protection Ordinance within the wellfield protection area are listed in **Table 8.3.**

Table 8.3 - Allowable Storm Water Disposal Methods for Residential and Nonresidential Property

Travel Time in Days or Distance in Feet from Property to Nearest Public Utility Potable Water Supply Well	Allowable Methods for Storm Water Disposal
More than 30 days but not exceeding 210 days	Infiltration or seepage or overflow outfalls only
More than 10 days but not exceeding 30 days	Infiltration or seepage only
More than 100 feet but not exceeding 10 days	Infiltration only
100 feet or less	None

Source: Miami-Dade County Ordinance, Section 24-43, Table C-1.

Liquid Waste Storage Disposal or Treatment Methods other than septic tanks utilized for the disposal discharge, storage or treatment of domestic sewage, sanitary sewer lift stations; and public sanitary sewers are subject to the following provisions:

Notwithstanding the grandfathering provisions of the wellfield protection ordinance, liquid waste storage, disposal or treatment methods (other than septic tanks utilized for the disposal discharge, storage or treatment of domestic sewage; sanitary sewer lift stations, and public sanitary sewers) are prohibited within the wellfield protection area.

8.4.6 Prohibition of Hazardous Materials Within Wellfield Protection Areas

Notwithstanding any provisions of the Wellfield Protection Ordinance, no County or municipal officer, agent, employee or Board shall approve, grant or issue any building permit, certificate of use and occupancy (except for changes in ownership), municipal occupational license (except for changes in ownership), platting action (final plat, waiver of plat or equivalent municipal platting action) or zoning action (district boundary change, unusual use, use variance or equivalent municipal zoning action) for any nonresidential land use, other than a bona fide agricultural land use, a bona fide rockmining use (lake excavation), a public sewer facilities use, or a public water supply facilities use, within the Northwest Wellfield protection area or within the West Wellfield Interim protection area or within the outer wellfield protection zone of the South Miami Heights Wellfield Complex, or within the maximum day pumpage wellfield protection area of the Alexander Orr Wellfield, Snapper Creek Wellfield, Southwest Wellfield, Miami Springs Lower Wellfield, John E. Preston Wellfield, or Hialeah Wellfield or within the basic wellfield protection area of any public utility potable water supply well, without obtaining the prior written

approval of the Director or the Director's designee. The Director or the Director's designee shall issue the Director's or the Director's designee's written approval only if the Director or the Director's designee determines that the nonresidential land use is in compliance with Sections 24-43(5)(a), 24-43(5)(b) or 24-43(5)(c).

Approval by the DERM is required for any non-residential use, excluding agricultural and rock mining uses, within the maximum day pumpage wellfield protection area. This approval is required of any land use which generates, handles, disposes of, discharges or stores hazardous materials. Approval is granted only if the DERM determines that all potential sources of pollution will be located as far away as is reasonably possible from all potable water supply wells; that hazardous materials will not be used generated, handled, disposed of, discharged or stored on that portion of the property; and that the following water pollution prevention and abatement measures are addressed:

- monitoring and detection of water pollution caused by hazardous materials;
- secondary containment of water pollution caused by hazardous materials;
- inventory control and record keeping of hazardous materials;
- stormwater management of water pollution caused by hazardous materials; and
- protection and security of facilities utilized for the generation, storage, usage, handling, disposal or discharge of hazardous materials.

Replacement, modification or limited expansion of existing facilities which will substantially reduce the existing risk of pollution from hazardous materials are reviewed by the DERM based on the following criteria:

- whether the proposed replacement, modification or limited expansion of the facility will provide adequate and increased monitoring and detection of pollution which may be or which has been caused by the hazardous materials on the property;
- whether the proposed replacement, modification or limited expansion of the facility will provide adequate and increased secondary containment of pollution which may be or which has been caused by the hazardous materials on the property;
- whether the proposed replacement, modification or limited expansion will provide adequate and increased inventory control and record keeping of hazardous materials on the property;
- whether the proposed replacement, modification or limited expansion will provide adequate and increased stormwater management of pollution which may be or which has been caused by the hazardous materials on the property; and

- whether the proposed replacement, modification or limited expansion will provide adequate and increased protection and security of the facilities utilized for the generation, storage, usage, handling, disposal or discharge of hazardous materials on the property.

8.4.7 Excavation

Excavation activities within the Wellfield Protection Areas require approval from the DERM and must comply with the following requirements:

- The property upon which the excavation has occurred or will occur and that portion of the property which has not been excavated or will not be excavated shall be provided with protection and security measures to prohibit the handling, disposal of, discharge storage of hazardous materials, solid waste, or liquid waste in the excavation area or on the property which has not been excavated or will not be excavated. Said protection and security shall be subject to the approval of the director or his designee;

- Furthermore, the owner of the property upon which the excavation has occurred or will occur and that portion of the property which has not been excavated or will not be excavated in form(s) prescribed by the director and approved by the Board of County Commissioners. The covenants shall be recorded in the public records of Miami-Dade County, Florida, by the DERM at the expense of the owner of the property upon which the excavation is to occur; or

- The excavation has a valid excavation permit or equivalent municipal permit for excavation and a valid Class IV permit, if required by Article II of the Wellfield Protection Ordinance, which was obtained prior to September 30, 1983, which permits have been valid and continuously in full force and effect since their issuance.

8.4.8 Pipelines for Hazardous Materials

Notwithstanding the grandfathering provisions of the Potable Water Supply Well Protection Ordinance, no installation, construction or operation of any pipeline or portion of pipeline used for the transmission or storage of any hazardous materials within the basic wellfield protection area is allowed. The grandfathering provisions provide that pipelines constructed prior to July 13, 1984, the effective date of the ordinance, are not subject to the ordinance and can remain operational.

8.4.9 Prohibition of Resource Recovery and Management Facilities within Wellfield Protection Areas

Notwithstanding the grandfathering provisions of the Potable Water Supply Well Protection Ordinance, no permits are issued for any resources recovery and management facility within the basic wellfield protection area of any public utility water supply well. The grandfathering provisions of the ordinance provide that valid permits for resource recovery facilities issued no later than March 12, 1987, may be renewed.

8.5 Potable Water Supply and Treatment Facilities

[Rule 9J-5.011 (1)(c),(d) and (e), F.A.C]

8.5.1 The Florida Keys Aqueduct Authority

The Florida Keys Aqueduct Authority (FKAA) is the sole supplier of potable water to the County. The primary purpose of the FKAA is to obtain, supply, and distribute an adequate water supply for the Florida Keys. The service area of the FKAA includes all of the lands within the County, but the Authority has the power to obtain potable water outside of its boundaries and transmit it for sale within its geographic boundaries, and also to serve customers residing within one mile of its existing pipeline and wellfield at Florida City in Miami-Dade County. The dominant land use classification within the service area remains conservation and residential. Commercial, education, industrial, institutional, military, public facilities, and recreational uses are also served.

Since the County is a consumer, (a shared facility user), any proportional capacity analyses are initially based on the service area population. Therefore, consumption rate of unincorporated Monroe County is factored by its percentage share of the FKAA total service area population.

The FKAA's source of water for withdrawal is the Biscayne and Floridan Aquifers. The South Florida Water Management District (SFWMD) regulates water withdrawal from the aquifers through the issuance of Consumptive Use Permits (CUP). The Consumptive Use Permit currently in effect (SFWMD Water Use Permit No. 13-00005-W) was issued on March 13, 2008, and is valid for a twenty year period ending March 13, 2028. This permit is actually a re-issuance of a permit granted by SFWMD on November 14, 2002. The current permit contains an annual withdrawal of 8.751 billion gallons per year, an average monthly allocation of 809 million gallons, or 17.79 MGD and an average dry season (December 1 – April 30) of 17 MGD.

The following schematic shows the FKAA's facilities and water production and distribution system excerpted from the Authority's 2008 Application for Water Use Permit Modification and Renewal. The FKAA system components are shown in **Figure 8.2**. The entire system consists of wells, pumps and storage tanks at Florida City, which connects to the water treatment facility and then to main and distribution lines, pump stations, and various storage tanks along the chain of keys to Key West.

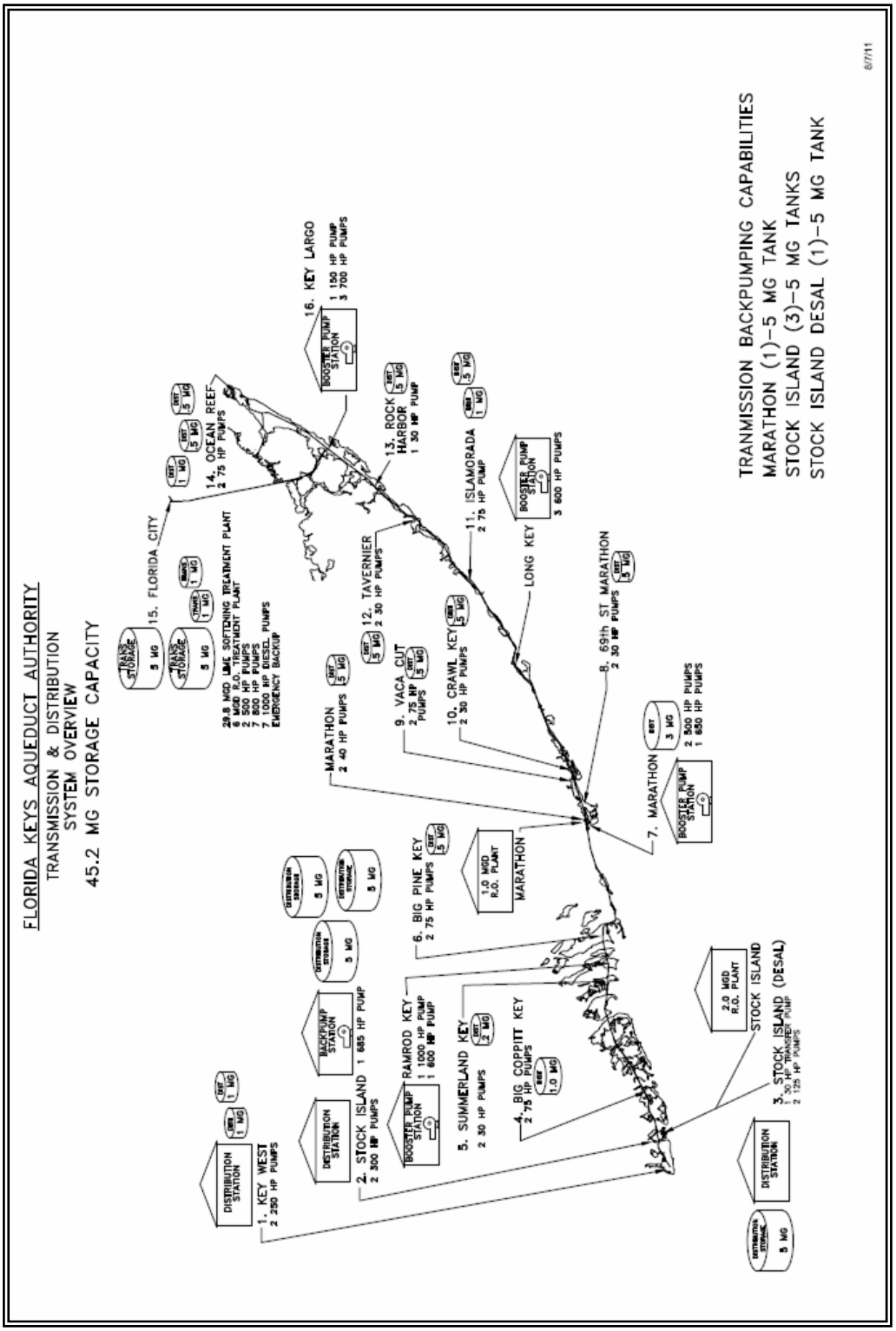


Figure 8.2 - FKAA Facilities

Source: Florida Keys Aqueduct

8.5.2 Florida City Wellfield

The primary raw water source for the system is a wellfield withdrawing from the Biscayne Aquifer west of Florida City in southeast Miami-Dade County. The aquifer consists of highly permeable limestone and underlies most of Miami-Dade and Broward Counties. The aquifer, approximately 75 feet thick at the FKAA wellfield, is recharged directly by rainfall, the network of SFWMD canals, and ground water seepage. The aquifer discharges through evapotranspiration, drainage and seepage to the Florida and Biscayne Bays, and by wellfield pumping.

A condition of the SFWMD CUP requires FKAA to monitor and submit data from the Salt Water Intrusion Monitoring (SWIM) program to the SFWMD on a monthly basis. In accordance with an additional condition of the permit FKAA is implementing a Saline Water Intrusion Monitoring Program (SALT) that utilizes 15 monitoring wells to measure any movement of the saline water interface. The SFWMD criterion to prevent saltwater intrusion is that one-foot head of fresh water be maintained between the wellfield and the saline water source. Saltwater intrusion usually results from a sustained decrease in fresh water head, allowing saltwater to migrate inland. Results of groundwater modeling indicate that drawdowns associated with increased withdrawals are minimal. The FKAA in cooperation with the United States Geologic Survey (USGS) maintains a ground and surface water quality monitoring network around the wellfield that is sampled monthly.

The network consists of ten FKAA wells and nine USGS wells that include two wells with continuous water level recorders. From the data included in the 2008 Application for Water Use Permit Modification-Renewal, it was concluded that in 2008 the 1,000 mg/lisochlor was estimated to be six miles southeast of the wellfield and was in approximately the same location as was reported in 1974.

8.5.3 Water Treatment and Storage Facilities.

The Florida City Water Treatment Plant (FCWTP) underwent extensive modification completed in August 1989 and is the sole water treatment facility utilized by the FKAA. The FDEP rated capacity for the FCWTP is 23.8 MGD. The FCWTP uses a process of lime softening followed by filtration as the core of its treatment process. Water disinfection is accomplished through contact with free or combined chlorine. Fluoridation is also provided to reduce the incidence of dental cavities.

The raw water flow rate is measured at each well discharge line by electronic, propeller type flow meters. A raw water metering facility measures total flow into the treatment system. Following treatment, the total treated water is pumped to the transmission main and measured with a flow meter. Finally, water consumption is measured with a meter at the end user location.

The raw water quality in the Biscayne Aquifer continues to be acceptable for potable water supply. Prior to treatment, this water meets all federal and state primary and secondary

water quality standards. In addition to governmental quality standards, potable water should appeal to the public: clear, colorless, pleasant to the taste, cool, non-staining, and convenient to use. The raw water supply at Florida City is also capable of satisfying all these criteria with minimal treatment. However, the total hardness of the raw water does pose problems with the longevity of the infrastructure. The raw water hardness at Florida City, 280 mg/l as CaCO, exceeds what is normally considered the desirable range for domestic use. The American Waterworks Association suggests a finished water hardness goal of 100 mg/l as CaCO for distribution. The Florida City Treatment Plant currently produces finished water with a total hardness between 80 mg/l and 110 mg/l as CaCO.

In order to comply with Biscayne Aquifer withdrawal limitations, a new Floridan wellfield and reverse osmosis (RO) water treatment process were recently constructed. Operational since the fall of 2009, the RO water treatment plant treats the brackish water of the Floridan Aquifer. The Floridan raw water contains approximately 4,000 to 5,000 parts per million of salts. This concentration is significantly lower than the 35,000 ppm typically found in seawater. This RO system utilizes very fine membrane elements mounted on RO system skids. The water is pressurized to approximately 250 pounds per square inch (psi) rejecting the salt while allowing the passage of the pure finished water. The RO water is disinfected in the same manner as the Biscayne lime-softened water. Finished water from the RO process is blended with water treated from the Biscayne Aquifer.

Storage facilities maintained by the FKAA have a total storage capacity of 45.2 MG; of this amount, there is 12 MG of storage available in above ground storage reservoirs at Florida City. The remaining capacity is obtained from tanks located throughout the transmission and distribution system that provide an additional 33.2 MG of storage capacity.

The FKAA is a closed system that does not have any interconnects with other water supply systems. FKAA also operates emergency pumping stations located at Florida City, Key Largo, Long Key, Marathon, Ramrod Key and Stock Island.

8.5.4 Reverse Osmosis Water Treatment Facility

The FKAA has two RO desalinization plants located in Marathon and on Stock Island. The treatment plants have a total capacity of 3.0 MGD and are maintained on a standby condition. In the 1980's the Stock Island RO plant was originally constructed to provide 3.0 MGD of additional treated water while the 18" transmission system was being upgraded in 1983. The RO plant was then mothballed. In the early 2000's the FKAA rehabilitated the Stock Island RO plant and relocated a portion of the capacity to Marathon. The emergency Stock Island and Marathon RO treatment capacities are 2 MGD and 1 MGD respectively.

8.5.5 Water Transmission and Distribution

The FKAA distributes potable water from the treatment plant to the Keys via a 130-mile, large-diameter main running the length of U.S. 1 that is connected to a series of storage and

pumping facilities. A separate network of small distribution lines on each Key connect to the transmission main.

The current transmission system in the Middle and Upper Keys consists of 36-inch and 30-inch-diameter transmission mains along U.S. 1 and a 12-inch-diameter transmission main along Route 905 to Ocean Reef. These transmission mains were constructed in the early 1980s. The current transmission system continues with 24-inch-diameter transmission mains that were constructed in the Lower Keys in the late 1980s and mid-1990s. Approximately 52 miles of the original 18-inch-diameter transmission main are still in service and supplement the newer 36-inch to 24-inch-diameter transmissions mains to meet the increasing water demands of the Keys.

8.6 FKAA System Status

[Rule 9J-5.011 (1)(d), F.A.C]

8.6.1 Impact of FKAA Florida City Wellfield on Adjacent Users

FKAA has evaluated the impacts of its Florida City Wellfield on adjacent users of the Biscayne and Floridan Aquifer System. Regional groundwater flows at the site are towards the southeast. The aquifer's ability to yield water in this area is extremely high and it has been ranked as one of the most permeable in the world (Klien and Hull, 1978: USGS WRI 78-107). Pumping tests conducted by FKAA at the site since 1987, as part of a well replacement program, supports the Klein and Hull analysis.

To project the impacts from the proposed allocation on adjacent users, FKAA staff simulated the projected drawdown cone. The intent of the model parameters was to approximate worst case conditions, 90 days of maximum pumpage with no recharge from rainfall or canals. FKAA concluded that the potential for adverse impacts on adjacent legal users as a result of the approved allocation is minimal. The existing legal users were identified by FKAA and were addressed in the predicted drawdowns.

For the Biscayne Aquifer, per the SFWMD Consumptive Use Permit (CUP), the available drawdown availability is approximately 81 feet. A maximum volume of water utilization of 17.79 MGD withdrawal therefore will not exceed the yield capacity of the aquifer. The water resource availability of the Biscayne Aquifer is not expected to be exceeded as a result of the withdrawal of the recommended allocation. For the Floridan Aquifer, a simulated withdrawal of 10.27 MGD resulted in a drawdown of approximately 15 feet. The available drawdown in the aquifer is approximately 929 feet. The potential for harm to occur to the water resource availability of the Floridan Aquifer System as a result of the withdrawal of the recommended allocation is considered minimal.

FKAA therefore concluded that the potential for adverse environmental impacts or impacts on existing legal users as a result of their proposed allocation is minimal.

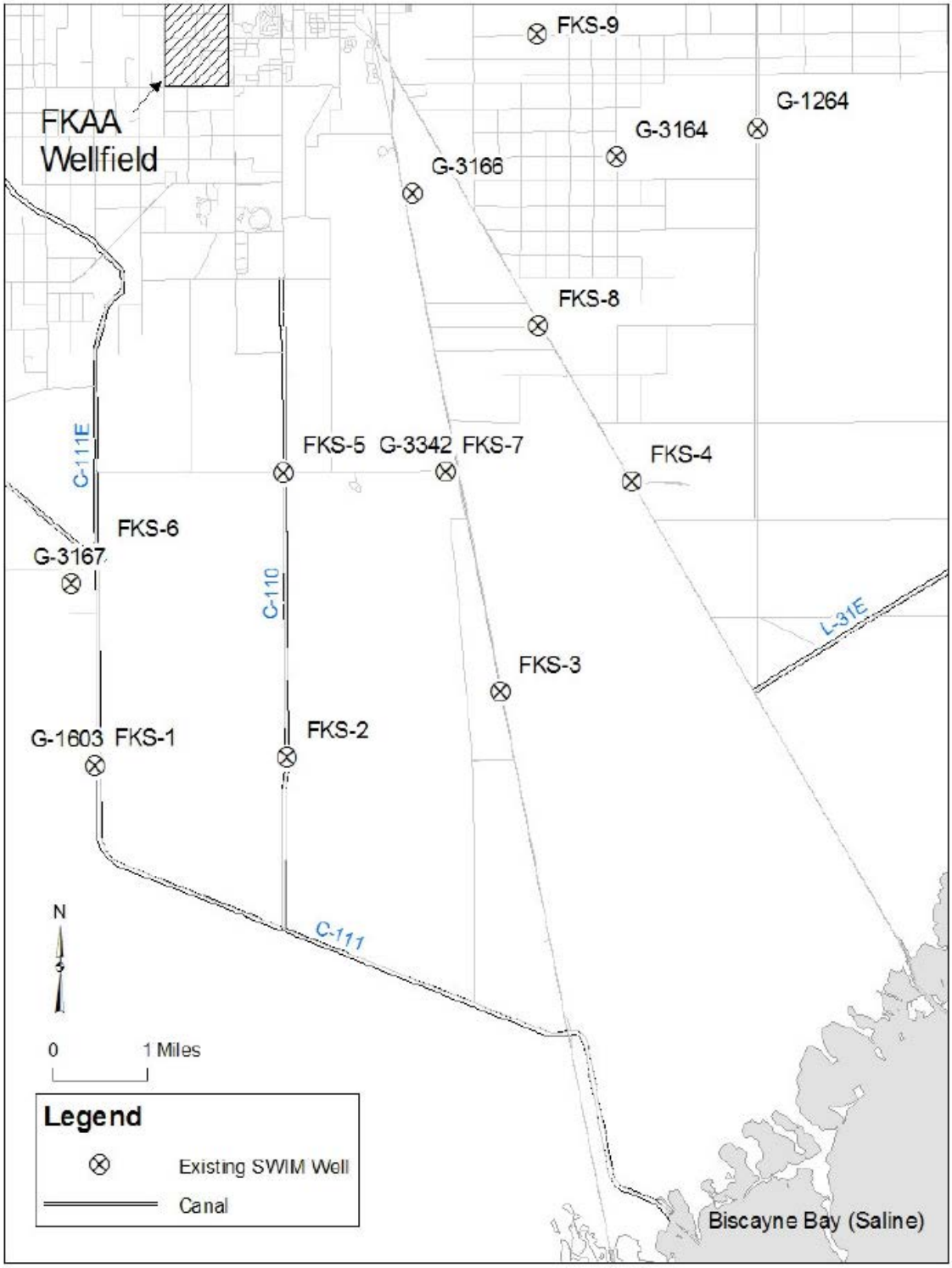
8.7 Water Quality

[Rule 9J-5.011 (1)(f), F.A.C]

8.7.1 Salt Water Intrusion

FKAA employs a Saltwater Intrusion Monitoring (SWIM) network consisting of 15 wells. (see locations depicted on **Figure 8.3**). The FKAA monitors water levels, chloride concentrations, and conductivity between the wellfield and the saltwater source. Variations in chloride and conductivity have been recorded as the saltwater fronts moves past the sampling zone. Because of these variations, collected water samples may not be representative of the actual fresh-saltwater interface.

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Source: Florida Keys Aqueduct Authority,

Figure 8.3 – FKAA Florida City Monitoring Network

8.8 Potable Water System Improvements

[Rule 9J-5.011 (1)(f), F.A.C

8.8.1 FKAA Capital Improvements Plan

The FKAA has a long range capital improvements plan which addresses both distribution systems and transmission and supply systems improvements through the year 2020. The program's projected expenditures total is $208.6 million, with $47.5 million earmarked for distribution system improvements and $33.5 million earmarked for pump and storage improvements. The capital improvements plan is to be funded by system development fees and the existing surcharge on water sales. The FKAA Capital Improvements Program for the next 5 years is presented in **Table 8.4.**

The FKAA assesses System Development Fees to new and existing customers who modify, add or construct facilities which impose a potential increased demand on the water system. This fee is charged in order to equitably adjust the fiscal burden of new pipeline and to expanded or improve appurtenant facilities between existing customers and new water users.

All System Development Fees are allocated to the direct and indirect cost of capital improvements made necessary by actual and expected increased demand on the water system. In addition, the FKAA is authorized to charge tapping fees, meter test fees, and investigation fees.

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Table 8.4 - FKAA Budget and Financial Plan – FY ending September 2011

Description	2011	2012	2013	2014	2015	Five year total expenditures
AMI meter replacement	$2,000,000	$2,000,000	$2,000,000	$1,500,000		$7,500,000
Distribution replacements	$2,000,000	$2,000,000	$2,000,000	$2,000,000	$2,000,000	$10,000,000
Distribution replacement (accelerated	$1,724,000	$2,446,800	$1,110,000			$5,280,800
Marathon RO improvements	$1,000,000					$1,000,000
Stock Island RO plant upgrades	$500,000					$500,000
Boca Chica Bridge – 24" WM	$1,800,000					$1,800,000
Key West 18" main replacement (N.	$3,700,000					$3,700,000
Key West Administration building	$700,000					$700,000
Reclaimed water system – Duck Key, Big	$1,500,000	$1,500,000				$3,000,000
Sewer lateral connections for Marathon &	$135,000					$135,000
Hawk's Cay advanced water treatment &	$1,268,500					$1,268,500
Pump station & force main to connect Navy	$100,000					$1,300,000
Property for expanded Navy capacity at Big	$1,000,000					$1,000,000
Property for expanded Navy capacity at Big	$1,000,000					$1,000,000
Navy Water Improvements	$677,000	$677,000	$677,000	$677,000	$677,000	$3,385,000
North Key largo 12" water main		$250,000	$500,000			$750,000
Florida City 5 mg storage tank			$2,600,000	$2,600,000		$5,200,000
Marathon 4 mg storage tank					$4,100,000	$4,150,000
Marathon customer service building				$3,000,000 $50,000	$1,000,000	$4,000,000
TOTAL	$19,104,500	**$10,073,800**	$8,887,000	$9,827,000	$7,777,000	$55,669,300

Source: FKAA

8.8.2 Fire Flows

The FKAA has not had sufficient water pressure to provide fire protection throughout the Keys. The following **Table 8.5** chart provides the parameters for the new and proposed (upgraded) systems.

Table 8.5 – Fire Protection Parameters for Selected Distribution Systems throughout the Keys

Distribution System	Fire Flow Rate for 2-hour Duration (gpm)	Required Storage Volume (gal)
Lake Surprise – Between Adams Cut and Lake Surprise	1,000	120,000
Rock Harbor	1,000	120,000
Tavernier	500	60,000
Plantation Key	500	60,000
Lower Matecumbe	500	60,000
Duck Key/Grassy Key	750	90,000
Marathon, Crawl Key	1,000	120,000
Marathon, 69th Street	500	60,000
Marathon, Vaca Cut	1,000	120,000
Marathon, 33rd Street	1,000	120,000
Ramrod Key	500	60,000
Summerland Key	500	60,000
Upper Sugarloaf Key	500	60,000
Lower Sugarloaf Key	500	60,000
Stock Island Distribution	1,000	120,000

Source: FKAA 20-Year Water System CIP Master Plan, December 2006
Monroe County, FL, 10 Year Water Supply Facilities Work Plan, May 2009

The FKAA and Monroe County had entered into entered into an agreement in September 2007, for installation and maintenance of fire hydrants in unincorporated Monroe County. This agreement acknowledges the majority of the water distribution system is not designed to provide fire flow and FKAA does not guarantee fire flow and purpose of the fire hydrants will be to provide various locations to fill fire fighting apparatus. The agreement continues stating the County Fire Rescue will recommend fire hydrant locations for proposed plans on the Distribution system, while FKAA will evaluate the technical and economic feasibility of the recommended locations. Only

hydrants that are determined to be technically feasibly will be installed and the County will fund any hydrants found to be technically feasibly but not economically feasible. Technical feasibility will be based on a 250 GPM and pressure of 20 PSI. The agreement continues to define funding and maintenance fee responsibilities between the County and the FKAA.

8.8.3 Storage

The FKAA Master Plan for Water Supply, Treatment and Transmission Facilities proposes increased storage capacity, to a total goal of 90 MG in the year 2025. This will provide for reliable service for distribution during plant or power outages, supplying 10 days of storage at 50 percent of the annual average daily flow in the year 2010. The total storage requirements will be divided between transmission and distribution systems. Fifty percent of the total storage capacity will be accessible to the transmission system for pumping and backpumping during plant and pipeline outages. The remaining 50 percent will be within the distribution system.

8.9 Water Conservation Programs

[Rule 9J-5.011 (1)(h), F.A.C]

The Water Resources Act of 1972, Chapter 373, F.S. formally designated the conservation of water as a key policy of the state and mandated that state and regional water resource agencies take steps to prohibit wasteful and unreasonable uses of the state's water supply. For South Florida, the adoption of the act thrust the SFWMD into a lead role in water supply planning and regulation.

Water conservation is a high priority in SFWMD policy and rules as well as in DEP rules, in keeping with the statutory mandate. To maximize the reasonable and beneficial uses of water, the SFWMD applies water conservation related criteria District-wide.

As part of its efforts to conserve freshwater resources in areas of high demand, the SFWMD will continue to analyze and support the development of alternative water sources such as use of Floridan Aquifer withdrawals reverse osmosis and use of reclaimed water. Also, as noted below, the SFWMD will continue to investigate and support other supply augmentation alternatives. The development of other supply sources, however, does not lessen the requirements for conservation and efficient water uses. As discussed below, inefficient or wasteful uses of water are not considered reasonable or beneficial.

A related concept found in Florida's water use policy is the use of the lowest quality water available and appropriate for a specific use. This policy, for example, encourages the replacement of high quality ground water with treated wastewater for irrigation purposes if a feasible source is available. The effect of this policy is to optimize the utilization of available resources by requiring diversification of sources.

The SFWMD identifies areas that have or will experience water supply problems in the next 20 years. During the past decade, the use of potable water for lawn and landscape irrigation has drawn extensive attention, culminating in new Year Round Water Conservation rules, Rule 40E-2 and 20, F.A.C., and has been the focus of numerous conservation campaigns. These efforts have included water shortage awareness campaigns and Florida-Friendly (low-irrigation landscaping) programs. These types of aggressive water conservation/efficient uses campaigns are supported by the Potable Water policies in the Policy Document.

The SFWMD will continue to work closely with local governments to encourage programs to reduce demands, develop alternative supply sources, protect environmental resources and otherwise carry out the Potable Water policies contained in the Policy Document.

The SFWMD imposed as a limiting condition on the Consumptive Use Permit issued in March 2008, a requirement for continued use and updating of the water conservation plan within the FKAA service area. The FKAA prepared its latest Water Conservation Plan in March 2007. The next sections (8.9.1 – 8.9.7) review the major components of the Water Conservation Plan.

8.9.1 Leak Detection

Leaks in the transmission/distribution system have historically contributed to tremendous losses in potable water; losses that have now been substantially reduced by an aggressive leak detection program. The FKAA has implemented Advanced Metering Infrastructure (AMI) technology that not only assists the FKAA in leak detection but also notifies customers of potential leaks on the consumer-side of the meter. Routine leak detection investigations are performed in each area of the County. Monthly reports are submitted to the FKAA Operations Department and filed for future reference. Two people are assigned the responsibility of leak detection, with assistance available from the Operations personnel. A detection device was utilized in 1985, during which time FKAA unaccounted for water (leaks) totaled 33 percent based on production versus sales. The latest figures available indicate an average unaccounted for water figure of 13 percent signifying a dramatic reduction in water loss from leaks.

8.9.2 Public Information Program

Since 1988, the FKAA has made available Water Conservation Kits that include a shower flow restrictor, a toilet tank water bag, and leak detector dye tablets. The aqueduct immediately informs customers when their water consumption exceeds four times their average bill. Additionally, the Aqueduct educates the customer on conservation and leak troubleshooting and will meet the customer onsite if desired. The Aqueduct conducts educational seminars and presentations at schools

throughout the County and distributes informational pamphlets and water conservation activity books.

8.9.3 Florida-Friendly Landscape Ordinance/Permanent Irrigation Ordinance

As defined by Section 373.185, F.S., the State's Water Management Districts are required to design and implement incentive programs to encourage local governments to adopt a "Florida Friendly" Landscape Ordinance. Currently, Monroe County does not have a Florida-Friendly landscape ordinance or a permanent irrigation ordinance, but intends to develop such regulations with input from the FKAA, SFWMD, and other appropriate agencies. Section 114-102 of the current Monroe County Land Development Code requires that 70 percent of the plant materials used to satisfy landscaping requirements for new development will be native species which require little irrigation. Florida-Friendly landscaping involves the utilization of plants which require little water or grouping plants according to their water needs thus irrigating more efficiently.

Additionally, the County has a water conservation component of the Nonresidential Rate of Growth Ordinance (Section 138-47). The intent of this ordinance is to encourage the planting of native vegetation and promote water conservation. The graded scale (points) are assigned to the project based on the percentage of native landscape plants on the property beyond that is required within landscaped bufferyards and parking areas.

A water efficient irrigation system can be achieved through an irrigation system audit and calibration program. Of the 45,000 accounts within the FKAA service area approximately 600 have some form of landscape irrigation system, of which approximately 100 are not supplied by the FKAA's potable water system. Irrigation system auditing would include testing of the water source for pressure and output rate, testing sprinkler heads for precipitation rate and coefficient of uniformity and setting irrigation zones for proper times and frequencies. Using the SFWMD Blaney Criddle model as the ideal irrigation requirement, a 5,000 square foot lot would take a technician approximately two hours to complete an audit. Based on a study conducted in Hillsborough County, Florida, which documented water savings resulting from a calibrated and properly scheduled irrigation system, an average of 27 percent water savings would result at each participating home. Assuming that outdoor water use is approximately 25 percent of the consumer total use, potential water savings per home would be approximately 4,000 gallons per year.

8.9.4 Plumbing Fixture Efficiency Standards

As stated above, the County's plumbing fixture standards require the installation of ultra-low volume fixtures for all new construction. The projected average monthly water consumption reduction per residential unit is expected be approximately 15 gallons per capita per day.

8.9.5 Filter Backwash Recycling

Recycling of the filter backwash and sludge decant from the sludge thickeners is performed continually at the Florida City Water Treatment Plant.

8.9.6 Reuse of Wastewater

In an effort to provide the highest quality potable water while reducing the environmental impact associated with increased aquifer withdrawals, the FKAA is constantly seeking out viable Alternative Water Supplies (AWS). This includes reclaimed water for reuse and wastewater recycling. As stated in the FKAA conservation plan, the benefits of using reclaimed water include the disposal of effluent in an environmentally friendly manner, extending the life of drinking water supply sources, postponing costly additional potable water infrastructure, and providing an irrigation supply during drought restrictions. At the time, the Monroe County Wastewater Master Plan concluded that reclaimed water was not feasible to install, operate, and maintain in the Florida Keys/Monroe County. Currently the FKAA evaluates each of its wastewater service areas to determine ways to implement and feasibly provide reclaimed water for its customers. Both the Big Coppitt Wastewater Treatment Plant and the Hawk's Cay/Duck Key Wastewater Treatment Plant are water reclamation facilities providing reclaimed water to a portion of their service areas. The Cudjoe Regional Wastewater Treatment Plant, once constructed, will also serve as a water reclamation facility, providing reclaimed water to a portion of the service area.

8.9.7 Metering

The FKAA has the capability to meter raw water withdrawal and finished water production into the transmission lines at the Florida City Water Treatment Plant. Point of delivery metering is accomplished at every consumer within the FKAA system. The metering data is utilized in the preparation of the monthly unaccounted for water report.

8.10 Proposed Level of Service

[Rule 9J-5.011 (1)(e)(5), F.A.C]

8.10.1 Water Quality Level of Service

Potable water quality can be expressed in terms of the water quality standards as defined in Chapter 62-550 of Florida Administrative Code, "Safe Drinking Water Act". This legislation was promulgated in order to assure that public drinking water systems meet minimum drinking water requirements.

The United States Environmental Protection Agency (EPA) is expected to enforce recently adopted federal drinking water standards under the 1996 Safe Drinking Water Act. These standards, when in effect, will supersede all other drinking water standards.

The water quality LOS standards for the County are as follows:

- Minimum potable water quality shall be as defined by the U.S. Environmental Protection Agency.

- The FKAA's construction of new treatment facilities has achieved the following planned objectives:

  - Produce finished water that meets all primary and secondary water standards including trihalomethanes;

  - Provide full treatment including softening and filtration;

  - Produce stable non-corrosive water for distribution; and

As a condition of the SFWMD CUP, and consistent with the 2005-2006 Lower East Coast Water Supply Plan Update (February, 2007), the FKAA must be compliant with the Minimum Flows and Levels Recovery Plan, Rule 40E-8, F.A.C. with its water resource operations. Any changes to the recovery plan by SFWMD will require a modification to the CUP, to remain consistent with the provisions of Chapter 373, F. S.

8.10.2 Water Quantity Level of Service

The potable water quantity LOS methodology was developed in conjunction with the SFWMD and the FKAA, from which the data was obtained.

The potable water LOS is divided into two categories: residential in gallons/capita/day, and nonresidential, expressed in gallons/square foot/day. Residential use is defined as permanent and seasonal residences including single

family, multifamily, senior, and mobile homes. Nonresidential is defined as commercial use with hotels and motels included in this category and the Navy and governmental uses excluded due to their uniqueness and their projected constant consumption rates.

The residential LOS is based on the permanent population plus the portion of the seasonal population living in residences. The seasonal number is defined as the average daily seasonal population living in residences on an annual basis. This level is 57.0 gallons/capita/day.

The nonresidential LOS is based upon building square footages of commercial space in the unincorporated County including hotels and motels. This level is 0.29 gallons/square foot/day.

The overall consumption goal for the system is 86.00 gallons/capita/day.

8.10.3 Potable Water Level of Service Standards Table

Table 8.6 - Potable Water Level of Service Standards

Residential LOS	66.5 gallons/capita/day
Non-Residential LOS	0.35 gallons/square foot/day

Note:
Equivalent Residential Unit: 149 gallons per day (2.24 average persons per household X 66.5 gallons/capita/day)

Table 8.7 - Goal Potable Water Consumption

Residential	57 gallons/capita/day
Non-residential	.29 gallons/square foot/day
Overall	86 gallons/capita/day

Source: FKAA

8.11 Present and Projected Future Ability to Meet Level of Service Standards *[Rule 9J-5.011 (1)(f), F.A.C]*

8.11.1 Alternative Water Supplies

The alternatives for persons living in the Keys who do not obtain water from FKAA are cisterns, home desalination systems, and bottled water for potable use with a supplemental well used for toilets and showers.

The groundwater in the Keys is characteristically high in hydrogen sulfide which is very corrosive to fixtures if used untreated. For this reason, home reverse osmosis plants are useful in the Keys. DEP permits these plants, but FKAA estimates that only

a handful are presently in use in the Keys. Monroe County has recently undertaken a plan to inventory all wells and cisterns so that the extent of these forms of alternative water supply use will be known.

Because the County does not own or operate any portion of the water supply, treatment, or distribution system, and is merely a retail customer of the FKAA, the requirements to "evaluate the degree to which the County has implemented the work plan for building public, private, and regional water supply facilities" is not applicable. The County will continue to support the FKAA and participate in conservation and other potable water initiatives sponsored by the Authority.

8.11.2 Florida Keys Carrying Capacity Limitations, Facilities Inadequacies and Policy Constraints

The active Consumptive Use Permit (Limiting Condition Number 25) indicates that the allocation contained in SFWMD Water Use Permit No. 13-00005-W is, "… based on the population projections from in the Monroe County Planning Department at the time of the application in 2008". This permit is subject to modification if the population projections within the plan are revised or modified and at the time of renewal, prior to March 2028.

8.11.3 Projected Demand

The future potable water demand was calculated for the current year using the established LOS of 66.66 gallons/capita/day for residential and 0.35 gallons/square foot/day for non-residential. The 20 year planning period (2005-2025) depicted in the County's 2009 Water Supply Plan (May 2009), and the FKAA 20-Year Water System Capital Improvement Plan, indicated the demand was calculated using the projected water demand rate accounting for the FKAA leak detection program which has a goal of 10 percent unaccounted for water. These demand projections also concurs with the total Unincorporated Functional Population Project with this Comprehensive Plan. A summary of future water supply demands are provided in **Table 8.8**.

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Table 8.8 - Future Potable Water Supply Needs

	2010	2015	2020	2025	2030
FKAA Service Population*	157,933	158,511	159,091	159,674	160,173 #
Unincorporated County Population **	69,923	70,445	70,951	71,458	71,964
% Population Unincorporated	44%	44%	45%	45%	45% #
Average Daily Flow – Total System (MGD) *	20.07	22.08	23.41	23.88	24.34 #
Average Daily Flow – Unincorporated County (MGD)	8.89	9.81	10.44	10.69	10.94 ##

* SFWMD Consumptive Use Permit Application Number: 050329-23 (FKAA), March 2008
** Population Projections Unincorporated Monroe County, August 30, 2010
# Extrapolated Value
Interpolated Value

The projected Finished Water Demand is expected to increase to 22.08 MGD in 2015 and 23.41 MGD in 2020.

8.11.4 Needs, Goals and Opportunities

A primary goal of the County will be to continue to support the FKAA in fulfillment of their statutory obligation and authority to provide for safe, high quality and adequate supply, treatment, distribution, and conservation of potable water to meet the needs of present and future residents. The County shall also ensure that at the time of development permit issue, adequate potable water supply is available for the proposed use at the adopted level of service.

The County will continue to utilize the following goals in addressing system needs. These shall include:

- Implement a concurrency management system that is consistent with the South Florida Water Management District Lower East Coast Regional Water Supply Plan and Florida Keys Aqueduct Authority 20-year Water System Capital Improvement Master Plan;

- Prepare and maintain a 10-year Water Supply Work Plan that identifies alternative water supply projects, traditional water supply projects, conservation, and reuse necessary to meet the Monroe County Unincorporated Area water supply needs, consistent with the SFWMD Lower East Coast Regional Water Supply Plan and the FKAA 20-year Water System Capital Improvement Master Plan;

- Secure funding through all available means, including but not limited to, grants, loans and user assessments to assure the completion of capital improvement projects in accordance with the County CIP priority and timeline; and

- Update the 10-year Water Supply Work Plan every 5 years or within 18 months after the governing board of the SFWMD approves an updated regional water supply plan.

- Finally, the identified goals for Potable water supply and distribution include:

  All distribution pump stations and upgrades to distribution lines will be designed to provide opportunities for fire protection.

  - Proposed Fire Protection Areas:
    1. Key West and Stock Island (current fire flow areas)
    2. Everywhere on US 1, except non-developable areas
    3. Ocean Reef
    4. Key Colony Beach
    5. Layton
    6. Marathon
    7. Duck Key
    8. Tavernier

  - Proposed Fire Flow Requirements by Land Use Zone:
    1. Suburban Residential 750 gpm
    2. Mobile Home, Recreational Vehicle 1,500 gpm
    3. Urban Commercial, Suburban Commercial, and Commercial 2,000 gpm

- All commercial facilities not along US 1 shall provide "on site" fire abatement, as currently required. In all other areas, the FKAA water system shall not be considered even as a future primary fire abatement source; however, all future water main upgrades will be designed and constructed so as to provide approximately 250 gpm and 20 psi to extreme locations.

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Bibliography

Florida Keys Aqueduct Authority, "Water Conservation Plan," March 2007.

Florida Keys Aqueduct Authority, Strategic Plan, November 20, 2007.

Florida Keys Aqueduct Authority, FKAA Water Sold Report August 1991

Florida Keys Aqueduct Authority, Unaccounted for Water Report, 2009

Florida Keys Aqueduct Authority, Wellhead Protection Program, February 2010.

Florida Keys Aqueduct Authority, 20-year Water System Capital Improvement Master Plan, December 2006.

South Florida Water Management District, Lower East Coast Water Supply Plan, 2005-2006 Update

Klein and Hull. 1987. Biscayne Aquifer, Southeast Florida. USGS WRI 78-107, PB 291250.

Monroe County, FL, 10-Year Water Supply Facilities Work Plan, May 2009

Miami-Dade County, Miami-Dade County Potable Water Supply Protection Ordinance, 1987.

Miami-Dade County, Water, Sewer and Solid Waste Element, April 1988.

South Florida Water Management District, "Water Use Permit Reissue #13-00005-W," issued to the Florida Keys Aqueduct Authority, March 10, 2008.

South Florida Water Management District, Draft Water Supply Policy Document, April 1991

South Florida Water Management District, Draft Water Supply Needs and Sources, 1990-2010, June 1991.

Supplemental and updated information furnish by Julie Cheon, Water Quality and Environmental Manager, FKAA, (personal communication (email), June 10, 2011).

CHAPTER 8.0 – POTABLE WATER – COMMENT RESPONSES

Commenter: Kathy Grasser,
Date Received: 8/17/10

Location	County Comment	K&S Action
Throughout **8.0 Potable Water Element**	Formatting, minor verbiage revisions "without affecting content", grammar, punctuation marks, acronyms, and font style changes.	Agree, revised as suggested.
8.0 Potable Water Element	Insert reviewers "purpose of this element", delete original	Agree, revised as suggested.
8.1 Introduction	Insert Definition of Potable Water	Agree, revised as suggested
Figure 8.1	Replace Figure 8.1 with Miami-Dade County Wellfield Protection Areas	Agree, revised as suggested.
8.2.1 Federal Reguations	Verbiage changes regarding Safe Drinking Water Act and paragraph moved to section 8.2.1	Agree, revised as suggested
8.2.3 Local Regulations	Table 604.4 2007 Florida Building Code inserted as Table 8.2	Agree, revised as suggested.
8.3 Wellfields	Rename Section to Wellfields and move Section 8.6.2 to 8.3.1 Wellfield Conditions	Agree, revised as suggested.
Figure 8.2	Replace Figure 8.2	No change due to higher quality print not available from source.
8.8.3 Florida Friendly Landscape	Verbiage added regarding Florida-Friendly Landscape	Agree, revised as suggested.
8.8.3 Florida Friendly Landscape	Remove paragraphs 2 and 4	Agree, revised as suggested
8.9.1 Water Quality LOS	Make corrections to Chapter No. of F.A.C. and "Safe Drinking Water Act"	Agree, revised as suggested
8.10.3 Project Demand	No revisions requested	Table 8.8 added - Future Potable Water Supply Needs
Bibliography	Updated sources to be listed	Agree, revised as suggested.

Commenter: FKAA **Date Received: 10/25/10**		
Location	**County Comment**	**K&S Action**
Section 8.2	1. Section 8.2 Sources of Water (page 3) discusses the FKAA's primary source of Biscayne Aquifer in Florida City but does not discuss the FKAA's new source of water, Floridan Aquifer, in Florida City.	Agree, revised as suggested.
Section 8.5	1. Section 8.5 Potable Water Supply and Treatment Facilities: a. Section 8.5.1 (Page 13, 2nd paragraph) – The FKAA's WUP is based on the population of the entire service area. It does not allocate by municipal boundary. b. Section 8.5.1 (page 13, 3rd paragraph) discusses the FKAA's withdrawals from the Biscayne Aquifer but does not discuss the additional withdrawals from the Floridan Aquifer in Florida City. Please refer to the MC Facilities Plan; there is a summary table with FKAA allocation withdrawals from the different water sources.	a.-f.) Agree, revised as suggested. Additional information has been added as suggested

Location	County Comment	K&S Action
	c. Section 8.5.2 (page 15) Florida City Wellfield– There are 15 monitoring wells; please refer to FKAA Wellfield Protection Program Section 3.5. Also, only two of those wells have continuous water level recorders. d. Section 8.5.3 (pages 15-16) Water Treatment and Storage Facilities – In August 2009, the Floridan Aquifer Desalination Facility became operational at the Florida City WTP. The FDEP permitted capacity for the reverse osmosis desalination WTP is 6 MGD. Softening of the source water is performed to prolong the life expectancy of the pipeline and home fixtures and appliances. Substitute domestic consumption with domestic use. When the storage tanks are discussed, there is a math error – 9.5 MG should be 28.2 MG. There are emergency pumping stations located in Florida City, Key Largo, Long Key, Marathon, Ramrod, and Stock Island. Remove capacities.	

Location	County Comment	K&S Action
	e. Section 8.5.4 (page 16) "Emergency" Reverse Osmosis Water Treatment Facility – The emergency seawater reverse osmosis plants located on Stock Island and Marathon have capacities of 2 MGD and 1 MGD, respectively. f. Section 8.5.5 (page 16) Water Transmission and Distribution – Remove "Recent water main installations have been buries as a means of hazard mitigation".	
Section 8.6	1. Section 8.6 FKAA System Status: a. Section 8.6.1 (page 17) Impact of FKAA Florida City Wellfield on Adjacent Users – Needs to be updated to reflect latest simulations performed for the 2008 WUP both on the Biscayne Aquifer and the Floridan Aquifer.	Agree, revised as suggested.
Section 8.7	1. Section 8.7 (page 17) Water Quality – revise 1st sentence. Also, the canals are not part of the FKAA SWIM network. Please refer to the FKAA Wellfield Protection Program section 3.5.	Agree, revised as suggested.

Location	County Comment	K&S Action
Section 8.8	1. Section 8.8 (page 20) Potable Water System Improvements: a. Section 8.8.1 FKAA Capital Improvement Plan - update with Board Approved 2011 CIP Plan with Critical Project list (Table 8.4). b. Section 8.8.2 (page 22) Fire Flows – Need to revise section and discuss current fire hydrant agreement; then, discuss potential distribution upgrades and additional storage to provide opportunities for improved fire protection.	a) Agree, revised as suggested. b) Information found in Needs and goals section
Section 8.9	1. Section 8.9 Water Conservation Programs: a. Section 8.9.1 (page 24) Leak Detection – Need to revised to reflect the new Automatic Meter Reading (AMR) technology that is being implemented in the FKAA water system. This technology will not only assist FKAA in automatic leak detection but notify customers of potential leaks on their side of the meter.	a-d)Agree, revised as suggested with additional referenced information.

Location	County Comment	K&S Action
	b. Section 8.9.3 (page 25) Florida Friendly Landscape Ordinance /Permanent Irrigation Ordinance – need to update account info; "One hundred percent participation can be expected using FKAA personnel to perform work"? c. Section 8.11.1 (page 28) Alternative Water Supplies – Where chloride concentrations are not too great, desalination of Floridan Aquifer water could be economically feasible, and even competitive with importing water via the Florida Keys Aqueduct? Please refer to FKAA Water Supply Plan; does this statement take into account the pumping/electrical costs to the customer. d. Section 8.11.4 Needs, Goals, and Opportunities (page 31) – revise bullet to read "FKAA will continue to upgrade the distribution system toward the goal of providing opportunities for fire protection in the following areas:; Please refer to Fire Hydrant agreement for last bullet.	

Commenter: Commissioner Rice **Date Received: 2/2011**		
Location	**County Comment**	**K&S Action**
Section 8.2	Section 8.2 Sources of Water – (Page 2) Remove last sentence from second paragraph. "The Ocean Reef Club is the only consumer currently using enough Florida Aquifer water which requires an individual South Florida Water Management District (SFWMD) permit."	Agree, revised as requested.
Section 8.11	Section 8.11.1 – Alternative Water Supplies (Page 28) Reword second sentence in third paragraph: "Construction of the ASR well commenced in January 2006 and is expected to be completed in October of same year."	Agree, revised as requested. Sentence reworded to state "well is completed".

Commenter: Julie Cheon, FKAA **Date Received: 6/2011**		
Location	**FKAA Comment**	**K&S Action**
Section 8.0	Multiple entries of updated information of the Potable Water System with preferred language revisions recommended throughout document.	Agreed, all updated information and language revised as requested.
Figure 8.2 **Page 14**	Remove Figure 8.2 FKAA Facilities titled "Operations Department" Insert Figure 8.2 FKAA Facilities titled "Florida Keys Aqueduct Authority"	Agreed, revised as requested.
Section 8.5.3 **Page 15**	***Insert paragraph:*** In order to comply with Biscayne Aquifer withdrawal limitations, a new Floridan wellfield and reverse osmosis (RO) water treatment process were recently constructed. Operational since the fall of 2009, the RO water treatment plant treats the brackish water of the Floridan Aquifer. The Floridan raw water contains approximately 4,000 to 5,000 parts per million of salts. This concentration is significantly lower than the 35,000 ppm typically found in seawater. This RO system utilizes very fine membrane elements mounted on RO system skids. The water is pressurized to approximately 250 pounds per square inch (psi) rejecting the salt while allowing the passage of the pure finished water. The RO water is disinfected in the same manner as the Biscayne lime-softened water. Finished water from the RO process is blended with water treated from the Biscayne Aquifer.	Agreed and paragraph accepted.

Commenter: Julie Cheon, FKAA continued
Date Received: 6/2011
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Location	FKAA Comment	K&S Action
Section 8.9.6 **Page 25**	***Insert following into 1st paragraph:*** Both the Big Coppitt Wastewater Treatment Plant and the Hawk's Cay/Duck Key Wastewater Treatment Plant are water reclamation facilities providing reclaimed water to a portion of their service areas. The Cudjoe Regional Wastewater Treatment Plant, once constructed, will also serve as a water reclamation facility, providing reclaimed water to a portion of the service area.	Agreed, revised as requested.
Figure 8.1	***Text on previous page refers reader to this graphic to indicate FKAA wellfield location, but location is not clearly labeled. Perhaps a less complex graphic with a label could be used.***	Graphic is current from Miami-Dade County, not aware of others that could be utilized
Section 8.6.1. **Paragraph 3**	RE: 81 feet - ***Not sure what is meant here. Is that referring to the depth of the aquifer? If so calling it drawdown availability may be confusing.***	Terminology as presented in consumptive use permit (CUP) by SFWMD
Section 8.6.1. **Paragraph 3**	***Not sure what is meant here. Is that referring to the depth of the aquifer? If so calling it drawdown availability may be confusing***	Terminology as presented in consumptive use permit (CUP) by SFWMD
Section 8.7.1	***Not sure what is meant here?*** "Variations in chloride and conductivity have been recorded as the saltwater fronts moves past the sampling zone. Because of these variations, collected water samples may not be representative of the actual fresh-saltwater interface."	Results from samples have shown viations that may not be the true representation of the actual fresh-saltwater interface.

Commenter: Julie Cheon, FKAA continued Date Received: 6/2011		
Location	FKAA Comment	K&S Action
Section 8.9.3 Paragraph 3	***Not sure about this number? What is its origin? Does the County do this irrigation audit, or is this paragraph just here to show that an irrigation audit is a tool that could be used?*** A water efficient irrigation system can be achieved through an irrigation system audit and calibration program. Of the 45,000 accounts within the FKAA service area approximately 600 have some form of landscape irrigation system, of which approximately 100 are not supplied by the FKAA's potable water system. Irrigation system auditing would include testing of the water source for pressure and output rate, testing sprinkler heads for precipitation rate and coefficient of uniformity and setting irrigation zones for proper times and frequencies. Using the SFWMD Blaney Criddle model as the ideal irrigation requirement, a 5,000 square foot lot would take a technician approximately two hours to complete an audit. Based on a study conducted in Hillsborough County, Florida, which documented water savings resulting from a calibrated and properly scheduled irrigation system, an average of 27 percent water savings would result at each participating home. Assuming that outdoor water use is approximately 25 percent of the consumer total use, potential water savings per home would be approximately 4,000 gallons per year.	Information as provided by FKAA in prior review and discussions.

Commenter: Julie Cheon, FKAA, continued
Date Received: June 2011

Location	Comment	K&S Response
Section 8.10.1 Paragraph 3	***This paragraph speaks more to quantity than quality.*** As a condition of the SFWMD CUP, and consistent with the 2005-2006 Lower East Coast Water Supply Plan Update (February, 2007), the FKAA must be compliant with the Minimum Flows and Levels Recovery Plan, Rule 40E-8, F.A.C. with its water resource operations. Any changes to the recovery plan by SFWMD will require a modification to the CUP, to remain consistent with the provisions of Chapter 373, F. S.	This is a condition in the SFWMD permit report. There may be some overlap.
Table 8.6	***Does this refer to a particular year?*** Potable Water level of Service Standards	This is the current LOS std for the County
Table 8.6	***Not sure where this number comes from?*** 149 gallons per day.	Based on documentation provided by the FKAA
Table 8.6	***Has this number been updated to 2.7?*** 2.24 average persons per household	Based on documentation provided by the FKAA
Table 8.7	***Table indicates a "goal" but text on previous page seem to indicate that this is the existing LOS?*** Goal Potable Water Consumption	Goal is to provide this minimum level of service for the projected system population
Table 8.7	***Not sure this is from FKAA? Do you have the original source.***	Info from SFWMD CUP application
Section 8.11.3	***Table 8.6 says 66.5*** The future potable water demand was calculated for the current year using the established LOS of 66.66 gallons/capital/day for residential…..	Table 8.6 is the current standard. Table 8.7 is the future goal.

Commenter: Julie Cheon, FKAA continued **Date: June 2011**		
Location	Comment	K&S Response
Table 8.8	***This does not match the DCA approved projection.*** Row: FKAA Service Population/Column: 2030/ 160,173	This figure "pointed-to" is system wide per the approved SFWMD permit application backup data

SOLID WASTE
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9.0 SOLID WASTE ELEMENT

[Rule 9J-5.011(1)(a)(d)(e) and (f), F.A.C.]

The Solid Waste Element of the Monroe County (County) Comprehensive Plan addresses the data inventory requirements of 9J-5.005(2) and Rule 9J-5.011 of the Florida Administrative Code (F.A.C.). The data inventory requirement will support the development of goals, objectives, policies, and implementation programs for the Solid Waste Element.

The Solid Waste Element is designed to meet the requirements of Florida's Local Government Comprehensive Planning and Land Development Regulation Act (Chapter 163, Florida Statutes). The purpose of the element is to describe the issues, needs and general facilities providing for existing and future solid waste management.

9.1 Introduction

The Solid Waste Element contains an inventory of the existing solid waste systems for the unincorporated areas of the County, and the current as well as projected demands. Chapter 9J-5, F.A.C., requires an inventory of the current solid waste management system, including the identification of waste characteristics and an inventory identifying solid waste deficiencies.

Solid waste management is a critical issue in the Florida Keys. While problems of landfill sitings, facilities, financing, and hazardous waste disposal have increased throughout Monroe County, the unique setting of the Keys makes waste management even more difficult. The geographic isolation, the limited land area, the environmental constraints, and the presence of nationally significant natural resources adds to the challenge of responsibly and efficiently managing the Keys' solid waste stream.

While landfilling has been the predominant means of waste disposal nationwide, our nation is becoming increasingly conscious of what is being thrown away and where it is going. An increasing awareness of the hazards of landfilling some types of wastes, of the potential for reuse of other materials, and the imminent closure of landfills around the country have brought about this change in attitudes towards solid waste management. Now, methods of processing and disposal are evolving that are changing the business of solid waste management.

Florida and the Keys have not been left out of this trend toward more complex, yet more efficient and healthier use of what was once considered simply waste. Landfills filled to capacity, new State laws, and public concern over present volume reduction and disposal methods have altered the direction of solid waste management in the County significantly over the years.

The current solid waste management system for the County, the problems and opportunities specific to the County, and the future solid waste management plans and levels of service are detailed in this element.

9.2 Background Information

9.2.1 Types of Solid Waste

The solid waste generated by a community is made up of many different types of wastes, which for public health, safety, and cost effectiveness should be disposed of in different ways. In general, solid wastes means sludge unregulated under the federal Clean Water Act or Clean Air Act, sludge from a waste treatment works, water supply treatment plant, or air pollution control facility, or garbage, rubbish, refuse, special waste, or other discarded material, including solid, liquid, semisolid, or contained gaseous material resulting from domestic, industrial, commercial, mining, agricultural, or governmental operations. Recovered materials as defined in Subsection (24) are not solid waste. (Section 403.703, F.S.)

Solid waste generated in the County is comprised of:

- Biological Wastes: Solid waste that causes or has the capability of causing disease or infection and includes, but is not limited to, biomedical waste, diseased or dead animals, and other wastes capable of transmitting pathogens to humans or animals. The term does not include human remains that are disposed of by persons licensed under Chapter 497, F.S. (Section 403.703 (3), F.S.)

- Biomedical Wastes: Solid waste, or a combination of solid wastes, which, because of its quantity, concentration, or physical, chemical, or infectious characteristics, may cause, or significantly contribute to, an increase in mortality or an increase in serious irreversible or incapacitating reversible illness or may pose a substantial present or potential hazard to human health or the environment when improperly transported, disposed of, stored, treated, or otherwise managed. The term does not include human remains that are disposed of by persons licensed under Chapter 497, F.S. (Section 403.703 (2), F.S.)

- Commercial Wastes: The wastes generated by the commercial and institutional sectors, including stores, offices, restaurants, warehouses, schools, hospitals, motels, churches and other non-manufacturing and non-processing establishments.

- Construction and demolition debris: means discarded materials generally considered to be not water-soluble and nonhazardous in nature, including, but not limited to, steel, glass, brick, concrete, asphalt roofing material, pipe, gypsum wallboard, and lumber, from the construction or destruction of a structure as part of a construction or demolition project or from the renovation of a structure, and includes rocks, soils, tree

remains, trees, and other vegetative matter that normally results from land clearing or land development operations for a construction project, including such debris from construction of structures at a site remote from the construction or demolition project site. Mixing of construction and demolition debris with other types of solid waste will cause the resulting mixture to be classified as other than construction and demolition debris. The term also includes:

- Clean cardboard, paper, plastic, wood, and metal scraps from a construction project;
- Except as provided in Section 403.707(9)(j), F.S., yard trash and unpainted, non treated wood scraps and wood pallets from sources other than construction or demolition projects;
- Scrap from manufacturing facilities which is the type of material generally used in construction projects and which would meet the definition of construction and demolition debris if it were generated as part of a construction or demolition project. This includes debris from the construction of manufactured homes and scrap shingles, wallboard, siding concrete, and similar materials from industrial or commercial facilities; and
- Minimal amounts of other nonhazardous wastes that are generated at construction or destruction projects provided such amounts are consistent with best management practices of the industry. (Section 403.703 (6), F.S.)

- Electronic Wastes: Electronic waste (E-Waste) currently does not have a formal definition in the State of Florida Statues. The term is loosely applied to consumer and business electronic equipment and devices that are near or at the end of their useful life. Since there is no absolute definition, electronic equipment and small appliances such as microwave ovens that could fall under the other waste categories need to be formally assessed and disposed of properly to avoid the hazardous waste contamination.

- Hazardous Wastes: Solid waste, or a combination of solid wastes, which, because of its quantity, concentration, or physical, chemical, or infectious characteristics, may cause, or significantly contribute to, an increase in mortality or an increase in serious irreversible or incapacitating reversible illness or may pose a substantial present or potential hazard to human health or the environment when improperly transported, disposed of, stored, treated, or otherwise managed. The term does not include human remains that are disposed of by persons licensed under Chapter 497, F.S. (Section 403.703 (13), F.S.)

- Industrial Wastes: Those wastes generated by industrial and manufacturing operations engaged in the processing and production of marketable goods. Although a significant amount of construction and demolition debris is generated in the County, and the County has designated some areas of the Keys in an "industrial" land use category in the past, none of the municipal solid waste generated in the County is classified as industrial waste. Construction and demolition debris is a separate category of "special wastes."

Businesses that fall within the industrial land use category on the *Existing Land Use Map* series are classified for solid waste management purposes as "commercial generators."

- Recyclable Material: Those materials that are capable of being recycled and that would otherwise be processed or disposed of as solid waste. (Section403.703 (26), F.S.) These include: paper, cardboard, yard waste, wood, plastics, scrap iron, aluminum, glass, and electronic waste (E-waste).

- Residential Solid Waste: The garbage generated by households. Yard trash, recyclables, and sometimes hazardous wastes are also generated by households, but should ideally be separated from other residential solid waste.

- Sludge: Includes the accumulated solids, residues, and precipitates generated as a result of waste treatment or processing, including wastewater treatment, water supply treatment, or operation of an air pollution control facility, and mixed liquids and solids pumped from septic tanks, grease traps, privies, or similar waste disposal appurtenances. (Section 403.703 (30), F.S.)

- Special Wastes: Those that require special handling and management, including but not limited to white goods, waste tires, used oil, lead-acid batteries, construction and demolition debris, ash residue, yard trash, and biological wastes (Section 403.703(31), F.S.)

- White Goods: Includes discarded air conditioners, heaters, refrigerators, ranges, water heaters, freezers, and other similar domestic and commercial large appliances. (Section 403.703 (42), F.S.)

- Yard trash: Means vegetative matter resulting from landscaping maintenance and land clearing operations and includes associated rocks and soils. (Section 403.703 (43), F.S.)

9.3 Regulatory Framework *[Rule 9J-5.011(1)(h), F.A.C]*

9.3.1 Federal Regulations

The federal government regulates solid waste in order to minimize the potential for environmental impacts, and to encourage resource recovery and sustainability. The U.S. Environmental Protection Agency (EPA) reviews solid waste management facilities for air and water quality impacts. The U. S. Army Corps of Engineers regulates "refuse" under Section 13 of the Rivers and Harbors Act of 1899, Chapter 425, Sec. 9, 30 Stat. 1151. 33 United States Code (U.S.C.) § 407. The 1976 Federal Resource Conservation and Recovery Act 42 U.S.C. §6901 et seq. (1976), removed the regulatory constraints that impeded resource recovery in order to encourage states to conserve materials and energy.

The Resource Conservation and Recovery Act also addresses the regulation of hazardous wastes. Pursuant to this Act, EPA has set forth guidelines and standards for the handling of hazardous wastes, and directs state agencies, including FDEP, to regulate hazardous waste management. To aid in hazardous waste management financing, the EPA "Superfund" Program was established by the Comprehensive Environmental Response, Compensation and Liability Act of 1980, 42 U.S.C. §9601 et seq. (1980). This Act provided EPA with the funds to respond to sites requiring clean-up and emergency mitigation, and allows local governments to apply for funding of their hazardous waste management projects. The law has subsequently been amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA), Title III, Section 305(a), and the Small Business Liability Relief and Brownfields Revitalization Act of 2002 Public Law (P.L.) No. 107-118, 115 Stat. 2356 (2002).

9.3.2 State Regulations

Besides Federal EPA regulation, the environmental impacts of solid waste are regulated at the state level by the Florida Department of Environmental Protection (FDEP). FDEP follows the solid waste management guidelines set forth in Chapter 62-701, F.A.C. when permitting solid waste facilities. Specifically, FDEP has established evaluation criteria for the construction, operation, closure and long-term care of landfills. The agency also regulates the handling, classification and disposal of wastes, as well as resource recovery operations.

The 1974 Florida Resource Recovery and Management Act (Section 403.701, F.S.) required each county to prepare a Solid Waste Management Plan. In 1988, this Act was amended by the Solid Waste Management Act to establish State goals, regulations and programs for a host of solid waste activities. Further amendments have been added to Chapter 403, F.S. since 1988 to include recycling mandates, resource recovery, hazardous wastes, biohazardous wastes, and a comprehensive set of solid waste management regulations and guidelines.

In 1988, the Florida Legislature set a 30 percent recycling goal when passing the Solid Waste Management Act, Section 403.7145, F.S. During the 2008 Legislative session, HB 7135 directed FDEP to prepare a recycling study to meet a statewide goal of 75 percent by 2020. In the 2010 Legislative session, HB 7243 set benchmarks to achieve a 7 percent recycling goal. The bill has since been adopted into 403.706 F.S. and requires local governments to create or assure their recycling programs could meet the following targets:

- 40% by December 31, 2012
- 50% by December 31, 2014
- 60% by December 31, 2016
- 70% by December 31, 2018
- 75% by December 31, 2020

However, according to HB 7135, a county with a population of 100,000 or less may provide its residents with the opportunity to recycle in lieu of achieving the goal set forth in this

section (Section 403.706 (4)(c), F.S.) Local governments are also required to have a program that will enable construction and demolition debris to be recycled if economically feasible.

9.3.3 Local Regulations

The Monroe County Land Development Code (MCLDC), in compliance with State concurrency requirements, require that, "…sufficient capacity shall be available at a solid waste disposal site to accommodate all existing and approved development for a period of at least three years from the projected date of completion of a proposed development or use" (MCLDC, Section 114-2(a)(2)). This regulation went into effect on February 28, 1988, and serves as a level of service (LOS) standard for solid waste disposal. The exact quantity that constitutes "sufficient capacity," however, is not defined in the MCLDCs.

The determination of sufficient capacity is assessed on an annual basis. As stipulated in Section 114-2(a)(3) of the MCLDC, capacities for solid waste and other public facilities are updated and presented each year on or before June 15th in a public facilities capacity assessment report that is approved by the Board of County Commissioners.

The MCLDC also requires that solid waste management plans be completed before any proposed development of a Major Conditional Use is reviewed by the Growth Management Department. Solid waste generation rates and capacity assessments must be submitted for review and coordination with the Public Works Division, Department of Solid Waste/Recycling (PWD-DSW/R).

In addition to providing solid waste facility capacity, the County has responsibilities for hazardous waste monitoring. Each Florida County must complete a hazardous waste management assessment, and then must maintain an inventory of each small quantity generator, the types and quantities of waste they generate, and their hazardous waste management practices. The County must verify the management practices of at least 20 percent of the small quantity generators each year (Section 403.7234, F.S.) Local governments are also required to participate in the FDEP administered "amnesty days," in which small quantities of hazardous waste may be dropped off for disposal free of charge. Finally, local governments can establish local hazardous waste collection centers with FDEP approval.

9.4 Solid Waste Generation *[Rule 9J-5.011(1)(e) and (f), F.A.C.]*

9.4.1 Land Uses Served By PWD-DSW/R Facilities

The predominant land uses in unincorporated Monroe County that are served by the PWD-DSW/R are residential, commercial, and governmental and institutional areas. Commercial facilities include numerous hotels, motels and marinas that provide accommodations to the seasonal population and tourists, as well as fish houses, marinas and boat yards that serve the commercial fishing industry. With one exception, the governmental and institutional

uses that exist in the County are also served by PWD-DSW/R. The military facilities at Boca Chica are served by the City of Key West's solid waste facilities on Rockland Key.

The type of land uses served by PWD-DSW/R is a significant factor in the amount of solid waste generated. **Table 9.1** depicts the solid waste generation in the PWD-DSW/R service area by the type of generator for the year October 1, 2008 to September 30, 2009. Seventy-three percent of the total of 116,884 tons of municipal solid waste processed by the County was generated by single family residences and 17 percent by multi-family complexes during this time period. Therefore, approximately 90 percent of the municipal solid waste stream in the PWD-DSW/R service area is generated by residential areas. The remainder is generated by the commercial sector (10 percent). This percentage includes governmental and institutional generators.

Table 9.1 - Municipal Solid Waste Composition by Type of Generator

Generator	Tons Per Year	Percent of Total Tons Per Year	Pounds per Capita per Day	Pounds per Capita per Year
Residential: multi-family	19,870	17	1.53	557
Residential: single-family	85,325	73	6.56	2,393
Commercial	11,688	10	0.90	328
Total	116,884	100	8.98	3,278

Source: Monroe County, – PWD-DSW/R , 2009 Data

Notes:

1) This table reflects tonnages delivered to the County's transfer stations and processed through the PWD-DSW/R system.
2) The residential single-family category includes mobile homes and live-aboards.
3) Per capita figures are based on the 2009 total (permanent + average seasonal) population of 71,311. Tonnages are PWD-DSW/R figures.
4) Data is for one year, January 1, 2009, to December 31, 2009.

9.4.2 Historical Solid Waste Generation

In 2010, the County provided solid waste service to accommodate 70,808 residents. FDEP certification of solid waste data for December 31, 2009 is reported to be 71,311 residents in the County. For the purpose of this document, this data will be used as the most recent certified data. This population base reflects a historical increase in population and corresponding solid waste generation rates dating back to 1960. **Table 9.2** summarizes historical solid waste generation for the service area.

Solid waste generation in the County has increased each year from 1998 to 2009 (see **Table 9.2**), showing a general increase over time. Although solid waste generation is expected to increase as the population increases, the solid waste tonnage generated in the County will also fluctuate with natural and economic events. For example, total tonnage values

significantly increased from 2004 to 2005, this increase reflects approximately 35,000 tons of additional waste due to tropical storms events that produce excess debris. Inversely, tonnage values significantly dropped during the years of 2007 and 2008, at which time major economic problems throughout the country were prevalent, causing less tourism, less consumption of goods, and drops in the County's population. Although, these events will not occur on an annual basis, general trends show that the steady increase of solid waste generated within the County will continue as population increases.

The tourism industry in the Florida Keys is another large factor in solid waste generation that needs to be accounted for in projected demands calculations. In 2009 the Monroe County Tourist Development Council estimated 3.3 million tourist visited the County and future tourism will continue to rise as general population increases, thus having a serious impact on the solid waste generation within the County.

Any future declines will also reflect the diligent efforts by the citizens of the County to reduce the amount of solid waste they generate, through the conscious consumption of goods, composting, mulching or other sustainability efforts. Additional factors which are less easily quantifiable could also affect solid waste generation. The amount of construction taking place in the County, and thus the amount of construction debris being disposed of, also significantly affects the total amount of solid waste generated. Periods with less construction could have contributed to the decline in total waste generation. Finally, the weather affects the rate of vegetative growth, and therefore affects the amount of yard waste generated. Drier years could result in less total waste generation.

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Table 9.2 - Historical Solid Waste Generation for the PWD-DSW/R Service Area in Tons per Fiscal Year (excluding: Islamorada)

FY	FDEP Total	Recycling	Disposal
1998	N/A	N/A	N/A
1999	N/A	N/A	N/A
2000	158,327	59,798	131,825
2001	125,893	51,435	96,075
2002	134,950	68,738	113,071
2003	134,734	34,619	113,427
2004	112,102	13,757	110,333
2005	212,470	73,085	212,470
2006	200,338	12,206	200,338
2007	134,467	12,497	134,467
2008	130,245	13,743	130,245
2009	116,884	12,099	95,327

Source: Monroe County – PWD-DSW/R

Note:

1) Data collection calendar year is January 1 to December 31.
2) These are scale tonnages. The amount of solid waste actually generated in the service area is greater (see **Table 9.3**).
3) Fluctuations in yearly data may be a result of major storm events, economic conditions, and other generation factors.
4) FDEP calendar years do not coincide with PWD-DSW/R calendar years, thus creating a differential in datum between departments.

9.4.3 Municipal Solid Waste Composition by Type of Material

The solid waste generated in the County is comprised of a variety of materials. The tonnage and per capita generation figures for each waste material generated in the PWD-DSW/R service area are shown in **Table 9.3**. Yard waste, paper products, construction debris, and miscellaneous material comprise the four largest components of the solid waste stream. Of these, yard waste is by far the largest component, with over 3,700 tons generated between January 1, 2009 and December 31, 2009. This constitutes 31 percent of the total 12,100 tons of waste generated in the PWD-DSW/R service area.

As seen in this breakdown, the potential for recycling is high. The recyclable materials, paper products, yard waste, wood (a portion of construction and demolition debris), plastics,

ferrous materials, aluminum, and glass comprise a total of approximately 70 percent of the County solid waste stream.

Table 9.3 - Municipal Solid Waste Composition by Type of Material

Materials	Tons per Year	Percent of Total Tons per Year	Pounds per Capita per Day	Pounds per Capita per Year
Newspapers	363	3	0.03	10.2
Glass	847	7	0.07	23.8
Aluminum Cans	121	1	0.01	3.4
Plastics	968	8	0.07	27.1
Construction & Demolition debris	1573	13	-	-
Yard Waste	3751	31	0.29	105.2
White Goods	---	---	---	---
Tires	242	2	0.02	6.8
Ferrous metals	847	7	0.07	23.8
Non-ferrous Metals	---	---	---	---
Paper: corrugated	---	---	---	---
Paper: other	484	4	0.04	13.6
Food Wastes	185	15	1.014	50.9
Textiles	242	2	0.02	6.8
Miscellaneous	847	7	0.07	23.8
Total	12,100	100%	0.93	339.36

Source: Monroe County – PWD-DSW/R

Notes:

1) Per capita figures are based on the 2009 total (permanent + average seasonal) population of 71,311.
2) The tons per year figures are for the PWD-DSW/R service area (Monroe County excluding Islamorada.) They represent scale tonnages, plus materials recycled by private businesses and citizens. Therefore, this table should not be used as a comparison to **Tables 9.2, 9.10, 9.11 and 9.12, and 9.13** for determination of capacity limitations and levels of service.
3) Data is for one year, January 1, 2009 to December 31, 2009.

9.5 Description of Existing Facilities and Planned Improvements

[Rule 9J-5.011(1)(d)(e) and (f), F.A.C.]

9.5.1 Haul-Out Disposal Plan

Due to the lack of capacity, maintenance issues, and retrofitting necessary for existing volume reduction units, the County's three historic landfills were finally closed by 1991. Without the means of disposal, the County entered into a haul out contract with Waste Management Inc. (WMI) in 1990 to have its solid waste hauled out of the County.

Prior to entering into the haul out contract with WMI, the County was responsible for the collection and disposal of solid waste. Prior to the haul out contract, the County's disposal methods consisted of incineration and landfilling at sites on Key Largo, Long Key and Cudjoe Key. Combustible materials were either incinerated or burned in an air curtain districtor. The resulting ash was used as cover material in the landfill. Non-combustible materials were deposited directly in the landfill.

As a result of the haul out contract with WMI to transport the solid waste to WMI's landfill in Broward County, the County's incinerators and landfills are no longer in operation. **Table 9.4** summarizes the status of the County's landfill and incinerators.

Table 9.4 - Status of County Landfill & Incinerators

Site	Incinerators	Landfills	Reserve Capacity (cubic yards)
Key Largo	Closed 12/31/90	Closed	N/A
Long Key	Closed 1/7/91	Closed	N/A
Cudjoe	Closed 2/25/91	Closed	N/A

Source: Monroe County Public Works Division June, 2010

In December 1990, WMI began to haul wet garbage, yard waste and construction debris out of the County. Since that time, the County has continually renewed five year contracts with WMI. The County has been paying annual disposal fees on a per ton basis of municipal solid waste. The County, in turn, has a guarantee that WMI will haul out and dispose solid waste generated in the PWD-DSW/R service area over the length of the five year contract. The initial haul out rate was $59.00 per ton. Currently, the County annual solid waste disposal fees are $80.37/ton. All non-separated solid waste material is hauled to an incineration facility owned and operated by Wheelabrator Technologies, Inc. in unincorporated Broward County.

Solid waste is collected by franchise and taken to the three historic landfill sites, which serve as transfer facilities. At the transfer stations, the waste is compacted and loaded on WMI

trucks for haul out. Recyclable materials, including white goods, tires, glass, aluminum, plastic bottles and newspaper are included as part of the solid waste haul out contract. A recent (2009) amendment to the contract includes WMI and the County's commitment to increase annual recycling rate to 40 percent by 2014.

9.5.2 Solid Waste Management and Disposal: 2010 to 2030

The County has recently renewed to 2016 their current solid waste haul out contract with Waste Management Inc. Although the current contract includes an option for extension, the County will be considering other options that may increase services for residents and possibly lower the annual collection and disposal rates. However, the current contract with WMI stipulates that the County will be responsible to pay out a fixed cost component of the contract if the County does not renew in 2021 to the approximate sum of $317,000.00.

9.5.3 Sludge, Septage and Leachate

Historical and present day practice for sludge, septage and leachate treatment and disposal by the County is the removal by private contractors to Black Point or Virginia Key waste water treatment facilities in Miami-Dade County. This practice has been in effect since August of 1990. Presently (2010) the County is under a haul out contract with Sweetwater Environmental Inc. (SEI) for sludge and septage and leachate. The County's last contract with SEI was from 2004 to 2009. This contract was recently renewed in 2009 and will expire in June, 2014.

Local collection of septage and sludge is made throughout the County and then brought to one of the three transfer facilities. The locations of SEI's three transfer facilities are: Cudjoe Key MM 22, Long Key MM 68, and Card Sound. Each facility has two 20,000 gallon containment tanks and are operated and maintained by SEI.

Although the haul out of sludge, septage, and leachate has been the County's means of disposal for the above referenced materials, many changes in the collection process has begun to streamline the disposal process as more sanitary sewer systems come online. Historically, franchise collection would have to collect septage from thousands of private facilities. As more public sanitary systems and package plants are put in place, the franchise will collect more from centralized systems in most areas throughout the County.

The County currently does not have any proposed long-term solution for sludge, septage and leachate treatment and disposal, other than its current means of haul-out to Miami-Dade County wastewater treatment facilities. However, if the County continues to use haul out procedures, future capacity of the Miami-Dade wastewater treatment facilities will not present an issue. Future plans may include composting sludge and other organic materials within the County.

9.5.4 Disposal of Hazardous Waste

The management and disposal of hazardous waste has been a major national issue for more than a decade. In 1976, the U.S. Environmental Protection Agency (EPA) was directed to develop a national program to regulate and manage hazardous waste and to provide incentive for states to adopt consistent programs under the Resource Conservation and Recovery Act. EPA is also authorized to respond to incidents requiring State cleanup and emergency mitigation. Funding for this purpose under the Comprehensive Response, Compensation, and Liability Act of 1980 is commonly referred to as the "Superfund" program.

9.5.5 State Legislation

In 1983, the Florida Legislature recognized the need to establish a coordinated and broad-based approach towards maintenance and improvement of the State's valuable and vulnerable water resources. The response was passage of a critical piece of environmental legislation entitled the Water Quality Assurance Act (WQAA) of 1983. One major component of the effort was that section specifically addressing hazardous waste. In preceding years, many sites in Florida where improper storage, treatment or disposal of hazardous waste had caused contamination of the ground water were uncovered. Consequently, Part IV of the WQAA addresses the critical role of hazardous waste as a potential groundwater contaminant.

This section of the law, contained in Chapter 403 of the Florida Statutes, established the framework for dealing with hazardous waste on the local level. It strictly prohibits the landfilling or disposal of hazardous waste to the ground anywhere in the State of Florida (Section 403.7222 F.S.). Furthermore, it requires two important actions of local government that continue to serve as a focus for local government activities concerning hazardous waste. First, Section 25 (403.7225 F.S.) mandates the implementation of local hazardous waste management assessment. The first component of this assessment consists of a survey of business establishment hazardous waste generators, an inventory of the type and quantity of the hazardous waste generated, and a listing of the current practices used by these generators to treat, store or dispose of this waste. Second, the statute requires that each county designate areas where a hazardous waste storage facility could be constructed to meet a demonstrated need.

9.5.6 Large Quantity Generators

Large quantity generators are those generators which produce more than 1,000 kilograms (kg) of hazardous waste in a calendar month. The only large quantity generators in the County are public facilities or the military: the Florida Keys Electric Cooperative, City Electric, the Florida Keys Aqueduct Authority, and the U.S. Navy and the Coast Guard. All of these generators are required to follow requirements that are monitored directly by the Florida

Department of Environmental Regulation and over seen by the Florida Department of Health (DOH).

9.5.7 Small Quantity Generators

Small quantity generators are those which produce between 100 and 1,000 kg per calendar month. The amount of material produced determines the regulations which must be followed. As a part of responsible management, the generator is required to maintain a record of the accumulation, amount, type and number of containers of waste. The generator must also have a Preparedness and Prevention Plan which sets procedures for managing the waste within the generator's business including safety precautions and emergency plans should an accident occur. The generator is required to obtain an EPA/FDEP identification number and must contract with a licensed transporter.

The County is responsible for monitoring small quantity generators. This program is managed by the Department of Health (DOH). There are approximately 800 potential small quantity generators that are registered in the County. On this list, all small quantity generators are termed "potential" because the definition of a generator is given in terms of how much waste is produced each month. Small businesses may produce hazardous waste one month but not the next. The businesses are not considered actual small quantity generators unless they have produced hazardous waste in a given month.

Businesses that produce a very small amount of waste in a given month are "conditionally exempt." This means that they do not have to follow manifestation procedures, but must still comply with storage requirements. Small quantity generators must have a "cradle to grave" manifestation, as required by FDEP and the EPA, documenting every stage of their waste disposal process. The PWD-DSW/R is required to inspect 20 percent of the 800 sites each year. FDEP also performs spot checks of generators.

9.5.8 Storage

The FDEP regulations specify on-site storage facilities and labeling requirements for small quantity generators. The DOH monitors this through inspections. There are no building code requirements for small quantity generators; only the containers and tanks are regulated.

9.5.9 Transportation and Disposal

Each small quantity generator is responsible for the transportation and disposal of its own hazardous waste. However, as part of the agreement with the County, small quantity generators can contract with the County's private contractor, at reduced rates. A generator can choose its own transportation company as well, as long as the company is licensed by the State. The generator of the waste and the transporter are both responsible for any mishaps; the "cradle to grave" manifestation must document every step. Transportation of hazardous

materials within public right-of-ways also falls under the jurisdiction of the Department of Transportation.

There are no hazardous waste disposal sites in Florida. Disposal sites are scattered throughout the South, each accepting only certain types of wastes. Cost for transportation and disposal for the small quantity generators and the County depends on not only the quantity of waste, but also on the type and how far it must be transported. Currently, the County uses Clean Harbors, Inc. for the removal, transport, and disposal of hazardous wastes within the County on a per-needed basis.

9.5.10 Household Hazardous Wastes

PWD-DSW/R has temporary storage facilities: at Cudjoe, Long Key, and Key Largo for small quantities of hazardous material and electronic waste. PWD-DSW/R receives bids for transportation and disposal contracts for these waste types. At present, the County uses the services of Clean Harbors Inc. for hazardous waste disposal. The County accepts household hazardous material and electronic waste during specified times and days at all three transfer station sites and sponsors special collection events at no charge to residents. Small quantities of these materials are accepted from businesses for a fee during regular collection hours. In addition, the County has encouraged auto repair stations to voluntarily collect batteries and waste oil from their customers as a public service.

9.5.11 Contaminated Sites

Property owners are required to clean up any contaminated sites on their property. There are five private properties in the County listed on EPA's Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS) inventory of potential hazardous waste sites. Many, if not all of these are Superfund sites. PWD-DSW/R also suspects there are some contaminated sites on civilian property but these would fall under the jurisdiction of FDEP.

Monroe County's Hazardous Waste Assessments, Identification of Abandoned Dump Sites (n.d.), lists additional sites which have the potential to be contaminated. The report lists the potential hazardous waste problem for these sites as minimal for all sites. Abandoned dump sites are under FDEP jurisdiction. The list of abandoned dump sites is presented in **Table 9.5.**

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Table 9.5 - Unincorporated Monroe County Abandoned Dump Sites

Site	Sec/Tws/Rng	MM	Owner	Type	Potential Hazardous Waste Adden
Boca Chica	5/68/26	8	U.S. Government	Landfill	Minimal (Inactive)
Saddle Bunch Key	8/67/27	15	U.S. Government	Landfill	Minimal (Inactive)
Middle Torch Key	17/66/27	27	Baltuff	Landfill	Minimal (Inactive)
Boot Key	16/66/32	48	Tropic South Inc.	Landfill	Minimal (Inactive)
Key Largo	9/60/40	NA	Carter	Landfill	Minimal (Inactive)
Cudjoe Key	20/66/28	21	PWD-DSW/R	Landfill/ Incinerator	Minimal (Inactive)
Key Largo	11/60/40	NA	PWD-DSW/R	Landfill/ Incinerator	Minimal (Inactive)
Long Key	27/65/35	68	PWD-DSW/R	Landfill/ Incinerator	Minimal (Inactive)

Source: PWD-DSW/R, 2010

Another cause of soil and groundwater contamination is storage tanks. The DOH is in charge of inspections for tanks containing vehicular fuel and pollutants. FDEP handles tanks containing hazardous substances. DOH estimates that 99 percent of the active tanks in the County are reported to DOH. Potential abandoned tanks may present a great health and safety hazard. DOH relies upon citizen reports of tanks, and upon the DOH Tank Inspector finding abandoned tanks while on field inspections.

9.5.12 Emergency Management

A federal "Community Right-To-Know" law, managed by the EPA with some authority delegated to the States, requires that companies using hazardous substances register with state and local authorities. Any projects producing hazardous waste are required to inform the local Fire Department, the Police, and the hospitals.

Through the Florida Department of Labor and Employment Security, Division of Safety and OSHA, Florida's "Right-To-Know" law is enforced. Employers must inform their employees about any toxic substances in the workplace. Workers can refuse to work with substances if they are not provided a Material Safety Data Sheet on the substance by their employer.

9.5.13 Public Education and Training

PWD-DSW/R offers training sessions and classes on hazardous waste management to various business and community groups. Training, along with evaluation and assessment, is

one of the topics on which the Cooperative Extension Service has written materials, slides, and a video that are available upon request. The County sponsors special household hazardous material and E-waste collection events at no charge to residents.

PWD-DSW/R's involvement with actual hazardous waste disposal is limited. PWD-DSW/R completes surveys required by the state and federal governments, and inspects the sites of suspected hazardous waste generators when reports of improper disposal are received. PWD-DSW/R also disseminates information on proper disposal methods to hazardous waste generators. Each year PWD-DSW/R also verifies the hazardous waste management practices of at least 20 percent of its inventory of small quantity hazardous waste generators, as required by law.

9.6 Public and Private Solid Waste Facilities

[Rule 9J-5.011(1)(d)(e) and (f), F.A.C.]

9.6.1 Solid Waste Collection

The collection of solid waste is undertaken by private contractors under franchise agreements with the County. The following private solid waste collection contractors presently operating under franchise agreements with the County are shown in **Table 9.6.**

Table 9.6 - Solid Waste Collection Contractors

Collection Company	Franchise Area
Waste Management, Inc	South of the Seven Mile Bridge
Marathon Garbage Service, Inc.	Middle Keys, MM45-MM72
Key Sanitary Service	Upper Keys, MM91-County line
Ocean Reef Club, Inc.	Ocean Reef Club
National Park Service (Agent)	Everglades National Park

Source: PWD-DSW/R, 2010

9.6.2 Transfer Facilities

Through the terms of the five year contract between the Monroe County Board of County Commissioners and WMI, a lease agreement which runs concurrent with the solid waste haul out contract allows for the utilization of the County owned transfer stations by WMI. The location of the transfer facilities are depicted on **Map Series 9-1**. The size and capacity of these facilities are shown in **Table 9.7.**

Table 9.7 - Solid Waste Transfer Facility Sizes and Capacities

Transfer Facility	Acreage	Capacity
Cudjoe Key Transfer Station	20.2 acres	200 tons/day
Long Key Transfer Station	29.5 acres	400 tons/day
Key Largo Transfer Station	15.0 acres	200 tons/day

Source: Waste Management Inc., 1991

The maintenance and operation of the solid waste transfer facilities is entirely the responsibility of WMI. These responsibilities include enforcement of safety procedures, ongoing repair and maintenance of facility components, assurance of compliance with all applicable federal, state and local laws, regulations and permits including those pertaining to the environment and OSHA, and prevention of any environmental degradation to the transfer sites. The contract only allows for the receipt of "acceptable waste" which is defined as not being Hazardous, Biohazardous or Atomic Waste. The disposal of unacceptable waste is the responsibility of the generator and must be accomplished through the use of licensed private waste removal firms. The County can, upon 12 hours notice, perform inspections to determine compliance with the operational terms of transfer station lease agreement.

9.6.3 Landfill and Resource Recovery Facilities

9.6.3.1 Landfill Facility

Although the original solid waste disposal site stipulated in the haul out contract was the WMI owned and operated Central Disposal Sanitary Landfill (CDSL) located at 3000 Northwest 48th Street, Pompano Beach (Unincorporated Broward County), Florida, all trash, unseparated recyclables and hazardous waste is currently hauled to the Wheelabrator facility in Broward County, Florida, for incineration and disposal.

9.6.3.2 Resource Recovery

Resource recovery is the process of recovering materials or energy from solid waste. Mandatory or voluntary recycling of common waste products like paper products, plastic containers, tires, glass, and metals has become a common means of recovering materials while reducing the volume of waste that is landfilled. Solid waste incineration has also become a common practice of resource recovery through the production of electricity.

Resource recovery in Broward County (North Broward at the North Regional Resource Recovery Facility (NRRRF) and South Broward at the South Regional Resource Recovery Facility (SRRRF)) is accomplished through two 2,250 ton/day, 70 megawatt trash to energy facilities designed, built, owned and operated by Wheelabrator Technologies (see **Table 9.8**). WMI utilizes the South Regional Resource Recovery Facility for Monroe County solid waste

disposal. Each facility is designed so its daily capacity can be expanded to 3,000 tons to meet future needs. Florida Power and Light Company purchases the electricity generated by the facilities. To provide for the disposal of ash from the resource recovery facilities, Wheelabrator has designed and constructed a state-of-the-art monofill with a liner system that includes structural fill, a six inch layer of bedding sand, a manufactured clay liner, two high-density polyethylene liners, a 24 inch layer of drainage sand and leachate collection systems. With the operation of these two facilities the expected life of the CDSL is extended approximately 20 years.

Table 9.8 - Disposal Facility Demand and Capacity Comparison

Disposal Facility	Current Demand	Design Capacity
CDSL	950 TPD	7,490,815 (tons)
NRRRF	250 TPD (ash)	3,200,000 (tons)
NRRRF	700 TPD	2,250 TPD
SRRRF	2,000 TPD	2,250 TPD

Source: Broward County, 2010

9.7 Recycling Program *[Rule 9J-5.011(1)(e)(f), F.A.C.]*

The "Monroe County Recycling Program" was initiated in September 1989. Initial activities included the purchase of four multi-material recycling containers and the establishment of neighborhood recycling centers as recycling drop off sites. Within two years of the initiation of the County's recycling program, the City of Key West and the Middle Keys area, including the City of Marathon, had established curbside collection for 18,000 residential units including both single and multi-family residential units. Since 1989, the County has expanded its recycling program to include all residential communities within the County on a voluntary basis.

Currently the County's recycling program consists of a voluntary curbside collection system, recycling centers at each of the solid waste transfer stations, and voluntary commercial collection. Recycling programs related to commercial establishments have been developed and put in place. The Monroe County School District has developed and implemented programs at all County schools. County, State and federal agencies have also initiated recycling programs. New commercial developments are required to submit a study to show how waste will be reduced and recycled from clearing through on-going business.

As previously noted, the County is contracted with WMI for solid waste haul out. Under the terms and conditions of the contract with WMI, solid waste is collected by franchisees and taken to the three trash transfer facilities. At these facilities, the solid waste is transferred to trucks for hauling out of the County. The solid waste hauled out of the County includes non-

recyclable and recyclable materials. Recyclable materials are being and will continue to be separated from the solid waste stream to the maximum extent possible at the source.

9.7.1 Voluntary Recycling

9.7.1.1 Curbside Collection

The County's residential curbside collection is facilitated by four franchise contractors. Each vendor is contracted to collect recycling from a defined service area and are as follows: (1) Stock Island to Seven Mile Bridge [Waste Management Inc.], (2) North End of Seven Mile Bridge to Mile Maker 72 [Marathon Garbage Services], (3) Mile Marker 91 to the County line [Keys Sanitary Service], and (4) Ocean Reef Club [Ocean Reef Disposal].

The education program for the residents includes television advertisements, newspaper, radio and printed material.

9.7.1.2 Recycling Centers

In addition to the curbside collection, recycling centers have been made available to the residents as part of County's recycling program. The current drop off centers are located at (1) Cudjoe Key Transfer Station (MM 21.5, Blimp Road), (2) Long Key Transfer Station (MM 68), and (3) Waste Management Recycling Center (MM 100.2, 300 Magnolia St. Key Largo). These locations accept recyclable material that coincides with curbside collection of recyclable material. In addition to typical recyclable materials (paper, plastic, glass, and metals), the Key Largo Recycle Center also accepts electronic waste (E-waste) and household hazardous wastes.

9.7.1.3 Commercial

The hospitality industry, including hotels, motels, guest houses, bars and restaurants, are also encouraged to establish recycling programs. Cardboard, glass, aluminum and office paper make up the largest components of the recyclable fraction of the hospitability industry. Lending institutions, hospitals, and other contributors of major amounts of white paper and computer paper have been encouraged to participate in recycling those materials. Recycling audits done on the premises have helped businesses to determine the amounts of materials with the potential to recycle. Commercial generators of all sizes have established programs to collect the various materials.

Collections of recyclable materials from commercial entities are voluntary and conducted on individual sites, and by individual businesses. Some businesses collect and transport materials to county recycling centers. There are four franchise waste companies offering commercial recycling services for recycling in the Florida Keys.

9.7.2 Government Recycling

9.7.2.1 Monroe County

Monroe County has implemented recycling programs at most County facilities. Materials collected include all materials that are collected curbside. Recycling is encouraged, but not mandatory at present.

9.7.2.2 Monroe County School Board

The Monroe County School Board has implemented recycling programs at all County school facilities and collects all recyclables that are collected curbside.

In-service training for faculty and staff is offered by Monroe County PWD-DSW/R staff. Recycling curriculum and recycling projects for teachers are offered through cooperative arrangements with the Monroe County School District. The Monroe County School District has a *Solid Waste Reduction Plan* in place.

The Florida Keys Community College has also implemented a recycling program.

9.7.2.3 U.S. Military

The United States military facilities located in the County participate in recycling programs at all facilities by collecting office and computer paper, cardboard, and aluminum which are currently being recycled at non-residential facilities. Curbside collection has been established for all military residential areas and includes collection of yard waste which is turned into mulch for use on military facilities.

9.7.3 Yard Waste Program

Yard waste comprises the largest percentage by weight and volume of the County's waste stream. However, yard waste is currently collected as part the solid waste stream and hauled out of the County. Residential yard waste mulching programs were implemented in the past, but discontinues due to limited demand, the spread of contagious tree diseases, and contamination concerns. Yard waste is collected from residential dwellings under various arrangements by the franchise service providers.

9.7.3.1 Monroe County

Currently, mulching takes place at the three locations within the County, but is limited to County funded maintenance of public lands and right-of-ways. Future consideration of a yard/organics waste program should be revisited in the near future, in order to institute new

means and methods to reduce current quantities of organic waste being hauled out of the County.

9.7.4 Abandoned Vehicles

A program to remove, crush and haul abandoned vehicles for processing has been developed by the County. This service is provided to the County through contractual agreements.

9.7.5 Education of Recycling

A revised comprehensive program for public education and awareness of recycling is currently in development and is being implemented for the entire County. Updated brochures, an on-line newsletter, press releases, and media interviews are prepared on a regular basis by PWD-DSW/R.

9.7.5.1 School System

Currently, the County conducts educational programs that instill awareness of waste management issues; encourage the participation of children in recycling efforts, promote classroom activities, extra curricular events and special competitions. A "Recycling Education and Awareness Program" for grades K-12 is in place and being taught throughout the school system. County staff currently assists, promotes and coordinates educational activities for the public school system. Materials have been developed for use in the classroom which includes puppet programs and video presentations. School presentations are linked to Sunshine State Standards (Florida Department of Education Standards).

9.7.5.2 Other Groups Targeted for Recycling Education Programs

Civic groups, homeowner associations, condominium associations, professional associations, the hospitality industry, business entities, and government agencies, including the State parks and military facilities have been targeted for recycling presentations and activities. On-line newsletters, event announcements and brochures have been developed by PWD-DSW/R for the use of these groups.

9.7.5.3 Government Agencies

Recycling presentations, activities and materials have been developed for use by all participating government agencies. They are available upon request and on the County Solid Waste Department's section of the Monroe County website.

9.7.5.4 Public Relations

A list of all local newspapers, radio stations and television stations has been compiled. News releases and public service announcements are sent regularly to all local newspapers and

radio stations. Paid advertisements have been utilized for publicizing special recycling events. Brochures have been prepared and distributed and flyers to promote recycling events have been circulated throughout the County by PWD-DSW/R.

9.7.6 State Mandated Waste Separation Deadlines

In addition to recycling of materials, as previously described, another way to reduce the demand for landfill space is to incorporate resource recovery and volume reduction practices into the solid waste disposal process. For this reason, and to reduce the hazard certain wastes may cause to humans and the environment, the State has imposed a number of deadlines for the separation of special wastes from landfills. However, due to a total population less than one hundred thousand people, state mandates for separation are not mandatory.

9.7.6.1 Waste Oil

Since September 1990, uncontaminated waste oil has been accepted at the all three PWD-DSW/R solid waste facilities and at no charge to residents.

9.7.6.2 Lead Acid Batteries

Lead acid and niCad batteries are collected and segregated by PWD-DSW/R at all three transfer facilities and the Key Largo Recycling Center on an ongoing basis. Pursuant to Section 403.717 F.S. it is illegal to landfill lead acid batteries.

9.7.6.3 Tires

Tires are also segregated from landfill waste. Tires without rims are collected at residences by residential service providers upon special request on regular collection days at no charge. Tires can be dropped off at any of the three transfer facilities for a fee. Tires are then stockpiled and hauled out for recycling.

9.7.6.4 Construction and Demolition Debris

Construction and demolition debris is separated from other solid waste. Recyclable components are stock piled at all three transfer stations by WMI until haul out of the materials to their recycling facility. Construction and demolition debris is transported to a special landfill facility in Homestead, Florida.

9.7.6.5 White Goods

White goods are collected by the franchised solid waste collectors, brought to the three transfer stations, and stockpiled. The County has contracted with Waste Management Inc. to

process, bale and ship white goods. Prior to transfer WMI removes Freon from all refrigeration and air conditioning units.

9.7.6.6 Electronic Waste

Electronic waste (E-Waste) can be dropped off at Cudjoe Key and Long Key transfer Facilities and at the Key Largo Recycling Center during designated dates and times. The E-Waste is then stockpiled by the County and collected by the franchise contractor for haul out to the contractor's recycling facility.

9.8 Geographic Service Area *[Rule 9J-5.011(1)(f), F.A.C.]*

PWD-DSW/R has divided solid waste collection operations within the County into three subdistricts. The geographic boundaries of these subdistricts are shown on the solid waste **Map Series 9.1** of the map Atlas, and are described below:

- Subdistrict I is served by the Key Largo Transfer Facility and comprises an area extending from the Miami-Dade County line to Snake Creek at southern Plantation Key. The collection franchises serving Subdistrict I are Keys Sanitary Service and Ocean Reef Solid Waste Inc.

- Subdistrict II is served by the Long Key Transfer Facility and comprises an area extending from Snake Creek to the Seven Mile Bridge. The collection franchise servicing Subdistrict II is Marathon Garbage Service.

- Subdistrict III is served by the Cudjoe Key Transfer Facility and comprises an area from the Seven Mile Bridge to Stock Island (Incorporated Key West is not part of the WMI operation). The collection franchise serving Subdistrict III is Waste Management, Inc.

9.9 Litter

9.9.1 Litter Types and Sources

Marine litter and terrestrial litter are the two primary types of solid waste litter within the County; both types create adverse affects, on the natural environment, animal species, the general aesthetics of local communities, and the beauty of the Florida Keys.

9.9.1.1 Marine Litter

Marine litter originates from a variety of sources including intentional and unintentional releases from recreational boaters, shoreline users, commercial fishing operations, sport fishing and diving charters, and oceanic sources such as merchant ships, cruise ships, and oil drilling vessels. In addition, litter on the land blows into the waterways of the Keys. See Chapter 3.0, (Conservation and Coastal Management of the Monroe County Comprehensive

Plan Update). Fishing line disposal containers are stationed on most fishing bridges within the County.

9.9.1.2 Terrestrial Litter

Terrestrial litter also originates from a variety of sources including both intentional and unintentional releases from trash receptacles, commercial haulers, motorists, pedestrians, and beach goers. Furthermore, animal infiltration of trash receptacles can produce litter within residential communities, commercial area, and park facilities.

9.9.2 Affects of Litter on Animal Species

Whether the litter is marine or terrestrial, it will have adverse effects on animal life within the County. Entanglement and ingestion of litter can cause bodily injury, illness and death to the wildlife within the Florida Keys. Endangered species such as Key Deer face further danger of survival with the interaction of humans and their litter. Exposure to litter may cause mortality by entanglement and disease. (U.S. Fish and Wildlife Service, National Key Deer Refuge, 2000).

9.9.3 Affects of Litter on the Environment

Litter can cause habitat destruction, which will eventually lead to the loss of a sustainable environment for which the animal life needs to survive. Litter not only causes physical damage to the environment, but also damages the aesthetics and allure of the Florida Keys which naturally draws thousands of tourists to each year.

9.9.4 Litter Control

Controlling litter within the County will need to be addressed through improved solid waste collection practices, animal/tamper proof waste receptacles, community cooperation, clean-up efforts, education, and local laws. Section 21-21(a) of the County's LDCs states, "No person shall place, cast, sweep, or deposit anywhere within the county any refuse in such a manner that the same may be carried, spread, or deposited by the elements upon any street, alley, parkway, or other public place or into any occupied or unoccupied property or waterway." Therefore, code enforcement should focus on persons dumping or littering. Furthermore, the County's education efforts should illustrate the impacts of litter upon animal species and habitat.

9.10 Level of Service Standards *[Rule 9J-5.011(1)(e), F.A.C.]*

The historical solid waste generation values for the PWD-DSW/R service area (**Table 9.2)** show a steady growth of total solid waste generation between the years 1998-2001. During the period 2002 - 2006, the County's solid waste generation was significantly higher. These higher values do not correspond to normal solid waste generation trends within the County

and in actuality result from a cluster of outliers. The outliers are functions of favorable economic conditions (greater consumption of goods and services) and storm events that cause a significant amount of over generation due to debris. Furthermore, during the period of 2007-2008, an economic recession affected solid waste generation, significantly reducing standard trends for generation growth.

The LOS Standard utilized for projecting solid waste demands during the planning periods will be 11.41 pounds/capita/day (lbs/cap/day). This LOS is calculated by averaging LOS from years 2000 through 2009. Although this value is higher than the current Comprehensive Plan (5.44 pounds per capita per day – Objective 801.1), it is considered a reasonable and conservative standard because: (1) these years represent a general trend of solid waste generation with respect to functional population growth; (2) the average LOS creates a conservative rate of solid waste generation in comparison to the increasing trend of solid waste generation between the years 1998-2000, thus predicting a comparative or slightly higher annual solid waste production in relation to population; (3) the limitations on future development should reduce the amount of construction and demolition debris generation; and (4) recycling and consumer awareness will be part of the County's efforts to reduce generation. **Table 9.9** depicts the historical solid waste generation for the County exclusively.

Table 9.9 - Solid Waste Generation Trends

	Solid Waste Generation	Population			LOS
Year	(Tons/Yr)	Permanent	Seasonal	Functional	(LBS/CAP/DAY)
2000	158,327	36,036	33,241	69,277	12.52
2001	125,893	36,250	33,263	69,513	9.92
2002	134,950	36,452	33,285	69,737	10.60
2003	134,734	36,543	33,307	69,850	10.57
2004	112,102	36,606	33,329	69,935	8.78
2005	212,470	37,164	33,351	70,515	16.51
2006	200,338	36,466	34,019	70,485	15.57
2007	134,467	35,749	34,568	70,317	10.48
2008	130,245	34,788	35,550	70,338	10.15
2009	116,884	36,268	35,043	71,311	8.98

Source: Monroe County Recommended Functional Population Series, Fishkind & Associates 2010

9.11 Projected Future Ability to Meet Level of Service Standards *[Rule 9J-5.011(1)(e)(f), F.A.C.]*

Table 9.10 presents solid waste generation for Monroe County (excluding Islamorada) from 2010 to 2030 based upon a LOS standard of 11.41 lbs/cap/day. The LOS includes recycling and disposal (excluding hazardous wastes). Planning periods are in five year increments.

Table 9.10 - Projected Demands

	Population			LOS	Projected Solid Waste Generation
Year	Permanent	Seasonal	Functional	(LBS/CAP/DAY)	(Tons/Year)
2010	35,368	35,440	70,808	11.41	147,436
2015	35,696	36,067	71,763	11.41	149,424
2020	35,374	37,120	72,494	11.41	150,947
2025	35,052	38,173	73,225	11.41	152,469
2030	34,730	39,226	73,956	11.41	153,991

Source: Monroe County Population Projections, Fishkind & Associates 2010
Notes: FEDP data uses only permanent population for their evaluations.

9.12 Key Carrying Capacity Limitations, Facility Inadequacies and Policy Constraints *[Rule 9J-5.011(1)(e)(f), F.A.C.]*

The latest data available from FDEP (2008 calendar year) indicated that 143,988 tons of solid waste was collected in the County and processed by franchise contractors between January 2008 and December 2008. The County's contract with WMI does not stipulate limitations to collection and disposal demands; therefore, WMI will continue to follow the terms of the contract without limitation on demand until 2016 or beyond if and the option to renew the haul out contract for an additional five years is exceeded. Based on the current contract between the County and WMI, the agreement will adequately address solid waste disposal and recycling needs through the five year contract period ending in 2016. With the provisions provided for in the contract, the County could hypothetically continue to renew contracts for future disposal needs. Although WMI projects that the Broward County Central Landfill's capacity will be approximately met by the year 2027, WMI does have other facilities in the State that will be able to facilitate the County's solid waste disposal needs well past the planning period of this document (2030). Therefore, it will be necessary for the County to research other means and methods to reduce solid waste generation, improve recycling volume, and increase sustainability to preserve resources in the County and its impacts on other Florida Counties.

The transfer facilities within the county are currently well below permitted capacity, and should not exceed capacity within the planning period of this document. **Table 9.12** represents the growth limitations within the County based on the transfer facilities capacities and the terms of existing haul out contract.

Table 9.11 - Remaining Broward County Central Landfill Capacity

Year	Remaining Capacity (Tons)	Allocation to Monroe County (Tons)	Projected Demand (Tons)
2010	25,000,000	N/A	190,737
2015	18,000,000	N/A	192,604
2020	11,000,000	N/A	194.436
2025	3,000,000	N/A	196,268
2027	Closed	N/A	198,100

Source: WMI, 2010

Note: 1. Projected remaining capacities for the Broward County Central Landfill shown above are estimated by WMI.
2. Ash for Wheelabrator facility is disposed of at Broward County Central Landfill.
3. WMI does not allocate landfill space for any entity that is contracted to dispose at their facilities.

Table 9.12 - Growth Limitations Based on Solid Waste Transfer Facility Capacity

Transfer Facility	Current Demand	Permitted Capacity	Design Capacity
Location	TPD	TPD	TPD
Key Largo	133.33	250	750
Long Key	133.33	250	750
Cudjoe Key	133.33	250	750
Total	400	250	2250

Source: WMI, 2010

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Bibliography

Monroe County, “Monroe County Public Facilities Capacity Assessment Report”, 2008

Monroe County PWD-DSW/R “Recycling Brochure”, 2010

Monroe County, “Monroe County Transfer Stations Operations and maintenance Agreement”, October 1993

Monroe County,, "Monroe County Public Facilities Capacity Assessment." 2008

Monroe County, “Renewal of Solid Waste Collection Franchise Agreements”, 2009

U.S. Fish and Wildlife, “National Key Deer Refuge Brochure”, 2000
http://apc.tamu.edu/keydeer/KDFacts.pdf

US Bureau of the Census, Comparison of Resident Population Estimates for Monroe County, 2000-2008

CHAPTER 9.0 – SOLID WASTE – COMMENT RESPONSES

Commenter: Rosa Washington
Date Received: 8/17/10

Location	Comment	K&S Response
9.2.1 Types of Solid Waste (Definitions)	Alphabetize definitions.	Revisions to definitions have been made and now it is in alphabetical order.
9.2.1 Types of Solid Waste (Definitions)	Add definition for Electronic Waste (E-Waste)	Formal Definition does not exist in Florida State Statues; however, explanation an informal definition has been added to definition list.
9.4.1 Land uses served by PWD-DSW/R Facilities	Revise NAS solid waste facilities location.	Verified actual location of Rockland Key with Rosa Washington (R.W.) and made revision from Stock Island to Rockland Key.
Table 9.1 Municipal Solid Waste Composition by Type of Generator	Discrepancies between table data and FDEP certified quantities from 2008.	Requested FDEP (2008) for comparison from R.W., found discrepancies and made revisions to table, table data source, and table notes.
9.4.2 Historical Solid Waste Generation	Discrepancies between 2008 populations.	Verified with R.W. that FDEP population is 76,081 and does not use the separate population as permanent and seasonal. Revised to reflect FDEP certified data.
9.4.2 Historical Solid Waste Generation	Additional mention of the increase of tourism should me noted in document.	Noted that tourism in the Florida keys should be accounted for and does impact the solid waste production.
Table 9.2	Excluded municipalities for table need to be confirmed.	Verified with R.W. that only Islamorada is excluded from FDEP data. Made revisions.
Table 9.2	Source needs confirmation and calendar year of source needs to be confirmed.	Verified with R.W. that data is from FDEP. FEDP's calendar year confirmed. Made revisions.
Table 9.3	Numbers do not completely match up with FDEP data.	Requested FDEP report for verification from R.W. Checked data made minor revisions to table data..
Table 9.3	Table notes need verification regarding total population in 2008.	Checked FEDP data, made minor revisions to table notes: total population change from 2008 FDEP report in note #1. Verified with R.W. that only Islamorada is excluded from FDEP data. Made revisions.

Location	Comment	K&S Response
9.5.1 Haul-Out Disposal Plan	Confirm Haul-Out Contract details.	Verified with R.W. Made revisions based on R.W. comments.
9.5.3 Sludge Septage, and Leachate	Confirm wording and add content regarding future plans.	Verified with R.W. Made revisions based on R.W. comments.
9.5.10 Household Hazardous Waste	Confirm wording and add content regarding future plans.	Verified with R.W. Made revisions based on R.W. comments.
9.5.11 Contaminated Sites	Note that there are not any contaminated public sites.	Revisions made.
9.5.13 Public Education and Training	Change Verbiage regarding "Amnesty Days".	Revisions Made per R.W. Direction
Table 9.6	Mid-Key Waste Inc. no longer exists and Island Disposal Service DNE.	Checked County website for verification and the table was correct, however, after speaking with R.W. the website needs to be updated and Marathon Garbage Service is the correct franchise for MM45-72.Made Revisions to table.
9.6.3.1 Landfill Facility	Change verbiage	Revisions made per comments.
9.6.3.2 Resource Recovery	Change verbiage	Revisions made per comments.
9.7 Recycling Program	Change verbiage/grammar	Revisions made per comments.
9.7.1.1.1 Curbside Collection	Include Ocean Reef Disposal Franchise as a recycling collection contractor.	Made revisions to include Ocean Reef.
9.7.1.1.2 Recycling Centers	Change Verbiage and add Key Largo Recycling Center.	Revisions made per comments.
9.7.1.1.3 Commercial Recycling	Change verbiage to properly describe commercial recycling collection and drop off procedures.	Revisions made per comments.
9.7.2Government Recycling	Remove "Mandatory" from title	Revisions made per comments.
9.7.2.1 Monroe County	Revise Verbiage per notes.	Revisions made per comments.
9.7.2.1 Monroe County School Board	Revise Verbiage per notes.	Revisions made per comments.
9.7.3 Yard Waste Program	Revise Verbiage per notes.	Revisions made per comments.
9.7.3.2 Residential	Revise Verbiage per notes.	Revisions made per comments.
9.7.5 Education	Note that an updated brochure is available online, and newsletter, press releases, and media interviews are prepared on regular basis.	Revisions made per comments.
9.7.5.1 School System	Revise Verbiage per notes.	Revisions made per comments.

Location	Comment	K&S Response
9.7.5.2 Other Groups Targeted for Recycling Education Programs	Is there currently a mailing list? Change verbiage.	Verified with R.W. that the mailing list is no longer part of program. However Rosa noted that upon request persons can be added to the newsletter email distribution list or go on-line for the newsletter. Made revisions per comments.
9.7.5.3 Government Agencies	Change Verbiage and Outdated Information.	Verified with R.W. Made revisions per comments and omissions.
9.7.5.4 Public Relations	Change Verbiage and omit notation about distribution of flyers and TV commercials.	Made revisions and revised public relations program information.
9.7.6.1 Waste Oil	Omit Service Station information and finer details for collection process. Also Change Verbiage.	Omitted reference to waste oil collection by service station and details regarding collection process at County collection facilities. Revised Verbiage.
9.7.6.2 Lead Acid Batteries	Omit Service Station/retailer battery collection. Remove Florida Statues (F.S.) reference.	Revised verbiage to only include County collection process. Omitted service station/retailer collection clause. Comment noted regarding F.S., however this clause is relevant and should remain. Updated Verbiage.
9.7.6.3 Tires	Revise Tire collection details.	Verified with R.W. and made revisions per comments
9.7.6.4 Construction and Demolition Debris	Revise Verbiage and note that Construction and demolition Debris is collected and transported to a special landfill in Homestead, FL.	Made revisions per comments and added details regarding C&D material disposal.
9.7.6.5 White Goods	Revise Verbiage, Omit Tampa Market reference, Not WMI removes Freon before transport.	
9.7.6.6 Electronic Waste E-waste cont.	Add reference that commercial collection of E-waste is accepted for a per lbs fee and revise verbiage.	Added reference regarding commercial collection of E-waste and revised verbiage. See above.
9.8 Geographic Service Area	Move section to front of document.	Comment Noted, however this section will serve this document's needs better for the existing and future conditions reference if it remains as is.
9.9.1.1 Marine Litter	Add reference that states fishing line disposal containers are stationed at most fishing piers.	Reference added.

Location	Comment	K&S Response
No Comments Received from County on 10-25-10		
Commenter: Kathy Grasser, Dent Pierce, and Rosa Washington **Date Received: 2/9/11**		
Location	**Comment**	**K&S Response**
9.3.2 State Regulations	HB 7135, Page 16 exempts small counties from recycling goals of 75%, according to Dent, we are exempted from the benchmarks listed	HB 7135 has since been adopted into Florida statues and does note that: A county with a population of 100,000 or less may provide its residents with the opportunity to recycle in lieu of achieving the goal set forth in this section. For the purposes of this section, the "opportunity to recycle" means that the county. Revisions made to SW Element to include updated information.
9.5.2	The WMI contract ends in 2016, however, there is a contract renewal for 2021, (if we don't renew with WMI, we own them over $325,000). See page 4 and Exhibit B of the contract.	Additional information regarding WM contract added to section 9.5.2.
9.12 Carrying Capacity	The landfill will be closed in 2027. Our contract technically expires in 2021. Our Comp plan term ends in 2030. Rosa is getting a letter from WMI on what they plan on doing next. Our SW has to go somewhere. This letter will discuss that. Since there is a time discrepancy of 6 years between the contract expiring and the landfill closing, Rosa is going to have WMI put something in writing on their next steps.	Letter closely reflects our research. Therefore, only a slight change in verbiage was revised regarding WMI landfill capacities to section 9.12 to reflect comment.

Location	Comment	K&S Response
9.4.2	Maybe there should be a paragraph pertaining to pre and post hurricane debris removal. During these times, the SW generation increases due to tree trimming and clean up.	See 9.4.2 for storm generated debris. Furthermore, if you are to include the years where pre/post storm debris is generated within the LOS calculations, then a separate section within the element will not be necessary unless the County has a storm debris plan to note within the element. LOS updated to include those years.
Table 9.2	FDEP data is annual and a year behind, so 2009 data is available.	The data in the document is the data we receive from Rosa Washington during the existing conditions phase of our services. We did not receive 2009 data at that that time. Unfortunately, we can't continue to update data as the Comp plan progresses. However, if you find that the 2009 data needs to be present please request this from Debbie Love from our offices.
Table 9.10 Level of Service Standards	Here is a conflict with the Level of Service Standards: on the 2nd to last line on the page, 'represent a general trend of solid waste increase with respect to population growth.' FDEP data is based on permanent population. MC's permanent population is decreasing. Therefore, this sentence is no longer true.	Yes, the County's permanent population is decreasing. However, the seasonal population is on the rise, which will increase the functional population and therefore increase waste output. This is why I think that the LOS should be based off the functional population since the waste generation growth is in the seasonal residents.
Tables 9.9, 9.10, & 9.11	Table 9.9 and 9.10, section 9.11 excludes Islamorada, but should also exclude Key West since they have their own waste management contract.	Table 9.9: FDEP includes the solid waste generation from the entire county, but does exclude Islamorada Therefore our LOS calculation excluded Islamorada population as well. Table 9.10:

Location	Comment	K&S Response
Table 9.10 Level of Service Standards	The LOS in the tech doc is 6.97 lbs/cap/day. FDEP data and their LOS calculation is based only on permanent population, not on seasonal population. Furthermore, when Rosa gathers her data from LOS FDEP, it reflects only permanent population. However, Table 9.9 includes both seasonal and permanent population (functional).	The use of the functional population should depict the actual LOS more accurately since permanent population is shrinking and seasonal population is on the increase.
Table 9.10 Level of Service Standards	LOS in the tech doc is based on years 2000, 2001 and 2007. The LOS is 6.22, 7.59 and 7.09, respectively. Two out of three of the 'averaged' LOS is above our LOS, which makes it inconsistent with the comp plan.	We have revised the LOS if you want to show a complete LOS with the inclusion of major event generators, then I would take an overall average of SW generation vs population.
Table 9.10 Level of Service Standards	See SW pounds per day excel sheet. Average For past 8 years: Permanent pounds per day per capita average: 16.44. Seasonal pounds per day per capita average: 16.31. Both functional and season pounds per day per capita average: 8.19. I am recommending either we change the LOS to include the seasonal population; doubling the current LOS of 6.97 to 13.94. Or include the attached updated Table 9.10	Made revisions to table 9.10 to reflect the use of functional population and made a small correction to your table to reflect the 2003 waste generated from216,186 tons/yr to 213,186tons/yr which I believe was just a typo. Revised table per the recommendation to us functional population.

Location	Comment	K&S Response
9.10 Level of Service Standards	This LOS includes both seasonal and permanent population, AND would include possibility of pre and post hurricane debris. And it wouldn't make our comp plan inconsistent.	Noted, See Previous responses.
9.10 Level of Service Standards	Based on MC recycling efforts and the increases in technology at the landfill, our actual LOS reported will decrease. I am concerned if we make the LOS 6.97, then we get hit by a hurricane and the lbs/cap/day increase, then we become inconsistent with the comp plan and any actions have to be inserted into the CIP.	Noted and revised to accommodate storm events
9.10 Level of Service Standards	Since this new plan doesn't expire till 2030, and recycling efforts are up, seasonal population is up, permanent population is down, we have been very very lucky as to not have any huge weather events, so in an effort not to change the SW LOS for the next 20 years, I'm taking suggestions as to how to proceed. Any suggestions?	From Section 9.10: (4) recycling and consumer awareness will be part of the County's efforts to reduce generation. From Section 9.11: Therefore, it will be necessary for the County to research other means and methods to reduce solid waste generation, improve recycling volume, and increase sustainability to preserve resources in the County and its impacts on other Florida Counties.

SANITARY SEWER
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10.0 SANITARY SEWER ELEMENT

[Rule 9J-5.011, F.A.C.]

The Sanitary Sewer Element of the Monroe County (County) Comprehensive Plan addresses the data inventory requirements of Rule 9J-5.005(2) and Rule 9J-5.011 of the Florida Administrative Code (F.A.C.). The Sanitary Sewer Element is a required comprehensive plan element under Florida's Local Government Comprehensive Planning and Land Development Regulation Act (Chapter 163.3177.6(c), F.S.).

The purpose of the element is to address the issues and needs of sanitary sewer facilities that will be provided concurrently with the demand for services; to identify safe disposal methods for treated waste; and to establish the level of service for sanitary sewer.

The Sanitary Sewer Element provides a description of the existing and projected sewage treatment and disposal methods in use in the County.

10.1 Introduction

The sustainability of the marine ecosystem of the Florida Keys (the "Keys") is dependent upon clear water with low nutrient loading. Treatment of sewage and the disposal of wastewater within the County historically have been accomplished through septic tanks, on-site treatment and disposal systems (OSTDS), and small to intermediate sized privately-owned wastewater treatment package plants. With expansion and growth, regional systems consisting of treatment plants and centralized sewer have been built providing a greater level of collection and treatment. Several sewer districts, both private and municipal, have been formed to service more densely populated areas.

Notwithstanding the above accomplishments, the Keys face the challenge of obtaining adequate funding sources to implement the extent of regional systems required to meet guidelines established by State and federal mandates. To further complicate the issue, in more sparsely populated areas, advanced methods of treatment are not generally economically feasible. Regulatory pressure and the implementation of numeric nutrient criteria increase the complexity of providing proper treatment of sewage. Current wastewater treatment practices, combined with severely limited soils and high land use densities result in increased potential for ground and surface water contamination.

Over the last 20 years, aerobic treatment units (ATU) for more advanced onsite treatment and secondary treatment plants have been introduced. Although they provide better treatment than septic tanks, including effluent disinfection, ATUs are not an efficient means of removal of phosphorus and nitrogen.

With the adoption of the *Monroe County Sanitary Wastewater Master Plan* (the "Master Plan") in June of 2000, the County has implemented a program to address these issues. The Master Plan addresses planned facilities, improvements, and expansion of regional facilities as well

as programs working with the Department of Health (DOH) to administer code enforcement for septic tanks. The plan focuses on utilizing regional systems for treatment in hot spots (areas of high density) and alternative Best Available Technology (BAT) in cold spots (areas of low density). Although originally planned to provide compliance by July of 2010, the Master Plan has fallen short mainly due to a gap in funding. This section will compare the existing service capacity against the level of service required for compliance with regulatory standards for both existing and projected demands.

The 2000 Master Plan identified 23,000 private onsite systems within unincorporated Monroe County, made up of septic tanks, ATUs, and unknown connections servicing a total of 4.88 million gallons per day (MGD). In addition, 246 small wastewater treatment plants (WWTP) were identified servicing another 2.40 MGD. The Master Plan called for several measures including the following:

- Replacement or upgrade of onsite systems to Onsite Wastewater Nutrient Reduction Systems (OWNRS);
- Creation of 12 community collection systems, five of which are to be phased into regional systems;
- Address hot spots with community systems by 2010; and
- Upgrade 17 facilities to BAT/Advanced Wastewater Treatment (AWT) by 2010.

In addition, facilities were to be upgraded to accommodate water reuse programs and the distribution system was to be installed. The major drawbacks to reuse cited in the Master Plan include the lack of large users and economic feasibility.

In the County's *Annual Assessment Report Evaluating the Work Program Year 10* (May 2008), the Department of Community Affairs (DCA) noted the following conclusions from the Department of Environmental Protection (FDEP) report to DCA:

- While progress had been made, there is a long way to go toward compliance in terms of completion schedules and meeting the July 1, 2010 deadline.
- Dozens of small facilities relying on connection to central systems will be out of compliance on that date.
- The same will likely be true of a number of homeowners served by septic tanks and OSTDS.
- FDEP would do whatever it could within its power to promote compliance assuming that the DOH would do the same to resolve the OSTDS requirements.

The Keys Wastewater Plan – November 2007 Report, prepared by Monroe County Engineering Division at the request of the Florida House of Representatives Environmental and Natural Resources Council, identified progress of the individual projects along with local government responsibilities for specific facilities. The report included a summary of nine local governments and utility service areas providing centralized systems within

unincorporated Monroe County. The executive summary of the report cited a funding gap of approximately $336 million in meeting the July 2010 date for compliance.

In April 2010, the Florida Senate and House approved SB 2018 extending the deadline for compliance to the end of 2015, and postponing fines and potential liens against property owners. In addition, the bill authorized $200 million of State funding for improvements; however, the source of funding remains unresolved.

Meeting the 2015 extension requires a detailed financial plan to implement necessary plant and infrastructure improvements. The funding gap of $330 million, which has already stretched the County's capacity for debt service, continues to broaden due to a delayed revenue stream resulting from delays in design and construction of new systems. Subsidizing costs is consistent with County's policy.

The County is reluctant to impose assessments on residents for un-funded mandates that could result in home forfeitures and financial hardship. The varying costs among projects pose additional problems. For example, areas such as Cudjoe Regional System, projected at $15,000 per EDU, costs up to three times as much as other systems ranging from $5,000 to $10,000 per EDU. Improvements to Cudjoe Regional System could require supplemental funding to bring costs in-line with other systems to avoid an unreasonable burden to the residents.

The County looks to State and Federal assistance to make up the difference. Because of uncertainties, all alternative avenues for funding need to be explored and implemented. Without a detailed financial plan and diligent pursuit of funding sources, there is concern that the 2015 extension may not be met.

10.2 Regulatory Framework

[Rule 9J-5.011 (2), F.A.C]

10.2.1 Federal Regulation

Pursuant to the Clean Water Act, 33 U.S.C. §1251 et seq. (1972), the Environmental Protection Agency (EPA) has authority to promulgate and administer regulations for sewage disposal and treatment. Implementation is delegated to the State of Florida through the FDEP. Once a wastewater management plan is approved, EPA may enter into agreement with the local government to implement.

EPA is currently working through the details for implementation of Numeric Nutrient Reduction Standards. The specific criteria of this program are not yet identified; however, the intent of the program is to restrict, in measurable quantities, the discharge of pollutant loads to surface waters and ultimately coastal and subterranean waters.

10.2.2 State Regulation

10.2.2.1 Area of Critical State Concern:

In 1975, due to concerns of the degradation of the marine ecosystem and continued pressures for expanded development, the DCA designated the Keys as an Area of Critical State Concern. Among other issues, this designation focused on programs including implementation of a comprehensive plan to address untreated sewage discharge into waters of the Keys. The County has since implemented a comprehensive planning process resulting in the Rate of Growth Ordinance (ROGO) and other efforts to manage impacts associated with development.

10.2.2.2 Five Year Work Program (the "Work Program") and the Florida Keys Carrying Capacity Study (FKCCS)

In December 12, 1995, the Administration Commission found the 2010 Monroe County Comprehensive Plan not in compliance and ordered facilitated rulemaking/mediation to address outstanding issues. In July 1997, the Administration Commission proposed Rule 28-20.100, F.A.C., which introduced the concept of the Work Program requiring the following activities as it relates to wastewater:

- Continued construction of wastewater facilities in hot spots begun in previous year.
- Design and construction of additional wastewater treatment facilities in accordance with the schedule of a wastewater master plan.
- Implementation of the FKCCS to establish development standards ensuring that all new development not exceed the capacity the ecosystem's ability to sustain impacts.
- Complete elimination of cesspits.

The FKCCS was tasked with providing specific recommendations, including adequate capital funding, protection of the environment, ensuring private property rights, providing for adequate affordable work force housing and meeting the goal of reducing the State's role in regulatory oversight. With respect to wastewater, the FKCCS used benchmarks to correlate impacts of nutrient loading on marine ecosystems and the level of sustainable development.

The four key topics of discussion within the FKCCS include Terrestrial Habitat Protection, Allocation and Distribution of Growth, Affordable Housing, and Funding. Of the four topics, Allocation and Distribution of Growth, and Funding addressed recommendations related to wastewater. The Allocation and Distribution of Growth is addressed through ROGO with the establishment of 2,548 additional residential units within the County to be built over a ten-year period. The distribution of the residential units involves many factors and various stakeholders, but the principles of focusing new development and infill within partially developed areas and guiding future growth towards areas with existing or planned/funded wastewater systems are consistent with the goals of the FKCCS.

Finding adequate funding for the environmental and socioeconomic needs of the Keys is a difficult issue. The County has a relatively small population and a high number of tourists. The burden of playing catch-up with years of inadequate treatment facilities combined with the increase in housing costs associated with the tourist-based economy adds to the issue of affordable housing and economically feasible solutions; however, all current infrastructure requirements and waste disposal standards are to be upheld. Many potential sources for additional funding were presented for discussion including establishing tolls, residential impact fees, bed tax, Ad Valorem Tax, State and federal matching funds, and tourist-based sales tax.

Although many tasks identified in the Master Plan remain incomplete, all are being addressed. The remaining tasks consist mainly of costly capital improvement projects for which funding remains the key issue to implementation.

In November of 2010, under section 28-20.130, the requirements for the Work Program were updated by DCA. Under the revised Work Program, specific tasks and timelines are established to bring deficient systems into compliance.

Among the rules are requirements for the County Comprehensive Plan to restrict permits for new development or redevelopment unless served by a central sewer system with committed funding; permitted by DEP and physically under construction or with an onsite sewage treatment facility shown to be in compliance with requirements of s.381.0065(4), F.S. Furthermore, the County must direct new and redevelopment to areas with committed funding, permit, and physically under construction.

Rules specific to Wastewater Implementation include the following:

- By July 1, 2011, the County shall evaluate annually and allocate funding for wastewater implementation with such funding identified in annual update to the Capital Improvements Element of the Comprehensive Plan.
- By July 1, 2011, the County shall determine cold spots and unfounded service areas and provide a map delineating those areas.
- By August 1, 2013, the County shall work with the owners of wastewater facilities, DEP, and DOH to fulfill requirements for compliance and coordinate notice and actions against owners that will not meet advanced wastewater requirements.
- By August 1, 2011, the County shall adopt an ordinance establishing the upgrade program with implementation dates and enforcement procedures for on-site package plants.
- By July 1, 2011, the County shall annually draft a resolution requesting $50 million of the $200 million of bonds authorized under Section 215.619, F.S. and appropriate sufficient dept service for the construction of wastewater projects within the Florida Keys.
- By July 1, 2011, the County shall evaluate State and federal funding opportunities and apply annually to at least one State or federal grant program for wastewater projects.

- By July 1, 2011, the County shall develop and implement local funding programs necessary for construction, operation, maintenance, and replacement of facilities.
- By July 1, 2011, the County shall by resolution identify and delineate on a map areas served by central sewage facilities and those that will not be served by central facilities.
- By July 1, 2011, in coordination with DEP, the County shall execute an interlocal agreement addressing non-service and unfunded service areas. The agreement shall address mechanisms for FKAA, DOH or DEP to provide upgrades and central management of onsite facilities located in non-service and unfounded areas. Furthermore, DOH and DEP will report to DCA with an assessment and magnitude of non-compliance and identify enforcement mechanisms needed to ensure upgrades.
- By July 1, 2013, the County shall provide a report including addresses and parcel numbers of property owners that fail or refuse to connect to central sewer facilities within timeline required. This report will be submitted to DCA and shall describe status of enforcement actions and circumstances under which enforcement has or has not been initiated.

Wastewater Projects and their associated timelines included in the rule amendment are as follows:

- Key Largo Wastewater Treatment Facility. Key Largo Wastewater Treatment District is responsible for wastewater treatment in its service area and the completion of the Key Largo Wastewater Treatment Facility.
  - By July 1, 2011, Monroe County shall complete construction of the South Transmission Line; and
  - By July 1, 2011, Monroe County shall complete design of Collection basin C, E, F, G, H, I, J, and K; and
  - By July 1, 2011, Monroe County shall complete construction of Collection basins E-H; and
  - By July 1, 2011, Monroe County shall schedule construction of Collection basins I-K; and
  - By July 1, 2011, Monroe County shall complete construction of Collection basins I-K; and
  - By July 1, 2011, Monroe County shall complete 50 percent of hook-ups to Key Largo Regional WWTP; and
  - By July 1, 2012, Monroe County shall complete 75 percent of hook-ups to Key Largo Regional WWTP; and.
  - By July 1, 2013, Monroe County shall complete all remaining connections to Key Largo Regional WWTP.
- Hawk's Cay, Duck Key and Conch Key Wastewater Treatment Facility.
  - By March 1, 2012, Monroe County shall complete construction of Hawk's Cay WWTP upgrade/expansion, transmission, and collection system; and
  - By July 1, 2013, Monroe County shall complete construction of Duck Key collection system; and

  - By March 1, 2012, Monroe County shall initiate property connections to Hawk's Cay WWTP; and
  - By December 31, 2012, Monroe County shall complete 50 percent of hook-ups to Hawk's Cay WWTP; and
- South Lower Keys Wastewater Treatment Facility (Big Coppitt Regional System).
  - By July 1, 2012, Monroe County shall complete 75 percent hookups to South Lower Keys WWTP; and
  - By July 1, 2013, Monroe County shall complete all remaining connections to the South Lower Keys WWTP.
- Cudjoe Regional Wastewater Treatment Facility.
  - By July 1, 2011, Monroe County shall complete planning and design documents for the Cudjoe Regional Wastewater Treatment Facility, the Central Area (Cudjoe, Summerland and Upper Sugarloaf) Collection System and the Central Area Transmission Main. (Plant is not being designed and/or constructed in phases.); and
  - By January 2012 Monroe County shall complete design and planning for Outer Area (Lower Sugarloaf, Torches, Ramrod, Big Pine Key) Collection System and Transmission Main; and
  - By October 1, 2011, Monroe County shall initiate construction of the wastewater treatment plant, the Central Area Collection System and Central Area Transmission Main); and
  - By July 1, 2014, Monroe County shall complete construction of Wastewater Treatment, Central Area Collection System and Central Area Transmission Main; and
  - By February 2012 Monroe County shall initiate construction of the Outer Area Collection System and Transmission Main; and
  - By February 2015 Monroe County shall complete construction of the Outer Area Collection System and Transmission Main; and
  - By July 1, 2014, Monroe County shall initiate property connections – complete 25 percent of hook-ups to Cudjoe Regional WWTP; and
  - By July 1, 2015, Monroe County shall complete 50 percent of hook-ups to Cudjoe Regional WWTP; and
  - By December 2015, Monroe County shall complete remaining hook-ups to Cudjoe Regional WWTP.

10.2.2.3 Department of Health Program for Compliance

The DOH administers code enforcement for septic tanks within the Keys. The DOH regulates permits and establishes criteria for construction and certification of these facilities.

10.2.2.4 Chapter 163.3177, F.S.

This statute encourages local governments to develop a "community vision" which provides for sustainable growth, recognizes fiscal constraints, and protects its natural resources. In

addition, it calls for development of "urban service boundaries" which ensure the area is served (or will be served) with adequate public facilities and services.

10.2.2.5 9J-5.011, F.A.C.

This section of F.A.C. requires local governments to analyze the jurisdictional needs and capabilities or deficiencies of facilities in meeting the requirements established through this section. Local governments are required to provide information in the comprehensive plans to show compliance or plans for compliance including specific information for facilities identified; entity responsible for operation; service areas and service capacity; current and projected demands; and level of service provided.

Among other requirements, local governments are to report on condition and performance of existing facilities and as well as problems and opportunities for improvement.

10.2.3 Local Regulation

10.2.3.1 Monroe County Sanitary Wastewater Master Plan

The *Monroe County Sanitary Wastewater Master Plan*, adopted in June 2000, addresses the requirements addressed in 9J-5.011, F.A.C. The Master Plan identifies programs established to meet the demands and level of treatment necessary for compliance.

10.2.3.2 Monroe County Comprehensive Plan

In accordance with 9J-5.011, F.A.C., local governments are required to address the following policy objectives in their comprehensive plans related to wastewater management in guiding development:

- Protection and improvement of water quality by providing for the construction, operation, maintenance, and replacement of central sewage collection, treatment and disposal, and installation and proper operation and maintenance of onsite sewage treatment systems.
- Establishment of construction schedules and capital financing plans for wastewater management improvements and standards for the construction of wastewater treatment facilities or collection systems.

One way the County has responded to these requirements is by establishing the Master Plan and adoption of the following policies in the Sanitary Sewer element, which are summarized in **Table 10.1.**

In addition, the County participated in research projects through the Florida Department of Environmental Protection, and published the document Reasonable Assurance Documentation (FKRAD -May 2008), which "provides reasonable assurance that the

stakeholders in the Keys have provided or will implement sufficient control mechanisms to return the area's near shore waters to the water quality targets". The following elements were implemented to provide the reasonable assurance: Description of the Impaired Water, Description of the Water Quality and Aquatic Ecological Goals, Description of the Proposed Management Actions to Be Undertaken, Description of Procedures for Monitoring and Reporting Results, and Description of Proposed Corrective Actions. The FKRAD rules related to Wastewater Management have been incorporated into the County's master plan and policy decisions.

Table 10.1 – Monroe County Comprehensive Plan Wastewater Policies

Policy No.	Summary
901.16	Established January 4, 1998, as the deadline for adoption of permanent level of service standards for package treatment plants and on-site disposal systems (OSTDS) based on the findings of the Wastewater Master Plan and correlated amendments to the Land Development Regulations.
901.4.2	Amendment to the Building Code requiring notification to property owners issued building permits to complete hook-up to the central sewer facilities, pending availability within one year of becoming available, or as required as part of changes in State law or in level of service.
901.4.4	County agreement with EPA, FDEP, South Florida Water Management District (SFWMD), and National Oceanic and Atmospheric Administration (NOAA) regarding the scope of studies required to document pollutant loads from OSTDS, cesspits, package treatment plants, and other point and non-point sources on the Florida Keys into surrounding waters. These studies shall be executed according to the terms of the agreement, in coordination with the Water Quality Protection Program for the Florida Keys National Marine Sanctuary. Upon execution of this agreement, the scope of the Sanitary Wastewater Master Plan shall be adjusted accordingly.
901.5.18	As part of the Sanitary Wastewater Master Plan, an inventory of all wastewater treatment plants and OSTDS areas shall be completed identifying: - the entity having operation responsibility; - current rated plant capacity; - existing treatment status (number and type of hookups); - all future committed capacity (number and type of hookups); - all facilities which fall below level of service standards identified in the Master Plan; - costs associated with improving those facilities to meet minimum level of service standards; - funding sources and construction schedules for those improvements; and - average and peak flow design capacity for sanitary sewer facilities.
901.4.9	In the event Central Sewer Service becomes available (as defined by Chapter 10D-6) to areas served by OSTDS, owners of OSTDS within such areas shall have 30 days to connect to the central system upon notification of availability.
901.5.8	County shall ensure that wastewater treatment facilities are designed and constructed in accordance with the adopted levels of service, so as to limit the discharge or introduction of pollutants
901.5.18	All existing development shall connect to public treatment plants where available within one year of the date of plant start-up.

Source: Monroe County 2010 Comprehensive Plan

10.3 Existing Facilities – General Description

[Rule 9J-5.011 (1) (f), F.A.C.]

Sanitary sewer treatment within the County is provided through a combination of regional systems, OSTDS, package plants, and septic tanks. Approximately 30 percent of the land mass is within the boundaries of incorporated areas of the County. The majority of the hot spots are located within the incorporated areas, accounting for roughly 75 percent of the total wastewater generated within the Keys.

The Master Plan includes four major principles to improve wastewater management throughout the Keys:

- Upgrade or replace existing onsite systems with onsite wastewater nutrient reduction systems (OWNRS) in cold spots;
- Implement central community wastewater collection and treatment systems in hot spots;
- When community treatment systems increase to the point where no longer economically feasible to operate as community systems, consolidate them into regional systems; and
- Phase implementation of small regional systems and construct regional treatment plants so that interim community treatment systems are not necessary.

With the implementation of the Master Plan, regional service areas have been delineated and total demands within each service area have been identified. The basic unit of measurement used in evaluation is an Equivalent Dwelling Unit (EDU). One EDU is equivalent to approximately 167 gallons per day (gpd) of wastewater.

In accordance with Chapter 64E-6, F.A.C., the DOH has authority for issuing permits for onsite disposal systems. Chapter 64E-6, F.A.C. stipulates that the owner of a properly functioning onsite sewage treatment and disposal system must connect to an available publicly owned or investor-owned sewerage system within 365 days after the system is available for connection. The owner of the onsite system in need of repair of modification must connect to an available sewerage system within 90 days. Due to the designation as an Area of Critical State Concern, variances for compliance shall not be granted under any circumstances.

In areas where injection wells are approved for use, the DOH is the permitting agent for ATUs where the daily domestic sewage flow will not exceed 2,000 gpd. For establishments with greater than 2,000 gpd, but less than 10,000 gpd, the DOH is the permitting authority for the ATUs, and the FDEP is the permitting agent for the injection wells.

Owners of onsite systems must comply with the general maintenance and operational requirements of Chapter 64E-6, F.A.C., and any additional operation and maintenance requirements specified by the system design engineer. Onsite systems must be inspected by an approved maintenance entity at least two times each year.

When site conditions are favorable and septic tank systems are properly designed, constructed, and maintained, they can be efficient and economical alternatives to centralized wastewater treatment systems. Under unfavorable site conditions, such as high septic tank density, high seasonal rainfall, shallow ground water, or highly permeable soils, OSTDS can be a significant source of nutrient and bacterial ground water contamination. Anderson et al. (1988), in their report regarding the impact of individual and small community sewage systems, indicated that virtually 100 percent of the soils in Monroe County are severely limited for conventional OSTDS practices.

10.3.1 OSTDS Systems

Though alternative OSTDS systems have been shown generally to provide improved treatment of sewage relative to conventional septic tanks, further monitoring and evaluation of these systems by DOH is essential to ensure the protection of public health and water quality in the Keys. Nitrogen and phosphorous concentrations in wastewater may be reduced through specifically designed systems. Such systems may be utilized for OSTDS and package treatment plants. They must be carefully designed, constructed, operated and maintained to achieve the desired results.

10.3.2 On-Site Management Systems

Various alternatives for on-site treatment and disposal of wastewater are available for use in the County. It is important, however, when choosing an alternative that each component combined to make a total system should meet the following basic criteria:

- Produce an effluent of adequate quality for safe disposal;
- Be simple (few mechanical parts; easy to maintain);
- Be reliable (maintain consistent treatment);
- Protect the aesthetic qualities of an area; and
- Be acceptable to the homeowner or to the owner of another type of establishment (easy to use; creates no nuisance).

In areas of low density, cold spots, where centralized systems are not economically feasible, the plan for treatment focuses on Best Available Technology (BAT). The term BAT refers to a practice that is determined to be the most effective, practical means of preventing or reducing the amount of pollution generated by nonpoint sources to a level compatible with water quality goals. The selection of an appropriate BAT will depend greatly upon site conditions such as land use, topography, slope, water table elevation, and geology. BAT selection must be very site specific so as to assure proper operation and prevent undesirable results such contamination of surface waters.

10.3.3 Central Sanitary Sewer Treatment Facilities

The treatment plant component of the central sanitary sewer facility functions to remove solid and organic materials from the sewage. Depending on the proportion of materials removed, processes which accomplish treatment are generally grouped into one of the following four categories:

- Primary Treatment

  Primary treatment removes between 30 and 35 percent of the organic materials and up to 50 percent of the solids from the sewage, and is the least expensive treatment. This level of treatment is also commonly referred to as physical treatment because screens and settling tanks are the most common methods used to remove the solids.

- Secondary Treatment

  Secondary treatment removes approximately 90 percent of total organic materials and suspended solids from sewage, and is the most common level of treatment provided by centralized facilities. This level of treatment generally requires multiple steps involving one biological process and one or more processes for removal of suspended solids, and is more expensive than primary treatment.

- Tertiary Treatment

  Sewage may also contain large quantities of synthetic organic compounds or inorganic chemicals which may create pollution problems if not removed. Tertiary treatment is any treatment process beyond secondary treatment. The most common tertiary processes remove compounds of phosphorous and nitrogen. One method of tertiary treatment is spray irrigation, such as the irrigation of the golf course at Key Colony Beach. Because of the extra processes required, tertiary treatment is more expensive than secondary treatment.

- Advanced Wastewater Treatment (AWT)

  This term refers to tertiary treatment within the wastewater treatment plant itself to levels of water purity generally acceptable for discharge directly into surface waters. AWT standards are set by law (Section 403.086, F.S.) in Florida. Very few wastewater treatment facilities in the State of Florida meet the AWT treatment standards. Advanced waste treatment is the most expensive method of treatment due to the additional plant and operations costs.

10.4 Existing Facilities – Detailed Description

[Rule 9J-5.011 (1) (e), F.A.C.]

There are currently nine sanitary service providers within the County consisting of four municipalities, four private entities, and the Florida Keys Aqueduct Authority (FKAA). A summary of EDUs treated by each service provider is shown in **Table 10.2**.

Table 10.2 – Service Area per Sanitary Service Provider

Service Area	Agency/ Provider	Total EDUs Within Service Area (EDU)	Total Demand Within Service Area (MGD)	Total Treatment Capacity	Excess Planned Capacity
Ocean Reef	NKL Utility Corp.	1,800	0.30	0.66	0.36
Key Largo	KLWTD	14,164	2.3	3.45	1.05
Village of Islamorada	City	8,895	1.49	1.92	0.43
City of Layton	FKAA	350	0.06	0.07	0.01
Duck Key/Conch Key	FKAA	1,412.9	0.17	0.20	0.03
City of Marathon	City	7,893	1.31	1.46	0.15
City of Key Colony	City	1,530	0.25	0.34	0.09
Cudjoe Regional *	FKAA	8,645	0.84	1.05	0.13
Baypoint WWTS	FKAA	430	0.07	0.07	0.045
Big Coppitt	FKAA	1,667	0.20	0.32	0.12
Boca Chica	US Navy	2,600	0.43	0.44	0.01
Key Haven	FKAA	450	0.06	0.20	0.14
Stock Island	KW Resort Util. Corp	2,672	0.45	0.45	0.00
City of Key West	City	24,075	4.84	10.00	5.2
Totals		75,736	12.65	13.04	0.54

Source: Keys Wastewater Plan – 2007, Report to Environmental and Natural Resources Council, FHR;
(E. Woods, Senior Administrator, Monroe County Sewer Projects, personal communication, June 27, 2011)
* Includes North Lower Keys, Big Pine Key, Ramrod, Middle Lower Keys, Summerland, Upper and Lower Sugarloaf.

This table inventories the number of EDUs within each service area to be treated through existing or planned wastewater projects. The table uses a conversion factor of 167 gpd per EDU to convert demand to MGD for comparison against capacity created in treatment facilities.

This section provides a summary of the wastewater systems for each service provider and identifies the treatment capacities provided by individual facilities within their respective service area.

10.4.1 Current Level of Service Requirements

In 1999, the Florida Legislature established binding treatment and disposal requirements for wastewater management including central treatment facilities regulated by FDEP and OSTDS regulated by the DOH. A standard of treatment was established for OSTDS and sewage treatment plants with a deadline for compliance of July 1, 2010. Facilities with less than 100,000 gpd were to apply Best Available Technology (BAT) standards, while facilities producing greater than 100,000 gpd apply AWT standards. **Table 10.3** indicates the standards applied to each.

Table 10.3 - BAT and AWT Standards

Effluent (treated wastewater) concentration in milligrams per liter (mg/l) as annual average (mg/1 is equal to 1 part per million)	BOD	TS	TN	TP
BAT standards apply to facilities with design capacities less than 100,000 gpd (generally, OSTDS and "package plants")	10	10	10	1
AWT standards apply to facilities with design capacities equal to or greater than 100,000 gpd (community and central wastewater treatment systems)	5	5	3	1

Source: FDEP Report to DCA, 10 yr Work Program April 2008

10.4.2 Wastewater Facilities

The most common type of centralized sanitary sewer system is the localized small sewage treatment facility, or "package plant" as they are commonly known. Large scale municipal sanitary sewer systems which generally provide services to densely populated areas are another type of centralized facility. These centralized facilities are comprised of three components which perform the basic functions of collection, treatment and disposal of sewage.

There are nine sanitary sewer service providers serving 15 associated service areas located throughout the County. For the most part, service areas within incorporated areas coincide with the limits of incorporation. The four service areas served by regional service providers within incorporated areas include the Village of Islamorada, Key Colony Beach, City of Marathon, and the City of Key West; the City of Layton is served by FKAA. Within unincorporated Monroe County, there are five regional service providers: North Key Largo Utility Corp., Key Largo Wastewater Treatment District, Key West Resort Utilities Corp., Stock Island, and FKAA. FKAA provides service to seven of the 15 service areas previously identified. A graphical representation of both the incorporated and unincorporated Regional Service Areas is provided in **Map Series 10.1**. This map also shows the total treatment capacity within each service and estimated demands (number of EDUs).

Regional systems are regulated through FDEP, and as such, are subject to the same State and Federal regulations. Because each regional service provider is accountable for compliance, responsibility for service areas within incorporated areas typically falls with the municipality they serve. With the exception of the City of Layton that is served through FKAA, each municipal and private provider is independent of one another.

The total EDUs for each service area is summarized in **Table 10.4**. The table shows progress made toward accounting for EDUs in implementing the various wastewater projects.

Table 10.4 – EDU Allocations per Wastewater Project

Wastewater Project	Total EDUs	Planning	Design	Construction	Connections	
		EDUs	EDUs	EDUs	Completed (EDUs)	Remaining (EDUs)
Ocean Reef	1,800			20	1,780	0
Key Largo	13,707	5,483	3,617	3,618	789	989
Village of Islamorada	8,895	7,695			1,200	0
City of Layton	350				317	33
Duck Key/Conch Key	1,454				1,021	433
City of Marathon	8,203	137	0	7121	945	0
City of Key Colony	1,502				1,502	0
Cudjoe Regional *	7,987		922	7065	0	0
Baypoint WWTS	430	281			149	0
Big Coppitt	1,711			818	893	0
Boca Chica	2,600				2,600	0
Key Haven	450				450	0
Stock Island	2,672				2,672	0
City of Key West	2,4075				24,075	0
Total	75,736	13,596	4539	18,642	38,393	1,455

Source: Keys Wastewater Plan – 2007, Report to Environmental and Natural Resources Council, FHR
* Includes North Lower Keys, Big Pine Key, Ramrod, Middle Lower Keys, Summerland, Upper and Lower Sugarloaf.

Hook-up of individual services does not correlate directly with construction of collection system or plant improvements. "Remaining EDU's" reflect those not yet connected, in some state of design, or under construction.

10.4.2.1 Village of Islamorada

The Village of Islamorada is sub-divided into five separate collection and treatment basins in varying states of completion. Total 9,654 EDUs; capacity 1.52 MGD.

North Plantation Key
EDUs to be treated: 1,400 EDUs (.17 MGD)
Treatment Capacity: 1,800 EDUs (.30 MGD)
Type of treatment: AWT
Status: Plant construction completed.
Collection system expansion in design phase.

South Plantation Key
EDUs to be treated: 1,443 EDUs (.0.23 MGD)
Treatment Capacity: 1,606 EDUs (0.25 MGD)
Type of treatment: AWT
Status: Competitive procurement for design, build, operate, finance firm.

Windley Key
EDUs to be treated: 507 EDUs (0.08 MGD)
Treatment Capacity: 583 EDUs (0.92 MGD)
Type of treatment: AWT
Status: Competitive procurement for design, build, operate, finance firm.

Upper Matecumbe
EDUs to be treated: 2,459 EDUs (0.39 MGD)
Treatment Capacity: 2,632 EDUs (0.41 MGD)
Type of treatment: AWT
Status: Competitive procurement for design, build, operate, finance firm.

Lower Matecumbe
EDUs to be treated: 1,275 EDUs (0.20 MGD)
Treatment Capacity: 1,538 EDUs (0.24 MGD)
Type of treatment: AWT
Status: Competitive procurement for design, build, operate, finance firm.

10.4.2.2 Key Colony Beach

The Key Colony Beach central collection system was constructed in 1960. Despite ongoing repairs to infiltration and inflow, this project is compliant with 2010 effluent standards.

Key Colony Beach
EDUs to be treated: 1,5301 EDUs (.25 MGD)
Treatment Capacity: 2,035 EDUs (0.34 MGD)
Type of treatment: AWT
Status: Meets LOS with excess capacity.

10.4.2.3 Marathon

The City of Marathon is sub-divided into seven separate collection and treatment basins in varying states of completion. Total 8,665 EDUs; capacity 1.46 MGD

Service Area 1, Knight's Key
EDUs to be treated: 114 EDUs (0.019 MGD)
Treatment Capacity: 138 EDUs (.023 MGD)
Type of treatment: BAT
Status: Pipeline to Service Area 3 WWTP under construction.

Service Area 2, Boot Key
EDUs to be treated: 4 EDUs (0.0 MGD)
Treatment Capacity: 4 EDUs (0.0 MGD)
Type of treatment: BAT
Status: Plans for wastewater service for Boot Key has been suspended since the closure of the Boot Key drawbridge.

Service Area 3, Vaca Key (west)
EDUs to be treated: 1,383 EDUs (0.23 MGD)
Treatment Capacity: 1,480 EDUs (.25 MGD)
Type of treatment: AWT
Status: Under construction.

Service Area 4, Vaca Key (central)
EDUs to be treated: 2,234 EDUs (0.373 MGD)
Treatment Capacity: 2,289 EDUs (0.399 MGD)
Type of treatment: AWT with effluent re-use to Sombrero County Club.
Status: Properties are connecting.

Service Area 5, Vaca Key (east)
EDUs to be treated: 2,671 EDUs (0.446 MGD)
Treatment Capacity: 2,934 EDUs (.499 MGD)
Type of treatment: AWT
Status: Served through expansion of existing Little Venice Plant. Under construction.

Service Area 6, Fat Deer Key (west)
EDUs to be treated: 832 EDUs (0.139 MGD)
Treatment Capacity: 928 EDUs (.155 MGD)
Type of treatment: Package Plant
Status: Properties are connecting. Served through vacuum collection and upgrade to existing package plant.

Service Area 7, Grassy Key

EDUs to be treated:	659 EDUs (0.110 MGD)
Treatment Capacity:	796 EDUs (0.132 MGD)
Type of treatment:	AWT
Status:	Under construction.

10.4.2.4 City of Key West

The City of Key West operates a wastewater treatment facility constructed in 1989. The system encountered Infiltration and Inflow (I&I) problems approximately ten years ago releasing extensive fecal coliform into nearshore waters. The City has implemented corrective measures since then including I&I testing and repairs to sewer systems; accelerated Capital Improvement Programs (CIP) related to sewer repair/replacement; constructed two Class 1 deep injection wells to eliminate ocean outfall; accelerated retrofit of the WWTP to meet AWT standards; and other pro-active measures. There a current headworks project underway as of January 2011. The U.S. Navy owns 23% of the capacity of the plant.

Key West WWTP

EDUs to be treated:	24,075 EDUs (4.02 MGD)
Treatment Capacity:	59,880 EDUs (10.0 MGD)
Type of treatment:	AWT
Status:	Meets LOS with excess capacity

10.4.2.5 City of Layton

Through partnership with FKAA, the City of Layton wastewater system serves the entire city. No future projects are currently planned for this system.

Layton BAT

EDUs to be treated:	350 EDUs (.06 MGD)
Treatment Capacity:	385 EDUs (.066 MGD)
Type of treatment:	BAT
Status:	System compliant with 2010 wastewater standards.

10.4.2.6 Ocean Reef

Ocean Reef is a privately operated system with a secondary treatment facility to accommodate reuse.

Ocean Reef

EDUs to be treated:	1,846 EDUs (.30 MGD)
Treatment Capacity:	3,952 EDUs (0.66 MGD)
Type of treatment:	AWT

Status: Re-use distribution system in place. System compliant with 2010 wastewater standards.

10.4.2.7 Key Largo

Key Largo wastewater treatment is provided through a WWTP and collection sub-divided among 11 basins identified as A through K. Improvements are in varying states of completion. Total EDUs 13,707; total capacity 2.30 MGD.

Key Largo WWTP

EDUs to be treated:	14,764 EDUs (2.29 MGD)
Treatment Capacity:	20,658 EDUs (3.4 MGD)
Type of treatment:	AWT
Status:	Project completion anticipate 2011; abandonment of septic tanks/onsite systems and connection to regional system underway.

10.4.2.8 Stock Island

Stock Island is a privately operated system operated by Key West Resort Utility Corporation. An upgrade was completed to bring the secondary treatment plant to AWT.

Stock Island

EDUs to be treated:	2,672 EDUs (0.45 MGD)
Treatment Capacity:	2,695 EDUs (0.45 MGD)
Type of treatment:	AWT
Status:	System compliant with 2010 wastewater standards.

10.4.2.9 Unincorporated Monroe/FKAA

FKAA operates a total of six wastewater systems within unincorporated Monroe County (does not include Layton). Total EDUs 14,726; total capacity 2.11 MGD.

North Lower Keys (Big Pine)

EDUs to be treated:	5,632 EDUs (0.55 MGD)
Treatment Capacity:	6,662 EDUs (0.65 MGD)
Type of treatment:	AWT
Status:	30% design.(Expanded Cudjoe Regional System)

South Lower Keys (Big Coppitt)

EDUs to be treated:	1,667 EDUs (0.20 MGD)
Treatment Capacity:	1,801 EDUs (0.22 MGD)
Type of treatment:	AWT
Status:	Treatment plant is active. System Complete.

Baypoint

EDUs to be treated:	429 EDUs (.07 MGD)
Treatment Capacity:	430 EDUs (.07 MGD)
Type of treatment:	BAT
Status:	Treatment plant is active. System complete.

Duck and Conch Keys

EDUs to be treated:	1,413 EDUs (0.17 MGD)
Treatment Capacity:	1,681 EDUs (0.20 MGD)
Type of treatment:	AWT
Status:	Under construction.

(E. Woods, Senior Administrator, Monroe County Sewer Projects , personal communication, June 27, 2011)

10.5 Capacity Analysis

Although unincorporated Monroe County includes approximately 70 percent of the County landmass, it accounts for only 25 percent of the total sanitary sewer demand; the majority of demand is treated by municipal service providers. Service within unincorporated Monroe County is provided through both private and public facilities. This section references facilities within unincorporated Monroe County only.

10.5.1 Operational Responsibility and Proportional Capacity [Rule 9J-5.011(1)(d) and (e), F.A.C.]

Through the Wastewater Master Plan, many regional improvements including facilities and collection systems have been identified. Both demand and treatment capacities for each service area have been accounted for and tabulated. The summary of capacities for unincorporated Monroe is presented here by region; Upper, Middle, and Lower Keys. A baseline was established using the planned EDU's for each service area and converting to a population. This number was compared against the projected unincorporated functional population distribution by sub-area. In comparing the 2010 population report to the population served within the service areas, the numbers deviate slightly but are within 10 percent. The explanation for this is the exacting nature of delineating service areas vs. the general approach to population on a regional basis. In addition, capacities for service areas do not incorporate those systems to remain on septic through DOH. It should be noted that this comparison is based on planned improvements. The level of completion of improvements within each service area varies.

10.5.2 Service Areas and Predominant Land Use [Rule 9J-5.011(1)(e)2., F.A.C.]

The service areas for unincorporated Monroe County have been separated into Upper, Middle, and Lower Keys to align with the 2010-2030 population projections. These service areas are made up of a combination of public and private systems as follows:

- Upper Keys: Key Largo Wastewater Treatment District
  Ocean Reef (private system)
- Middle Keys: Duck Key Service Area (servicing Duck and Conch Keys)
- Lower Keys: Cudjoe Regional Service Area
  Big Coppitt Service Area
  Baypoint Service Area (institutional)
  Boca Chica Key/NAS (institutional)
  Key Haven Service Area (private)
  Stock Island (private)
  Other miscellaneous private service areas

The limits and location of these service areas are identified on **Map Series 10.1**. Additional development and expansion of service is not expected to occur due to the restricted land use. However, the shift from permanent to seasonal occupation of units results in an increase of the functional population and associated increase in the number of persons per household. This increase translates to approximately a 3.6 percent increase in demand for the Upper, Middle, and Lower Keys.

10.5.3 Design Capacities of Wastewater Treatment Facilities [Rule 9J-5.011 (1)(e)3., F.A.C.]

Table 10.5 identifies the capacity for treatment through various planned improvements. The table depicts capacity in MGD, EDU's, and Population for each service area within unincorporated Monroe County. A conversion factor of 2.27 persons per EDU was used to determine Population Capacity.

Table 10.5 – Capacity of Unincorporated Monroe County Sanitary Sewer Services Area

Service Area	Provider	Capacity (MGD)	Capacity (EDU's)	Capacity (Population)*
UPPER KEYS				
Key Largo	KLWTD	2.30	13,772	31,263
Ocean Reef	NKU UTIL.	0.47	2,814	6,389
SUBTOTAL =		**2.77**	**16,587**	**37,652**
MIDDLE KEYS				
Duck Key/Conch Key	FKAA	0.28	1,677	3,806
Long Key	Not Applicable (N.A)	N/A	N/A	N/A
SUBTOTAL =		**0.28**	**1,677**	**3,806**
LOWER KEYS				
Cudjoe	FKAA	1.33	7,964	18,078
Big Coppit	FKAA	0.32	1,916	4,350
Baypoint	FKAA	0.07	419	680
Boca Chica	US NAVY	0.44	2,635	5,981
Key Haven	FKAA	0.20	1,198	2,719
Stock Island	KW RESORT UTIL.	0.45	2,695	6,117
SUBTOTAL =		**2.81**	**16,907**	**37,924**

*Population + 2.27 persons per EDU

The total capacity by population aligns with the projections for functional population. **Table 10.6** shows a more detailed comparison of population within each service area against capacity.

10.5.4 Level of Service (2010)
[Rule 9J-5.011(1)(e)4. and 5., and (f)1.a.,F.A.C.]

Expanding upon **Table 10.5, Table 10.6** shows the relationship between the 2010 demands and capacity of planned improvements to accommodate such demands and a percent utilized as an indication of surplus capacity for each service area. Assuming service area capacities properly account for peak flows, a utilization rate of 100 percent indicates that no additional EDU's can be treated without further plant expansion.

Table 10.6 - 2010 Demand vs. Capacity

Key Largo	2.30	13,772	13,707	**65**	100%
Ocean Reef	0.47	2,814	1,800	**1,014**	64%
MIDDLE KEYS					
Duck Key/Conch Key	0.28	1,677	1,454	**223**	87%
Long Key	NA	NA	NA	**NA**	
LOWER KEYS					
Cudjoe	1.33	7,964	7,987	**(23)**	>100%
Big Coppitt	0.32	1,916	1,711	**205**	89%
Baypoint	0.07	419	430	**(11)**	>100%
Boca Chica	0.44	2,635	2,600	**35**	99%
Key Haven	0.20	1,198	450	**748**	38%
Stock Island	0.45	2,695	2,672	**23**	99%

Following projected growth rates of 3.6 percent for the Upper, Middle, and Lower Keys, **Table 10.7** expands upon T**able 10.6** showing additional demands against capacity of planned improvements.

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Table 10.7 - 2030 Demand vs. Capacity

Service Area	Capacity (EDU's)	2010 Demand (EDU's)	2030 Demand (EDU's)*	Surplus/Deficit (EDU's)	Percent Utilized
UPPER KEYS					
Key Largo	13,772	13,707	14,200	**(428)**	
Ocean Reef	2,814	1,800	1,865	**949**	66%
MIDDLE KEYS					
Duck Key/Conch Key	1,677	1,454	1,506	**171**	90%
Long Key	NA	NA		**NA**	
LOWER KEYS					
Cudjoe	7,964	7,987	8274	**(310)**	
Big Coppit	1,916	1,711	1,773	**143**	92%
Baypoint	299	419	445	**(26)**	
Boca Chica	2,635	2,600	2,694	**(59)**	
Key Haven	1,198	450	466	**732**	39%
Stock Island	2,695	2,672	2,768	**(63)**	

* 2030 Demand = (1.036) (2010 Demand)

10.5.5 Performance, Problems, and Opportunities [Rule 95-5.011(1)(f)2. and 3., FAC]

The capacities and demands for the previous tables are for planned improvements in various states of completion. A more detailed analysis of existing connections and level of service are identified in the analysis of existing conditions. The primary obstruction hindering implementation has been funding.

All proposed improvements at or above 100 percent utilization should be further analyzed to ensure conformance with future demands. In addition, the reallocation of demands from Permanent to Functional Population and the migration from Upper to Lower Keys may result in the need to confirm plant capacities.

One uncertainty is the impact that the pending EPA Water Quality Standards for the State of Florida's Lakes and Flowing Waters and Marine Systems, 40 CFR, part 131, may have on both existing and proposed facilities. The mandates associated with this program may introduce additional requirements for treatment and result in further improvements to both regional and small private facilities.

10.6 Policy and Regulations

[Rule 9J-5.011 (2) (c), F.A.C]

The most significant issue in implementing the proposed wastewater plan is the lack of funding and construction of proposed improvements. Of the total number of EDUs treated through the ongoing programs, only 45 percent have resulted in hook-ups being made.

Some of the recommendations to overcome fiscal impacts suggested in the Master Plan are as follows:

- FKAA and County to pursue uniform fee structure to enable implementation to less dense areas to level out impact and connection fees.
- Pursue State and federal grants with FKAA to supplement costs.
- A Memorandum of Understanding between FKAA and County was established identifying FKAA as the service provider, except for municipal areas.
- Acquire necessary land to accommodate future facilities and expansion.
- Develop standards and hook-up requirements for hot spots in coordination with DOH.

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Bibliography

Anderson, D.L., J.M. Rice, M.L. Voohees, R.A. Kirner, and K.M. Sherman, 1987, *In On-Site Wastewater Treatment*.

Department of Community Affairs, "Annual Assessment Report, Florida Keys Area of Critical State Concern", July 2007.

Department of Environmental Protection, "Report to Department Community Affairs, 10-year Work Program for Monroe, Florida Keys Wastewater Improvements", April 2008.

Florida Keys Aqueduct Authority, "Lower Keys Wastewater Master Plan Update", November 2008 Workshop.

FDEP, "Florida Keys Area Reasonable Assurance Documentation – North, Central, South-Centera and Southern", May 2008.

Monroe County Comprehensive Plan, Technical Document, Element 10.0, 2000.

Monroe County, "Keys Wastewater Plan" – November 2007, Report to Environmental and Natural Resources Council, Florida House of Representatives.

Monroe County, "Monroe County Sanitary Wastewater Master Plan", June 2000.

Supplemental and updated information furnished by Elizabeth Wood, Senior Administrator, Monroe County Sewer Projects (personal communication (email), June 27, 2010)

CHAPTER 10.0 - SANITARY SEWER – COMMENT RESPONSES

Commenter: Kevin G. Wilson, P.E.- Comments Received: 8/19/2010		
Location	**Comment**	**K&S Response**
10.2.1 Federal Regulations	Only Surface waters but the ultimate objective is groundwater & coast waters	Agree, revised as suggested.
10.3 Existing Facilities – General Description	What is the variance issue here? (4th paragraph)	Agree, revised as suggested
10.6 Policy and Regulations	Why does FKAA need to own facilities? Eliminate this bullet.	Agree, removed first sentence of the bullet.
Commenter: FKAA – Comments Received:10/25/2010		
Location	**Comment**	**K&S Response**
Table 10.2	Baypoint WWTS is incorrect. Current flow of 25,000 gpd; WWTP capacity ~ 70,000 gpd.	Table revised.
Table 10.2	Coppit EDU's are incorrect. Construction is complete and plant operational.	Table revised to reflect comment.
Section 10.4.2	Revise summary of South Lower Keys (Big Coppit) and Duck/Conch Keys treatment plants to be consistent with table 10.2 and 10.4.	Summaries revised.
Tables 10.5 through 10.7	Inconsistencies and errors.	Data obtained, numbers revised, inconsistencies resolved.

Commenter: Judith Clark, P.E. –
Comments Received: 2/1/2011

Location	Comment	K&S Response
Wastewater, 10.1 Page 3	Cudjoe Key Regional should be Cudjoe Regional System. They also state a low cost per EDU of $5,000; I am not aware of any system being that inexpensive. The amount of assessment that other systems have been assessed is that low, $4,500, but the rest of the cost is subsidized. I'm not sure where that number came from.	Verbiage added identifying County's policy toward subsidizing projects to lower costs to residents.
10.2.2.2 Page 5	The information in the Rule has been changed; we have a conference call this Thursday I think. You probably know that already, but that section will need updating.	Rules have been modified as noted.
10.3.1 Page 11	Aerobic Treatment Units. The text of this paragraph doesn't seem to really address ATUs. Not sure what intent was/is.	Text modified as noted.
10.4.2.9 Page 19	North Lower Keys s/b Big Pine, not Pines. This area is now part of the Cudjoe Regional System. It is under design; construction is on hold until funding sources identified.	Status modified as noted.
10.4.2.9 Page 20	Middle Keys and Lower Sugarloaf are both part of the Cudjoe Regional System. It will be AWT, it is being designed; construction on hold until funding sources identified.	Text modified per comment.

Commenter: Judith Clark, P.E. (cont'd)– Comments Received: 2/1/2011		
Location	**Comment**	**K&S Response**
	There was originally a plan for a couple of separate plants; it was in April 2008 I believe, that we had the Consultant do an analysis and they determined it was more cost effective to combine the area into one regional plant. This is a change from the Master Plan.	Comment noted. No change to text.
10.4.2.9 Page 20	Duck and Conch Keys – It says facility constructed, secondary treatment. Currently this facility is being expanded to treat the residents on Duck Key and it is being upgraded to AWT standards.	Text modified per comment.
Commenter: Planning Commission Meeting Member Denise Werling Comment Received: January 12, 2011		
Location	**Comment**	**K&S Response**
10.2.4 Page 18	The Navy owns the capacity of the City by 23%. 4 million are actually 10 million gallons/day Pg 10-20 include Boca Chica capacity	Comment unclear and contradicts information provided for both the City and Navy facilities. Understand the comment to say that Key West plant capacity is approximately 10MGD with approximately 2.3MGD going to the Navy. Statement contradicts previous information showing City's capacity at 4MGD and Navy's demands of approx. 0.4MGD. This statement seems to suggest that City ahs excess capacity of 6MGD and that 2.3 of the 6 is dedicated to the Navy.

Commenter: Elizabeth Woods, Senior Administrator, Monroe County Sewer Projects Comments Received: June 27, 2011		
Location	**Comment**	**K&S Response**
Section 10.0 Sanitary Sewer	Multiple entries of updated information with preferred language revisions recommended throughout document including formatting, punctuation, etc.	Agreed, revised as requested.
Table 10.2 Page 13	Table 10.2 Service Area per Sanitary Service Provider Revised numbers throughout Table relating to Total EDUs, Treatment Capacity, etc.	Agreed, revised as requested.
Section 10.4.2 10.4.2.1 thru10.4.2.9 Pages 14 - 21	Wastewater Facilities EDUs, Treatment Capacity and Status updated information for each service area.	Agreed, revised as requested.
Commenter: Ron Demes, NAS Key West Comments Received: Via Email June 27, 2011		
Location	**Comment**	**K&S Response**
Section 10.4.2.4	Key West wastewater treatment plan update as follows: 1. Permitted capacity 10.0 MGD 2. There are two injection wells.	Agreed, revised as requested.

	3. There is a current headworks project (Januay 2011). 4. The Navy owns 23% of the capacity of the Plant.	

DRAINAGE
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11.0 DRAINAGE ELEMENT

The Drainage Element of the Monroe County (County) Comprehensive Plan addresses the data inventory requirements of Rule 9J-5.005(2) and Rule 9J-5.011 of the Florida Administrative Code (F.A.C.). The data inventory requirements will support the development of goals, objectives, policies, and implementation programs for the Drainage Element.

The purpose of the Drainage Element of the Comprehensive Plan is to describe the issues, needs and general facilities providing for existing and future drainage conditions.

11.1 Introduction

Development and urbanization affect hydrologic cycles, natural systems and drainage patterns. The natural biologic and geologic systems are adapted to, and altered by, the climatic and hydrogeologic regimes of a locale. As human activity disturbs this balance by removing vegetation, altering topography and increasing imperviousness, the intensity and frequency of damaging storm water runoff increases, as does the resulting erosion and flooding. Urbanization also alters the chemical composition of runoff. As rainfall washes over buildings, lawns, roadways, and parking lots, it carries away the detritus of human activity and absorbs anthropogenic compounds from pesticides, fertilizers, metals and petrochemicals.

These consequences of human habitation and activity require that stormwater be controlled and managed to mitigate the adverse effects on the natural environment and to safeguard life and property. This element provides an analysis of stormwater management system practices in the County. Based upon this analysis, the subsequent Goals, Objectives and Policies contained within the Comprehensive Plan policy document outline the growth management strategies necessary to correct existing deficiencies and accommodate future development.

11.2 Terms and Concepts

11.2.1 Stormwater Runoff

A certain amount of rainfall is converted to water flowing over land during and immediately following a storm event. Under the effects of gravity, the runoff flows toward sea level through depressions and channels which comprise the drainage system of an area. The drainage system may consist of natural features, artificial features or a combination of both. The occurrence of stormwater runoff is highly variable, depending upon the amount of rain falling during each storm event and on the conditions within the drainage basin. Since most storm events are relatively moderate, natural drainage features typically evolve to accommodate moderate quantities of stormwater runoff. Severe storm events create runoff volumes in excess of what these features can handle, resulting in temporary flooding of adjacent land.

11.2.2 Infiltration

As rain falls to the ground it is initially absorbed by the topsoil and percolates downward through the soil matrix until the ground is saturated and runoff begins at the surface. This process is referred to as infiltration.

11.2.3 Impervious Surface

Urbanization increases the imperviousness of a watershed by covering the ground with hard surfaces such as buildings, roads and parking lots, and thereby increases the quantity and frequency of runoff, also degrading the water quality.

The existing definition of "impervious surface" in Section 1.7.20 of the South Florida Water Management District (SFWMD) Environmental Resource Permitting Information Manual is,

> "Land surfaces which do not allow, or minimally allow, the penetration of water; examples are buildings, non-porous concrete and asphalt pavements, and some fine grained soils such as clays."

Natural topography varies in its ability to absorb rainfall through infiltration; the greater the degree of imperviousness, the greater the percentage of rainfall that will appear as runoff.

11.2.4 Stormwater Management System

A stormwater management system is the collection of facilities, improvements or natural systems whereby stormwater runoff is collected, controlled, conveyed, impounded or obstructed. Stormwater management facilities are designed to ensure that the volume, rate, timing and pollutant load of runoff after development is similar to that which occurred under natural conditions.

11.2.5 Best Management Practices

Best Management Practices (BMPs) are the techniques applied to manage stormwater runoff. These are selected to be the most effective and economical combination of structural, operational and regulatory practices for local conditions. Stormwater Management practices are regulated in the County by the SFWMD.

11.2.6 Design Storm

A design storm is a rainfall event of a particular duration and frequency which a stormwater management system must be designed to accommodate (See section 11.9.1, Water Quality Level of Service Standards.)

11.3 Climate and Rainfall

[Rule 9J-5.011(1)(f), F.A.C]

The Florida Keys (the Keys) experience a subtropical savanna-type climate characterized by warm humid summers and mild dry winters. The mean annual sunshine is 3,300 hours, 10 percent more than the Florida peninsula to the north.

The average temperature in the Keys ranges from a summer high of 89 degrees in July to a winter low of 63 degrees in February. Temperatures below freezing have not been recorded in the Keys, primarily due to the moderating effects of the warm marine waters in the area and the presence of the warm Gulf Stream along the coast.

The typical annual total precipitation in the Keys is 40 inches. Most of the rainfall comes in the wet season during the months of May through October. Winter rainfall accounts for less than one-third of the annual precipitation. Thunderstorms are the primary source of water during the wet season. During hot summer days, moist oceanic air heats up over the land, becoming unstable as it rises. As the moisture condenses, thunderstorms form. During the dry winter season, most of the rainfall is due to cold fronts, which pass over the area on the average of once a week. Day-long dry-season storms are rare.

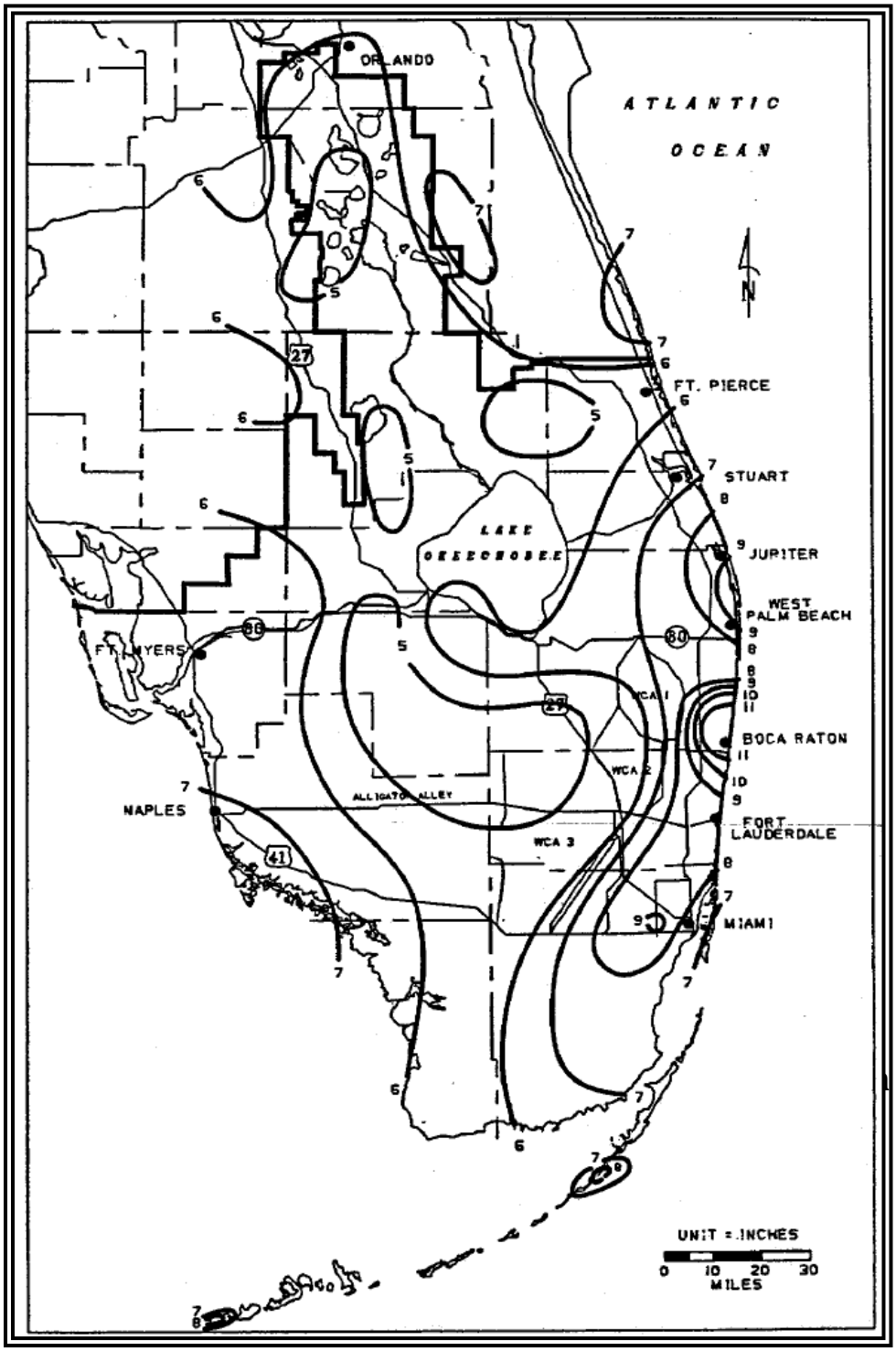
There is a decrease in precipitation and seasonal differences in precipitation southward from the Upper Keys to the Lower Keys. This is due to two factors. Winter cold fronts do not pass into the Lower Keys as often as they pass into the Upper Keys. Further, convective thunderstorms do not develop as readily over small islands as they do over the mainland.

The SFWMD uses rainfall maps for 24-hour duration storms of various return frequencies. These maps are used to determine the depth of rainfall in inches for use in the design and analysis of stormwater management systems. **Figures 11.1** and **11.2** present the maps for the 10-year and 25-year return frequency storms.

The Florida Department of Transportation (FDOT) also uses rainfall data to design and permit storm drainage along the agency's facilities. **Figure 11.3** presents the FDOT Intensity Duration Frequency (IDF) curves for Zone 11, which includes the Florida Keys.

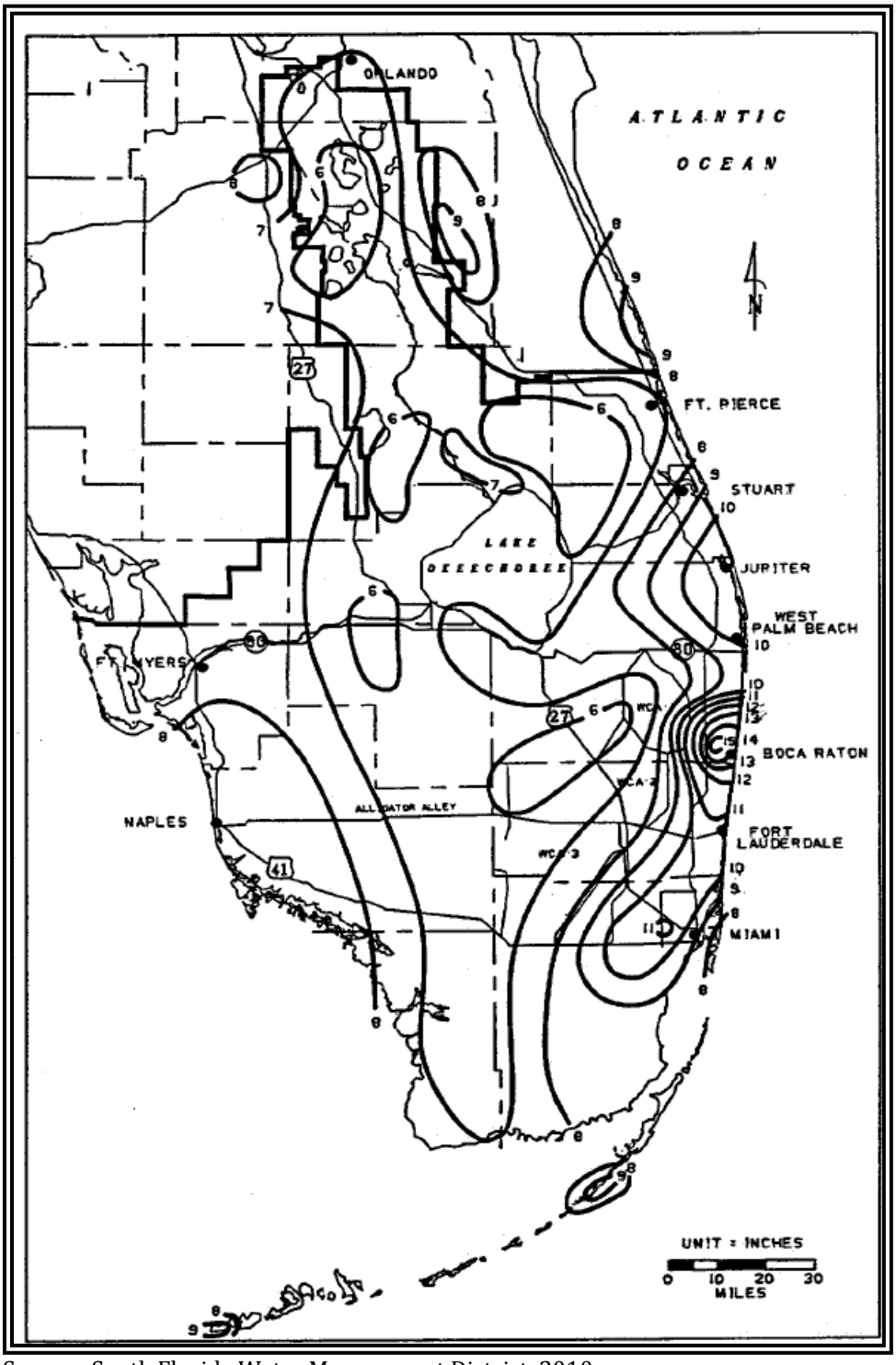
Prevailing tradewinds from the east and southeast in the Keys are relatively mild, averaging 11 to 12 knots throughout the year. The strongest winds occur during the winter months from December through March, when cold fronts move over the area from the north.

The Keys lie in an area which is susceptible to tropical cyclones and hurricanes. These low pressure systems vary in intensity and orientation. Tropical depressions or disturbances are cyclones with winds of less than 38 miles per hour (mph). By comparison, tropical storms exhibit distinct circulation patterns, with winds exceeding 38 mph. When the maximum winds exceed 74 mph, the storm is categorized as a hurricane.



Source: South Florida Water Management District, 2010

Figure 11.1 – 10 Year, 24 Hour Return Frequency Storm



Source: South Florida Water Management District, 2010

Figure 11.2 – 25 Year, 24 Hour Return Frequency Storm

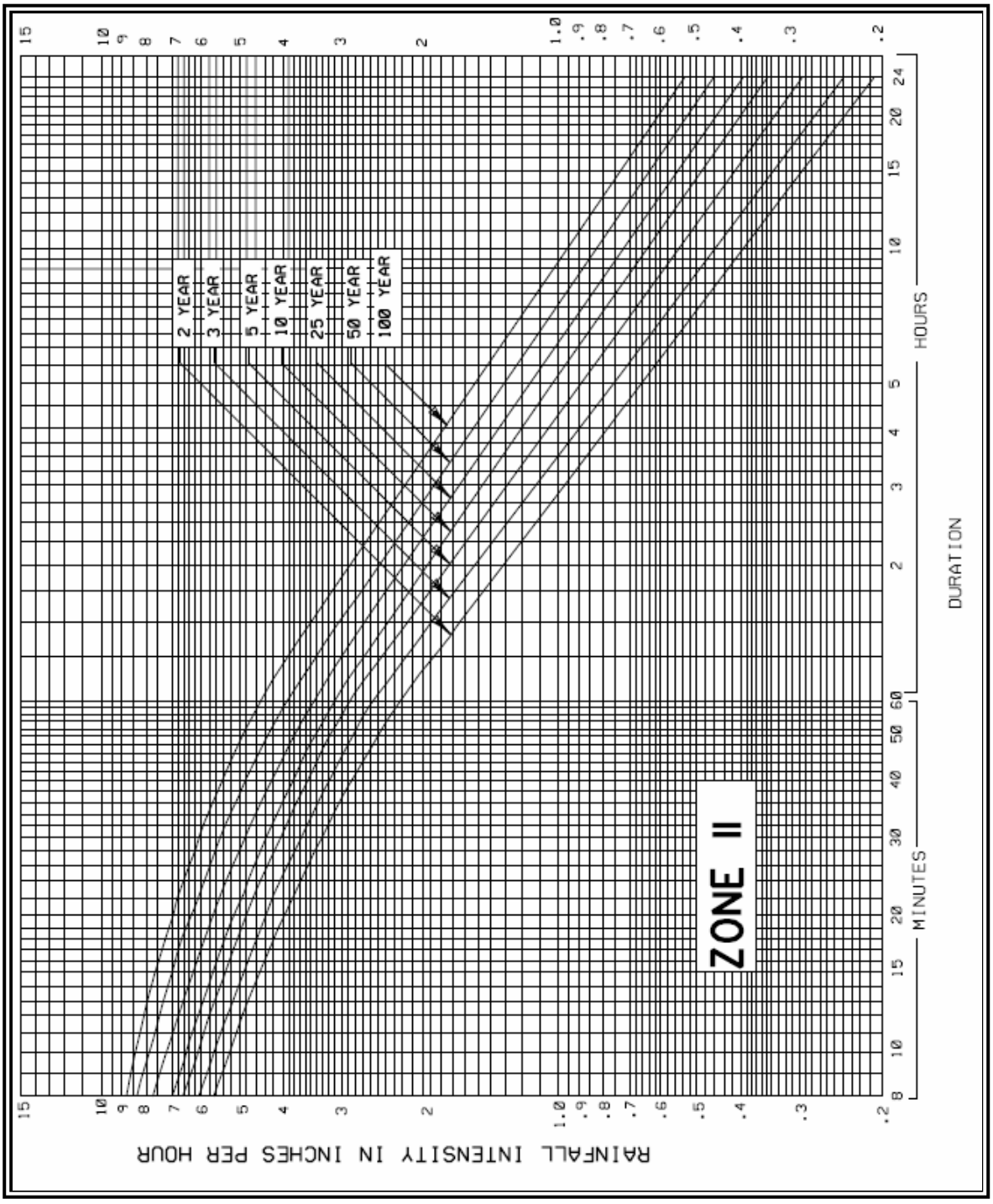


Figure 11.3 - IDF Curves

Source: FDOT Drainage Manual, 2010

11.4 Regulatory Framework

[Rule 9J-5.011(1)(h), F.A.C.]

11.4.1 Federal Regulations

In 1987 Congress re-authorized the Federal Water Pollution Control Act (the "Clean Water Act") (CWA) 33 United States Code (U.S.C.) §1251 et seq. (1972). Section 208 of the CWA had been the traditional means of addressing pollution abatement and water quality since 1972. In 1987 Congress also enacted the Water Quality Act (WQA). (Public Law 100-4), Titles IV & V. The WQA contains three provisions which specifically address stormwater discharges and sets forth the permitting criteria for municipal and industrial stormwater discharges. The central provision governing stormwater is Section 405 of the WQA which adds Section 402(p) to the CWA and establishes the general role and exceptions for municipal and industrial stormwater discharges. The Environmental Protection Agency (EPA) has promulgated rules for the application of National Pollution Discharge Elimination System (NPDES) permit programs for stormwater discharges.

The NPDES is a program under the CWA that regulates the quality of discharges into the "waters of the United States." The NPDES program initially focused on discrete point source discharges (e.g., pipe outfalls) and now also has regulatory programs that deal with potential discharges that might also have been considered non-point sources, such as industrial and municipal stormwater. Under the NPDES program, the EPA issues permits for operators of large and small municipal separate storm sewer systems, known as MS4s, and for runoff associated with industrial operations and construction.

Stormwater NPDES permits issued to industry and construction permit operations require implementation of stormwater controls to meet narrative and/or numeric effluent limits as well as documentation of the controls used on-site in a stormwater pollution prevention plan. Permit recipients must develop and implement a stormwater management plan. At this writing, based on the EPA's new focus on measurable compliance, the EPA is in the process of promulgating Water Quality Standards for the State of Florida's Lakes and Flowing Waters and Marine Systems, 40 Code of Federal Regulations (CFR), part 131, which regulate discharges that impact surface and groundwater resources.

11.4.2 State Regulations

While the EPA generally regulates water quality, water quality standards are developed by Florida Department of Environmental Protection (FDEP) and adopted by the Environmental Regulatory Commission. FDEP is charged with enforcing the standards, although it may delegate some of its authority to the regional water management district or other governmental units. Other regulatory authority, such as the land use/zoning powers of local government, directly impact water quality, and the SFWMD has established a program to address water resource concerns related to land use and other comprehensive plan issues. Currently, FDEP is working with the EPA to establish Water Quality Standards for the State of Florida's Lakes and Flowing Waters and Marine Systems, 40 CFR, part 131, for Florida.

The SFWMD regulates surface waters within the district that includes the entire County. Under Part IV of Chapter 373, F.S., and Rules Chapter 40E-4, F.A.C., and 40E-40, F.A.C., the SFWMD is responsible for permitting the construction and operation of surface water management systems. Additionally, the SFWMD has been delegated stormwater quality and quantity responsibility by the FDEP under Chapter 62-25, F.A.C.

The SFWMD is comprised of 16 counties and has a nine member Governing Board which sets policy for the agency. The SFWMD is divided into two separate watershed basins: the Big Cypress Basin and the Okeechobee Basin. The Big Cypress Basin has a Basin Board which sets policy for the Big Cypress Basin. A portion of mainland Monroe County lies within the Big Cypress Basin, but the majority of the County is in the Okeechobee Basin.

The FDEP is the primary environmental regulatory agency in the State of Florida and has the authority under Chapter 403, F.S. to classify water bodies and to regulate discharges to ensure that they are appropriate to the water body's designation. The FDEP has classified much of Florida Bay and the reef track as "Outstanding Florida Waters" (OFW) affording these areas State protection. Rule amendments adopted by the FDEP provide a new water quality classification: "Outstanding National Resource Waters." The proposed rules impose an anti-degradation standard for designated water bodies. The Everglades National Park (including a large portion of Florida Bay) is among those water bodies included in the rule's designations of Outstanding National Resource Waters.

In addition to the above regulations, the FDOT independently permits stormwater discharges and connections to FDOT rights-of-way under Chapter 14-86, F.A.C.

11.4.3 Local Regulations

In the past, the only controls on stormwater imposed by the County were those involving flood protection and floodplain encroachment in Section 122 of the Monroe County Land Development Code (MCLDC). Subsequently, the MCLDC has been revised, based on recommendations provided in the County's Stormwater Management Master Plan (SMMP), 2001, to not only provide stormwater controls for flood protection and floodplain encroachment, but also to include water quality controls in Section 114-3 of the MCLDC. This new MCLDC also includes water quality controls for existing and proposed residential development and addresses retrofitting of existing facilities and redevelopment activities. This meets the intent of Section 114-3(a) of the MCLDC, to protect the vital water resources of the County.

In conjunction with Section 114-3 of the MCLDC, the County has prepared a Manual of Stormwater Management Practices which provides information on acceptable forms of BMPs. This document was prepared with the assistance of the South Florida Regional Planning Council (SFRPC) and the SFWMD and includes BMPs consisting of rate control structures, catch basins with skimmers and baffles, and wet and dry detention/retention facilities.

11.4.4 Work Program and Florida Keys Carrying Capacity Study

In December 12, 1995, the State of Florida Administrative Commission found the 2010 Monroe County Comprehensive Plan not in compliance and it noticed a proposed rule (Rule 28-20.100, F.A.C.) and ordered facilitated rulemaking/mediation to address outstanding issues. The disputed provisions of the Rule required further action. Mediation was conducted resulting in subsequent rule changes and challenges. The Administration Commission eventually adopted Rule 28-20.100, F.A.C. in July 1997. This rule introduced the concept of the "Five Year Work Program" (Work Program). The Work Program required, among other things, the implementation of several stormwater improvement projects and the Florida Keys Carrying Capacity Study (FKCCS).

Reports began to be issued to the Governor and Cabinet in March 1998. In January 1999, the second report to the Governor and Cabinet was issued stating a lack of substantial compliance. Subsequent rule amendments extended the program's deadline to accommodate the tasks that had not been completed and today tasks remain incomplete beyond the extended horizon of the Work Program. No Work Program task has been ignored or not acted upon and all tasks may be considered either complete or in progress. While the number of remaining tasks is limited, these tasks are costly and time consuming to complete.

The Final Order in 1995 also initiated the FKCCS. In 1996 the Work Program required the development of a carrying capacity analysis study which was completed in July 2002. The US Army Corps of Engineers and the Florida Department of Community Affairs (DCA) formed a partnership to jointly fund and complete the study and the Carrying Capacity Impact Analysis Model (CCIAM). The goal of the FKCCS, excerpted from Rule 28-20.100, F.A.C. was as follows:

> "The carrying capacity analysis shall be designed to determine the ability of the Florida Keys ecosystem and the various segments thereof, to withstand all impacts of additional land development activities."

In 2001, the FKCCS was peer reviewed by the National Research Council (NRC). The NRC found that the CCIAM was not ready to determine the ability of the Florida Keys ecosystem to withstand all impacts of additional development activities as required by Rule 28-20.100, F.A.C. Based on subsequent FKCCS revisions, it was later concluded that the CCIAM may be a useful tool in some circumstances, but it had limitations, particularly the inability to determine the impact to near shore water quality. The NRC did agree with several recommendations of the study including the implementation of the Stormwater Management Master Plan (SMMP) (See Section 11.6.2.1, Stormwater Management Master Plan.)

In November 2010, DCA proposed amendments to Rule 28-20 F.A.C. which includes specific stormwater tasks and their associated timelines:

- By July 1, 2011, Monroe County shall evaluate and allocate funding for stormwater implementation. Monroe County shall identify any funding in the annual update to the Capital Improvements Element of the Comprehensive Plan;

- By July 1, 2011, Monroe County shall apply for stormwater grants from the South Florida Water Management District; and

- By July 1, 2011, Monroe County shall complete Card Sound Road stormwater improvements.

11.5 Existing Facilities

[Rule 9J-5.011(1)(f), F.A.C.]

11.5.1 The Keys

Over the last 50 years, the County has witnessed rapid growth as development has spread beyond the confines of Key West and Key Largo. Over this period, the unincorporated sections of the County have been transformed from very isolated and rural to increasingly urbanized.

Because of the combination of the proximity of the ocean, dense vegetation and permeable soil, many citizens of the County have traditionally given little concern to stormwater runoff. Most rainfall readily infiltrates the undifferentiated sands that comprise the soil of the Florida Keys. (See *Chapter 12.0, Natural Ground Water and Aquifer Recharge Element.*)

Historically, drainage works in the County primarily consisted of improvements addressing low areas, mosquito ditches cut to drain native wetlands, and boat canals used as primary drainage facilities with building sites draining directly into them by sheet flow, minor ditches or through percolation. On a number of projects, the County has also included the installation of stormwater seepage trenches as part of many of the County Road resurfacing projects. Further, a number of injection wells have been installed as part of drainage improvements within County Roads when possible and funding allowed.

The dredging of navigable canals and borrow pits has also had an effect on the hydrologic regime of the Florida Keys. Besides the obvious impact to the landscape, such activities can have widespread off-site effects. Because canal cuts open new interfaces between the ocean and groundwater, they can have dramatic hydrogeologic consequences.

Ditches along U.S. 1 have served as primary drainage systems on several Keys, transporting stormwater along the axis of the highway to the ocean. The highway was originally constructed on an old railroad with little improvement other than pavement installation. Key Largo, Islamorada and other urbanized segments of U.S. 1 have limited storm drainage systems. As part of a major roadway projects, the FDOT installs storm sewer and retention basins adjacent to U.S. 1 as required to meet current attenuation and water quality requirements.

The overriding stormwater concern for residents of the County has always been the low-lying topography with the threat of inundation by hurricane-driven storm surges. In some areas, particularly in Key West and Marathon, significant localized flooding occurs from longer duration storms which occur almost annually. Virtually the entire landmass of the Florida Keys lies within the 100-year flood plain designated by the Federal Emergency Management Agency (FEMA) and is classified as an area of special flood hazard. (See *Chapter 3.0, Conservation and Coastal Management Element.*)

11.5.2 The Mainland

The mainland segment of the County has been largely ignored by development interests because it consists solely of the vast system of marshes, sloughs, tree islands and cypress forests known as the Everglades. This indifference has not, however, protected this wilderness from the effects of human activity. Much of mainland Monroe County was incorporated into the Everglades National Park which was created in 1947. Also in 1947, the U.S. Army Corps of Engineers undertook the Central and Southern Florida Flood Control Project (C&SFP). This extensive network of canals and control structures was intended to meet the needs of flood protection, drainage and irrigation of farmland, and water supply to the urban areas along the coast. Although none of the C&SFP improvements are within Monroe County, the project modified the hydrology of the Shark River Slough, Rocky Glades, Taylor Slough and Broad River which serve as headwaters to the Everglades National Park.

Completed in the 1960s, the C&SFP had unfortunate consequences for the Everglades, including Everglades National Park. This management system altered the hydro period of the Everglades, exacerbating droughts and extending inundations. The C&SFP also altered the quantity of fresh water and transported an increased quantity of nutrients and agrichemicals from the Everglades Agricultural Area through the Everglades National Park and into Florida Bay.

Currently planned improvements to restore the Everglades are underway under the Comprehensive Everglades Restoration Plan (CERP). This plan is one of the largest ecosystem restoration programs in United States. CERP was authorized by the Water Resources Development Act of 2000. The goal of CERP is to restore the South Florida ecosystem, including the Everglades, while providing for other water supply and flood protection needs of South Florida.

The restoration focuses on several major problems affecting Florida Bay and the Florida Keys. These issues include water quantity, flow, increased salinity, water quality, fish and wildlife resource management, water supply and public access. Examples of projects designed to improve the water resources of Monroe County include:

- Water Conservation Areas: Protect and improve the natural resources of the Water Conservation Areas (WCA) as an integral part of the Everglades system while maintaining the multiple functions of the WCA.

- Everglades National Park: Provide adequate timing, distribution and flow of rainfall-quality water (phosphorus concentrations equal to or less than 0.03 milligrams per liter (mg/l)) to the Everglades National Park (ENP) which will maintain and perpetuate natural southern Everglades habitats and functional ecosystems.

- C-111 Basin: Manage the C-111 Basin to protect environmental resources and maintain existing public uses, and to provide more natural hydroperiod and flow conditions and adequate water quality to the basin's wetlands, coastal estuaries and the ENP.

- Florida Bay: Protect and improve natural surface water quality, quantity, distribution and timing of water flowing into Florida Bay through the ENP, the C-111 and the Florida Keys so as to maintain the ecosystem integrity and habitat diversity of the receiving waters.

11.5.3 Performance Assessment [Rule 9J-5.011(1)(f), F.A.C.]

11.5.3.1 Water Quantity

Little documentation about the design or implementation of drainage improvements in the County existed prior to the creation of the County SMMP. The presence of flooding problems and inference of inadequate capacity was based upon the personal knowledge of local residents. This information was collected during the development of the SMMP through public involvement activities. In the past, the FDOT has used a 3-year frequency event of critical duration for the design of its facilities within Monroe County. More recently the FDOT has been using a 25-year frequency for U.S. 1 highway improvements.

The Natural Resources Conservation Service (NRCS) completed a comprehensive soil survey of the County in 1995. The delineation of soil types compiled in this survey provides an important tool in the analysis and design of stormwater systems and assists in the assessment of potential problem areas. Existing soil types in the Florida Keys are illustrated on the Soils Map series of the Map Atlas.

11.5.3.2 Water Quality

In 1988 the FDEP prepared an assessment of nonpoint source pollution for the entire State in conjunction with the Federal Clean Water Act, Section 205(j) water quality assessment program. The data collected in the Florida Keys was extremely limited and insufficient to distinguish potential stormwater problems. The assessment, however, did show degradation of water quality in urbanized areas.

The County participated in research projects through the Florida Department of Environmental Protection, and published the document Reasonable Assurance Documentation (FKRAD -May 2008), which "provides reasonable assurance that the

stakeholders in the Keys have provided or will implement sufficient control mechanisms to return the area's near shore waters to the water quality targets". The following elements were implemented to provide the reasonable assurance: Description of the Impaired Water, Description of the Water Quality and Aquatic Ecological Goals, Description of the Proposed Management Actions to Be Undertaken, Description of Procedures for Monitoring and Reporting Results, and Description of Proposed Corrective Actions. Further the report introduces the following stormwater program rules. Current stormwater management programs will limit any significant increase in annual nutrient loading in anthropogenic stormwater discharged to the Halo Zone waters through the following provisions: Current authority of FDEP under the delegated Stormwater NPDES program to enforce permit conditions against communities that are not in compliance with their MS4 Permits; Existing on-site stormwater management requirements of SFWMD related to new development activities; Authority for FDEP and SFWMD to undertake enforcement actions for non-complying stormwater management practices; Local Monroe County land development regulations governing the development of raw land and the redevelopment of properties that establish on-site stormwater attenuation and treatment requirements prior to discharge; and ability of Monroe County to undertake authorized enforcement actions for non-complying stormwater management practices.

11.6 Surface Water Management

[Rule 9J-5.011(1)(g), F.A.C.]

The major impact of inadequate draining facilities upon surrounding natural resources is that associated with flooding and stormwater runoff. Rapid runoff of stormwater results in the loss of valuable freshwater resources, and may have other ecological impacts as well. Further, potential recharge capabilities of natural water systems have been lost or greatly diminished, due to the lack of stormwater drainage practices throughout the County.

Development associated with urbanization increases runoff by increasing flow velocity and flow volume due to the characteristics of impervious surfaces. Flow velocity and volume increase significantly when the path is changed from rough surfaces, such as woodland, grassland, or natural channels to smoother surfaces, such as parking lots. The creation of large expanses of impervious surfaces also prohibits water storage in the soils they cover. In this manner the problem is compounded since natural water storage capacity is lost while stormwater runoff is increased.

Urban development covers large areas of land with impervious surfaces which inhibit the ground's ability to absorb rainfall and increases stormwater runoff. This increased amount of runoff places greater stress on the natural drainage system, which results in increased probability of flooding during periods of heavy rainfall.

11.6.1 SFWMD Permitting Practices

The permitting of surface water management systems by the SFWMD is specified in Chapter 373, Part IV, F.S. This section regulates the construction, alteration, maintenance and

operation of most real property improvements designed to control surface waters. An applicant for a surface water permit must show that the proposed project is consistent with the goals and policies expressed in Section 373.016, F.S. (Declaration of Policy) and Section 373.016, F.S. (State Water Use Plan), and must demonstrate that construction or alteration of the surface water management systems will not be harmful to the water resources of the SFWMD. In addition, the operation and maintenance of the systems cannot be inconsistent with the overall objectives of the District or be harmful to the water resources of the District.

Documentation of existing conditions is limited to General and Individual Surface Water Management Permits issued by the SFWMD. A general SFWMD surface water management permit is applicable to development which is less than 40 acres in size and has limited site activities such as upland clearing, earthwork and lake construction. An individual SFWMD surface water management permit is generally applied to sites greater than 40 acres. An individual surface water management permit must be approved by the SFWMD Governing Board. SFWMD issues exemptions from obtaining a general permit for projects less than 10 acres of total land area and less than two acres of impervious surface. Projects within the County that have been issued permits by the SFWMD are listed in **Appendix A**.

Chapter 40E-4, F.A.C. describes the permit requirements for construction, alteration or operation of surface water management systems. To satisfy the permit requirements an applicant must either receive an individual permit or qualify for a general permit. Individual permits are issued by the Governing Board upon application and compliance with Part IV of Chapter 363, F.S. and Chapter 40E, F.A.C. with the specific permitting criteria found in Rule 40E-4.091, F.A.C. General permits are issued by Rule for most small projects and certain types of highway construction. To qualify for a general permit, an applicant needs to file the notice specified in the rules, a copy of the project construction plans and basic technical data about the project such as proposed minimum road and floor elevations, proposed discharge rate, and retention/detention volume and facilities.

Upon receipt of this information, the District determines whether the project qualifies for a general permit and/or if any additional information is needed. Once the District has indicated that the general permit is in effect for the project, no further application is required. Both individual and general permits are subject to revocation, suspension or modification in accordance with the provision of Chapter 40E, F.A.C. and Chapter 373, F.S. SFWMD regulates stormwater discharge and water treatment quality through the provisions contained in Chapter 62-25, F.A.C. which are the State stormwater discharge regulations.

In 2005, the SFWMD initiated the implementation of their “ePermitting” program, making it possible to apply for a permit online, in addition to providing the public with convenient access to its existing permit files. In 2009, the online public access to existing permit portion of the project was completed, providing online access to more than 9.1 million records. **Table 11.1** is a sampling of the permits issued by the SFWMD within the County. (See **Appendix A** for the complete list.)

Table 11.1 – Sampling of Monroe County SFWMD Permits

NO.	APPROVED DATE	APPLICATION NO	PERMIT NO	LANDUSES	WATERSOURCE/RECEIVING BODY	PROJECT ACRES	LOCATION	OPERATOR
1	25-Jun-10	100520-10	44-00191-S	Institutional	Existing System	14.42	S26/T67/R25	Florida Keys Community College
2	15-Aug-08	080116-6	44-00411-P	Government; Residential	Gulf Of Mexico	31.74	S32/T67/R25	Southeast Housing LLC
3	11-Jan-07	060109-8	44-00357-P	Residential; Commercial	Groundwater Table And Adjacent Surface Waters	55.13	S25 26/T67/R25	Landings at Key Haven Property Owners Association
4	3-Feb-06	051227-20	44-00204-S	Residential; Commercial	Atlantic Ocean And Groundwater Table	20.58	S6/T68/R25	Sunset Island Homeowner's Association
5	2-Sep-05	050525-18	44-00345-P	Residential	Adjacent Bay And Groundwater Table	23	S35/T67/R25	Islander Village Master Property Owners Association Inc.
6	3-Mar-05	040617-11	44-00334-P	Residential	Groundwater Table	12.86	S31/T65/R33	Indigo Reef Marina Homes Property Owners Assoc. Inc.
7	14-Aug-03	030226-5	44-00149-S	Airport Related Facilities	N/A	33.45	S3/T68/R25	Monroe County
8	26-Sep-01	010919-4	44-00283-P	Recreational	Florida Bay	48.23	S18/T63/R38	Village of Islamorada
9	7-Sep-00	000619-9	44-00274-P	Institutional	Atlantic Ocean	20.96	S4 5 6/T63/R38	Monroe County School District
10	3-Feb-00	991011-15	44-00262-P	Government	Atlantic Ocean	97.8	S6/T64/R37	Florida Department of Environmental Protection Division of Recreation & Parks
11	14-Jan-98	971121-5	44-00051-S	Residential	Toms Harbor	18.43	S21/T65/R34	Village At Hawk's Cay Property Owners Assoc Inc
12	14-Aug-97	970716-6	44-00178-S	Residential	On-Site Drainage Wells And Garrison Bite	25.9	S31/T67/R25	Department of the Navy
13	14-Nov-96	960819-10	44-00211-P	Institutional	On Site Freshwater Wetland Via Outfall Swale	37.87	S36/T66/R27	Monroe County School Board
14	15-Jul-96	960612-7	86-00066-S	Commercial	Total On-Site Retention	24.21	S32 33/T63/R37	Hawthorne Realty Group
15	2-Oct-95	950829-4	44-00202-S	Commercial	Sisters Creek	14.6	S15/T66/R32	Office of Cuba Broadcasting
16	16-Mar-94	940222-10	44-00041-S	Commercial	Tidal Canal	21.81	S22/T61/R39	K-Mart Corporation
17	21-Apr-92	911204-3	44-00096-S	Commercial	Existing Basin	16.8	S32/T67/R25	Lewis Property Investors Inc.
18	9-May-91	910208-9	44-00156-S	Highway	Atlantic Ocean	28.2	S00/T63/R37	Florida Department of Transportation
19	3-Oct-90	900913-14	44-00050-S	Sanitary Landfill	Florida Bay	20	S19/T66/R28	Monroe County
20	22-Jun-90	900418-4	44-00122-S	Institutional	Total Onsite Retention	16.46	S1/T61/R39	Mccarthy Edward A Archbishop Of Archdiocese Of M
21	15-Nov-89	891013-9	44-00104-S	Highway	Existing Ditch And Swales	83.66	S1 11 12 14 15 22/T61/R39;S6/T61/R40	Florida Department of Transportation
22	19-Jul-89	890301-3	44-00091-S	Residential	Atlantic Ocean Via Fla Straits	14	S14/T66/R32	Sunrise Isle Homeowners Association
23	13-Jul-89	890315-6	44-00090-S	Residential	Atlantic Ocean & Card Sound	134.09	S13 24/T59/R40;S18/T59/R41	Ocean Reef Improvement Association
24	31-May-89	12148-B	44-00087-S	Residential	Total Onsite Retention	22.3	S35/T65/R33	Little Crawl Key Homeowners Association
25	17-May-89	10278-6	44-00054-S	Residential; Commercial	Atlantic Ocean	13.32	S6/T68/R25	Truman Annex Property Owners Association

Source: SFWMD ePermitting

Prior to the 1990's, given the location and configuration of the Keys and the unlimited outfall capacity of the surrounding water bodies, relatively little consideration had been given to stormwater runoff. There is concern that this history of unregulated stormwater runoff contributes to a portion of the nearshore water nutrient and sediment loading. Subsequent regulatory developments have increased focus on stormwater management practices related to water quality and quantity. Designation of the Keys as an Area of Critical State Concern (ACSC) (Section 380.0552 F.S.) in 1974 and designation of the surrounding waters as Outstanding Florida Waters (OFW) (Chapter 62-3, F.A.C.) in 1985 required that a county-wide comprehensive water quality monitoring program be established. In 2001, the County Stormwater Management Master Plan was created, and a portion of its recommendations have been implemented, though not yet complete.

11.6.2 Needs Assessment
[Rule 9J-5.011(1)(f), F.A.C.]

11.6.2.1 Stormwater Management Master Plan

At the present time, only project specific surface water management systems exist in the County that are capable of servicing existing land use or mitigating associated impacts. A facility-specific land use inventory has not been completed to ascertain the drainage system needed to serve a combination of residential, commercial, industrial, extractive, institutional and agricultural land uses as well as public facilities, conservation/preservation areas and vacant lands.

Similarly, a comprehensive analysis of current demand and projected needs for stormwater management facilities, which would include future facility capacity analysis based on development permitted by the County, projected population, and land use distributions based on the "Future Land Use Map," has not been completed. Recognizing the inadequacy regarding surface water management in the County, a SMMP was completed in 2001 to assess the need for design of drainage systems in the developed portions of the County. The objectives of the SMMP included:

- assessing the adequacy of existing stormwater conveyance systems in developed or developing basins;

- prioritizing stormwater management needs of each island within a framework of the needs of the entire County; and

- developing a plan of identifying options available to the County on how to finance the cost of construction, operation, and maintenance of required stormwater management facilities.

Monroe County's present stormwater management practices have been revised, partially as a result of information and recommendations provided in the SMMP. However, these revised practices have not been adequate to solve all of the problems associated with stormwater management. The SMMP did identify a significant number of stand alone improvements, some of which have been implemented, that have had positive water quantity and quality impacts in localized areas. A number of SMMP referenced projects are in various stages of completion with yet other needing funding Projects identified that have been completed or are in process include: El Prado Circle on Big Coppitt Key, Card Sound Road (SR905A), Marathon Government Center, Burton Drive at U.S. 1 in Tavernier, Jo-Jean Way in Tavernier and Veterans Park in Little Duck Key. It should be further noted, projects associated with U.S. 1 right-of-way are the responsibility of FDOT. The County has partnered with the FDOT on numerous occasions and look forward to maintain this partnership.

Additionally, the focus of the SMMP was on public facilities, and did not address the needs of many of the private stormwater management systems throughout the County.

To this end, in an effort to provide increased control of water quantity, enhance water quality, and effectively manage stormwater, the feasibility of creating a county-wide Stormwater Utility entity can be examined. Under the Utility, developed parcels of property could be assessed a fair and equitable user fee based upon that property's amount of impervious surface or other criteria. This user fee could then be used by the utility to correct existing deficiencies and provide for future facilities in the stormwater management system. The utility fee could also provide ongoing revenues for operation and maintenance of the public system.

11.6.2.2 Other Needs

11.6.2.2.1 Revise as Necessary, Section 114-3 of the Monroe County Land Development Code Which Regulates Stormwater Management

Section 114-3 of the MCLDC provides stormwater management criteria compliant with existing federal and State criteria, and Section 114-4 provides for revisions to 114-3 to maintain compliance. Revisions to the MCLDC may soon be necessitated by impending EPA and FDEP establishment of quantitative nutrient criteria for surface water, anticipated sea level rise due to global warming and possible deviations from historically observed storm frequencies, intensities and durations. Additionally, revisions may also be necessitated to insure compliance and inspectability for residential permits.

11.6.2.2.2 Continue and Expand the Assessment of Ground Water and Surface water Quality

As mentioned above, the County participated in the development of the FKRAD documents that provided control mechanisms in the quest to return near shore waters to the water quality targets. The results of recent studies clearly demonstrate that development is adversely affecting water quality in the County. (See *Chapter 12.0, Natural Ground Water and Aquifer Recharge Element.*)

11.6.2.2.3 Prepare an Inventory of Drainage Systems and Performance Data for All Public and Private Systems Within the County

The Monroe County Department of Public Works should undertake the inventory and evaluation of existing drainage structures and facilities within county rights-of-way, identifying flooding issues; and, obtain data from the FDOT and municipalities for their facilities, collaborating efforts to resolve common issues.

11.6.2.2.4 Evaluate the Performance of Systems Constructed Under Monroe County Stormwater Management Regulation.

The County should periodically sample the discharge from stormwater management systems to determine compliance with the water quality requirements of the MCLDC and modify BMP recommendations as appropriate to improve the performance of future systems.

11.7 Adoption and Implementation of a Stormwater Management Ordinance

[Rule 9J-5.011(1)(h), F.A.C.]

Section 114-4 of the MCLDC, revises the Surface Water Management Criteria of the adopted Monroe County Land Development Codes and sets forth the following Monroe County responsibilities related to updating surface water management criteria:

The County Planning Commission shall consult with the Florida Department of Environmental Protection and the South Florida Water Management District, and shall recommend a stormwater management ordinance for adoption by the Board of County Commissioners that is consistent with Chapter 62-25, F.A.C. The recommendation shall be provided to the Board of County Commissioners pursuant to Section 102-158 of the MCLDC within 12 months of its effective date.

The following tasks are recommended for implementing stormwater management ordinance revisions aimed at controlling the quality and quantity of stormwater discharges from new and existing duplex and single family home development in the

County, and to provide information for distribution to the general public explaining the County's proposed stormwater management ordinance revisions:

Task 1: Review and assess the stormwater management techniques used in the development of typical duplex and single family homes in the County in the past to determine compliance with existing code and to determine the need for code revision or enforcement.

Task 2: Prioritization of project areas (residential subdivisions) most in need of implementation of stormwater management criteria.

Task 3: Refine criteria, procedures, and techniques used in the development of new and the retrofitting of existing duplex and single-family homes using the information developed in Tasks 1 and 2, and provided in the SMMP to a) eliminate or alleviate discharge into the public right-of-way from new duplex and single-family homes and b) retrofitting of existing duplex and single family homes to accomplish the same. The criteria must demonstrate the ability to be implemented through effective, practical, and cost-effective stormwater management improvements and BMP implementation. Procedures and techniques to control stormwater are to be implementable within the site planning, construction, and retrofitting stages of single family and duplex home sites. The code shall also require that the building official verify the implementation of required stormwater controls for new and updated construction. The intent of these procedures is to improve localized flooding conditions and improve the quality of the nearshore waters of Monroe County.

Task 4: Alternative analysis of all criteria, procedures, and techniques identified in Task 3.

Task 5: Development of a layman's brochure for distribution to the general public explaining the implementation of the criteria developed in Task 3 above, in addition to the refinement of the County's Stormwater Management Ordinance.

The current surface water management criteria for new development, and the retrofitting of existing duplexes and single family home sites, is contained in the MCLDC, Section 114-3.

11.8 Stormwater Management Master Plan

[Rule 9J-5.011(1)(f), F.A.C.]

Currently, no comprehensive study of drainage systems and stormwater management systems has been conducted in the County. Many research efforts have been directed at identifying specific impact areas of flooding or biotic communities in the nearshore

waters of the County while not being designed specifically to identify the causative stormwater discharge points which, in most cases, were beyond the scope of these studies. Although these studies have been reviewed and when applicable have been incorporated in the SMMP as design and improvement recommendations, it is now recognized that, in order to properly address the issue of preventing environmental degradation resulting from stormwater runoff, a comprehensive effort beyond the magnitude of anything yet undertaken will be required. Implementation of the SMMP has affected the fiscal, regulatory, and public and private operational characteristics presently in place related to stormwater systems utilized in the County. Successful implementation of the SMMP has and continues to require fiscal and political commitments and coordination at varying levels governmental and regulatory agencies.

The end result of the SMMP was to provide adequate and equitable means for the construction of a comprehensive, long-term, surface water management system which addresses existing as well as new development.

11.9 Level of Service Standards

[Rule 9J-5.011(1)(e) and (f), F.A.C.]

The level of service (LOS) standards for drainage meets or exceeds the requirements set forth in Chapter 62-25 F.A.C. The levels of service standards can only be applied to development having drainage systems permitted after the adoption of Section 9.5-293 of the MCLDC and, subsequently Section 114-3 of the MCLDC, and cannot be immediately applied to the vast number of unpermitted drainage systems or developments not having drainage systems. Stormwater quality and quantity infractions can only be addressed through vigilance and enforcement of the County's criteria. The level of service standards are described in Sections 11.9.1, 11.9.2 and 11.9.3 of the MCLDC.

11.9.1 Water Quantity Level of Service Standards

The following protection levels for development are based upon design storm frequency and duration:

- Residential and commercial building floors - 100 year, 3 day;
- Emergency shelters/service building floors - 100 year, 3 day;
- Evacuation routes and emergency service road - 100 year, 3 day;
- Arterial roads - 100 year, 3 day;
- Collector roads - 25 year, 3 day;
- Neighborhood roads - 5 year, 1 day;
- Urban sites - 5 year, 1 day;
- Rural sites - 3 year, 1 day; and
- Off-site discharge rates are limited to historic, predevelopment conditions or as previously determined by the SFWMD or the County.

11.9.2 Water Quality Level of Service Standards

Projects shall be designed and operated so that off-site discharges meet State water quality standards, as set forth in Chapter 62-302, F.A.C.

11.9.3 Retention/Detention Criteria (SFWMD Water Quality Criteria, 5.0 and Monroe County Criteria, Section 114-3 of the MCLDC)

- Retention, detention, or both retention and detention in the overall system, including swales, lakes, canals, greenways, etc., shall be provided for one of the three following criteria or equivalent combinations thereof (SFWMD Water Quality Criteria):

  - Wet detention volume shall be provided for the first inch of runoff from the developed project, or the total runoff of 2.5 inches times the percentage of imperviousness, whichever is greater.

  - Dry detention volume shall be provided equal to 75 percent of the above amounts computed for wet detention. (Note: This reduction is not allowed per MCLDC, Section 114-3.)

  - Retention volume shall be provided equal to 50 percent of the above amounts computed for wet detention. Retention volume included in flood protection calculations requires a guarantee of long term operation and maintenance of system bleed-down ability. (Note: This reduction is not allowed per MCLDC, Section 114-3.)

- Projects that discharge directly to sensitive receiving waters shall provide the dry retention or detention volume according to the following formula:

  Treatment volume = C x Disturbed area (acres) x 3.2 (inches)/12 (inches/foot)

  Where treatment volume (acre feet) is the amount of stormwater treatment necessary, the disturbed area is the total lot area and C is the rational method runoff coefficient. The rational method coefficient for the water quality treatment volume calculations shall be 0.1 for pervious areas and 0.95 for impervious areas.

- Commercial or industrial projects shall provide at least one-half-inch of dry detention or retention pretreatment prior to discharge to a disposal structure such as a well, subsurface drainage basin, or trench, as part of the required retention/detention.

11.9.4 Present and Projected Future Ability to Meet Level of Service Standards

The established SFWMD water quantity and quality drainage criteria and related Florida Administrative Code water quality requirements in conjunction with the implementation of the revisions to the Surface Water Management Criteria in Section 114-3 of the MCLDC, allows for drainage requirement criteria to be imposed on a site specific basis. Section 114-3 of the MCLDC allows for imposition of stormwater management criteria on development exempted from SFWMD requirements because of site characteristic such as size and impervious area, such as residential lots. Additionally, Section 114-3 of the MCLDC allows for more stringent requirements than those imposed by SFWMD, not allowing water quality credits for providing retention or dry detention.

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Bibliography

Monroe County, 2010 Comprehensive Plan, 1990.

U.S. Environmental Protection Agency, "Overview of Climate Change Adaptation in the Southeastern United States with a Focus on Water and Coastal Resources Draft Discussion Paper," Prepared by Stratus Consulting Inc., January 26, 2010.

Florida Stormwater Association, "General Comments Concerning EPA's Proposed Numeric Nutrient Criteria (40 CFR Part 131.43)," 2010.

FDEP, "Florida Keys Area Reasonable Assurance Documentation – North, Central, South-Central and Southern," May 2008

Monroe County, "Monroe County and Incorporated Municipalities Key West, Marathon, Key Colony Beach, Layton, and Islamorada Village of Islands Local Mitigation Strategy 2005 Revision," November 2005.

CERP Assessment Team, "Comprehensive Everglades Restoration Plan 2009 System Status Report Draft," April 2010.

SFWMD, SFWMD News Release "SFWMD Expands Online Public Access to Permitting Records," January 28, 2009.

Monroe County*, Stormwater Management Master Plan*, August 2001, Prepared by Camp Dresser & McKee, Inc.

SFWMD, "Basis of Review for Environmental Resource", November 11, 2009.

CHAPTER 11.0 - DRAINAGE SUMMARY – COMMENT RESPONSES

Commenter: Kevin Wilson
Date Received: 8/17/10

Location	County Comment	K&S Action
11.4 Regulatory Framework	The Manual of Stormwater Management Practices is out of date.	Comment noted. The "needs and opportunities" chapter of the drainage element will address the need to update the Manual of Stormwater Management Practices.
11.4 Regulatory Framework	Should this mention the plan to revamp 114-3?	The plan to revamp Section 114-3 of the MCLDR should be addressed in the "needs and opportunities" chapter of the drainage element. We intend to address changes to the MCDLR Section 114-3 in the "needs and opportunities" chapter.
11.4 Regulatory Framework	What new state wide stormwater rule?	Numeric Nutrient Criteria (NNC) is currently being promulgating by the EPA. No new state wide rules regarding NNC have been established to this point. Any new criteria, once established, can be addressed with revision(s) to Section 114-3 of the MCLDR if not covered by the FDEP or SFWMD. Any needs to be addressed once the EPA has established NNC, can be included in the "needs and opportunities" chapter of the drainage element.
11.4 Regulatory Framework	Most of the 114-3 revamp will be what is required for residential permits to insure compliance and inspectability.	Comment noted. We intend to address changes to the MCDLR Section 114-3 in the "needs and opportunities" chapter.
11.6.1 SFWMD Permitting Practices	Where is Appendix A? Is it necessary to list permitted projects in a 20 year document?	All Appendices, Maps and Attachments were submitted to the County on August 13, 2010. [Rule 9J-5.011(1)(e)] requires the permit information to be provided in the Comprehensive Plan.

Location	County Comment	K&S Action
11.6.2.1 Stormwater Management Master Plan	A BIG deal Stormwater Utility recommended in the previous Comp. Plan.	Comment Noted. This will be addressed in the "needs and opportunities" chapter of this element.
11.9.3(a)Retention/Detention Criteria	The MCLDR 114-3 uses more strict requirements and does not permit reductions of 50% or 75%.	Comment noted and address through revision to the drainage element. Please see revisions to 11.9.3(a) and 11.9.4.
11.9.3(b) Retention/Detention Criteria	The Disturbed area is defined as the "total lot area"	Comment noted and addressed through revision to drainage element. Please see revisions to 11.9.3(b).
Commenter: Judy Clarke **Date Received: 10/26/10**		
Location	**County Comment**	**K&S Action**
11.2.6 Design Storm	Is "typically, a 24-hour, 25-year return frequency storm is used" true? Section 11.9.1 lists different design storms than what is listed in section 11.2.6	Revised verbiage and referenced section 11.9.1 to address comment.
11.4.4 Work Program and Florida Key Carrying Capacity Study	This section is strange. Only refers to stormwater in last sentence. SMMP- hasn't been mentioned yet in report, but dropped in this section.	Comment noted. Addressed SMMP to reflect Stormwater Management Master Plan (SMMP) and referenced section 11.6.2.1(SMMP).
11.5.1 The Keys (Existing Facilities)	Was this section updated or is it the same as the previous comp plan? We have installed injection well and seepage trenches.	Comment noted. Injection wells and seepage trenches address localized flooding as mentioned in section 11.5.1
11.5.3 Water Quantity	-They need to spell out what SMMP is and when it was written before using abbreviation all through out the section. - When was the NRCS completed?	-SMMP Comment was spelled out in section 11.2.6 per previous comment. -Added date of NRCS.
11.5.3.2 Water Quality	- Nothing more recent on water quality than the noted1988? -All of this sounds like ancient text; is this current, or a complete history of water quality?	- Nothing more recent based on our review of the documents received by our office. -This is the history based on documents reviewed by our office.

Location	County Comment	K&S Action
11.6.1 SFWMD Permitting Practices	-Add the word "has" to second sentence in second paragraph. -Revise verbiage in second paragraph. -Revise verbiage in fifth paragraph - Again, this text sounds very old. The County re-did its stormwater codes in 1995 didn't it? They need to qualify "Historically" as "prior to 1990's…2001,… whatever. -Is 2001 the correct date?	- Revision made. - Revised verbiage. - Revised verbiage. - Revised verbiage. - Yes.
11.6.2.1 Stormwater Management Master Plan	- What is the first paragraph saying? - This text is old. Recognizing the "present" inadequacy. We wrote the master plan in 2001. - Is this (a significant number of SMMP proposed improvements have yet to be implemented) true? - When do we talk about County stormwater permitting requirements?	- There is no master drainage systems, only those associated with specific areas. - Revised verbiage. - Yes - In section 11.9
11.6.2.2.2 Continue and Expand the Assessment of Ground Water and Surface Water	-When do they consider recent?	- Please see chapter 12.0 for the specific dates, etc.
11.6.2.2.3 Prepare and Inventory of Drainage Systems and Performance Data for all Public and Private Systems Within the County	-FYI – This topic came up recently and I am working with public works to document our structures only, not DOT or Municipal. -	- Comment noted.
11.6.2.2.4 Evaluate the Performance of Systems Constructed Under Monroe County Stormwater Management Regulation	- Need a sampling location – i.e. injection wells don't discharge to surface or outfall, can't sample. Are they familiar with our stormwater structure or is this standard text?	- To determine the effectiveness of water quality measures, sampling is needed whether the runoff is conveyed to surface water or injection wells.
11.7 Adoption and Implementation of a Stormwater Management Ordinance	- is this stuff to do in the future or what we did in 1990's? This seems to address improving our codes, but I don't recall anything in the section about what our codes require. - This was done in the past; is this historical text or a "new" idea?	- Updating County code is ongoing to insure County code is consistent with FDEP and SFWMD. -This was done in the past and remains a need to be done procedure. Task 5: for instance, needs revision.

Location	County Comment	K&S Action
11.8 Stormwater Management Master Plan	-This text implies that the master plan is still being written and revised. It isn't as far as I know.	-Correct. Comment Noted and element revised
Note: Please provide information requested on the attached memo dated May 19, 2010.		

Commenter: Judy Clarke
Date Received: 2/18/11, Follow up 3/10/11

Location	County Comment	K&S Action
Section 11.4.3	Cite report dates	Updated as suggested
Section 11.4.4	Update rules – JPA cancelled	Rule updated as suggested
Section 11.5.1	Insert language regarding inspection and add language regarding seepage trenches within County roads	Updated as requested
Section 11.5.3.2	Add reference to FKRAD	References to FKRAD added as suggested.
Section 11.6.1	Add detail of completed stormwater projects	Details of Completed stormwater projects added.
Section 11.5.3.2 and Section 11.6.2.2.2	Provide detail of existing State/County cooperative studies	References to completed studies (FKRAD) have been added to 11.5.3.2 and referenced 11.6.2.2.2
Section 11.7	Reference to Regulation (FDER) change to Protection (FDEP)	Agreed. Changed

NATURAL GROUNDWATER AQUIFER RECHARGE ELEMENT
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12.0 NATURAL GROUNDWATER AQUIFER RECHARGE ELEMENT

[Rule 9J-5.011(1)(g) and (h), F.A.C.]

The Natural Groundwater Aquifer Recharge Element of the Monroe County Comprehensive Plan addresses the data inventory requirements of Rule 9J-5.005(2) of the Florida Administrative Code (F.A.C.). The data inventory requirement will support the development of goals, objectives, policies, and implementation programs for the Natural Groundwater Aquifer Recharge Element (Rule 9J-5.011, F.A.C.).

The Natural Groundwater Aquifer Recharge Element is a required comprehensive plan element under Florida's Local Government Comprehensive Planning and Land Development Regulation Act (Chapter 163, Florida Statutes). The purpose of the element is to provide for necessary public facilities and services correlated to future land use projections.

12.1 Introduction

The potable water supply resources used by Monroe County (County), including both the aquifer system and treatment facilities, are geographically located in Miami-Dade County - entirely outside of the County's jurisdiction (see Chapter 8.0, Potable Water Element). In the County, the surficial aquifer is brackish to saline and contains an inadequate quantity of water for use as a potable water supply. The Florida Keys Aqueduct Authority (FKAA) is the agency that obtains and distributes potable water in the Keys. Discussions of the potable water supply, permitting process and water treatment and distribution systems are presented in Chapter 8.0, Potable Water Element. As a result of the potable water source for the County being located entirely within Miami-Dade County, aquifer protection related to the FKAA's Florida City Wellfield is accomplished through the provisions of the Miami-Dade County Wellfield Ordinance. In the County, groundwater resource protection and management takes place in the context of the regulation of public and private interests in relation to wetlands, wildlife, aquifer discharges to surface waters, and other components of the natural system.

12.2 Geology

Although Mesozoic sediments represent thicknesses well in excess of 10,000 feet, only the more recent Cenozoic sediments have a direct bearing on aquifers of the Keys. Of these, the most important are the sediments deposited since Miocene time, including the Miami Oolite, the Key Largo Limestone, the Tamiami Limestone, the Hawthorne Formation, the Tampa Limestone, and the Suwannee Limestone.

The Miami Oolite (oolitic facies of the Miami Formation) is found at the land surface from Big Pine Key to Key West and is an offshore extension of the same formation found in southeast Florida. It was formed as a shoal deposit in warm shallow seas. Maximum thickness of the formation is 40 feet with an average of 20 feet in the Keys. It is white to yellow in color and

contains considerable fine to medium quartz sand that fills the solution holes. The Miami Oolite has many voids, thereby giving it a high porosity. However, there is little interconnection between the voids, causing it to have low permeability. This formation overlays the Key Largo Limestone in the southern Keys.

The Key Largo Limestone occurs at land surface from Soldier Key, off Miami, to Bahia Honda. It occurs as an ancient reef formation deposited during Pleistocene time. It averages 60 feet in thickness and is approximately 90 miles long at land surface, by 3 miles wide (Parker et al., 1955). It is composed mainly of corals, amorphous limestone and detritus from wastage of the reef. The Key Largo Limestone contains cavities which make it very permeable. As a result, fresh water readily escapes to the sea, and ocean water easily enters the formation.

Hoffmeister and Multer (1964) found that the Miami Oolite passes laterally into the Key Largo Limestone at the southeastern point of Big Pine Key. They also found that the oolite in the rest of the island is underlain by the Key Largo Formation. The gradational contact between the Miami Oolite and the Key Largo Limestone in most places in Big Pine Key lies at a depth of 13 to 20 feet (Hanson, 1980).

The Tamiami Formation underlies the Key Largo Limestone. It is predominantly permeable sand with limestone lenses. It forms the lower part of the Biscayne Aquifer system, with the Miami Oolite and Key Largo Limestone forming the upper part.

The Hawthorne Group underlies the Biscayne Aquifer system and generally acts as a confining layer to the deeper Floridan Aquifer System. It is relatively impermeable and consists of silt, clayey sand, and sand. It is phosphatic and greenish in color. Beneath Key Largo, this sequence is approximately 300 feet thick.

Underlying the Hawthorne Group is the Tampa Limestone. This formation consists of interbedded calcarenite (cemented sand-size grains of calcium carbonate) and calcilutite (flour-size grains). The calcarenite sequences contain abundant mollusk molds, giving it high moldic porosity and permeability. The Tampa Limestone is approximately 600 feet thick. Because of the alternating high and low permeability beds, this formation is considered a minor water-bearing zone of the Floridan Aquifer.

The Suwannee Limestone is considered a principal artisan water-bearing zone of the Floridan Aquifer System. It consists of white, finely porous, chalky limestone composed chiefly of fragmental shells of bryozoa and foraminifera. In Key West, the formation is approximately 450 feet thick.

12.3 Hydrogeology

Two major groundwater systems underlie the County: the deeper Floridan Aquifer System, and the shallower Surficial Aquifer System (the upper portion of which contains the Biscayne Aquifer). **Table 12.1** illustrates the relative positions and productivities of these hydrogeologic units.

Table 12.1 - Groundwater Systems in Monroe County

Hydrogeologic System	Hydrogeologic Unit	Water Resource Potential	Depth*
Surficial Aquifer System	Biscayne Aquifer	Largely saline, must be desalinated for potable use. No additional withdrawals will be permitted. Vulnerable to spills and contamination. Small lenses of relatively fresh water float above the saltwater on some of the larger keys.	The Biscayne Aquifer is the upper part of the Surficial Aquifer System and extends from ground surface to approximately 100 feet deep. The Surficial Aquifer System extends to 200 feet.
Intermediate Confining Unit	Hawthorn Confining Beds	Very low permeability, continuing unit for the Floridan Aquifer System.	200 to 900 feet
Floridan Aquifer System	Floridan Aquifer	Wells yield from 75 to 1,000 gallons of saline water per minute. Requires desalinization for all uses.	900 to 3500 feet

*Depths vary considerably across the County. Depths shown are typical depths in the Upper Keys.

In the Keys, both of these aquifer systems have chloride concentrations which exceed the drinking water criteria of 250 milligrams per liter. Therefore, in most cases, they could be used as a potable water source only after utilization of water quality treatment processes such as desalinization.

In Miami-Dade County, the Biscayne Aquifer (the upper part of the Surficial Aquifer System) is a major source of potable water and essentially all potable water in the Keys is piped via aqueduct to the Florida Keys from wellfields in the Biscayne Aquifer in Miami-Dade County (see Chapter 8.0, Potable Water Element). Some County residents provide their own water supply using home reverse osmosis plants to desalinate Biscayne Aquifer water, or by collecting rain water in cisterns.

On some of the larger islands of the Lower Keys, small lenses of freshwater to slightly brackish water float on the top of the Biscayne Aquifer near the ground surface. Chloride levels in these lenses are generally too high for human consumption, but the lens water is suitable for some irrigation purposes and provides an important source of freshwater for wildlife and vegetation.

The amount of water stored in an aquifer is a function, in part, of water inflow, balanced against the water discharged from an aquifer. This discharge can take the form of either a naturally occurring flow from springs, lakes or wetlands, or in the form of wells. Should the water loss exceed the water inflow, water pressures between adjoining aquifers can be affected, and over drafting, or over mining, can occur, leading to an exchange of water between the aquifers.

Protection of the functions of natural groundwater aquifer recharge areas and natural drainage features in the County is a legitimate goal because of the benefits associated with replenishment of water supplies such as: prevention of lateral movement of salt water from saline zones (known as saltwater intrusion); dilution of contaminants which could contribute to the degrading of the ambient water quality; reduction of surface flooding by providing storage; and prevention of sinkhole formation. The issue of water quality protection must also be addressed because of the potential for recharge areas to receive contaminants and to transfer them to underlying aquifers.

12.4 Freshwater Lenses *[Rule 9J5.011(1)(g), F.A.C.]*

On some of the larger keys, a thin lens of freshwater to slightly brackish water floats on top of the saltier Biscayne Aquifer. The size of the lens is dependent on rainfall, evapotranspiration, groundwater losses to the marine environment, and pumpage (Hanson, 1980). The large Upper Keys, Elliott Key for example (Klein, 1970), do not have permanent lenses despite their large size and the increased rainfall northward. Only the largest of the Lower Keys, Big Pine and Key West, have permanent freshwater lenses (Parker et al., 1955). The Lower Keys are more likely to have lenses because of their geometry and geology. These Keys, in plan view, retain the broad flat of an ooid shoal in contrast to the Upper Keys which are narrow and elongate parallel to the shelf. In addition, the surficial lithologic unit of the Lower Keys (oolite) is less transmissive than that of the Upper Keys (reef). Small, ephemeral lenses occur on other Keys including Sugarloaf Key, Little Torch Key, Cudjoe Key, No Name Key, Little Pine Key, and Ramrod Key.

The chloride concentrations are usually too high for potable use, but the water is used locally for irrigation and domestic consumptive uses. Irrigation wells have to be very shallow because chloride concentrations increase rapidly with depth. On Big Pine Key, only the upper 15 feet of the aquifer contained water suitable for irrigation (Hanson, 1980). The freshwater lenses of the Florida Keys are considered to be critical to the support of the existing wildlife and plant communities in these areas.

Historically, wells were installed in freshwater lenses. Many of these were installed by private landowners for domestic water supply for the house and/or landscaping, but there were also some commercial uses such as irrigation for nurseries. The amount of water withdrawn from wells is unknown, but anecdotal evidence suggests that withdrawals have declined due to closure of several plant nurseries and due to closure of individual private domestic wells.

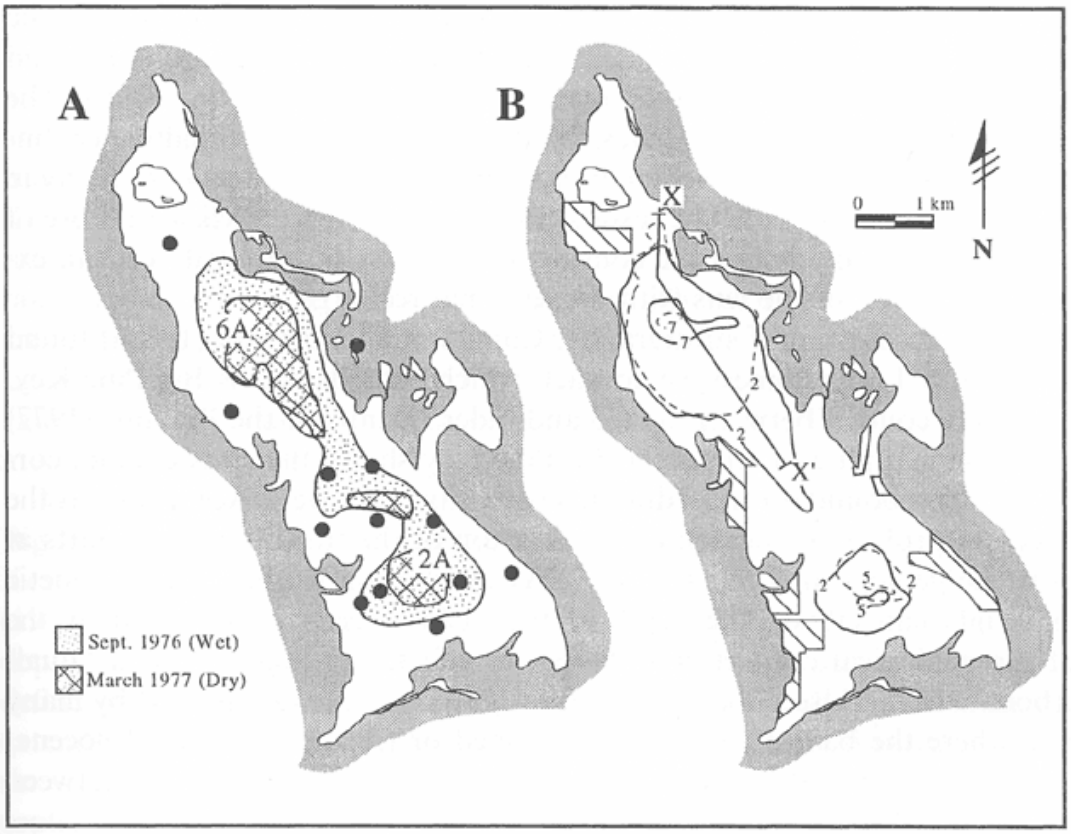
There are many potential sources of contamination to the freshwater lens system because of its high permeability. The main source of contamination is saltwater intrusion, which can be caused by over pumping, drought, or sea level rise.

Recharge areas for the lenses are the permeable surface areas above the lenses. There are no specific maps of recharge areas for the lenses. Big Pine Key has the only permanent freshwater lens system in unincorporated Monroe County; lenses on other islands are ephemeral and/or brackish. **Figure 12.1** represents the extent of freshwater lenses on Big Pine Key and is the best approximation of the recharge area for the lenses on that island. There are no natural drainage features of the freshwater lenses.

12.4.1 Freshwater Lenses on Big Pine Key

There are two distinct freshwater lenses on Big Pine Key. In both lenses, freshwater floats on the underlying saltwater with changes occurring seasonally due to tidal influences and rainfall-dependent freshwater recharge (USFWS, 2009). Hanson (1980) mapped the freshwater lenses in Big Pine Key by monitoring the downhole variation in salinity at monthly intervals (June 1976 to April 1977) at 22 shallow observation wells. The results indicated a considerable lateral expansion and contraction of the lens in response to the seasonal recharge. The maximum thickness of the freshwater column, however, remained fixed, at approximately 16 feet. A map of the freshwater lens system on Big Pine Key is presented in **Figure 12.1**.

Hanson's study (1980) of the fresh water on Big Pine Key found that continued pumping (at the pumping rate at that time) from shallow wells would probably not damage the system. However, he projected that future increased withdrawals from new residences and new or enlarged plant nurseries would "increase the stress on the freshwater lens which can only supply moderate amounts without detrimental effects during most years." Indeed, subsequent investigation shows that the effects of urbanization are being exhibited by the freshwater lens (Stewart et al, 1989). The southeast lens on the Key has decreased in lateral extent and maximum depth and is clearly affected by saltwater intrusion due to pumping and canal dredging activities. A modeled simulation of pre-development and current conditions on Big Pine Key showed that the total volume of the lens has decreased by 20 percent in response to dredging of canals (Langevin et al., 1998). The maps of freshwater lenses on Big Pine Key were being updated in 2010 by a consultant to the County but were not yet available at the time this report was prepared (September 2010).



Maps showing seasonal variation in freshwater lens at Big Pine Key. (A) Boundary of lens defined by the contour of 500 mg L^{-1} Cl^- at 1.5-m depth below water table as mapped by Hanson (1980) from wells (indicated as dots). Stippled area shows limit of freshwater lens in September 1976 (wet season); cross-hatched area shows limit of freshwater lens in March 1977 (dry season). (Adapted from Vacher et al., 1992, after Coniglio and Harrison, 1983.) (B) Location of freshwater-saltwater interface at selected depths (2, 5, and 7 m) below water table as defined by electromagnetic profiling (Wightman, 1990). Dashed line indicates limit in March 1987 (dry season); solid line indicates limit in August 1987 (wet season). Cross-hatching in B indicates areas of finger canals, which clearly limit lens area. (Adapted from Vacher et al., 1992.)

Figure 12.1 - Map of Freshwater Lens on Big Pine Key
(excerpted from Halley et al., 1997).

12.4.2 Freshwater Lenses on Sugarloaf Key and Little Torch Key

Meadows et al. (2004) studied lenses on Sugarloaf Key and Little Torch Key. The following is excerpted from their study report. Electromagnetic profiling and groundwater sampling on Sugarloaf Key and Little Torch Key in the Lower Keys of Florida show that these small, low-lying islands support only brackish-water lenses. On both islands, the lenses have central cores with lower salinities surrounded by areas of increasing salinity. The uppermost few meters of these central zones are uniform and slightly brackish (approximately 3 parts per thousand) year-round on Sugarloaf Key. On Little Torch Key, which is smaller, there is a similar central, uniform brackish zone during the wet season, with salinity slightly higher than on Sugarloaf Key. These lenses are similar in form to many freshwater lenses, except that the central zone is slightly brackish rather than fresh. During the dry season, Little Torch Key loses the central brackish zone, and salinities increase approximately linearly with depth. In the dry-season, the freshwater/saltwater mixing zone effectively extends throughout the lens. Seasonal variations on Little Torch Key are less evident outside the central zone. The central lower-salinity core on Sugarloaf Key coincides with elevations greater than 2.6 feet (0.8 meters). Using vegetation as a proxy for elevation, the central zone corresponds to the highest elevations on Little Torch Key as well. Tidal efficiencies on Sugarloaf Key indicate the tidal signal propagates through the high-permeability, buried Key Largo Limestone, and then upward through the overlying lower permeability Miami Limestone that contain the lenses. Mixing driven by tidal pumping is likely responsible for the absence of true freshwater lenses on these islands (Meadows et al., 2004).

Ross et al. (1994) concluded that sea level rise and associated salinization of groundwater and soil water is a major factor in the reduction of pine forests of Sugarloaf Key. They also concluded that if sea level continues to rise, the Florida Keys will experience a decline in both landscape and species diversity, as species-rich upland communities are replaced by simpler mangrove communities.

12.5 Biscayne Aquifer *[Rule 9J5.011(1)(g), F.A.C.]*

The Biscayne Aquifer, located throughout southeastern Florida (**Figure 12.2**), is the largest supplier of freshwater in southeast Florida. It is the most productive of the shallow unconfined aquifers in the area and is one of the most permeable in the world (Parker et al., 1955). The Biscayne Aquifer is considered an unconfined aquifer. In an unconfined aquifer, water levels are in equilibrium with atmospheric pressure. The upper boundary is termed the water table. The lower boundary is formed by a relatively impermeable bed.

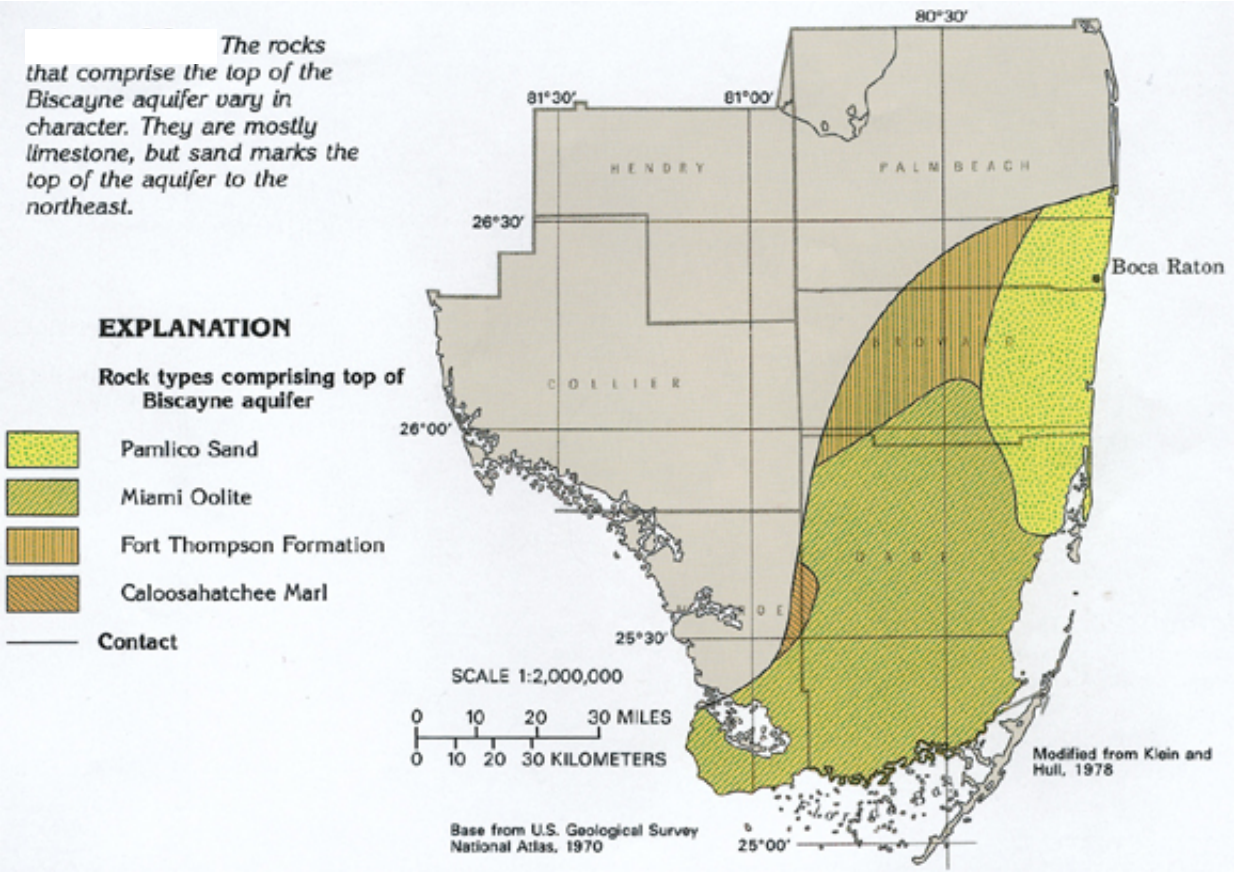


Figure 12.2 - Map of the Biscayne Aquifer
(excerpted from Miller, 1990).

In the Florida Keys, the Biscayne aquifer is approximately 100 feet thick and includes the Miami Oolite, Key Largo Limestone, and the upper permeable portions of the Tamiami Formation.

In the Keys, water from the Biscayne Aquifer ranges from brackish to chloride levels associated with seawater, and requires desalinization for potable use. As a result, the Biscayne Aquifer in the Keys is not used as a drinking water source and potable water is piped via aqueduct to the Florida Keys from a wellfield (the Florida City Wellfield) in the Biscayne Aquifer in southeastern Miami-Dade County. The FKAA is the agency responsible for obtaining and delivering freshwater to the Keys. They treat the water in Florida City, then pipe it via aqueduct to Florida Keys residents. Because water from the Florida City Wellfield is the primary source of potable water to the Keys, contamination by saltwater intrusion or other contaminants in the Florida City Wellfield would be a disaster for the Keys. Continued water quality monitoring, and appropriate management to control saltwater intrusion, are crucial to the protection of the County's water supply and are requirements of the FKAA Water Use Permit.

As noted earlier, some County residents provide their own water supply using home reverse osmosis plants to desalinate Biscayne Aquifer water, or collecting rain water in cisterns. However, due to the limited availability of fresh groundwater and its vulnerability to saltwater intrusion, and importance to wildlife and native vegetation, very few wells have been permitted in the shallow aquifer since the 1980s. Review of the South Florida Water Management District (SFWMD) ePermitting database (accessed June 4, 2010) (**Table 12.2**) indicates the SFWMD has issued five current water use permits for facilities drawing water from the Biscayne Aquifer in the Keys. These include industrial water uses such as aquaculture/fish tanks and air conditioner heat exchangers. In addition, SFWMD has issued 12 current permits for construction zone dewatering. On the mainland, Everglades National Park has public water supply permits to draw water from the Biscayne Aquifer for use in the park office and restroom facilities.

In addition to water use wells, there are injection wells known as Class V wells that are used to dispose of treated sewage. These Class V wells are permitted by the Florida Department of Environmental Protection (FDEP). In 2000, there were roughly 750 sewage disposal wells, ranging in depth from 30 to 90 feet, operating in the Florida Keys. FDEP regulates underground injection wells according to the federal Safe Drinking Water Act.

Table 12.2 - Water Use Permits Issued by SFWMD for Monroe County

Permit No.	Approved Date	Status	Permit Type	Expiration Date	Project Name	Watersource/ Receiving Body	Landuses	Party of Concern
44-00048-W	6-Oct-88	Complete	Water Use Renewal	6-Dec-88	City Of Key West Wastewater Treatment Plant	;	Dewatering	Applicant: Danis/Shook
44-00048-W	16-Jun-88	Complete	New Water Use	12-Sep-88	City Of Key West Wastewater Treatment Plant	;	Dewatering	Applicant: Danis/Shook
88-00071-W	14-Mar-88	Complete	New Water Use (General Permit)	9-Mar-08	Gu8-2169 (5515 Overseas Highway Marathon Fl)	;	Generic (Old GP's)	Applicant: Gulf Products Division B.P. Oil Company
88-00072-W	14-Mar-88	Complete	New Water Use (General Permit)	9-Mar-08	Gu7-2162 (79971 Overseas Highway Islamorada Fl)	;	Generic (Old GP's)	Applicant: Gulf Products Division B.P. Oil Company
44-00002-W	12-May-88	Complete	Water Use Renewal	15-Apr-91	Ocean Reef Inc	;	Golf Course	Applicant: Ocean Reef Inc
44-00001-W	10-Mar-88	Complete	Water Use Renewal	10-Mar-91	Card Sound Golf Club	;	Golf Course	Applicant: Card Sound Golf Club (Lessee)
44-00002-W	13-Jun-85	Complete	Water Use Modification	15-Apr-88	Ocean Reef Club - Harbor Course And Dolphin Course	;	Golf Course	Applicant: Ocean Reef Club Inc
81-00473-W	28-Dec-81	Complete	New Water Use (General Permit)	24-Nov-01	Proposed Concrete Batch Plant	;	Industrial	Applicant: City National Bank Of Miami As Trustee
80-00070-W	23-Apr-80	Complete	New Water Use (General Permit)	29-Jan-99	Coral Harbor Club Condominium	;	Industrial	Applicant: Long Ray
79-00202-W	14-Nov-79	Complete	New Water Use (General Permit)	29-Jan-99	Public Housing	;	Industrial	Applicant: Frigola Alfred
79-00184-W	5-Oct-79	Complete	New Water Use (General Permit)	29-Jan-99	Turtle Kraals Water Supply Well	;	Industrial	Applicant: Armsby John W. C/O Paul Kenson Jr. & Assoc
79-00216-W	17-Dec-79	Complete	New Water Use (General Permit)	29-Jan-99	Water Well For Florida Bay Club Key Largo Fl	;	Landscape	Applicant: Netter Charles C/O Paul C. Kenson Jr. & Assoc
44-00001-W	7-Jan-88	Complete	Water Use Renewal	15-Apr-89	Card Sound Golf Club	;	Landscape	Applicant: Ocean Reef Club Inc
44-00398-W	22-Sep-09	Withdrawn	New Water Use (General Permit < 3 Mgm)		Theater Of The Sea Inc.	;	Landscape	Applicant: Theater Of The Sea Inc
44-00002-W	7-Jun-79	Complete	New Water Use	7-Jun-89	Ocean Reef Club	;	Public Water Supply;Landscape	Applicant: Ocean Reef Club Inc
44-00372-W	10-Apr-07	Complete	New Water Use (General Permit < 3 Mgm)	12-May-27	Kraus Supermarket	Biscayne Aquifer	Aquaculture	Applicant: Kraus Commercial Property Group Llc
44-00183-W	11-Jan-93	Complete	New Water Use (General Permit)	11-Dec-12	Exxon Station #4-5727	Biscayne Aquifer	Industrial	Applicant: Exxon Company Usa
44-00188-W	30-Sep-93	Complete	New Water Use (General Permit)	12-Jun-12	Marathon Airport Terminal Facilities	Biscayne Aquifer	Industrial	Applicant: Monore County Commissioners Office
44-00157-W	18-Jun-91	Complete	New Water Use (General Permit)	5-Jun-11	Remedial Action Plan	Biscayne Aquifer	Industrial	Applicant: Universal Brands Inc
44-00144-W	21-Dec-90	Complete	New Water Use (General Permit)	21-Dec-10	Texaco (10898 Overseas Highway Marathon Key)	Biscayne Aquifer	Industrial	Applicant: Texaco
13-01499-W	20-Oct-00	Complete	New Water Use (General Permit)	20-Oct-20	Everglades National Park 14 Sites And Headquarters	Biscayne Aquifer	Public Water Supply	Applicant: Everglades National Park
13-00651-W	22-Jul-93	Complete	New Water Use (General Permit)	19-Jul-13	Everglades National Park	Biscayne Aquifer	Public Water Supply	Applicant: Everglades National Park
44-00002-W	14-Jan-93	Complete	Water Use (Individual Basin Extension)	12-Sep-94	Ocean Reef Club Inc	Dade/Monroe County	Golf Course	Applicant: Ocean Reef Club Inc
44-00001-W	11-Jul-91	Complete	Water Use Renewal	11-Jul-94	Card Sound Golf Club	Dade/Monroe County	Golf Course	Applicant: Card Sound Golf Club Inc

Table 12.2 - Water Use Permits Issued by SFWMD for Monroe County (continued)

Permit No.	Approved Date	Status	Permit Type	Expiration Date	Project Name	Watersource/ Receiving Body	Landuses	Party of Concern
44-00001-W	15-Mar-79	Complete	New Water Use	15-Oct-88	Card Sound Golf Club	Floridan Aquifer & On-Site Canals	Landscape	Applicant: Ocean Reef Club Inc
44-00002-W	11-Jul-01	Complete	Water Use (Letter Modification)	15-Dec-05	Ocean Reef Club	Floridan Aquifer System	Golf Course	Applicant: North Key Largo Utility Corp
44-00002-W	9-Jun-94	Complete	Water Use Renewal	15-Dec-05	Ocean Reef Club Inc	Floridan Aquifer System	Golf Course	Applicant: Ocean Reef Club Inc
44-00002-W	13-Jun-02	Complete	Water Use Modification	13-Jun-22	Ocean Reef Community	Floridan Aquifer System	Golf Course;Landscape	Applicant: Ocean Reef Club J
44-00284-W	6-Apr-01	Complete	New Water Use (General Permit)	6-Apr-21	Silver Shores Mobile Home Park	Floridan Aquifer System	Landscape	Applicant: Silver Shores Leaseholders Association
44-00001-W	10-May-07	Complete	Water Use Renewal	10-May-27	Card Sound Golf Club	Floridan Aquifer System;On-Site Lined Man Made Reservoir	Golf Course	Applicant: Card Sound Golf Club Inc
44-00001-W	11-Aug-94	Complete	Water Use Renewal	28-Feb-07	Card Sound Golf Club	Floridan Aquifer System;On-Site Lined Man Made Reservoir	Golf Course	Applicant: Card Sound Golf Club Inc
	29-Jul-03	Withdrawn	New Water Use (General Permit)		Key Deer Crossings	Ground Water	Dewatering	Applicant: Gilbert Southern Corp
	9-Apr-08	Void	New Water Use (General Permit)		Area 4 Wastewater Treatment Plant	Groundwater	Dewatering	Applicant: City Of Marathon
44-00442-W	8-Jan-10	Complete	New Water Use (General Permit)	24-Jan-15	Gravity Injection Wells 5	On-Site Borrow Pit(S)	Dewatering	Applicant: City Of Key West
44-00440-W	30-Nov-09	Complete	New Water Use (General Permit)	30-Nov-14	Gravity Wells 4 / Triple Chamber Outfall Installation	On-Site Borrow Pit(S)	Dewatering	Applicant: City Of Key West
44-00415-W	25-Aug-08	Complete	New Water Use (General Permit)	25-Aug-09	Garrison Bight Restrooms Sanitary Sewer	On-Site Borrow Pit(S)	Dewatering	Applicant: City Of Key West
44-00389-W	4-Jan-08	Complete	New Water Use (General Permit)	6-Jan-09	Key West Pump Station D A Modifications And Forcemain Ext	On-Site Borrow Pit(S)	Dewatering	Applicant: City Of Key West
44-00312-W	18-Jul-03	Complete	New Water Use (General Permit)	19-Jul-04	Pump Assisted Stormwater Drainage Intersections	On-Site Borrow Pit(S)	Dewatering	Applicant: Key West City Of
44-00315-W	11-Jul-03	Complete	New Water Use (General Permit)	12-Jul-04	Air Traffic Control Tower Operation Facility	On-Site Borrow Pit(S)	Dewatering	Applicant: Us Navy
44-00302-W	17-Oct-02	Complete	New Water Use (General Permit)	17-Oct-03	Stock Island Vacuum Sewer Expansion Phases 1-3	On-Site Borrow Pit(S)	Dewatering	Applicant: Key West Resort Utility Corp
44-00002-W	12-Sep-91	Complete	Water Use Renewal	12-Apr-94	Ocean Reef Club Inc	South Dade	Golf Course	Applicant: Ocean Reef Club Inc
44-00358-W	6-Mar-07	Withdrawn	New Water Use (No-Notice General Permit)		Railway Apartments	Surficial Aquifer	Dewatering	Applicant: Old Town Key West Development L L C
44-00158-W	21-Jun-91	Complete	New Water Use (General Permit)	29-Jan-10	Parks B Banks	Surficial Aquifer System	Agricultural	Applicant: Banks Parks B
44-00155-W	4-Apr-91	Complete	New Water Use (General Permit)	19-Feb-11	585049 Owens Oil Service Station	Surficial Aquifer System	Industrial	Applicant: Arnold Owens Inc
44-00206-W	9-May-96	Complete	New Water Use (General Permit)	9-May-99	Jet Engine Test Cell (Swmu-9)	Surficial Aquifer System	Industrial	Applicant: Commanding Officer-Naval Air Station
		No Response	New Water Use (General Permit < 3 Mgm)		Holiday Inn Express	Taron Creek	Public Water Supply;Landscape	Applicant: S H Marathon Ltd
44-00448-W	11-Feb-10	Complete	New Water Use (General Permit)	14-Feb-15	Stormwater Gravity Injection Wells Phase V I	Water Table Aquifer	Dewatering	Applicant: City Of Key West
44-00422-W	3-Mar-09	Complete	New Water Use (General Permit)	10-Apr-14	Key Largo	Water Table Aquifer	Dewatering	Applicant: Key Largo Wasterwater Treatment District

Table 12.2 - Water Use Permits Issued by SFWMD for Monroe County (continued)

Permit No.	Approved Date	Status	Permit Type	Expiration Date	Project Name	Watersource/ Receiving Body	Landuses	PARTY OF CONCERNS
44-00441-W	17-Dec-09	Complete	New Water Use (General Permit)	17-Jan-14	W W T P Area 3	Water Table Aquifer	Dewatering	Applicant: City Of Marathon
44-00412-W	23-Dec-09	Complete	Water Use (Letter Modification-Minor GP)	30-Jan-12	Walgreens	Water Table Aquifer	Dewatering	Applicant: Walgreens
44-00447-W	4-Feb-10	Complete	New Water Use (General Permit)	5-Feb-11	White Street Stormwater Pump Station	Water Table Aquifer	Dewatering	Applicant: City Of Key West
44-00443-W	27-Jan-10	Complete	New Water Use (General Permit)	1-Feb-11	Marathon Vacuum Station 5	Water Table Aquifer	Dewatering	Applicant: Oac Action Construction Corp
44-00445-W	6-Jan-10	Complete	New Water Use (General Permit)	6-Jan-11	Marathon Service Area 5 Sewer & Stormwater Collection System	Water Table Aquifer	Dewatering	Applicant: Lanzo Construction Co.
44-00412-W	12-Aug-08	Complete	New Water Use (General Permit)	1-Dec-09	Walgreens	Water Table Aquifer	Dewatering	Applicant: Walgreens
44-00405-W	14-Aug-09	Complete	Water Use (Letter Modification-Minor GP)	12-Nov-09	Navy P P V Housing -Trumbo Point	Water Table Aquifer	Dewatering	Applicant: Southeast Housing Llc
44-00413-W	14-Aug-08	Complete	New Water Use (General Permit)	20-Sep-09	Seagrape Apartments	Water Table Aquifer	Dewatering	Applicant: Carlisle Development Group
44-00405-W	21-Aug-08	Complete	New Water Use (General Permit)	22-Aug-09	Navy P P V Housing -Trumbo Point	Water Table Aquifer	Dewatering	Applicant: Southeast Housing L L C
44-00409-W	14-Jul-08	Complete	New Water Use (General Permit)	15-Jul-09	Triple Chamber Outfall Structure Installation	Water Table Aquifer	Dewatering	Applicant: City Of Key West
44-00406-W	6-Jun-08	Complete	New Water Use (General Permit)	27-Jun-09	Gravity Injection Wells-Phase 3	Water Table Aquifer	Dewatering	Applicant: City Of Key West
44-00401-W	30-Apr-08	Complete	New Water Use (General Permit)	3-Jun-09	Area 4 And 6 Wwtp	Water Table Aquifer	Dewatering	Applicant: City Of Marathon
44-00399-W	11-Mar-08	Complete	New Water Use (General Permit)	29-Mar-09	Pump Station	Water Table Aquifer	Dewatering	Applicant: City Of Key West
44-00388-W	21-Dec-07	Complete	New Water Use (General Permit)	21-Dec-08	Big Coppitt Wwtp	Water Table Aquifer	Dewatering	Applicant: Fkaa
44-00375-W	31-May-07	Complete	New Water Use (General Permit)	2-Jul-08	Gravity Injection Wells Phase 2	Water Table Aquifer	Dewatering	Applicant: Key West City Of
44-00375-W	21-Sep-07	Complete	Water Use (Letter Modification-Minor GP)	23-Jun-08	Gravity Injection Wells Phase 2	Water Table Aquifer	Dewatering	Applicant: Key West City Of
44-00355-W	2-May-07	Complete	New Water Use (General Permit)	18-May-08	Front And Whitehead Street Stormwater Improvements	Water Table Aquifer	Dewatering	Applicant: City Of Key West
44-00371-W	5-Apr-07	Complete	New Water Use (General Permit)	5-Apr-08	Margaret And Angela Streets Stormwater Improvements	Water Table Aquifer	Dewatering	Applicant: City Of Key West
44-00338-W	15-Jun-05	Complete	New Water Use (General Permit)	24-Jun-06	Gravity Injection Well	Water Table Aquifer	Dewatering	Applicant: Key West City Of
44-00331-W	21-Dec-04	Complete	New Water Use (General Permit)	21-Dec-05	Key Largo Wastewater Management System	Water Table Aquifer	Dewatering	Applicant: Key Largo Wastewater Treatment District
		Hold For Conc	New Water Use (General Permit)		George Street Stormwater Basin Improvements	Water Table Aquifer	Dewatering	Applicant: City Of Key West
44-00385-W		No Response	New Water Use (General Permit)		Hawks Cay Pool Well Points	Water Table Aquifer	Dewatering	Applicant: Hawks Cay Investors Ltd
44-00419-W	20-Nov-08	Complete	New Water Use (General Permit < 3 Mgm)	29-Dec-28	Hawks Nest Condo	Water Table Aquifer	Industrial	Applicant: Hawks Nest Condominium Inc
44-00192-W	14-Dec-93	Complete	New Water Use (General Permit)	8-Nov-13	Bp Site #24589 - Fdep Fac #448511957	Water Table Aquifer	Industrial	Applicant: Bp Oil Company

Source: SFWMD ePermitting Database June 4, 2010.

Recharge of the Biscayne Aquifer occurs primarily to the north of Monroe County and includes (1) infiltration of rainfall or irrigation water through surface materials to the water table; (2) infiltration of surface water imported by overland flow in the Water Conservation Areas or by canals; and (3) infiltration of urban runoff by way of drains, wells, or ponds (Fish and Stewart, 1991). Recharge by rainfall is greatest during the wet season, from June to November, and recharge by canal seepage is greatest during the dry season, from December to May (Fish and Stewart, 1991). Recharge occurs throughout most of Miami-Dade County and the Water Conservation Areas of Miami-Dade, Broward, and Palm Beach Counties. In the southern part of Miami-Dade County, groundwater flows southward into Monroe County (Fish and Stewart, 1991).

Due to several factors (including the low and gentle topography, the effects of canals and other water management structures, the effects of pumping, and seasonal variations in rainfall), there is not a distinct line that separates aquifer recharge areas from discharge areas. Areas and canals that are recharge areas at one time (during summer rainstorms or during the winter rainy season) may be discharge areas during other times. Portions of the Everglades in mainland Monroe County, for example, alternate between recharge areas and discharge areas. However, discharge tends to dominate with increasing proximity to Florida Bay, which is a major regional discharge area in Monroe County. At a regional scale, the Keys are within the discharge area, but rainfall on the islands provides some localized and episodic recharge.

Discharge in Monroe County is by: (1) groundwater flow to canals, to seepage areas near the coast, and widespread and direct seepage into marine waters; (2) evapotranspiration; and (3) wells pumped for municipal, domestic, or other supplies (Fish and Stewart, 1991). Groundwater discharge and evapotranspiration are greatest during the wet season when water levels, temperature, and plant growth rates are high (Fish and Stewart, 1991). In the Keys where there are no natural rivers, there is no natural drainage of the Biscayne Aquifer into discernible drainage features such as rivers.

Perennial aquifer recharge areas include the Water Conservation Areas (**Figure 12.3**). In addition, the non-coastal (northern) parts of Everglades National Park and the non-coastal parts of Miami-Dade County contribute recharge to both the Florida City Wellfield and the Surficial Aquifer System under Monroe County.

The quality and quantity of raw water in the Biscayne Aquifer is of paramount importance to regional supply. Aquifer recharge and water storage are the key components of maintaining an abundant water supply. A major difficulty with the raw water supply is not the average annual quantity of available water, but the seasonal variability in available quantity. Approximately 80 percent of South Florida's average annual rainfall occurs during the wet season from May to September. Water supply issues are addressed in Chapter 8.0, Potable Water Element.

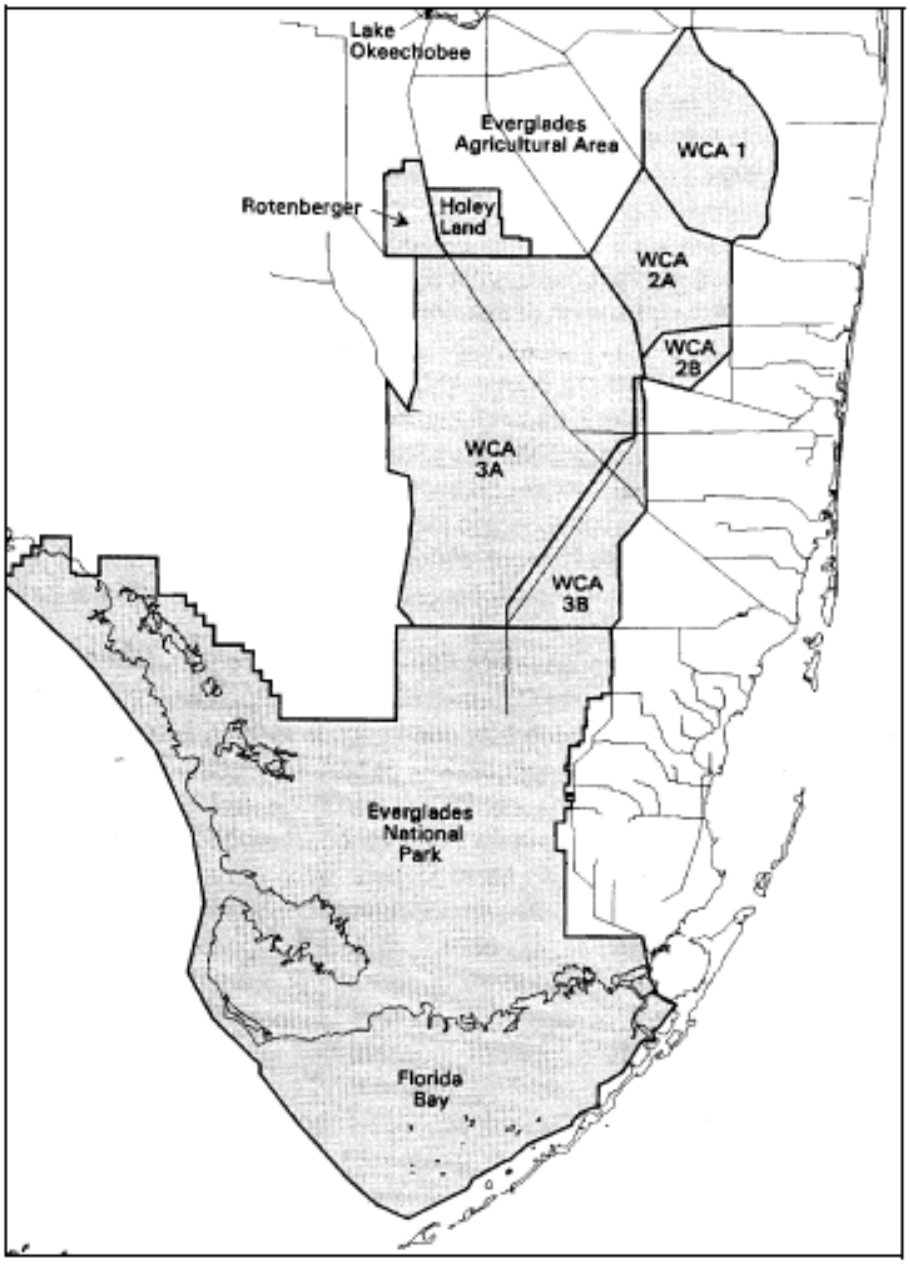


Figure 12.3 - Map of Aquifer Recharge Areas for the Biscayne Aquifer
(excerpted from Lower East Coast Regional Water Supply Plan, Planning Document, prepared by the South Florida Water Management District, May 2000).

Recharge and storage of South Florida's water resources are managed by the SFWMD, an arm of State government, in coordination with the U.S. Army Corps of Engineers. The regional water conveyance canals and water storage system, or Water Conservation Areas, were constructed by the U.S. Army Corps of Engineers with federal funds and are operated and maintained by SFWMD. SFWMD also determines additional management and construction needs for the canal or groundwater system and regulates major water inputs and withdrawals which impact these systems. SFWMD manages and operates its sophisticated network of floodgates, pumping stations, canals, levees, and Water Conservation Areas to maintain the delicate balance between flood and drought throughout the year. Groundwater resources are also proximal to natural areas subject to heightened regulatory protection such as Everglades National Park. Wet seasonal rainfall is captured and stored in Lake Okeechobee and the Water Conservation Areas. Water releases from these sources can be made so that water flows south to Miami-Dade County to aid in maintaining an adequate water supply throughout the year.

The fresh and salt waters of the region come into contact along the coast. When stream flow and water tables are high, sea water is prevented from moving inland; when stream flow and water levels are low, sea water moves up tidal streams and into the aquifer, rendering the groundwater unpotable in coastal areas. The progressive movement of the saltwater interface inland has been halted by the SFWMD, but the saltwater intrusion problem is a constant threat in South Florida, especially in times of drought. It is projected that the region's saltwater intrusion issues will become susceptible to increased risk as South Florida experiences additional sea level rise. For the Biscayne Aquifer, this may result in reduced availability of freshwater for potable use which will be even more exacerbated during periods of drought (Heimlich et al., 2009).

The direct connection between the ground and surface water systems makes the Biscayne Aquifer susceptible to pollution and disruption from urban activities at the land surface. Many contaminants are rapidly diluted in the large volumes of water contained in the aquifer, and the porous limestone acts as a filter. However, high concentration of pollutants can overload and incapacitate the aquifer's natural cleansing action.

Sources of contamination can be divided between point sources and nonpoint sources. A "point source" is defined as any discernible, confined and discrete facility that discharges pollution. Landfills, impoundments, gasoline stations, septic tanks, and cesspits are examples of point sources which can contaminate the groundwater aquifers. Because the aquifer is very permeable, effluent from septic tanks and cesspits moves easily through the drainfield and can migrate off site. Septic tank effluent characteristically contains bacteria including fecal coliform and fecal streptococcus as well as other various virus and chemical pollutants. This could pose public health concerns for those households using well water for consumptive uses such as bathing.

Nonpoint sources are any discernible sources of pollution not associated with point sources. They are more pervasive and less controllable sources of pollution. Stormwater runoff from urban areas is an example of nonpoint pollution which affects both ground and surface water. Typical components of nonpoint source pollution are those contaminants resulting from the application of substances or the weathering of substances associated with urban development. Oils and greases, trace metals, pesticides, herbicides and nutrients can be expected to emanate from urbanized areas. Treatment systems for these pollutants typically consist of holding areas to attenuate runoff. As such, these areas may contribute pollutant loads to the surficial aquifer. It is, nevertheless, believed that the risk to the surficial aquifer is less than the risk to surface waters from direct discharge of runoff.

Several studies have been performed that demonstrate the transmissivity of the substrates of the Florida Keys and the rapid exchange of wastewater from onsite systems or injection wells to surface waters. Kruczynski (1999) summarized this information on water quality of groundwater in the Florida Keys and the following was excerpted from that report.

Lapointe et al. (1990) measured significant nutrient enrichment of groundwater contiguous to onsite disposal systems at several sites. Mean dissolved inorganic nitrogen [987 micromolar (uM)] was 400 times higher and mean soluble reactive phosphorus (9.77 uM) was 70 times higher in groundwater adjacent to a septic tank seepage field compared to a reference site. Concentrations of nitrogen and phosphorus decreased in the groundwater away from the septic tank toward the adjacent canal, presumably due to dilution by groundwater. They also theorized that some of the soluble reactive phosphorus was absorbed by the substrate. Concentrations of nutrients in the canals (dissolved inorganic nitrogen 4.91 uM; soluble reactive phosphate 0.43 uM) were elevated compared to control sites. Concentrations of nutrients in the canals were highest in the summer because of seasonally maximum tidal ranges and increased flushing during the summer wet season (Kruczynski, 1999).

Shinn et al. (1994) placed and sampled 24 wells beneath the Keys, nearshore areas, and outer reefs to determine if sewage effluent from Class V wells is reaching offshore reef areas via underground flow. Class V wells (drilled 90 feet and cased to 60 feet) were permitted by FDEP for disposal of wastewater. Sample wells were located in transects off Ocean Reef Club, Key Largo, and Saddlebunch Keys and were sampled quarterly for one year. Investigators found well water to be consistently hypersaline with a marked increase in ammonia in offshore groundwater. Other forms of nitrogen and phosphorus present in offshore groundwater were only slightly elevated above levels found in surface marine waters. Highest levels of nitrate, nitrite, and phosphorus were found in shallow onshore groundwaters (Kruczynski, 1999).

Nearshore wells were observed to discharge water during falling tides and draw water into the wells during rising tides. This "tidal pumping" results in considerable

water movement in and out of the upper few meters of limestone and is a likely mechanism for mixing and transferring nutrient-rich groundwater into overlying surface waters (Kruczynski, 1999).

Paul et al. (1995) placed a man-made tracer virus in a septic tank and into a 45 foot deep injection well in Key Largo and found the virus in the surface waters of an adjacent canal and the Atlantic Ocean in 11 and 23 hours, respectively. Rates of migration ranged from 1.87 to 79.3 feet/hour (0.57 to 24.2 meters/hour). They concluded that current onsite disposal practices in the Florida Keys can lead to rapid nutrient enrichment and fecal contamination of subsurface and surface marine water in the Keys (Kruczynski, 1999).

Paul et al. (1997) repeated the viral tracer experiment with 40 foot deep injection wells on Key Largo and a permitted 90 foot deep Class V injection well on Long Key. At both sites, viral tracers appeared in the groundwater within 8 hours after injection, and in marine surface waters 10 hours in Key Largo and 53 hours in Long Key (Kruczynski, 1999).

Chanton (1998) completed two extensive surveys and mapped areas of concentrations of natural tracers near the Keys. Groundwater seepage areas were found on both the Florida Bay and Atlantic Ocean sides of the Keys. Two injection studies were completed: one on Key Largo and one on Long Key. In both tests, the tracer was injected into groundwaters and was observed, greatly diluted (approximately one million times) within hours to days in nearby surface waters. At the Long Key site, it was found in a canal located across U.S. 1 from the injection site. Wastewater injected into the groundwater at Long Key rapidly migrated toward the surface due to the fact that freshwater "floats" on the highly saline groundwater (Kruczynski, 1999).

Kump (1998) sampled groundwater in wells drilled to various depths surrounding a wastewater injection well on Long Key. He confirmed the presence of a shallow, low-salinity lens floating on top of the groundwater. Distribution of nutrients away from the site of injection was variable, but phosphate, nitrate, and ammonia concentration appeared to be highest nearest the injection well at a depth of 16 feet. However, the elevated concentrations of these nutrients were observed in sampling wells located in different directions from the point of injection. The absence of phosphate in high pH waters in shallow wells leads to the postulation that phosphate may be removed by adsorption onto the limestone substrate (Kruczynski, 1999).

In October 1996, Kump injected phosphate at the same time that Chanton injected a non-reactive tracer (sulfur hexafloride- SF6) into a Class V injection well (60/90 feet) at Long Key. Within 4 hours there were elevated tracers at the sampling well located between the injection well and the Atlantic Ocean. The peak of both tracers occurred after about 3 hours. After the peak, the ratio of the tracers fell because the concentration of phosphate fell more rapidly than that of SF6. Using data from one

of the sampling wells, it was calculated that the tracer SF6 appeared to be moving vertically at about 23 feet per day. The pattern of early SF6 peaks in some wells that are associated with phosphate peaks, and later SF6 increases with no increase in phosphate concentration at other wells, cannot be ascribed simply to dilution of phosphate by groundwater. The predicted phosphate concentrations based on the assumption of no preferential uptake and the observed tracer concentrations would be well above detection at many of the wells. These observations support the hypothesis that phosphate is being stripped from the groundwater. The rate and long term capacity of substrates in stripping phosphate was unknown (Kruczynski, 1999).

12.6 Floridan Aquifer *[Rule 9J5.011(1)(g), F.A.C.]*

In South Florida, the Floridan Aquifer System is a confined or artisan system. An artisan aquifer is saturated and is bounded at the top and bottom by completely impermeable beds. The water level rises above the top of the confined aquifer in tightly-cased wells which are open only to the artisan aquifer. The Floridan Aquifer System underlies all of Florida and parts of the adjacent states of Georgia and Alabama. In Miami-Dade County it occurs at about 900 feet below sea level (Parker et al., 1955). It consists of a 1,500 foot thick series of artisan water-bearing zones within the Tampa and Suwannee Limestones. The Floridan Aquifer System is confined above by the Hawthorne Group and below by less permeable limestone and dolomite units. In December 1975, the static head in the Floridan aquifer ranged from 38 to 41 feet above mean sea level in Key Largo (Beaven and Meyer, 1978). Wells into the Floridan Aquifer System in the Keys range from 75 gpm (gallons per minute) to more than 1,000 gpm, with 750 gpm being the average. Flow rates depend upon the amount of penetration into aquifer and the types of sediments encountered (Parker et al., 1955).

Although available in significant quantities, Floridan water requires desalinization treatment before it is suitable for either potable or irrigation use. Chloride concentrations in the Floridan Aquifer System range from 1,600 to 20,000 milligrams per liter, with concentrations generally increasing to the south. FKAA has recently been required to construct Floridan Aquifer Production Wells, a Floridan Aquifer Reverse Osmosis Treatment Facility, and a Demineralized Concentrate Disposal Well pursuant to its Water Use Permit. Based on the SFWMD ePermitting database (accessed June 4, 2010) (**Table 12.2**), there are only three consumers in the County that are using enough Floridan Aquifer water to require an individual SFWMD permit: Ocean Reef Community (golf course and landscaping), Silver Shores Mobile Home Park (landscaping), and Card Sound Golf Course (golf course irrigation).

The Floridan Aquifer System is the best source of raw water for large desalinization operations because it has low chloride levels compared to the Biscayne Aquifer in the Keys or compared to seawater. The water in the Floridan Aquifer System has potential as a source of supply for public and industrial purposes after desalinization. Chloride and dissolved solid concentrations are major considerations when

determining the cost effectiveness of a desalinization process (Lapointe and O'Connell, 1989). Water from the upper portion of the Floridan Aquifer System (brackish zone) could provide raw water for treatment at reasonable cost for large-scale municipal and industrial supply. The Floridan Aquifer System does not outcrop or receive direct recharge anywhere in South Florida. Therefore, there is no potential for contamination from surface sources. Concern does exist, however, that large withdrawals from the Floridan Aquifer could cause upwelling or encroachment of saline water which in turn would increase production costs for current and future reverse osmosis/desalinization plants.

As a confined aquifer in South Florida, the Floridan Aquifer System has no natural recharge areas in South Florida. The Floridan Aquifer System is recharged in central and northern Florida, southern Georgia, and small parts of adjoining Alabama and South Carolina. There are no natural recharge areas within the jurisdiction of Monroe County. With no natural recharge in Monroe County, maps of recharge areas are not applicable.

12.7 Regulatory Framework *[Rule 9J5.011(1)(h), F.A.C.]*

The overall intent of federal and State regulation of groundwater aquifers is the protection of public drinking water supplies from contamination. The protection of water table levels and the regulation of aquifer withdrawals are primarily under the domain of the SFWMD, while water quality is regulated by FDEP. These agencies may also be involved in the preservation of freshwater resources in general where they are not used for mass public consumption, but the effective regulation of these resources are carried out mainly at the local government level.

In the Florida Keys, lenses are not recognized as a source of potable water supply and, therefore, are not subject to potable supply regulations.

12.7.1 Federal Regulations

U.S. Public Law 104-182, "Safe Drinking Water Act" was enacted on August 6, 1996, to reauthorize and amend the prior law to continue implementing a nationwide system of monitoring and controlling the quality of water supplied by public water systems. The U.S. Environmental Protection Agency (USEPA) was given authority to administer the Act. In addition, the Act also required USEPA to develop criteria for selecting critical aquifer protection areas. The program calls for state and local governments to map those areas and develop protection plans, subject to USEPA review and approval. Once a plan is approved, USEPA may enter into an agreement with the local government to implement the plan.

The Safe Drinking Water Act provides for the protection of public water system wellfields and aquifers used as the sole source of a community drinking water supply.

Amendments provide for wellfield protection which require states to work with local governments through the planning process to identify and to protect wellhead areas.

USEPA is currently promulgating additional Water Quality Standards for the State of Florida's Lakes and Flowing Waters, 40 CFR Part 131, which regulate discharges that impact surface and groundwater resources.

12.7.2 State Regulations

USEPA generally regulates water quality standards, although water quality standards at the State level are developed by FDEP and adopted by the Environmental Regulatory Commission. FDEP is charged with enforcing the standards, although it may delegate some of its authority to the regional water management district or other governmental units. Other regulatory authority, such as the land use/zoning powers of local government, directly impact water quality, and the SFWMD has established a program to address water resource concerns related to land use and other comprehensive plan issues.

The permitting programs of SFWMD and FDEP achieve their joint goal through different mechanisms. FDEP's statutory authority and regulatory program for protection of the State's water quality addresses discharges into the waters of the State. This program is distinguished from the SFWMD regulatory water use program which addresses withdrawals from surface and ground water sources. The SFWMD program protects the quality of the State's water resources (primarily related to the movement of constituents). Decisions in this program can cause discharge of pollutants into the water resources through the transport of pollutants in "used" water.

FDEP Rules within Chapter 403, F.S., "Florida Safe Drinking Water Act," and Chapter 62-528, Part III, F.A.C., classify and regulate the use of aquifers. The FDEP has also developed increasingly stringent regulatory requirements for facilities which discharge to groundwater under Section 62-528, F.A.C., and for those facilities which inject materials underground through deep well injection. Groundwater quality standards are included in Chapter 62-528, F.A.C., with Florida Keys groundwater generally falling under Class G-III criteria. These criteria set standards for protection of public health in general and the protection of natural systems from toxic substances, but nutrients are not addressed.

The SFWMD consumptive use permitting program regulates quality issues associated with water withdrawals by evaluating the potential for a withdrawal to cause the following:

- saltwater intrusion;
- harm to offsite land uses;
- harm to wetlands or other surface waters;

- pollution of the water resources;
- is otherwise reasonable-beneficial;
- interfere with presently existing legal uses;
- is in accordance with Section 373.2295, F.S. relative to the interdistrict transfer of groundwater and Section 373.223(3), F.S. concerning water transport and use of groundwater or surface water across county boundaries;
- appropriately makes use of reclaimed water;
- is consistent with the public interest;
- is in accordance with established minimum flows and levels; and
- will not withdraw water reserved under Chapter 40E-10, F.A.C.

The SFWMD also requires well plugging pursuant to Chapter 373.207, F.S., to prevent the movement of saline water into freshwater aquifers.

The SFWMD uses FDEP's water quality standards and water body classifications to determine the water quality status of aquifer and surface waters. The SFWMD will recommend to FDEP new standards (including site-specific alternative criteria) or classifications as necessary to protect the water resources of the state.

In the development of Surface Water Improvement and Management plans, water supply plans for specific geographic subregions, and other planning documents, the SFWMD may identify areas and water bodies for which additional protection is necessary. The development of such water quality guidelines or caps will be done in coordination with FDEP. The SFWMD will continue to develop or support initiatives such as the wellfield protection programs to assist local governments in linking water quality with land use decisions. The SFWMD Surface Water Improvement and Management process will identify, recommend and implement solutions for water quality problems within specific priority water bodies.

The SFWMD may allow movement of lower quality water into a higher quality aquifer to occur only in limited, defined circumstances when the use is necessary for maximum reasonable-beneficial use and is consistent with the FDEP ground water classification. To achieve water quality protection and enhancement in these situations, it is recommended that the regional water supply plans establish boundaries and recommend water quality-caps beyond which a use may not degrade an aquifer, as consistent with state water quality standards.

As a corollary, the SFWMD regional water supply plans may establish areas of water quality which, on a local or regional level, may have already exceeded the recommended limits. In these instances, the SFWMD may apply regulatory means of enhancing water quality, to the extent possible, to meet the specified water quality requirements of the defined area. However, SFWMD caps will not allow degradation of a source to a point which exceeds the FDEP classification for the water body. The SFWMD will encourage linkage of the proposed groundwater boundaries and caps with local government land use decisions similar to wellfield protection ordinances

with the intent that local governments make land use decisions based on potential aquifer development as consistent with the water quality protection and enhancement goal.

12.7.3 Local Regulations

At the present time, the County has no special regulatory programs related to protection of natural groundwater aquifer recharge areas, nor has there been any comprehensive identification of these areas. While Chapter 380, F.S., does express concern for preservation of freshwater wetlands for wildlife, the only specific regulation directly affecting groundwater is the prohibition of well excavation in "high quality pineland" areas. Existing local regulations presently affecting ground water pollution sources are mainly limited to those addressing stormwater runoff.

12.7.4 Wellfield Protection

In 1983, FDEP began developing a wellhead protection program to prevent contamination of public water supplies. The program, known as the G1-Rule, is based on groundwater quality, a five-year travel time contour, and a calculated radius of protection. Since its adoption, the G1-Rule has been challenged in court and as a consequence has not been successfully implemented. However, FDEP encourages and supports local governments to take the lead in protecting their drinking water supplies and is assisting the Florida Department of Community Affairs with related comprehensive planning.

For Miami-Dade County, wellfield protection planning began in the late 1970s. The Wellfield Protection Program is based on the need to protect the drinking water resources from potential contamination and the delineation of prohibitive or protection zones. Various wellfield protection zones are identified based on modeled contaminant travel time and drawdown. Specific wellfield protection rules are located in Chapter 24-12.1 of the Code of Miami-Dade County.

The FKAA wellfield is located just west of Florida City and consists of 10 operational wells. Each well extends into the Biscayne Aquifer, which serves as the primary raw water source. Raw water quality at the FKAA wellfield has historically been acceptable for potable water supply. Water quality data included in the permit modification application indicated that the water is hard and low in turbidity, color and iron. Review of the data for the 2008 application (SFWMD Water Use Permit No. Re-issue 13-00005-W, March 2008) indicated that water quality had changed little if any as a result of current withdrawals. No percolation ponds, hazardous or toxic waste disposal sites, sewer mains, saline water bodies or wastewater treatment facilities are located within a 1 mile radius of the wellfield. The *Wellfield Protection Program* (CH2MHill, 2010) identifies potential contamination sources. The FKAA wellfield is currently protected by the Miami-Dade County Wellfield Protection

Ordinance which is administered by the Department of Environmental and Resource Management.

A condition of the permit requires FKAA to monitor and submit data from the Salt Water Intrusion Monitoring program to the SFWMD on a monthly basis. In accordance with an additional condition of the permit FKAA is implementing a Saline Water Intrusion Monitoring program which utilizes monitoring wells to measure any movement of the saline water interface. An example of the SFWMD criteria to prevent saltwater intrusion is that 1 foot head of fresh water be maintained between the wellfield and the saline water source. Saltwater intrusion usually results from a sustained decrease in fresh water head, allowing saltwater to migrate inland. Results of groundwater modeling indicate that drawdowns associated with increased withdrawals are minimal. The FKAA in cooperation with the United States Geologic Survey (USGS) maintains a water quality monitoring network around the wellfield that is sampled monthly. The network includes 19 monitoring wells, 2 of which have continuous water level recorders. The *Wellfield Protection Program* (CH2MHill, 2010) identifies the well locations and provides analytical data. From the data included in the 2008 Application for Water Use Permit Modification Renewal, it was concluded that in 2008 the 1,000 milligrams per liter isochlor is estimated to be six miles southeast of the well field in approximately the same location reported in 1974.

12.7.5 Freshwater Lens Resources

The freshwater lens systems of the Florida Keys are considered to be critical to the support of the existing wildlife and plant communities in these areas. There is a need for continued efforts towards monitoring their condition, including size and water quality. Protection of the lens systems should be accomplished through regulation of withdrawals and of land use in recharge and wetland areas. Of particular concern are: freshwater withdrawals for private consumptive uses, loss of recharge areas to impervious surface coverage, contamination of groundwater from surface sources, and salt water intrusion due to sea level rise.

It has been demonstrated that the freshwater lens on Big Pine Key has suffered some reduction from its former size. While droughts and sea level rise may be contributors to this phenomenon, it cannot be disputed that freshwater withdrawals have their effect on the lens. New dredge and fill projects are largely prohibited in the Keys both by State and local governments. Further increases in private consumptive withdrawals should not be permitted and alternative water sources are needed.

The current Stormwater Management Ordinance does address the need to handle stormwater on site, but it does not stress the need to retain natural drainage features and reduce impervious surfaces. Standards are needed to ensure impervious surfaces do not reduce the quantity or quality of aquifer recharge to the point where the natural resources are significantly degraded. Incentives could be provided to reduce existing impervious areas. Specialized requirements or incentives may be

appropriate in areas that serve as aquifer recharge areas for freshwater lenses. Acquisition of important recharge areas may also be an option for preservation.

The County already implements some regulations that serve the purpose of protecting the freshwater lens recharge areas. Mining can pose a threat to recharge areas. Therefore, the County prohibits any resource extraction activity that would cause the introduction of saline aquifer waters into fresh water aquifers.

In addition, a habitat analysis is required for any proposed development in slash pinelands or tropical hardwood hammock. Since pineland habitat is an indicator of freshwater lens recharge areas, the County now requires a relatively high open space ratio in these areas.

The County also requires on-site retention of stormwater, which helps the fresh water filter into the ground and eventually into the freshwater lenses, instead of draining to lower ground where it would more likely evaporate or drain into the ocean.

12.7.6 Water Conservation

The Water Resources Act of 1972 formally designated the conservation of water as a key policy of the state and mandated that state and regional water resource agencies take steps to prohibit wasteful and unreasonable uses of the state's water supply. For South Florida, the adoption of the act also thrust the SFWMD into a lead role in water supply planning and regulation.

Water conservation is a high priority in SFWMD policy and rules as well as FDEP rules, in keeping with the statutory mandate. Implementation of demand management programs will be both passive (public information) and active (irrigation using micro-irrigation systems, use of reclaimed water, leak detection, water conservation rate structures, model landscape codes, use of rain sensors, ultra low flow plumbing structures in new construction, etc).

As part of its efforts to conserve freshwater resources in areas of high demand, the SFWMD will continue to analyze and support the development of alternative water sources such as use of Floridan Aquifer withdrawals, reverse osmosis, and use of reclaimed water. Also, as noted below, the SFWMD will continue to investigate and support other supply augmentation alternatives. The development of other supply sources, however, does not lessen the requirements for conservation and efficient water uses. As discussed below, inefficient or wasteful uses of water are not considered reasonable or beneficial under Florida law.

A related concept found in Florida's water use policy is the use of the lowest quality water available and appropriate for a specific use. This policy, for example, encourages the replacement of high quality ground water with treated wastewater for

irrigation purposes if a feasible source is available. The effect of this policy is to optimize the utilization of available resources by requiring diversification of sources. The SFWMD identifies areas that have or will experience water supply problems in the next 20 years. During the past decade, the use of potable water for lawn and landscape irrigation has drawn extensive attention, culminating in new year-round water conservation rules, and has been the focus of numerous conservation campaigns. These efforts have included water shortage awareness campaigns and Florida-Friendly (low-irrigation landscaping) programs.

Some water conservation measures are identified in the County Code of Ordinances. Examples include restrictions on landscape irrigation during certain times of the day when evaporative losses are high, unnecessary watering of impervious areas, and rain sensors on irrigation systems - new installations of automatic irrigation systems must be equipped with a water sensing device that will automatically discontinue irrigation during periods of rainfall (Code of Ordinances, Chapter 12, Article IV, Section 12-82). There are also potable water conservation standards, including the requirement for installation of toilets with a maximum flush of 3.5 gallons, showerheads and faucets with a maximum flow rate as specified in the Florida Building Code; and independent water systems are encouraged whenever permitted (Code of Ordinances, Chapter 12, Article III, Section 114-46). Additional water conservation measures may be applicable, including incentives for water conservation features installed on remodeling work that does not otherwise require upgrades to meet current codes.

Bibliography

Beaven, T. R. and F.W. Meyer, 1978. Record of Wells in the Floridan Aquifer in Dade and Monroe Counties. U.S. Geological Survey.

CH2MHill, 2010. Wellfield Protection Program. Prepared by CH2MHill for the Florida Keys Aqueduct Authority, February 2010.

Chanton, J., 1998. Use of natural and artificial tracers to detect subsurface flow of contaminated groundwater in the Florida Keys National Marine Sanctuary. Final Report submitted to the Water Quality Protection Program, 52 pp.

Fish, J.E. and M. Stewart, 1991. Hydrogeology of the Surficial Aquifer System Dade County, Florida. U.S. Geological Survey, Water-Resources Investigations Report 90-4108.

Halley, R.B., H.L. Vacher, and E.A. Shinn, 1997. Geology and Hydrogeology of the Florida Keys. *Geology and Hydrology of Carbonate Islands - Developments in Sedimentology, v. 54*, edited by H. L. Vacher and T. Quinn. http://sofia.usgs.gov/ publications/papers /keys_geohydro/index.html.

Hanson, C.E., 1980. Water Resources of Big Pine Key, Florida. U.S. Geological Survey Open-file Report 80-447, 36 pp.

Heimlich, B.N., F. Bloetscher, D.E. Meeroff and J. Murley, 2009, *Southeast Florida's Resilient Water Resources: Adaptation to Sea Level Rise and Other Climate Change Impacts,* Florida Atlantic University.

Hoffmeister, J.E. and H.G. Multer, 1964. Pleistocene limestones of the Florida Keys. In: R.N. Ginsburg (Editor), Geol. Soc. Am. Annu. Meet. Field Trip Guideb., Field Trip 1, pp. 57-61.

Klein, H., 1970. Preliminary evaluation of availability of potable water on Elliot Key, Dade County, Florida. U.S. Geol. Surv. Open File Rep. 70010, 15 pp.

Kruczynski, W.L., 1999. Water Quality Concerns in the Florida Keys: Sources, Effects, and Solutions. U.S. Environmental Protection Agency, Florida Keys National Marine Sanctuary, Water Quality Protection Program, September 1999. 68 pp. http://floridakeys.noaa.gov/ research_monitoring/ wqpp_white_paper.pdf

Kump, L. 1998. Wastewater nutrients in groundwaters of the Florida Keys: Contrasting behaviors of phosphorus and nitrogen. Final Report submitted to the Water Quality Protection Program, 56 pp.

Langevin, C.D., M.T. Stewart, and C.M. Beaudoin, 1998. Effects of Sea Water Canals on Fresh Water Resources: An Example from Big Pine Key, Florida. Ground Water, Vol. 36, Issue 3 (May-June), pages 503-513.

Lapointe, B.E. and J.D. O'Connell, 1989. Effects of On-Site Sewage Disposal Systems on Nutrient Relations of Groundwaters and Nearshore Surface Waters of the Florida Keys. Harbor Branch Oceanographic Institution, Inc., Big Pine Key, Florida.

Lapointe, B.E., J.D. O'Connell, and G. Garrett, 1990. Nutrient couplings between on-site sewage disposal systems, groundwaters, and nearshore surface waters of the Florida Keys. Biogeochemistry 10:2289-307.

Meadows, D.G., J.P. Caballero, S.E. Kruse and H.L. Vacher, 2004. Variation of Salinity in Brackish-Water Lenses of Two Florida Keys. Published by Coastal Education & Research Foundation, Inc. *Journal of Coastal Research*, Vol. 20, No. 2 (Spring, 2004), pp. 386-400.

Miller, J.A., 1990. Ground Water Atlas of the United States - Alabama, Florida, Georgia, and South Carolina. U.S. Geological Survey, HA 730-G. http://pubs.usgs.gov/ha/ha730/ch_g/

Parker, G.G. et al., 1955. Water Resources of S.E. Florida, with Special References to the Geology and Groundwater of the Miami Area. U.S. Geological Survey.

Paul, J.P., J.B. Rose, J. Brown, E.A. Shinn, S. Miller and S.R. Farrah, 1995. Viral tracer studies indicate contamination of marine waters by sewage disposal practices in Key Largo, Florida. Appl. Environ. Microbiol. 61:2230-2234.

Paul, J.P., J.B. Rose, S.C. Jiang, X. Zhou, P. Cochran, C. Kellogg, J. Kang, D. Griffin, S. Farrah, and J. Lukasik, 1997. Evidence for groundwater and surface marine water contamination by waste disposal wells in the Florida Keys. Water Research 31:1448-1454.

Ross, M.S., J.J. O'Brien, and L. Sternberg, 1994. Sea Level Rise and the Reduction in Pine Forest in the Florida Keys. Ecological Applications 4(1): 144-156.

Shinn, E.A., R.S. Reese, and C.D. Reich, 1994. Fate and pathways of injection well effluent in the Florida Keys. U.S. Geological Survey Open File Report 94-276, 116 pp.

Stewart, N.T., M.J. Wightman and K.M. Beaudoin, 1989. The freshwater lenses of Big Pine Key. In: Freshwater and surface water resources of Big Pine Key, Monroe County, Florida, M.L.U.S., Environmental Protection Agency. Part 143 - National Secondary Drinking Water Standards, 40 CFR 143, 44FR 42198.

USFWS, 2009. Lower Florida Keys National Wildlife Refuges Comprehensive Conservation Plan. U.S. Department of the Interior, Fish and Wildlife Service, Southeast Region.

CHAPTER 12.0 – NATURAL GROUNDWATER AQUIFER RECHARGE ELEMENT

Commenter: Kevin G. Wilson, P.E. - Engineering & Project Management Dept. Comments Received: 8/17/2010		
Location	**Comment**	**K&S Response**
Sec 12.7.5 (Freshwater Lens Resources) page 23	Do we wish to provide incentives in the revised ordinance to eliminate existing impervious area? Should the requirements (or incentives) be different in areas with fresh water lenses like BPK?	Agree, revised in Section 12.7.5 paragraph 3.
Sec 12.7.6 (Water Conservation) page 24	Do MCC require use of rain sensors on irrigation systems? Does require low flow supply fixtures (e.g., showerheads, or toilets)? Incentives for remodels not requiring upgrades to new codes?	Agree, added to the end of Section 12.7.6.
Commenter: FKAA (Jolynn Reynolds) Comments Received: 10/25/2010:		
Location	**Comment**	**K&S Response**
Section 12.4 Freshwater Lenses (page 4)	The FKAA only requires wells to be abandoned only in areas that SFWMD provided grant funding after Hurricane George	This sentence was unnecessary and was deleted.
Section 12.7.4 Wellfield Protection (page 22)	Refer to Exhibit 3.4 in the FKAA Wellfield Protection Program for potential contamination sources; refer to section 3.5 for the SWIM well monitoring network; there are 15 monitoring wells, only two of those wells have continuous water level monitoring and no more canals are part of the FKAA's monitoring network	Added references to the Wellfield Protection Program which identifies potential contamination sources, and saltwater intrusion monitoring well locations and data. Updated the info on the FKAA monitoring network.
Commenter: FKAA (Julie Cheon) Comments Received: 6/11/2011		
Location	**Comment**	**K&S Response**
Natural Groundwater Aquifer Recharge Element, page 22	Suggested change: The network includes ~~15~~ 19 monitoring wells, 2 of which have continuous water level recorders. The *Wellfield Protection Program* (CH2MHill, 2010) identifies the well locations and provides analytical data.	Revised number of wells as suggested.

RECREATION AND OPEN SPACE

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13.0 RECREATION AND OPEN SPACE ELEMENT
[RULE 9J-5.005(2)]

The Recreation and Open Space Element of the Monroe County (County) Comprehensive Plan addresses the data inventory requirements of 9J-5.005(2) of the Florida Administration Code (F.A.C.). The data inventory requirements will support the development of goals, objectives, policies, and implementation programs for the Recreation and Open Space Element.

The Recreation and Open Space Element is designed to meet the requirements of Florida's Local Government Comprehensive Planning and Land Development Regulation Act (Chapter 163, Florida Statutes).

The purpose of this *Recreation and Open Space Element* is to plan for a system of recreational areas, parks, and facilities, both privately-owned and publicly-owned which are accessible to permanent residents and the significant tourist population for the County.

13.1 Introduction

Monroe County possesses an abundance of recreational and open space resources that are enjoyed by the permanent residents and visitors to this unique area. The County is a desirable place for people to live and for tourists from all over the world to visit due to its subtropical climate, natural beauty, and numerous water and conservation oriented recreational facilities.

The County, its unique environments, and the presence of bountiful off-shore waters provide the full spectrum of recreational facilities which include:

- national, state, county, and municipal parks;
- refuges and rookeries;
- preserves and sanctuaries;
- botanical sites;
- historic, geological, and archeological sites; and,
- conservation lands and natural areas.

All of the conservation and recreation lands and waters of the County provide a full range of active and passive activities available to permanent residents and seasonal visitors alike. However, due to the natural characteristics of this subtropical chain of islands (keys), with large bodies of waters on both sides of a central roadway connecting the islands, the focus of the majority of these recreational opportunities are and will continue to be water-dependent and water-related uses.

The County, along with other governmental agencies and the public in general, shares the responsibility of providing recreational opportunities and protecting open space resources and the natural and unique environment of the Florida Keys region. Further, the provision of

providing recreation and conservation lands and facilities in the County serves two primary purposes: 1) to conserve valuable natural and cultural resources that might otherwise be destroyed; and 2) to provide a reasonable balance of passive and active recreational opportunities for permanent residents and visitors. These two purposes are equally important in supporting the recreation-related tourism which plays such an important role in the economy but also for the enjoyment of the resident population of the County.

The County has five incorporated cities which range in size of permanent and seasonal population from a few hundred to the City of Key West at about 41,000. Recreational and open space lands and facilities are distributed within all of the city boundaries as well as the unincorporated areas of the County. A park or recreation site that contains recreational facilities may be located in a city and may be owned by that city, Monroe County, a private entity, or even the Federal government or the state of Florida. Facilities within that recreation site, such as a baseball field or a swimming pool, may service a population that extends beyond the city's boundaries. In like manner, the Monroe County School District (MCSD) schools serve populations beyond the city boundaries as well as the unincorporated County as a whole. Therefore, for the purposes of this update, city recreational lands and facilities as well as the MCSD lands and facilities have been included.

The County has divided only the unincorporated county into "Planning Areas" (PA); however, since the Recreational and Open Space Element update includes the incorporated cities, different boundaries are needed to be set for all the land areas. For purposes of this inventory and discussion, they will be designated as "Recreation and Open Space Planning Areas" or ROSPA; there are four ROSPA areas which utilize the mile markers along U. S. 1 as the dividing lines. The linear geography of the Keys portion of the County lends itself to these clearly defined areas which are marked along U.S. 1 by mile marker (MM) signs. Most of the permanent resident population and seasonal population utilize these markers for locating sites.

The four designated areas are the Mainland ROSPA (MROSPA), the Upper Keys ROSPA (UKROSPA), the Middle Keys ROSPA (MKROSPA), and the Lower Keys ROSPA (LKROSPA). The MROSPA encompasses the south and southwest tip of Florida. Although the MROSPA is connected to the keys portion of the County by roads, these roads actually travel through Dade County, Florida. The northernmost limit of the UKROSPA is MM 112 which is the southern limit of Dade County. The UKROSPA continues southeast and then south to MM 73 and includes a portion of the keys on Key Largo along SR 905 to Ocean Reef. The UKROSPA contains the incorporated city of the Village of Islamorada. The MKROSPA extends west-southwest from MM 73 to MM 38.5 which is the south end of the Seven Mile Bridge. The MKROSPA contains the incorporated cities of Layton, Key Colony Beach and Marathon. The LKROSPA extends west from MM 38.5 to MM 0 and includes the non-land linked keys of the Dry Tortugas, the Sand Keys, and the Marquesas Keys. Key West, the County seat and the largest city, is included in the LKROSPA.

13.2 Inventory of Existing Conservation and Recreation Lands and Facilities

Unlike any other County in Florida, over 90 percent of the land area in the County is and will continue to be dedicated to conservation and recreation lands. The Mainland Planning Area lands, for example, are entirely part of the Federal Government's Everglades National Park and the Big Cypress National Preserve. There is 4.07 million acres of publicly-owned conservation and recreation lands and waters provided in the County. The mainland portion of the County accounts for 1.63 million acres of this total. The vast majority of these areas are conservation lands which provide, activity-based, water-dependent and water-related recreation opportunities. In addition to these publicly provided lands and waters, many County businesses provide recreational activity-based facilities which are available to the functional population (which includes both the permanent and seasonal populations) of the County.

Conservation and recreation lands in the County can generally be differentiated based on the purposes for which they were acquired or established and management priorities between natural resource protection and the provision for recreational opportunities. These defined distinctions follow the State of Florida, Statewide Comprehensive Outdoor Recreation Plan (SCORP) as outlined in the *Outdoor Recreation in Florida 2008* and are as follows:

- **Conservation lands** include lands that have been acquired by either public agencies or private organizations for the purposes of protecting significant natural resources, historic or archeological resources, and plant and wildlife habitats. Although these lands may include recreational facilities that provide passive or active recreational opportunities, these recreational facilities and activities are generally limited in scope, tied to compatibility with the resource, and are enhanced by the protection of that natural resource. In all cases, the recreational uses and facilities are of secondary importance to the preservation of the natural resource.

- Due to the unique and sensitive natural resources in the County, these conservation lands typically include large amounts of terrestrial and submerged lands ranging in size from several hundred to almost one million acres of total acreage per site. Florida Statutes 161 and 9J5 do not distinguish between conservation lands and conservation waters. The provision of conservation lands, especially in the County, is to consider largely the responsibility of the State and Federal governments, due to their broad natural resource commitments and preservation powers, and large-scale land management requirements (Florida DNP, 1991 and ORF 2008).

- **Recreation lands** include publicly and privately-owned lands which provide opportunities for active and passive recreational pursuits. Recreation lands generally focus on user needs, rather than the resource protection of the conservation lands, and as such are typically smaller and more densely developed than conservation lands and provide a broader range of recreational activities and facilities. Recreation lands are typically classified by the *Outdoor Recreation in Florida 2008* as being either "resource-

based" or "activity-based." Resource-based recreation lands and facilities focus around a significant natural or preserved resource and include appropriate recreation activities which occur in a particular natural setting of that resource. Activity-based (or user-based) recreation lands or facilities are not dependent upon a specific resource and are typically developed with recreation and support facilities which can be provided almost anywhere for the convenience of the user. According to *Outdoor Recreation in Florida 2008*, the responsibility for the provision of activity-based recreation areas and facilities is largely the responsibility of the local government.

It should be noted that there are inherent potential conflicts in providing recreational activities in close proximity to sensitive natural resources, preserves, archeological sites, wildlife habitats, and other significant resources, especially in the County. These conflicts are generally resolved through management plans to protect the natural resource, which either limit the scope of recreational activities in or adjacent to the resource or prohibit public access to these lands altogether.

13.2.1 Inventory of Conservation Lands and Facilities

13.2.1.1 Publicly-Owned Conservation Lands and Facilities

13.2.1.1.1 Federally-Owned Conservation Lands and Facilities

The vast majority of the 4.07 million acres of conservation and recreation lands or waters in the County are under the Federal jurisdiction (**Table 13.1**). These are mainly large, resource-based conservation areas that include environmentally significant marine, wetland and/or terrestrial habitats. These areas function to protect and preserve resources and habitats that might otherwise be destroyed and provide both passive and active recreational and environmental education opportunities for permanent residents of and visitors to the region of South Florida and the Florida Keys. The federally-owned conservation lands for the County are listed in **Table 13.1** and are more fully described in the *Conservation and Coastal Management Element*.

13.2.1.1.2 State of Florida - Owned Conservation Lands and Facilities

The State of Florida owns approximately 102,000acres of lands and waters in the County and its surrounding waters of the Atlantic Ocean and the Florida Bay as shown in **Table 13.2**. The State of Florida administers these facilities which include large areas of significant marine or terrestrial habitats. These facilities also often contain limited resource-based recreational opportunities such as nature trails, overlooks, camping, fishing, and boating. The State of Florida also owns and maintains smaller recreational sites throughout the Keys. Most of these sites are water-dependent recreation sites and facilities such as beaches, boat ramps, old bridges, catwalks, and docks (see **Table 13.6**). State-owned conservation lands are listed in **Table 13.2** and are more fully described in the *Conservation and Coastal Management Element*.

13.2.1.1.3 Monroe County-Owned Conservation Lands and Facilities

County-owned conservation lands have been acquired over the years through land purchases by the Monroe County Land Authority (MCLA), land purchases by the Board of County Commissioners (BOCC), and the dedication of ROGO lots to the BOCC. These properties are located throughout the Keys, are undeveloped, and generally have parcel sizes of one acre or less. In many cases they are near or adjacent to larger conservation properties owned by the state or federal government. Many of the properties originally acquired by MCLA and the BOCC have been conveyed to the State or federal government. As of September 30, 2010, the inventory of conservation lands titled in either MCLA or the BOCC totaled approximately 1,400 acres.

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Table 13.1 - Inventory of Federally-Owned Conservation Lands

Name	Location	Mile Marker	Planning Area	Total (Acres)	Upland (Acres)	Submerged* (Acres)	Facilities
National Park Service							
Everglades National Park	Mainland	NA	Mainland	1,500,000	800,000	700,000	Visitor Centers / Information Area, Interpretive Center, Canoe & Hiking Trails, Trailer & Camp Sites, Beach, 3 Boat Ramps
Big Cypress National Preserve (1)	Mainland	NA	Mainland	126,362	126,362	NA	Hunting, Hiking Trails
Fort Jefferson National Preservation; Dry Tortugas National Park (2)	Dry Tortugas	Offshore	Lower Keys	64,761	104	64,657	10 Tent Sites, 10 Picnic Tables, Museum, Interpretive Building, Hiking Trail, Beach, Swimming, Fishing, Coral Reefs, Snorkeling
U.S. Fish and Wildlife Service							
Crocodile Lake National Wildlife Refuge (3)	North Key Largo	SR 905	Upper Keys	6,800	6,150	650	Breeding & Nesting Habitats, American Crocodiles, Other Wildlife

Table 13.1 - Inventory of Federally-Owned Conservation Lands (continued)

Name	Location	Mile Marker	Planning Area	Total (Acres)	Upland (Acres)	Submerged* (Acres)	Facilities
Great White Heron National Wildlife Refuge (4) (5)	Big Pine Key to Key West	20	Lower Keys	7,600	7,500	100	Beach, Great White Heron & other Birds' Habitat, Fishing
National Key Deer Wildlife Refuge (5)	Big Pine to Sugarloaf	15 to 30	Lower Keys	9,200	9,100	100	Nature Trail, Visitor's Center
Key West National Wildlife Refuge	Key West	Offshore	Lower Keys	2,019	2,019	NA	Mangrove Habitat, Nesting Birds
National Oceanic and Atmospheric Administration							
Florida Keys National Marine Sanctuary	Offshore Florida Keys	Offshore	Lower Keys	2,351,403	73,650	2,377,753	Fishing, Diving, Snorkeling, Coral Reefs
Total				4,068,145	1,024,885	3,143,260	

NA = Not available

* Area approximately below the mean high water line

(1) Approximately 74.75 additional acres of privately owned lands are within the boundary of Big Cypress National Preserve.

(2) Approximately 3.220 additional acres of submerged lands owned by the State of Florida are within the boundary of Fort Jefferson National Monument.

(3) An additional 1.713 acres of privately owned lands within the boundary of Crocodile Lake National Wildlife Refuge are planned for future acquisition.

(4) The total acreage includes 1,200 acres under perpetual lease from the State of Florida since 1936.

(5) Approximately 100 acres within National Key Deer Wildlife Refuge and Great White Heron National Wildlife Refuge are submerged lands.

(6) Approximately 3,400 additional acres of privately owned lands are intended to be acquired for the National Key Deer Refuge.

Table 13.2 - Inventory of State of Florida-Owned Conservation Lands

Name	Location	Mile Marker	Planning Area	Total	Upland (in Acres)	Submerged*	Facilities
State Parks and Recreation Facilities							
John Pennekamp Coral Reef State Park	Key Largo	102.5	Upper Keys	61,072.2	7,388.1	53,684.1	47 RV/Trailer sites, marina, dumping station, 122 tables, 21 shelters, 2 beaches, boat ramp, visitors center, trails, concessions, restrooms
Long Key State Park	Long Key	67.5	Middle Keys	966.0	849.0	117.0	30 RV/Trailer Sites, 30 tent sites, 6 shelters, Fishing, Interpretive/Nature trails, canoe trails & rentals, observation tower, picnic, restrooms
Curry Hammock State Park	Marathon	56	Middle Keys	970.0	970.0	NA	Beach, Basketball, Trails, Camping, Bicycling, Restrooms, Play Equipment, Picnic Tables
Bahia Honda State Park	Bahia Honda	37	Lower Keys	325.0	325.0	0.0	48 RV/Trailer Sites, 32 Tent Sites, 6 Cabins, 142 Tables, 12 Shelters, Trails, Beach, Boat Ramp, 2 Marinas, Fishing, Picnic, Dockage
State Botanical, Geological and Historic Sites							
Dagny Johnson Key Largo Hammock Botanical State Park (2)	N. Key Largo	106.5	Upper Keys	6,588.0	6,563.1	24.9	Trails, ADA accessible, protected plants & animals, bicycling, picnic

Table 13.2 - Inventory of State of Florida-Owned Conservation Lands (continued)

Name	Location	Mile Marker	Planning Area	Total	Upland (in Acres)	Submerged*	Facilities
Lignumvitae Key Botanical State Park	Lignumvitae Key	78	Middle Keys	587.0	486.0	101.0	Historic/Archeological Structures, Interpretative / Nature Trail, Docking, Fishing
Windley Key Fossil Reef Geological State Park	Windley Key	85.5	Upper Keys	29.0	28.5	0.5	Nature trails, native plants, coral reefs, picnic
Ft. Zachary Taylor Historic State Park	City of Key West	0	Lower Keys	54.0	54.0	0.0	Guided tours, trails, fishing, snorkeling, restrooms, picnic, bicycling
Indian Key Historic State Park	Indian Key	78	Middle Keys	115.0	17.0	98.0	Interpretive/Nature trails, boat ramp, docking, beach, Wrecker's Village ruins, ferry service, picnic
State Aquatic Preserves							
Lignumvitae Key Aquatic Preserve	Lignumvitae Key (off shore)	78	Middle Keys	7,000.0	0.0	7,000.0	Boating, snorkeling, fishing, wildlife, observation
Biscayne Bay-Card Sound State Aquatic Preserve	Ocean Reef (offshore)	SR 905	Upper Keys	7,080.0	0.0	7,080.0	Boating, canoeing, fishing, swimming, snorkeling
San Pedro Underwater Archeological Preserve (Aquatic Preserve)	Offshore Indian Key	77.5	Middle Keys	650.0	0.0	650.0	Historic/Archeological ship wreck, dive site, mooring buoys, snorkeling, glass bottom boat, tours

Table 13.2 - Inventory of State of Florida-Owned Conservation Lands (continued)

Name	Location	Mile Marker	Planning Area	Total	Upland (in Acres)	Submerged*	Facilities
Ft. Jefferson National Preservation (1)	Dry Tortugas	Offshore	Lower Keys	3,220.0	0.0	3,220.0	snorkeling, fishing, canoe trails
Coupon Bight State Aquatic Preserve	Big Pine Key	30	Lower Keys	6,000.0	0.0	6,000.0	Boating, snorkeling, fishing, observation, beach
Other State Acquisitions							
Coupon Bight/Key Deer/CARL Project (3)	Big Pine Key	30	Lower Keys	1,769.0	1,769.0	0.0	To be incorporated into Coupon Bight Aquatic Preserve and National Key Deer Wildlife Refuge
Florida Keys Ecosystem (4)	Key Largo to Boca Chica	NA	Upper, Middle, & Lower Keys	5,610.0	5,610.0	0.0	Preservation
Total				102,035.2	24,059.7	77,975.5	

* Area approximately below the mean height water line

(1) Leased to the State of Florida by the National Park Service. This is in addition to the federal acreage shown.

(2) An additional 651 ac. yet to be acquired.

(3) An additional 1,061ac. yet to be acquired.

(4) An additional 6,253ac. yet to be acquired.

Sources: Florida Department of Natural Resources: Div. of Recreation and Park, Properties Under the Jurisdiction of the Division, July 1, 1991 and Div. of State Lands, Aquatic Preserves Status Report, November 1989 National Audubon Society, South Florida Water Management District.

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13.2.1.2 Privately-Owned Conservation Lands and Facilities

The Florida Keys Land and Sea Trust (FKLST) and The Nature Conservancy (TNC) are the two private, non-profit organizations involved in the acquisition and maintenance of environmentally-sensitive lands in the County. Conservation lands, of approximately 377 acres, are currently owned by these organizations and **Table 13.3** summarizes these lands and facilities. In addition to these two organizations, other private organizations may own small parcels of land in the County for conservation purposes. However, an inventory of these other private organization's lands is not included in this Element.

Table 13.3 - Inventory of Privately-Owned Conservation Lands

Name	Location	Mile Marker	Planning Area	Size Acres (1)	Facilities	Ownership/ Management
Florida Keys Land and Sea Trust						
Crane Point Hammock	Marathon	50.5	Middle Keys	64.0	Hiking trails, 2 museums, historic sites	Owned and managed by FKL&ST
Spoonbill Sound Hammocks	Cudjoe Key	22.0	Lower Keys	26.0	Fishing, Canoeing, Hammock Preserve	Owned and managed by FKL&ST
Ocean Reef Club Parcel Sunrise Cay Park-Hammock Golf Course	North Key Largo	SR 905	Upper Keys	4.0	Private preserve in the Ocean Reef Club-Golf Course	Owned by FKL&ST
Subtotal				94.0		
The Nature Conservancy						
Lower Matecumbe Hammock Site	Lower Matecumbe Key	74.0	Middle Keys	26.0	Hammock Preserve	Owned and managed by TNC
Cross Keys Mangroves, Terrestris	Big Pine Key	30.0	Lower Keys	123.0	Hammock Preserve	Owned and managed by TNC

Table 13.3 - Inventory of Privately-Owned Conservation Lands (continued)

Name	Location	Mile Marker	Planning Area	Size Acres (1)	Facilities	Ownership/ Management
Big Pine Key Holdings, National Key Deer Refuge	Big Pine Key	30.5	Lower Keys	2.0	Will eventually be turned over to the FWS as part of the National Key Deer Refuge	Owned and managed by TNC
John J. Pescatello Torchwood Hammock	Little Torch Key	28.5	Lower Keys	132.0	Hammock Preserve	Owned and managed by TNC
Subtotal				283.0		
Grand Total				377.0		
(1) Total acres may include some submerged lands						
TNC = The Nature Conservancy						
FKL&ST = Florida Keys Land & Sea Trust Note: Facilities indicated above are publicly-owned facilities plus privately-owned facilities which allow public access with or without a fee paid. Included are sites in the unincorporated County and the incorporated cities as well as the federal and state owned facilities, and private conservation owned facilities.						

13.2.2 Summary of Existing Conservation and Recreation Lands and Facilities

In summary, currently the County boasts approximately4.07 million acres of Conservation lands and waters. The ownership and maintenance of these lands and waters is primarily under the Federal Government, the State of Florida, private Conservation organizations and the MCLA. Arguably, the Conservation lands in and around the County serve a population more regional and statewide than the County itself, however, for comparison, the Level of Service (LOS) based on the County's 2010 functional population equates to over 26,500acres per 1,000 functional population. The distribution of these lands, due to the unique linear geography of the Keys allows for the population to be within a short drive or walk of numerous and varied conservation lands.

13.2.3 Inventory of Recreation Lands and Facilities

Generally the large Conservation lands are primarily sensitive natural resources but also contain some activity type recreation facilities. Recreation lands are typically smaller in size than Conservation lands and contain fewer sensitive natural resources or no natural

resources. Some of the activity-based recreation facilities and lands in the larger Conservation lands, have been included in the Recreation Lands and Facilities inventory for specific activities such as camping or boat ramps. Recreation lands in the County, regardless of ownership, all have at least some activity-based (user-oriented) forms of recreational facilities, unless they are not yet developed. Since the County is such a popular tourist destination, many user-oriented recreational facilities are also provided under private ownership of businesses. These lands have not been included in the inventory herein. The following discussion and associated tables describe and summarize both the lands and facilities for all the ownership categories throughout the County.

13.2.3.1 Publicly-Owned Recreation Lands and Facilities

13.2.3.1.1 Monroe County-Owned Recreation Lands and Facilities

The County owns approximately 216 acres of recreation lands. These lands and facilities are inventoried in **Table 13.4** and are shown as being either resource-based and/or activity-based.

There are 42 parcels identified by name, MM, location by particular Key, and the specific recreational facilities contained on each site. As inventoried, the County owns approximately 104 acres of resource-based recreation lands and 112 acres of activity-based recreation lands. Approximately 22 of the 42 sites offer activity-based recreational opportunities and the other 20 sites are resource-based lands.

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Table 13.4 - Monroe County-Owned Recreation Lands

Name	Location	Mile Marker	Facilities	Classification (Acres)	
				Resource	Activity
Mainland Recreation and Open Space Planning Area (MROSPA)					
None				0	0
Subtotal				0	0
Upper Keys Recreation and Open Space Planning Area (UKROSPA) MM 73-112					
Hibiscus Park (Buttonwood Lane)	Key Largo	101.5	Vacant, inaccessible waterfront	0.5	NA
Riviera Village Park (Bay Drive)	Key Largo	105.5	Boat basin, four picnic pavilions, waterfront, benches	1.8	NA
Garden Cove Park	Key Largo	106	Boat ramp	1.5	NA
Friendship Park	Key Largo	101	Ball field, 3 basketball courts, picnic shelters, Play equipment, restrooms, trail	NA	2.38
Key Largo Community Park- Jacob's Aquatic Center	Key Largo	99.6	2 boat ramps, play equipment, aquatic park, 3 swimming pools, beach	1.5	13.6
Varadero Beach Park	Key Largo	95.5	Beach	2.0	NA
Harry Harris County Park	Key Largo (Tavernier)	94	Beach, two ball fields, play equipment, swimming boat ramp, BBQs, shuffleboard, beach, picnic tables, restrooms	2.0	15.1
Old Settlers Park	Key Largo (Tavernier)	92.5	Play Equipment, picnic, shelter, beach, butterfly garden	NA	3.0
Sunset Point Park	Key Largo (Tavernier)	92	Vacant, waterfront access, boat ramp	1.2	0.9
Burr Beach Park (Sunny Haven)	Key Largo	91	Vacant, waterfront access	0.1	NA
Old State Rte. 4A	Upper Matecumbe Key	82.5	Vacant	0.3	NA
Old State Rte. 4A, Hurricane Monument	Upper Matecumbe Key	81	Historical marker	1.2	NA
Anne's Beach, Lower Matecumbe Beach (5)	Lower Matecumbe Key	73.5	Beach, swimming, bike path, picnic pavilions, boardwalk	6.1	6.0
Subtotal				18.2	34.98

Table 13.4 - Monroe County-Owned Recreation Lands (continued)

Name	Location	Mile Marker	Facilities	Classification (Acres)	
				Resource	Activity
Middle Keys Recreation and Open Space Planning Area (MKROSPA) MM 38.5-73					
Sunset Bay Park	Grassy Key	58	Beach	0.6	NA
Yacht Club (1)	Vaca Key (Marathon)	54	Boat ramp, teen club, 2 tennis courts, basketball court	NA	2.0
Sombrero Beach (Switlik Park)	Monroe County	50	Beach, picnic pavilions, ball field, 2 volleyball courts, equipped play area, dog park, pier, fishing, BBQ	0.6	8.0
Old 7-Mile Bridge	Monroe County	41-47	Fishing, Bicycling, Beaches	5.0	NA
7-Mile Bridge	Pigeon Key	45	Historical structures	5.0	NA
Subtotal				10.6	10.0
Lower Keys Recreation and Open Space Planning Area (LKROSPA) MM 0-38.5					
Veteran's Memorial Park	Little Duck Key (Ohio Key)	40	Picnic pavilions, beach, BBQs, boat ramp, swimming, beach, restrooms *	0.6	24.9
Missouri Key/South side US 1	Missouri Key	39	Roadside pull-off, beach	3.5	NA
Heron Ave./Tarpon St.	Big Pine Key	30	Vacant	0.7	NA
J. Watson Field (Stiglitz Property) (2)	Big Pine Key	30	Historic House, 2 tennis courts, volleyball, play equipment, baseball, picnic	1.2	2.4
Big Pine Key Park	Big Pine Key	30	Vacant	5.5	4.6
Blue Heron Park	Big Pine Key	30	Play equipment, 3 pavilions, basketball, volleyball,	NA	5.5
Bob Evans/ Chamber of Commerce	Big Pine Key	30	Vacant	0.3	NA
Palm Villa Park	Big Pine Key	30	Benches, waterfront, play equipment, basketball	NA	0.6
State Road 4	Little Torch Key	28	Boat ramps	0.1	NA
Ramrod Key Park	Ramrod Key	27	Beach *, swimming	1.2	1.2
West Summerland Park	West Summerland Key	25	2 Boat ramps	31.8	NA
Bay Point Park	Saddlebunch Key	15	Play equipment, volleyball, picnic tables, trail, basketball, 2 tennis courts, pavilions, soccer nets	NA	1.58

Table 13.4 - Monroe County-Owned Recreation Lands (continued)

Name	Location	Mile Marker	Facilities	Classification (Acres)	
				Resource	Activity
Boca Chica Beach, S R 941 (3)	Boca Chica Key	11	Beach, picnic table *	6.0	NA
Palm Drive cul-de-sac	Big Coppitt Key	11	Vacant	0.1	NA
Big Coppitt Volunteer Fire Department Park (4)	Big Coppitt Key	10	Play equipment, benches, skateboard	NA	0.75
Wilhelmina Harvey Park	Big Coppitt Key	9.5	Play equipment, path	NA	0.65
Gulfview Park, Delmar Ave.	Big Coppitt Key	10	Boat ramp	0.2	NA
Rockland Hammock	Rockland Key	10	Vacant	2.5	NA
Bernstein Park	Raccoon Key	4.5	Play equipment, volleyball, baseball, track, trail, soccer field, tennis courts, basketball, restrooms	NA	11.0
East Martello Park	Key West Island	1.5	Picnic, teen center, Historic Fort	14.56	NA
Higgs Beach Park, C.B. Harvey, Rest Beach	Key West Island	1	1.6 mile beach, concession area, 2 band shells, pier, picnic pavilions and grills, 5 tennis courts, play area, bike path, volleyball, swimming, dog park	5.0	12.1
West Martello Park	Key West Island	1	Historic Fort	0.8	NA
Whitehead Street Lighthouse	Key west Island	1	Historic Fort, Museum	0.8	NA
Pines Park (S. Roosevelt)	Key West Island	1	Picnic	NA	1.72
Subtotal				74.9	67.0
Grand Total				103.66	111.98

(1) The total acreage of the Yacht Club is approximately 6.0 acres. The unique layout of this facility restricts active recreation to approximately 2 acres partially leased to the Marathon Yacht Club by Monroe County.

(2) House and yard (1.2 acres) owned by Monroe County. Additional 2.4 acres leased by Monroe County from the Big Pine Athletic Association.

(3) Lands Leased to Monroe County from U. S. Navy.

(4) Church to west of park has public access 2 basketball, volleyball, and boucci courts.

(5) Beach leased to Village of Islamorada

*Denotes approximate acreage; (for beaches the length of the beach x a minimum of 15 ft.)

Source: Monroe County Growth Management Division.

The activity-based recreational facilities that are inventoried include facilities and activities such as baseball/softball, football/soccer, tennis courts, basketball courts, picnic tables and picnic pavilions, volleyball courts, handball/racquetball courts, equipped play areas, multi-use areas, benches, tracks, piers, bike paths, boat ramps, fishing, swimming, swimming pools, barbeque grills, shuffleboard courts, beaches and restrooms. Additionally, other recreation uses and facilities are indicated such as historic structures, bandshells, dog parks, skateboard facilities, aquatic parks, museums, and concessions.

Detailed plans and scheduling for up-grades to the Monroe County Recreation and Open Space activity-based lands and facilities are discussed in the Monroe County Parks and Recreation Master Plan, dated March 2005, by Wade and Trim.

13.2.3.1.2 Beaches - Recreation Lands and Facilities

The beaches in the County are a very significant part of the Recreational Lands and Facilities. There are 29 public beaches in the County which are owned either by the Federal Government, State of Florida, Monroe County, the City of Marathon, the Village of Islamorada, or the City of Key West. In addition, there are some privately-owned beaches; however, these have only been included in the level of service (LOS) calculations for the recreation facilities. A beach, under the State of Florida SCORP definitions can be both an activity-based recreation land and a resource-based recreation land. **Table 13.5** lists the public beaches and indicates the estimated acreage split between these two recreation type lands for the purposes of both the land LOS projections and the LOS facilities projections. Where the beach is located on a large tract of land (federal and state parks and conservation areas), the split of the activity-based lands are estimated for just the active uses present and the balance of the land is applied to the resource-based lands for LOS calculations. This gives a good indication of the extreme excess of resource-based recreation uses that are available to the permanent resident and seasonal population of the County without having to place beaches in one or the other recreation category.

13.2.3.1.3 Roadside and Bridge- Recreation Lands and Facilities

Because of the linear geographic nature of the Keys, many roadside sites as well as out of service vehicle and railroad bridges along U.S. 1 have been modified to be used as recreational and open space. Currently, not all of these sites have been developed; **Table 13.6** lists these unique sites. These sites are mostly government owned and due to their locations are water-dependent, resource-based recreation uses. Uses such as parking, scenic overlooks, fishing piers, boat ramps, and old bridges are examples of these particular sites. The inventory in **Table 13.6** has each site named (although some sites do not have formal names), its location by MM and ROSPA, the ownership of the site, and the type of water-dependent use facility. Most of these sites are very small in land size, but have been included in the resource-based lands summaries for the LOS calculations because the uses are uniquely resource-based.

Table 13.5 – Monroe County - Beaches and Waterfront Parks

Name	Location	Mile Marker	Facilities	Classification (Acres)	
				Resource	Activity
Mainland Recreation and Open Space Planning Area (MROSPA)					
Everglades National Park	Mainland	NA	3 boat ramps, beach, trails, camping	NA	20.0
Subtotal				0.0	20.0
Upper Keys Recreation and Open Space Planning Area (UKROSPA) MM 73-112					
Riviera Village Park (Bay Drive)	Key Largo	105.5	Vacant, inaccessible waterfront	0.5	NA
John Penekamp Coral Reef State Park	Key Largo	102.5	Camping, Shelters, Picnic tables, Boat Ramp, Marina, Beach Concessions, Restrooms, Swimming	2,300.0	49.6
Hibiscus Park (Buttonwood Lane)	Key Largo	101.5	Waterfront, 4 pavilions, benches, boat basin	1.8	NA
Key Largo Community Park	Key Largo	99.6	Aquatic Park, 2 boat ramps, play equipment, beach, 3 swimming pools	1.5	13.6
Varadero Beach Park	Key Largo	95.5	Beach	2.0	NA
Harry Harris County Park	Key Largo (Tavernier)	94	Beach, two ball fields, play equipment, swimming boat ramp, BBQs, shuffleboard, beach, picnic tables, restrooms	2.0	15.1
Sunset Point Park	Key Largo (Tavernier)	92	Vacant, waterfront, access, boat ramp	1.2	0.9
Burr Beach Park (Sunny Haven)	Key Largo	91	Vacant, waterfront access	0.1	NA
Founders Park	Islamorada	87	Beach, pool, ball fields, boat ramp, fishing, tennis courts, basketball, skate park, vitae course, trails, dog park, boucci courts	1.0	39.0
Islamorada Library Beach Park	Islamorada	81.5	Beach, BBQ, benches, play equipment, pavilion, picnic tables, restrooms	1.2	NA
Indian Key Fill	Matecumbe	78	Beach	0.75	NA
Anne's Beach, Lower Matecumbe Beach	Lower Matecumbe	73.5	Beach, swimming, picnic pavilions, bike path, boardwalk	6.1	6.0
Subtotal				2,318.15	124.2
Middle Keys Recreation and Open Space Planning Area (MKROSPA) MM 38.5-73					
Sunset Bay Park	Grassy Key	58	Beach	0.6	NA
Curry Hammock State Park	Fat Deer/ Little Crawl Keys	56	Basketball, Restrooms, Play Equipment, Picnic Tables, Beach	350.0	15.0

Table 13.5 – Monroe County - Beaches and Waterfront Parks (continued)

Name	Location	Mile Marker	Facilities	Classification (Acres)	
				Resource	Activity
Sombrero Beach (Switlik Park)	Monroe County	50	Beach, picnic pavilion, ball field, equipped play area	0.6	8.0
Subtotal				351.2	23.0
Lower Keys Recreation and Open Space Planning Area (LKROSPA) MM 0-38.5					
Veteran's Memorial Park	Little Duck Key (Ohio Key)	40	Picnic pavilions, beach, BBQs, boat ramp, swimming, beach, restrooms	0.6	24.9
Missouri Key/southside US 1	Missouri Key	39	Roadside pull-off, beach	3.5	NA
Bahia Honda State Recreation Area	Bahia Honda Key	37	Camping, Picnic Tables, Trails, Boat Ramp, Marina, Shelters, Beach	310.1	15.0
Palm Villa Park	Big Pine Key	30	Beaches, play equipment, basketball	0.6	NA
Ramrod Key Park	Ramrod Key	27	Beach, swimming	1.2	1.2
Great White Heron National Wildlife Refuge	Big Pine Key	20	Fishing, Beach, Bird Wildlife Refuge	7,599.0	1.0
Boca Chica Beach, S R 941	Boca Chica Key	11	Beach, Picnic Table	6.0	NA
Smathers Beach	City of Key West	2	2 miles beach, volleyball, swimming, canoeing, restrooms, concessions	1.0	2.6
Higgs Beach Park, C.B. Harvey, Rest Beach	Monroe County	1	1 mile beach, concession area, 2 band shells, pier, picnic pavilions, grills, 5 tennis courts, play area, bike path, volleyball, swimming, dog park	5.0	12.1
Pines Park (S. Roosevelt)	City of Key West	1	Unimproved Beach, Picnic	1.7	NA
Simonton Street Beach	City of Key West	0.5	Beach, Boat Ramp, Bath House	1.5	NA
Ft. Zachary Taylor State Historic Park	Key West Island	0	Beach, Historic Fort, camping, fishing, trails	52.0	2.0
Ft. Jefferson National Monument	Dry Tortugas Islands	0	Hiking, Trails, Swimming, Fishing, Beach, Picnic Tables, Museum, Camping, Dock	37.3	2.0
Subtotal				8,019.5	60.8
Grand Total				10,688.9	228.0
Note: this table includes only those facilities that are owned or leased by Federal, State, County or City lands.					
Source: Monroe County Growth Management Division.					

Table 13.6 – Roadside and Bridge Recreation Lands and Facilities

Location	Mile Marker	Planning Area	Facilities	Ownership/Maintained	Classification (Acres)	
					Resource*	Activity
Flamingo Visitor Center	NA	Mainland	4 Boat ramps	Private-fee	1.5	NA
Card Sound Road	SR 905A	Upper Keys	Boat ramp	Fl Dept. of Transportation	0.5	NA
Cross Key	113	Upper Keys	Boat ramp	Everglades National Park	1.0	NA
Little Blackwater Sound	111	Upper Keys	Boat ramp	Fl Dept. of Transportation	1.0	NA
Caribbean Club	104	Upper Keys	Boat ramp	Private-fee	0.5	NA
Sunset Point Public Boat Launch	95.5	Upper Keys	Boat ramp	Monroe County	0.5	NA
Tavernier Creek	91	Upper Keys	Boat ramp	Monroe County	1.0	NA
Hurricane Monument	82	Middle Keys	Monument	State of Florida	0.5	NA
Indian Key	78	Middle Keys	Boat ramp, ferry service to Lignumvitae	Fl Dept. of Transportation	1.8	NA
Lower Matecumbe Key	73.5	Middle Keys	Beach, parking	Fl Dept. of Transportation	1.5	NA
Channel Two Catwalk	73	Middle Keys	Fishing area, parking	Fl Dept. of Transportation	1.3	NA
Channel Five Catwalk	71	Middle Keys	Fishing area, parking	Fl Dept. of Transportation	1.3	NA
Fat Deer Key	54	Middle Keys	Boat ramp, parking	Fl Dept. of Transportation	1.5	NA
Marathon Boat Ramp	53	Middle Keys	Boat ramp	City of Marathon	0.5	NA
Marathon Yacht Club	49	Middle Keys	Boat ramp, dock	Private-fee	0.8	NA
Boot Key	48	Middle Keys	Roadside Bird Watching	Fl Dept. of Transportation	0.5	NA
Missouri Key	40	Lower Keys	Pull off, Overlook	Fl Dept. of Transportation	0.5	NA
Spanish Harbor Wayside Park	34	Lower Keys	Boat ramp, parking	Fl Dept. of Transportation	1.5	NA

Table 13.6 – Roadside and Bridge Recreation Lands and Facilities (continued)

Location	Mile Marker	Planning Area	Facilities	Ownership/Maintained	Classification (Acres)	
					Resource*	Activity
Big Pine Key- Old Wooden Bridge Marina	30.5	Lower Keys	Fishing areas, parking	Fl Dept. of Transportation	2.3	NA
The Blue Hole	30	Lower Keys	Observation Deck, habitat	State of Florida	3.0	NA
Big Pine Key	30	Lower Keys	Boat ramp	Monroe County	0.5	NA
Little Torch Key	28	Lower Keys	Boat ramp	Monroe County	0.5	NA
Kemp Channel	23.5	Lower Keys	Fishing area, parking	Fl Dept. of Transportation	1.5	NA
Shark Key	11.5	Lower Keys	Boat ramp, parking	Fl Dept. of Transportation	1.0	NA
Boca Chica	6.5	Lower Keys	Catwalk	Fl Dept. of Transportation	0.8	NA
Stock Island	5.5	Lower Keys	Boat ramp, parking	Fl Dept. of Transportation	2.0	NA
Totals (24 sites)					29.3	NA
* All acreages are estimated from aerial photos and include adjacent parking & other facilities related to the facility						
Source: Monroe County Growth Management Division						

13.2.3.1.4 City-Owned Recreation Lands and Facilities

Table 13.7 is an inventory of lands owned by the five incorporated cities. The incorporated cities of Key West, Key Colony Beach, Marathon, Layton, and the Village of Islamorada all provide public recreational lands and facilities. Although these city-owned lands and facilities are primarily meant for use by the citizens of the cities, currently no restrictions are in place to prevent the use of these facilities by the functional population of the County. In fact, some of the County-owned recreation lands and facilities are located within the incorporated boundaries of these cities.

The functional populations used in this Element have been adjusted for inclusion of the permanent and seasonal unincorporated populations as well as the incorporated city populations, permanent and seasonal. These adjusted populations are then used in the LOS calculations for each of the four ROSPAs. Note however, that the Mainland ROSPA has no reported population, but the facilities on the Mainland are included in the LOS calculations for the County as a whole.

The facilities provided by municipalities are primarily activity-based and with a few exceptions are on small sites. The recreational facilities on city-owned lands can be seen to surpass the SCORP rated LOS for that facility in relation to the total population of the individual cities; the facilities of the cities serve a population outside of the municipal

boundaries. This table identifies these city lands by name and location, including MM, identifies the facilities within each recreational land; and approximates the acreage of each site for resource-based and activity-based uses.

Table 13.7 - Summary of City-Owned Recreation Lands and Facilities

Name	Location Park Type	Mile Marker	ROSPA	Facilities	Classification (Acres)	
					Resource	Activity
VILLAGE OF ISLAMORADA						
Founders Park	Community Park	87	Upper Keys	Pool, Beach, 2 Baseball Fields, Bocci Courts, Tennis Court, Trails, Basketball, Skate Park, Vita Course Trails, Dog Park, Open Play Field	1.0	33.0
Plantation Yacht Harbor Site	Community Park	87	Upper Keys	4 Tennis Courts, 6 Shuffleboard Courts, Boat Ramp, Picnic Tables, Volleyball, Fishing, Play Equipment, Rec. Building, Bike Course, Marina	1.0	5.0
Islamorada Library Beach Park	Community Park	81.5	Upper Keys	Beach, BBQ, Benches, Play Equipment, Pavilion, Picnic Tables, Restrooms	1.2	NA
Hurricane Monument (1)	Mini Park	81.5	Upper Keys	Historical Marker	1.2	NA
Bay Hammock	Mini Park	79	Upper Keys	Boat Ramp	0.5	NA
Pen Key Club	Mini Park	83.5	Upper Keys	Boat Ramp	0.5	NA
Bayside Boat Ramp	Mini Park	71	Upper Keys	Boat Ramp	0.5	NA
Subtotal					5.9	38.0
CITY OF LAYTON						
No Parks or Facilities			Middle Keys		0.0	0.0
Subtotal					0.0	0.0
CITY OF MARATHON						
Bayside Boat Ramp	Mini Park	54	Middle Keys	Boat Ramp	0.5	NA
Coco Plum Beach	Mini Park	54	Middle Keys	Beach, Dog Park	0.5	NA

Table 13.7 - Summary of City-Owned Recreation Lands and Facilities (continued)

Name	Location Park Type	Mile Marker	ROSPA	Facilities	Classification (Acres)	
					Resource	Activity
Aviation Blvd.	Mini Park	51	Middle Keys	Boat Ramp, Picnic Tables	0.25	NA
Waloriss Subdivision Park	Mini Park	49.5	Middle Keys	Vacant, cleared	0.3	NA
Dorothy Blvd. Park	Mini Park	48.5	Middle Keys	Waterfront, vacant	0.1	NA
Calle Ensenada	Mini Park	49	Middle Keys	Vacant	0.25	NA
Marathon Community Park	Community Park	49	Middle Keys	2 Baseball Fields, 4 Tennis Courts, Dog Park, Picnic Tables, 2 Soccer Fields, 2 Boucci Courts, 3 Pavilions, 2 Shuffleboard Courts., Play Equipment, Concessions, 2 Basketball Courts., Restrooms, Skate Park	NA	30.0
Boot Key City Marina*	Mini Park	48	Middle Keys	Boat Ramp, Dockage, Restrooms	38.0	NA
Jesse Hobbs Park	Community Park	49.5	Middle Keys	Basketball court (lighted), Play Equipment, Benches, Dog Park	NA	1.5
33rd Street Boat Ramp	Mini Park	48.5	Middle Keys	Boat Ramp, Restrooms	1.0	NA
Rotary Field of Dreams	Community Park	48	Middle Keys	Play Equipment, Picnic Pavilion, Picnic Tables, Restrooms	NA	3.0
Events Field	Community Park	47.5	Middle Keys	Open Play Field, Fishing, Picnic	1.3	9.7
Knight's Key	Community Park	47	Middle Keys	Vacant	NA	4.0
Subtotal					42.2	48.2
CITY OF KEY COLONY BEACH						
Tract C	Mini Park**	53	Middle Keys	Vacant	0.5	NA
City Hall Park	Mini Park	53	Middle Keys	Picnic	NA	1.0
Gazebo Park	Mini Park	53	Middle Keys	Picnic	NA	1.0
Tract E	Mini Park**	53	Middle Keys	Vacant	0.5	NA
Sunset Park	Mini Park	53	Middle Keys	Beach, Benches, Picnic Tables	NA	1.2

Table 13.7 - Summary of City-Owned Recreation Lands and Facilities (continued)

Name	Location Park Type	Mile Marker	ROSPA	Facilities	Classification (Acres)	
					Resource	Activity
East Side Park	Mini Park	53	Middle Keys	Jogging, 2 Tennis courts	NA	2.0
Subtotal					1.0	5.2
CITY OF KEY WEST						
Bayview Park	Community Park	1.5	Lower Keys	Softball Fields, Play Equipment, 2 Pavilions, 6 Tennis Courts, Restrooms, Basketball Court	NA	7.5
Bill Butler Park	Mini Park	0.5	Lower Keys	Play Equipment	NA	0.5
Clayton Sterling Complex	Community Park	3	Lower Keys	4 Baseball Fields	NA	7.0
Cozumel Park	Mini Park	4.5	Lower Keys	Play Equipment, Open Space	NA	0.5
Dr. Martin Luther King-Community Center and Pool	Community Park	1	Lower Keys	Pool, Play Equipment, Basketball Court	NA	1.0
Sonny McCoy Indigenous Park	Community Park	1	Lower Keys	5 Boucci Courts, Pavilions, Picnic, Trails	7.0	3.0
Little Hamaca Park	Community Park	3	Lower Keys	Trails, Picnic Areas	5.5	NA
Nelson English Park	Community Park	1.5	Lower Keys	Play Equipment, Picnic Tables, Open Spaces, Basketball Courts	NA	0.25
Wickers Sports Complex	Community Park	3	Lower Keys	Volleyball, 2 Tennis Courts, 3 Ball fields, Football, Soccer, Softball, Play Equipment	NA	2.0
Stock Island Boat Ramp	Mini Park**	5	Lower Keys	Boat Ramp	1.0	NA
Smathers Beach	Community Park**	2	Lower Keys	2 miles of Beach, Volleyball, Canoeing, Swimming, Concessions, Restrooms	1.0	2.6
Simonton Street Beach	Neighborhood Park	0.5	Lower Keys	Beach, Boat Ramp, Bath House	1.5	NA
Willie Ward Park	Mini Park	0.5	Lower Keys	Picnic Tables, Play Equipment	NA	0.25
Subtotal					16	24.60
Grand Total					65.1	116.00
* Includes submerged lands						
** estimated acreages						

13.2.2.2 Monroe County School Board-Owned Recreation Lands and Facilities

In addition to the recreation lands owned by the County and the incorporated cities, the recreational lands owned by the Monroe County School District are available for public use. Public access to these recreation sites are governed through an interlocal agreement between the County and the Monroe County School Board. The 14 school sites and their individual facilities are described in **Table 13.8** in terms of size, facilities provided, and the distribution within the Monroe County Planning Areas. Although these school sites and their facilities may be located within an incorporated city, the users for these facilities may come from outside the city limits. As indicated, there are approximately 192 acres of activity-based recreation lands owned by the School District.

13.2.2.2.1 Recreation Lands Leased to Monroe County

The County also leases land from public and private entities in order to provide permanent residents and seasonal visitors with adequate recreation opportunities. These lands are described in **Table 13.9,** in terms of being either resource-based or activity-based. This inventory includes the name of the facility, the location by MM and by ROSPA, the types of recreational facilities on each site, and the Owner of the lands. As **Table 13.9** indicates, there are approximately 6 acres of activity-based and 7 acres of resource-based recreation lands leased by the County.

Table 13.8 - Monroe County School District-Owned Recreation Lands and Facilities

Key/Location	Name/Grade Level	Mile Marker	Facilities	Classification (Acres)	
				Resource	Activity
Mainland Recreation and Open Space Planning Area (MROSPA)					
No Facilities					
Subtotal				0.0	0.0
Upper Keys Recreation and Open Space Planning Area (UKROSPA) MM 73-115					
Key Largo	Key Largo Elementary/Middle School	105	Play equipment, baseball field. 2 basketball court, running track, multi-purpose field (soccer field), 4 racquetball courts, picnic tables, shelters, benches, play equipment, indoor gym	NA	29.0
Plantation Key	Plantation Key Elementary School	89.5	Play equipment, 1 tennis court, 2 basketball courts, 1 baseball field, 1 volleyball court, picnic tables, shelters, benches	NA	7.0

Table 13.8 - Monroe County School District-Owned Recreation Lands and Facilities (continued)

Key/Location	Name/Grade Level	Mile Marker	Facilities	Classification (Acres)	
				Resource	Activity
Plantation Key	Coral Shores High School*	90	Baseball field and football field (lighted), track (health course), 5 tennis courts, softball field, indoor gym, basketball court (indoor)	NA	16.0
Subtotal				0.0	52.0
Middle Keys Recreation and Open Space Planning Area (MKROSPA) MM 38.5-73					
City of Marathon	Marathon High School	49.5	Baseball field, soccer and football field (lighted), 1 softball field, 3 tennis courts, 3 basketball courts, picnic tables, indoor gym, basketball court (indoor)	NA	27.0
City of Marathon	Stanley Switlik Elementary School* Sue M. Moore Public School	48.5	Play equipment, 2 baseball fields (lighted), basketball court, shared soccer/football field, shelter, play equipment, picnic tables	NA	7.0
City of Marathon	Grace Jones Community Center (leased)	47	Play equipment, basketball court	NA	0.2
Subtotal				0.0	34.2
Lower Keys Recreation and Open Space Planning Area (LKROSPA) MM 0-38.5					
Big Pine Key	Big Pine Key Neighborhood School	30	Play equipment, picnic tables, benches	NA	5.0
City of Key West	Key West High School*	0.5	Baseball/softball field, 2 soccer/football fields, 4 tennis courts, track (health course), benches, picnic tables, basketball court (indoor), volleyball court (indoor)	NA	24.0
Sugarloaf Key	Sugarloaf Elementary/Middle School*	19.5	2 baseball/softball fields, play equipment, 3 basketball courts, track (health course), shelters, benches, picnic tables, volleyball court (indoor)	NA	37.0
City of Key West	Gerald Adams Elementary School*	10	Baseball/softball field, soccer field, 2 basketball courts, play equipment, pavilions, picnic tables, benches	NA	12.0
City of Key West	Poinciana Elementary School*	3	Basketball court, play equipment, pavilions, picnic tables, benches	NA	7.0

Table 13.8 - Monroe County School District-Owned Recreation Lands and Facilities (continued)

Key/Location	Name/Grade Level	Mile Marker	Facilities	Classification (Acres)	
				Resource	Activity
City of Key West	Glynn Archer Elementary School	1.5	Play equipment, pavilions, picnic tables, benches	NA	2.0
City of Key West (N.A.S.)	Sigsbee Charter Elementary School (1)	1.5	Play equipment, basketball court,	NA	9.0
City of Key West	Horace O'Bryant Middle School*	1	Soccer field, 6 basketball courts, 3 racquetball/handball courts, track (health course), pavilions, picnic tables, benches, volleyball court (indoor)	NA	10.0
Subtotal				0.0	106.0
Total				0.0	192.2
(1) Owned by the Monroe County School District, but made a charter school in summer 2010.					
*Denotes only those schools that currently have interlocal agreements in effect between Monroe County and Monroe County School District					
Mile Marker designations are approximate to nearest point on U.S. 1					
All acreages are approximate					
Sources: Monroe County Public Facilities Capacity Assessment Report 2008; Monroe County Parks and Recreation Master Plan (draft) 2005; Monroe County School District 2010.					

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Table 13.9 – Recreation Lands Leased to Monroe County

Name	Location	Mile Marker	ROSPA	Facilities	Classification (Acres)	
					Resource	Activity
No Facilities			Mainland		0.0	0.0
Subtotal					0.0	0.0
No Facilities			Upper Keys			
Subtotal					0.0	0.0
No Facilities			Middle Keys		0.0	0.0
Subtotal					0.0	0.0
St. Peters Church (2)	Big Pine Key	30	Lower Keys	Ball field, picnic pavilion	0.0	3.7
Watson Field (3)	Big Pine Key	30	Lower Keys	Ball field, equipped play area, volleyball	1.2	2.4
State Road 941 (4)	Boca Chica Key	8	Lower Keys	Beach	6.0	0.0
Subtotal					7.2	6.1
Total					7.2	6.1
(1) Beach leased to the Village of Islamorada						
(2) Leased from the Archdiocese of Miami with conditions restricting use for ten year beginning 1991.						
(3) Leased from Big Pine Athletic Association under terms of 10 year maintenance agreement beginning in 1989.						
(4) Leased from the U.S. Navy, approximate acreage.						
Source: Monroe County Growth Management Division						

13.2.2.3 Privately-Owned Recreation Lands and Facilities

Due to the nature of the Keys tourist-oriented economy, privately-owned recreation areas and facilities play an important role in the quality and availability of recreation throughout the County. While almost all of the resource-based recreation lands and facilities are provided by Federal, State, not-for profit private agencies, and the County itself, the majority of all activity-based recreation is provided through the County and the extensive group of privately-owned businesses which cater to tourists. While not every private community or business provides activity-based recreation facilities, many businesses and communities do provide facilities that service the functional population of the County. Swimming pools, camping facilities, playgrounds, golf courses, and tennis and volleyball courts are examples of some of these privately provided facilities. For the purposes of this Element, only the facilities that are judged to be available to the larger functional population, which includes the seasonal population, are counted in the current and future LOS summaries. There are over 94 swimming pools, 52 playgrounds, 180 tennis courts, 19 volleyball courts, 40 camping facilities, and 135 holes of golf on 8 courses. **Table 13.10** is a partial summary of these privately-owned community and business facilities.

Additionally, these privately-owned businesses provide some resource-based facilities. The significant facilities in this category are the boat ramps, marinas, docks, and piers. The nature of these privately-owned recreational facilities in the County are oriented in and around the great natural recreation amenity of the Atlantic and Gulf waters. In the County, the majority of the marinas, boat ramps, fishing facilities, and camping facilities are privately-owned. A few small beaches are also privately-owned. These types of water-dependant and water-related recreational uses are itemized and mapped in the *Coastal Management Element* of this update. However, the distinction between "water-dependant" uses and "water-related" uses has ramifications in the planning for the County in both the Recreation and Open Space planning and the general private development planning because of the continued attraction of the Atlantic and Gulf waters for both permanent residents and seasonal visitors.

13.2.4 Summary of Recreation Lands and Facilities Provided in Monroe County

The most pertinent activity-based recreational facility standards as described in the 2008 SCORP are shown in **Table 13.11**. This table identifies that there is a great deal of variation in demand for different types of facilities throughout the State of Florida due to geographic, cultural and population variations. For some facilities the maximum and minimum populations per facility are close and therefore the median is also close. However many of the facilities vary greatly in the guide for the user population and therefore the SCORP does not prevent use of criteria other than the maximum, minimum or median as long as the level of service standard is within the population ranges given. For this Update Monroe County will use the median for all facilities except for beaches.

For management and projection purposes for the *Recreation and Open Space Element* as part of the update to the Comprehensive Plan, the lands as reported in the summary in **Table 13.12** are used as the current recreation lands toward meeting the adopted LOS for the County based on the current functional population which includes all five incorporated cities within the County. The majority of the recreational facilities on the recreation lands, service both residential and the seasonal populations beyond the boundaries of the individual cities. Both resource-based lands and activity-based lands, shown in **Table 13.12,** are broken down by the ROSPA in which the lands are located without regard to the location of the population which is serviced by these lands. The seven categories of resource-based lands shown in **Table 13.12** are the County-owned lands, the County-leased lands, Monroe County School District lands, City-owned lands, beach lands, road and bridge lands, and privately-owned lands. The five categories of activity-based lands shown in **Table 13.10** include the County-owned lands, the County-leased lands, Monroe County School Board lands, City-owned lands, and Privately-owned lands.

It should be noted that no acreages were added to **Table 13.12** under the privately-owned lands in any of the ROSPA totals. Acreages for those portions of privately-owned recreation lands were not readily available and would be difficult to obtain without physical measurement or aerial photo interpretation; any acreages in the privately-owned lands

would only increase meeting the Levels of Service (LOS) on both the ROSPA and overall County basis.

Table 13.10 – Privately-Owned Recreation Lands and Facilities

Name	Location/ Subdivision	Mile Marker	ROSPA	Facilities	Classification	
					Resource	Activity
Private Parks						
Ocean Isle Estates	Key Largo	NA	Upper Keys	Boat Ramp, Dockage	Resource	Activity
Sexton Cove Estates	Key Largo	NA	Upper Keys	Boat Ramp, Dockage	Resource	Activity
Key Largo Mobile Home sites	Key Largo	NA	Upper Keys	Shuffleboard	Resource	NA
Cross Key Waterway Estates	Key largo	NA	Upper Keys	Boat Ramp	Resource	NA
South Creek Village	Key Largo	NA	Upper Keys	Boat Ramp, Basketball	Resource	Activity
Coastal Waterways Trailer Park	Key Largo	NA	Upper Keys	Boat Basin	Resource	NA
Key Largo Village	Key Largo	NA	Upper Keys	Boat Ramp, Dockage, Tiki Hut	Resource	NA
Port Largo 2nd.	Key Largo	NA	Upper Keys	Vacant	Resource	NA
Key Largo Beach	Key Largo	NA	Upper Keys	Boat Basin	Resource	NA
Thompson's	Key Largo	NA	Upper Keys	Vacant	Resource	NA
Key Largo Ocean Shores	Key Largo	NA	Upper Keys	Boat Basin	Resource	NA
Pirate's Cove	Key Largo	101	Upper Keys	2 Boat Ramps, Clubhouse	Resource	NA
Winken, Blynken & Nod	Key Largo	96	Upper Keys	Boat Ramp, Picnic tables, Beach, Volleyball	Resource	Activity
Lime Grove Estates	Key Largo	NA	Upper Keys	Boat Basin, Tiki Hut	Resource	Activity
Bay Harbor	Key Largo	NA	Upper Keys	Boat Ramp, Boat Basin, Tidal Swimming	Resource	Activity
Hammer Point Park	Plantation Key	93.1	Upper Keys	Boat Ramp	Resource	Activity
Edenaire	Plantation Key	NA	Upper Keys	Boat Basin	Resource	Activity
Tavernero	Plantation Key	NA	Upper Keys	Boat Ramp, Dockage	Resource	NA
Plantation Key Colony	Plantation Key	NA	Upper Keys	Boat Ramp, BBQ, Picnic Tables	Resource	NA
Driftwood Trailer Park	Plantation Key	92	Upper Keys	Camping	Resource	NA

Table 13.10 – Privately-Owned Recreation Lands and Facilities (continued)

Name	Location/ Subdivision	Mile Marker	ROSPA	Facilities	Classification	
					Resource	Activity
Plantation Shores	Plantation Key	NA	Upper Keys	Boat Ramp, Picnic Tables	Resource	NA
Indian Harbor	Plantation Key	NA	Upper Keys	Boat Ramp	Resource	NA
Key Heights	Plantation Key	NA	Upper Keys	Boat Ramp	Resource	NA
Plantation Beach	Plantation Key	NA	Upper Keys	Boat Ramp, Picnic Tables, Volleyball	Resource	Activity
Bayridge	Plantation Key	NA	Upper Keys	Pool, Boat Basin, Picnic Tables	Resource	Activity
Plantation Harbor	Plantation Key	NA	Upper Keys	Boat Ramp	Resource	NA
Toner's Nautical	Plantation Key	NA	Upper Keys	Boat Ramp	Resource	NA
Treasure Harbor	Plantation Key	87	Upper Keys	Boat Ramp, Dockage, Clubhouse	Resource	NA
Venetian Shores	Plantation Key	86	Upper Keys	Boat Ramp, Common Area	Resource	NA
Antiqua	Lower Matecumbe	NA	Middle Keys	Vacant	Resource	NA
Dorsett	Grassy Key	NA	Middle Keys	Vacant	Resource	NA
Coral Key Village	Duck/Conch Key	61.5	Middle Keys	Volleyball, Basketball	N/A	Activity
Indies Island	Duck/Conch Key	61.5	Middle Keys	Vacant	Resource	NA
Crane Hammock	City of Marathon	NA	Middle Keys	Vacant	Resource	NA
Waloriss	City of Marathon	NA	Middle Keys	Vacant	Resource	NA
Port Pine Heights	Big Pine Key	NA	Lower Keys	Vacant	Resource	NA
Summerland Estates	Summerland Key	NA	Lower Keys	Boat Ramp, Dockage	Resource	NA
Summerland Key Cove	Summerland Key	NA	Lower Keys	Boat Ramp, BBQ, Picnic Tables, Restrooms	Resource	NA
Subtotals					0.00	0.00
RV/ Camping Areas						
Point Laura Marina and Campground	Key Largo	NA	Upper Keys	29 RV/Trailer Sites, 14 Tent sites, 2 Tables Shelter, Beach, Boardwalk, Boat Ramp, Marina	NA	Activity

Table 13.10 – Privately-Owned Recreation Lands and Facilities (continued)

Name	Location/ Subdivision	Mile Marker	ROSPA	Facilities	Classification	
					Resource	Activity
Twin Harbor Motel and Campground	Key Largo	NA	Upper Keys	60 RV/Trailer Sites, 5 Cabins/ Shelters, 72 Tables, 2 Beaches, Boat Ramp, 2 Marinas, 2 Basketball Goals, Shuffleboard Court, Multi-purpose Building	NA	Activity
Key Largo Campground and Marina	Key Largo	101.5	Upper Keys	33 Tent Sites, 43 Tables, 2 Beaches, Boat Ramp, Marina, Swimming Pool, 4 Shuffle Board Courts, Multipurpose Building, Equipped Play Area, Recreational Center	NA	Activity
Blue Fin Rock Harbor Marina	Key Largo	100	Upper Keys	RV/Trailer Sites, Picnic Tables, Boat Ramp Benches, Swimming, Fishing, Marina	NA	Activity
American Outdoors	Key Largo	NA	Upper Keys	Interpretive/Nature Trail, Beach, Boat Ramp Marina, 2 Shuffleboard Courts, Multipurpose Court, Recreation Center	NA	Activity
Calusa Camp Resort	Key Largo	NA	Upper Keys	300 R.W./Trailer Sites, 300 Tables, Boardwalk, Boat Ramp, Marina, Swimming Pool, 2 Tennis Courts, Basketball Goal, 2 Shuffleboard Courts, Equipped Play Area, Recreation Center	NA	Activity
Happy Vagabond Campground	Key Largo	NA	Upper Keys	75 R.V../Trailer Sites, 75 Tables, Swimming Pool Shuffleboard Court, Equipped Play Area,	NA	Activity
Boy Scouts of Florida National High Adventure Sea Base	Lower Matecumbe	NA	Middle Keys	2 Cabins, Beach, 9 Boardwalks/catwalks, Boat Ramp, Marina, 2 Swimming Pools, Basketball Goal, Recreation Center	NA	Activity
Sea Oats Beach	Lower Matecumbe	NA	Middle Keys	Nature Preserve	Resource	NA
Topsider Resort	Lower Matecumbe	NA	Middle Keys	Boardwalk, Boat Ramp, Marina, Swimming Pool, 2 Tennis Courts	NA	Activity

Table 13.10 – Privately-Owned Recreation Lands and Facilities (continued)

Name	Location/ Subdivision	Mile Marker	ROSPA	Facilities	Classification	
					Resource	Activity
KOA Campground	Fiesta Key	70	Middle Keys	325 R.V./Trailer Sites, 150 Tent Sites, 20 Cabins, 375 Tables, 6 Shelters, Beach Boardwalk, Boat Ramp, Marina, Swimming Pools, 2 Shuffleboards, Handball/Racquetball Court, Multipurpose Court, Equipped Play Area, Recreation Center	NA	Activity
Outdoor Resorts	Long Key	NA	Middle Keys	20 R.V./Trailer Sites, 20 Tables, Boat Ramp, Swimming Pool, 4 Tennis Courts, Basketball Goal, 2 Shuffleboard Courts, Recreation Center	NA	Activity
Lions Travel Park	Grassy Key	NA	Middle Keys	58 R.V./Trailer Sites, 12 Tables, Beach Boardwalk, Boat Ramp, Marina, Recreation Center	NA	Activity
Jolly Roger Travel Park	Grassy Key	NA	Middle Keys	110 R.V./Trailer Sites, 25 Tent Sites, 4 Cabins, 125 Tables, Shelter, Beach, Boat Ramp, Marina, 2 Shuffleboard Courts	NA	Activity
Gulf Stream Travel Park and Marina	City of Marathon	NA	Middle Keys	83 R.V./Trailer Sites, 22 Tables, Marina, Swimming Pool	NA	Activity
Key Trailer Courts	City of Marathon	NA	Middle Keys	140 R.V./Trailer Sites, 8 Tables, 4 Shelters, Boat Ramp, Marina, 2 Shuffleboard Courts	NA	Activity
Key Lime Resort and Marina	City of Marathon	NA	Middle Keys	Marina, Swimming Pool, Tennis Court, 2 Shuffleboard Courts	NA	Activity
Key Trailer Court	City of Marathon	NA	Middle Keys	100 R.V./Trailer Sites, 8 Tables, Shelter, Beach, Boat Ramp, 2 Shuffleboard Courts	Resource	NA
Knight's Key Park and Marina	City of Marathon	NA	Middle Keys	113 R.V./Trailer Sites, Boat Ramp, Marina	Resource	NA
Sunshine Key Camping Resort	Ohio Key	NA	Lower Keys	389 R/V./Trailer Sites, 450 Tables, Multipurpose Trail, Beach, Boat Ramp, Marina, Swimming Pool, 2 Tennis Courts, Basketball Goal, 3 Shuffleboard Courts, Multipurpose Building, Equipped Play Area	NA	Activity
Des Camp Association	Big Pine Key	NA	Lower Keys	4 Cabins/Shelters, Boat Ramp, Marina, Multipurpose Building	Resource	NA

Table 13.10 – Privately-Owned Recreation Lands and Facilities (continued)

Name	Location/ Subdivision	Mile Marker	ROSPA	Facilities	Classification	
					Resource	Activity
Breezy Pines Trailer Park	Big Pine Key	NA	Lower Keys	100 R.V./Trailer Sites, 100 Tables, Swimming Pool, 2 Shuffleboard Courts	Resource	Activity
Halcyon Beach Trailer Park	Big Pine Key	NA	Lower Keys	15 R.V./Trailer Sites, 10 Tables, Marina, Shuffleboard Court	Resource	Activity
Big Pine Key Fishing Lodge Camp Ground	Big Pine Key	NA	Lower Keys	100 R.V./Trailer Sites, 25 Tent Sit4s, 9 Cabins, Shelters, 20 Tables, Boat Ramp, Marina, 2 Shuffleboard Courts, Multipurpose Building	Resource	Activity
Mariner Resort and Marina	Big Pine Key	NA	Lower Keys	Beach, Boat Ramps, Marina, Swimming Pool, 2 Tennis Courts, Multipurpose Building	Resource	Activity
Boy Scout Camp Sawyer	West Summerland Key	NA	Lower Keys	6 Tent Sites, 6 Tables, Beach, Boat Ramp	Resource	Activity
Girl Scout Camp Wesumkee	West Summerland Key	NA	Lower Keys	27 Cabins/Shelters, 20 Tables, 2 Recreation Centers	Resource	Activity
Venture Out	Cudjos Key	NA	Lower Keys	60 R.V./Trailer Sites, 60 Tables, Boat Ramp, swimming Pool, Tennis Court, Basketball Goal, 6 Shuffleboard Courts, Multipurpose Building, 2 Recreation Centers	Resource	Activity
KOA Campground	Upper Sugarloaf Key	NA	Lower Keys	150 R.V./Trailer Sites, 200 Tables, Beach, Boat Ramp, Marina	Resource	NA
Lazy Lakes Campground	Sugarloaf Key	NA	Lower Keys	100 R.V./Trailer Sites, 100 Tables, Basketball Goal, Recreation Center	Resource	Activity
Geiger Key Marina and Travel Park	Geiger Key	NA	Lower Keys	35 R.V./Trailer Sites, 2 Cabins, 35 Tables, 2 Boat Ramps, Marina, Recreation Center	NA	Activity
Boyd's Campground	Stock Island	NA	Lower Keys	100 R.V./Trailer Sites, 20 Tent Sites, 100 Tables, Shelter, Beach, Boat Ramp, Marina, Recreation Center	NA	Activity
Leos Campground	Stock Island	NA	Lower Keys	10 R.V./Trailer Sites, 12 Tent Sites, Boat Ramp, Marina	NA	Activity
Subtotals					0.00	0.00

Table 13.10 – Privately-Owned Recreation Lands and Facilities (continued)

Name	Location/ Subdivision	Mile Marker	ROSPA	Facilities	Classification	
					Resource	Activity
Private Resorts						
Ocean Reef Club	North Key Largo	NA	Upper Keys	Beach, Swimming Pool, 16 Tennis Courts, Equipped Play Area	NA	Activity
Holiday Isle Resort and Marina	Windley Key	106.0	Upper Keys	Beach, Boat Ramps, Marina, Swimming Pool,	NA	Activity
Amy Slate's Amoray Dive Resort	Key Largo	104.5	Upper Keys	Swimming Pool, Beach, Dock, Marina, Picnic	NA	Activity
Marriott's Key Largo Bay Beach Resort	Key Largo	103.8	Upper Keys	Swimming Pool, Tennis Court	NA	17.0
Jule's Undersea Lodge	Off Key Largo	103.2	Upper Keys	Unique underwater accommodations, Diving	NA	Activity
Tarpon Flats Inn	Key Largo	103	Upper Keys	Marina, Commercial Dock	NA	Activity
Key Largo Resort at Manatee Bay	Key Largo	102	Upper Keys	Beach, Swimming Pool	NA	Activity
Largo Lodge	Key Largo	101.7	Upper Keys	Boat Ramp, Dockage	NA	Activity
Marina Del Mar/ Holiday Inn/ Ramada Inn	Key Largo	99.7	Upper Keys	Swimming Pool, 2 Tennis Courts, Commercial Dock, Marina, Play Equipment	NA	Activity
Sunset Cove Motel	Key Largo	99.3	Upper Keys	Boat Ramp, Dockage, Beach, Fishing Pier	NA	Activity
Hungry Pelican Motel	Key Largo	99.3	Upper Keys	Beach, Boat Ramp, Dockage, Picnic, Fishing Pier	NA	Activity
Kona Kai Resort	Key Largo	97.8	Upper Keys	Swimming Pool, Beach, Dockage, Tennis Court, Picnic	NA	Activity
Seafarer Resort & Dive Center	Key Largo	97.6	Upper Keys	Beach, Picnic, Dockage	NA	Activity
Mariner's Resort Villa & Marina	Key Largo	97.5	Upper Keys	2 Swimming Pools, 2 Tennis Courts	NA	Activity
Key Largo Grande Resort/Hilton	Key Largo	97.0	Upper Keys	Beach, Trails, 2 Swimming Pools, Tennis Court, Dock	NA	12.5
Ocean Pointe Suite Resort	Key Largo	92.5	Upper Keys	Swimming Pool, Beach, Trails, 2 Tennis Courts, Picnic, Boat Ramp, Marina	NA	Activity
Atlantic Bay Resort	Key Largo	92.5	Upper Keys	Swimming Pool, 2 Boat Ramps, Dockage, Beach	NA	3.0
Lookout Lodge Resort	Plantation Key	87.7	Upper Keys	Beach, Picnic, Dockage	NA	Activity
Pelican Cove Resort & Marina	Upper Matecumbe Key	84.5	Upper Keys	Beach, Swimming Pool, Play Equipment, Volleyball, Dockage	NA	Activity

Table 13.10 – Privately-Owned Recreation Lands and Facilities (continued)

Name	Location/ Subdivision	Mile Marker	ROSPA	Facilities	Classification	
					Resource	Activity
Chesapeake Beach Resort	Upper Matecumbe Key	83.4	Upper Keys	Beach, Boat Ramp, Dockage, Play Equipment	NA	6.5
Ocean Dawn Suites	Upper Matecumbe Key	82.9	Upper Keys	Swimming Pool, Tennis Court, Beach	NA	Activity
Casa Morada	Upper Matecumbe Key	82.2	Upper Keys	Swimming Pool, Tennis Court, Play Equipment	NA	2.0
Cheeca Lodge	Village of Islamorada (Upper Matecumbe Key)	82	Upper Keys	Beach, Fishing Piers, 2 Swimming Pools, 6 Tennis Courts, Equipped Play Area, Golf Course, Dockage	NA	27.0
Whale Harbor Resort	Village of Islamorada (Upper Matecumbe Key)	82	Upper Keys	Beach, Marina, Swimming Pool, Shuffleboard Court	Resource	Activity
Plantation Yacht Harbor and Marina	Village of Islamorada (Upper Matecumbe Key)	82	Upper Keys	5 Tables, Boat Ramp, Marina, Swimming Pool, 4 Tennis Courts, Basketball, Recreation Building, 6 Shuffleboard Courts, Multipurpose Building,	NA	Activity
The Moorings Village Resort	Upper Matecumbe Key	81.5	Upper Keys	Swimming Pool, Tennis Court, Dock	NA	18.0
Kon-Tiki Resort	Upper Matecumbe Key	81.2	Upper Keys	Beach, Swimming Pool, Pier, Dockage, Boat Ramp	NA	Activity
Hampton Inn & Suites	Upper Matecumbe Key	80.0	Upper Keys	Swimming Pool, Dock	NA	Activity
Breezy Palms Resort	Upper Matecumbe Key	80.0	Upper Keys	Beach, Swimming Pool, Picnic, Volleyball, Dock	NA	Activity
Matecumbe Resort	Lower Matecumbe Key	76.5	Upper Keys	Beach, Boat Ramp, Dockage, Volleyball, Swimming Pool	NA	3.8
White Gate Court	Lower Matecumbe Key	76.0	Upper Keys	Beach, Dockage	NA	3.0
Tropic Aire Resort	Lower Matecumbe Key	75.8	Upper Keys	6 Tables, Shelter, Beach, 2 Boardwalk/Catwalks	NA	Activity
Coral Bay Resort	Lower Matecumbe Key	75.6	Upper Keys	Beach, Swimming Pool, Pier, Dockage, Boat Ramp	NA	4.0
Topsider Resort	Lower Matecumbe Key	75.5	Upper Keys	Swimming Pool, Tennis Court, Play Equipment, Picnic, Pier, Dockage	NA	2.0
Caloosa Cove Resort & Marina	Lower Matecumbe	73.8	Upper Keys	Marina, Swimming Pool, Tennis Court, Beach, Picnic, Play Equipment	NA	10.0
Zane Grey Inn	Long Key	68.5	Middle Keys	Swimming Pool, Dockage	NA	Activity

Table 13.10 – Privately-Owned Recreation Lands and Facilities (continued)

Name	Location/ Subdivision	Mile Marker	ROSPA	Facilities	Classification	
					Resource	Activity
Conch Key Cottages	Walker's Island	62.3	Middle Keys	Swimming Pool, Boat Ramp, Marina	NA	Activity
Hawk's Cay	Duck Key	61.0	Middle Keys	Boat Ramp, Marina, Beach, Tennis Courts	NA	60.0
Tarpon Lodge	Vaca Key (Marathon)		Middle Keys	15 Tables, Boardwalk, Boat Ramp, Marina, Swimming Pool, Tennis Court	NA	Activity
Gulf View Waterfront Resort	Grassy Key	58.5	Middle Keys	Swimming Pool, Boat Ramp, Dockage, Beach	NA	Activity
Casa Del Sol Beach Resort	Grassy Key	58.2	Middle Keys	Swimming Pool	NA	Activity
Bonefish Resort	Grassy Key	58.0	Middle Keys	Swimming pool, Beach, Picnic	NA	Activity
Rainbow Bend Resort	Grassy Key	58.0	Middle Keys	Swimming Pool, Beach, Pier, Dockage	NA	Activity
Yellowtail Inn	Grassy Key	58.0	Middle Keys	Swimming Pool, Beach, Pier, Picnic	NA	Activity
White Sands Inn	Grassy Key	57.6	Middle Keys	Swimming Pool, Beach, Picnic, Dock	NA	Activity
Cocoplum Beach and Tennis Club	Vaca Key (Marathon)	54.5	Middle Keys	Swimming Pool, Tennis Court, Volleyball	NA	Activity
Sea Isles Condo	Key Colony Beach	54.0	Middle Keys	Swimming Pool, Beach, Picnic, Shuffleboard	NA	Activity
Continental Inn	Key Colony Beach	54.0	Middle Keys	Swimming Pool, Beach, Tennis Court	NA	Activity
Key Colony Beach Motel	Key Colony Beach	54.0	Middle Keys	Swimming Pool, Beach	NA	Activity
Coral Lagoon Resort and Marina	Vaca Key (Marathon)	53.5	Middle Keys	Marina, Swimming Pool, 2 Tennis Courts	NA	6.0
Ocean Isles Fishing Village	Vaca Key (Marathon)	53.0	Middle Keys	Boat Ramp, Beach, Swimming Pool, Recreation Area, Boardwalk, Marina, Picnic	NA	Activity
Indigo Reef Marina Homes Resort	Vaca Key (Marathon)	53.0	Middle Keys	Swimming Pool, Dockage	NA	15.0
Tropical Cottages	Vaca Key (Marathon)	50.5	Middle Keys	Boat Ramp, Dockage	NA	Activity
The Reef Resort	Vaca Key (Marathon)	50.5	Middle Keys	Swimming Pool, Picnic, Marina, 2 Tennis Courts	NA	6.0
Sombrero Resort and Lighthouse Marina	Vaca Key (Marathon)	50.0	Middle Keys	4 Tennis Courts, 18 Hole Regulation Golf Course, Swimming Pool, Marina, Boat Ramp	NA	Activity
Banana Bay Resort & Marina	Vaca Key (Marathon)	49.5	Middle Keys	Swimming Pool, Tennis Court, Play Equipment, Marina, Beach	NA	10.0

Table 13.10 – Privately-Owned Recreation Lands and Facilities (continued)

Name	Location/ Subdivision	Mile Marker	ROSPA	Facilities	Classification	
					Resource	Activity
Marathon Key Beach Club	Vaca Key (Marathon)	49.5	Middle Keys	Swimming Pool, Tennis Court, Marina, Beach	NA	Activity
The Blackfin Resort	Vaca Key (Marathon)	49.5	Middle Keys	Beach, Picnic, Marina, Swimming Pool	NA	4.5
Crystal Bay Resort	Vaca Key (Marathon)	49.0	Middle Keys	Play Equipment, Picnic, Swimming Pool, Boat Ramp, Marina, Pier	NA	Activity
Buccaneer Lodge Resort	Vaca Key (Marathon)	48.5	Middle Keys	Beach, Boardwalk, Boat Ramp, Swimming Pool, 2 Tennis Courts, Shuffleboard Courts, Equipped Play Area, 2 Volleyball Courts, Dockage	NA	10.0
Tranquility Bay Beach House Resort	Vaca Key (Marathon)	48.5	Middle Keys	2 Beaches, 2 Swimming Pools	NA	12.0
Blue Waters Resort Motel	Vaca Key (Marathon)	48.5	Middle Keys	Swimming Pool, Boat Basin	NA	Activity
Faro Blanco Marina Resort	Vaca Key (Marathon)	48.5	Middle Keys	2 Marinas, Swimming Pool, Boat Ramp, Picnic, Play Equipment	NA	Activity
The Hammocks at Marathon	Vaca Key (Marathon)	48.2	Middle Keys	Marina,	NA	Activity
Marathon Yacht Club	Vaca Key (Marathon)	48.0	Middle Keys	2 Tennis Courts, Basketball Court, Teen Club, Boat Ramp	NA	Activity
Big Pine Key Fishing Lodge	Big Pine Key	33.0	Lower Keys	Swimming Pool, Camping, Marina	NA	Activity
Little Palm Island	Little Torch Key	28.5	Lower Keys	Swimming Pool	NA	5.0
Parmer's Resort	Little Torch Key	28.5	Lower Keys	Swimming Pool, Dockage	NA	Activity
Dolphin Marina and Cottages	Little Torch Key	28.5	Lower Keys	Marina, Dockage, Boat Ramp	NA	Activity
Mariner Resort and Marina	Big Pine Key	NA	Lower Keys	Beach, Boat Ramp, Marina, Swimming Pool, 2 Tennis Courts, Multipurpose Building	NA	Activity
Sugarloaf Lodge	Sugarloaf Key	15.0	Lower Keys	Beach, 2 Boat Ramps, Marina, Swimming Pool, 2 Tennis Courts, Shuffleboard Court, Multipurpose Building	NA	Activity
Beachside MarrIott	Key West Island, Key West	NA	Lower Keys	Swimming Pool, Beach	NA	Activity
Casa Marina Resort & Beach Club	Key West Island, Key West	NA	Lower Keys	Beach, 2 Swimming Pools, 2 Tennis Courts	NA	Activity

Table 13.10 – Privately-Owned Recreation Lands and Facilities (continued)

Name	Location/ Subdivision	Mile Marker	ROSPA	Facilities	Classification	
					Resource	Activity
Doubletree Grande Key Resort	Key West Island, Key West	NA	Lower Keys	Swimming Pool	NA	Activity
Hyatt Key West Resort & Spa	Key West Island, Key West	NA	Lower Keys	Beach, Swimming Pool	NA	Activity
Ocean Key Resort & Spa	Key West Island, Key West	NA	Lower Keys	Swimming Pool, Marina	NA	Activity
Orchid Key Inn	Key West Island, Key West	NA	Lower Keys	Swimming Pool	NA	Activity
Parrot Key Resort	Key West Island, Key West	NA	Lower Keys	Beach, 4 Swimming Pools	NA	Activity
Pier House Resort & Caribbean Spa	Key West Island, Key West	NA	Lower Keys	Beach, Swimming Pool	NA	Activity
The Reach Resort	Key West Island, Key West	NA	Lower Keys	Beach, Swimming Pool	NA	Activity
Sheraton Suites Key West	Key West Island, Key West	NA	Lower Keys	Swimming Pool	NA	Activity
Sunset Key Guest Cottages	Key West Island, Key West	NA	Lower Keys	Beach, Swimming Pool, 2 Tennis Courts	NA	Activity
Truman Hotel	Key West Island, Key West	NA	Lower Keys	Swimming Pool	NA	Activity
The Westin Key West Resort & Marina	Key West Island, Key West	NA	Lower Keys	Marina, Swimming Pool	NA	Activity
Curry Mansion Inn	Key West Island, Key West	NA	Lower Keys	Swimming Pool	NA	Activity
Island City House Hotel	Key West Island, Key West	NA	Lower Keys	Swimming Pool	NA	Activity
Heron House Court	Key West Island, Key West	NA	Lower Keys	Swimming Pool	NA	Activity
The Gardens Hotel	Key West Island, Key West	NA	Lower Keys	Swimming Pool	NA	Activity
Lighthouse Court	Key West Island, Key West	NA	Lower Keys	Swimming Pool	NA	Activity
The Marquesa Hotel	Key West Island, Key West	NA	Lower Keys	2 Swimming Pools	NA	Activity
The Mermaid & the Alligator	Key West Island, Key West	NA	Lower Keys	Swimming Pool	NA	Activity
The Palms Hotel	Key West Island, Key West	NA	Lower Keys	Swimming Pool	NA	Activity
The Paradise Inn	Key West Island, Key West	NA	Lower Keys	Swimming Pool	NA	Activity
Pilot House Guesthouse	Key West Island, Key West	NA	Lower Keys	Swimming Pool	NA	Activity

Table 13.10 – Privately-Owned Recreation Lands and Facilities (continued)

Name	Location/ `Subdivision	Mile Marker	ROSPA	Facilities	Classification	
					Resource	Activity
Simenton Court Historic Inn and Cottages	Key West Island, Key West	NA	Lower Keys	4 Swimming Pools	NA	Activity
Travelers Palm Tropical Suites	Key West Island, Key West	NA	Lower Keys	Swimming Pool, Picnic	NA	Activity
Weatherstation Inn	Key West Island, Key West	NA	Lower Keys	Swimming Pool	NA	Activity
Westwinds Inn	Key West Island, Key West	NA	Lower Keys	Swimming Pool	NA	Activity
Alexander's Guesthouse	Key West Island, Key West	NA	Lower Keys	Swimming Pool	NA	Activity
Big Ruby's	Key West Island, Key West	NA	Lower Keys	Swimming Pool	NA	Activity
Equator Resort	Key West Island, Key West	NA	Lower Keys	Swimming Pool	NA	Activity
Oasis Guesthouse & Coral Tree Inn	Key West Island, Key West	NA	Lower Keys	Swimming Pool	NA	Activity
Pearl's Rainbow	Key West Island, Key West	NA	Lower Keys	2 Swimming Pools	NA	Activity
Subtotals					0.00	237.30
Golf Courses						
Ocean Reef Golf Course	North Key Largo	SR 905	Upper Keys	3- 18 Hole Golf Courses, Club House, Cart Rentals	NA	Activity
Angler's Club	North Key Largo	100	Upper Keys	Par 3/Executive Golf Course	NA	Activity
Key Colony Beach Golf Club	Key Colony Beach	53	Upper Keys	Par 3/Executive Golf Course	NA	Activity
Cheeca Lodge	Village of Islamorada	82	Middle Keys	Par 3/Executive Golf Course	NA	Activity
Sombrero Beach	Sombrero Golf Course	55	Lower Keys	18 Holes, Club House, Cart Rentals	NA	Activity
Stock Island	Key West Golf Course	5	Lower Keys	18 Holes, Club House, Cart Rentals	NA	Activity
Subtotals					0.00	0.00
Grand Totals					0.00	237.30
Note: Acreages are given when they were able to be found, however these acreages are not used in any of the Element's update or LOS calculations.						
Sources: Monroe County Growth Management Division; *Insider's Guide to Florida Keys and Key West* by Nancy Toppino, 2010; *Fodor's In Focus Florida Keys, 2009*						

Table 13.11 – State of Florida Recreation Guidelines (SCORP 2008) vs. Monroe County LOS

Activity	Resource/Facility (measurement)	Population Served			Monroe Cty. LOS (Funct. Pop.)
		Maximum	Minimum	Median (2)	
Baseball/Softball Fields	per field	10,000	2,000	5,000	5,000
Basketball	per court	20,000	500	5,000	5,000
Football/Soccer/Rugby	per field	25,000	4,000	6,000	6,000
Tennis Courts	per court	10,000	1,067	2,000	2,000
Volleyball	per court	12,000	4,000	6,000	6,000
Racquetball/Handball	per court	20,000	2,500	10,000	10,000
Shuffleboard	per court	12,000	1,000	6,000	6,000
Equipped Play Areas	per play area	15,000	5,000	10,000	10,000
Multi-purpose Court	per court	4,000	3,000	3,500	3,500
Golf	per 9 hole course	50,000	8,000	25,000	25,000
	per 18 hole course	62,200	25,000	50,000	50,000
Swimming Pool (1)	per pool	50,000	1,000	25,000	25,000
Picnic Areas	per area	10,000	5,000	6,000	6,000
Camping (RV, trailer, tent)	per acre of camp area	25,000	5,600	6,750	6,750
Saltwater Fishing (non-boat)	per 800 feet of pier, catwalk, jetty	25,000	5,000	5,600	5,600
Boat Ramp	per ramp	12,500	1,500	5,000	5,000
Physical Exercise (jogging, parcourse)	per facility	50,000	10,000	15,000	15,000
Nature Study	per mile of trail	10,000	6,250	6,750	6,750
Hiking	per mile of trail	10,000	5,000	6,750	6,750
Bicycling	per mile of trail	10,000	1,500	5,000	5,000
Sandy Beach	per mile of beach	211,200	25,000	25,000	100,000

(1) Based on a standard pool of 4800 square feet.

(2) Monroe County uses the median population of SCORP, except in beach area where the standard of 100,000 has been adopted. However, Monroe County's *Parks and Recreation Master Plan* (draft 2005) indicates that the adopted LOS in the 2010 Comprehensive Plan is 1 Baseball/Softball field per 7,000 functional population and that the LOS for Tennis Courts is 1 per 6,000 functional population. The MCPRMP 2005 has not been adopted as of March 2011.

Source: (adapted from): *Outdoor Recreation in Florida, (final draft) SCORP 2008*, Appendix D

Table 13.12 - Summary of Existing Recreation and Open Space Areas Provided in Monroe County

Facilities Ownership	Mainland ROSPA (Acres)	Upper Keys ROSPA (Acres)	Middle Keys ROSPA (Acres)	Lower Keys ROSPA (Acres)	Totals (Acres)
Resource-Based					
Monroe County-Owned (1)	0.0	18.2	10.6	74.9	103.7
Monroe County-Leased (2)	0.0	6.1	0.0	7.2	13.3
School Board-Owned (3)	0.0	0.0	0.0	0.0	0.0
City-Owned (4)	0.0	0.0	49.1	16.0	65.1
Beaches (5)	0.0	2,318.2	351.2	8,019.5	10,688.9
Roadside and Bridge	1.5	4.5	9.7	13.6	29.3
Privately-Owned (6)	0.0	0.0	0.0	0.0	0.0
Totals	1.5	2,347.0	420.6	8,131.2	10,900.3
Activity-Based					
Monroe County-Owned (1)	0.0	35.0	10.0	67.0	112.0
Monroe County-Leased (2)	0.0	6.0	0.0	6.1	12.1
School Board-Owned (3)	0.0	52.0	34.2	106.0	192.2
City-Owned (4)	0.0	0.0	91.4	24.6	116.0
Privately-Owned (6)	0.0	0.0	0.0	0.0	0.0
Totals	0.0	93.0	135.6	203.7	432.3

Note: This table is a summary of Tables 13.5, 13.6, 13.7, 13.8, 13.9, and 13.10. Included in this table are:

(1) Lands owned by Monroe County but not the Monroe County Land Authority (MCLA)

(2) Lands leased by Monroe County

(3) Lands governed by an inter-local agreement between MC and the Monroe County School District (MCSD)

(4) Lands owned by one of the 5 Incorporated within Monroe County but available to the MC population

(5) Lands for this category exclude all activity-based uses for each site but include all other lands as resource-based, and also include Federal, State, County, and incorporated City lands at each site.

(6) For this table, Privately-owned lands are not tabulated.

13.3 Recreation Demands

The County, as the local government, under Florida's SCORP is required to establish LOS standards for recreation lands and facilities, in order to ensure planning for adequate recreation and open space facilities that will be provided to support present and future development and population. For recreation lands and facilities, the LOS standard represents the minimum amount of recreation lands and facilities that should be provided by the County to meet the estimated demand for not only the land area but the various types of recreational activities (facilities).

Because recreational preferences vary based on such factors as age, sex, and income, it is extremely difficult to accurately estimate existing and future demand for recreation areas and facilities. For this reason, population based acreage and facility standards are commonly used as a guideline to determine general land area and location requirements for various types of park and recreation areas. These general requirements are later used in conjunction with research on specific local area population characteristics and preferences and the natural resource characteristics of potential recreation and open space sites to determine the appropriate size, location, and facility requirements of specific recreation areas.

The following sections discuss recreational opportunities desired by the County residents, State of Florida LOS guidelines, the LOS standards adopted by the Board of County Commissioners, and the ability of the County to provide adequate recreation lands and facilities based upon the adopted LOS standards.

13.3.1 General Recreation Demands

The combination of climate, clean waters, coral reefs, abundant fish and wildlife and accessibility are the main attractions to both visitors and permanent residents of the Florida Keys. There are currently over 4.07 million acres of publicly-owned conservation lands and waters in the County (including the Mainland ROSPA), primarily providing both water-dependant and water-related recreational opportunities.

For this update, the Monroe County 2010-2030 Population Projections, March 15, 2011 by Fishkind & Associates and Keith and Schnars, PA (MCPP 2011) was used as a basis for both resident, seasonal and functional populations for years indicated.

Using the 2010 functional population of 138,803, this translates into approximately 29,490 acres of conservation and recreation lands and waters/1,000 functional population. Based upon this simple calculation of the demand for recreational land there seems to be more than enough for the permanent residents and visitors to the County. However, the majority of the 4.07 million acres are conservation lands and a calculation for recreation lands and facilities is extremely important to the recreation/tourism industry of the County. Equally as important is the provision for a variety of recreational opportunities to the County functional population. In general, residents have indicated that there is a shortage of activity-based

recreation areas in the County. Recreational facilities frequently citied as being in short supply included baseball/softball fields, football/soccer fields, equipped play areas, boat ramps, and physical exercise courses.

13.2.2 State of Florida Recreation Guidelines

The Florida Department of Environmental Protection (FDEP) *Outdoor Recreation in Florida 2008* (ORF 2008), classifies several types of community recreation areas and facilities which are typically considered in a County-wide Recreation and Open Space Element. These guidelines and descriptions provide a relative basis for review of the adequacy of recreational opportunities available for the County residents. However, the report indicates that these guidelines may not apply to all communities in Florida.

- "The guidelines presented in this plan are intended for broad, statewide application, and make no allowances for localized differences in communities or in specific outdoor recreation environments. As a result, these guidelines may not be wholly applicable in any given instance and should not generally be applied without some modification. Local jurisdictions particularly are encouraged to develop their own guidelines to more adequately reflect local conditions in determining recreation needs" (Florida DNR, 1989).

It should be noted also, the guidelines described in the ORF 2008 are typical of urban metropolitan areas, and therefore, due to the unique environment, geographic isolation, non-metropolitan character, and presence of extensive marine resources for recreation and environmental preservation in the County and the Florida Keys, these guidelines may not prove to be a realistic portrayal of recreational behavior, needs, and preferences for the permanent residents of and visitors to the County. Recreation and open space guidelines typically recommend a system of parklands and recreational facilities. A system typically ranges from small, densely developed mini parks serving a local population to large regional parks which include significant environmental and historic resources and attract visitors from a large service area. These guidelines are not always applicable to the County for the following reasons:

- Due to the natural resource characteristics of the County, both the permanent resident and seasonal population recreational preferences are for water-oriented recreational activities such as boating, fishing, and scuba-diving to which public access is readily available (See **Table 13.13**);

- The County's functional population has a very high proportion of seasonal visitors (Over 40 percent in 2010) whose recreation needs are often met by the private or resort facilities (see **Table 13.14**); and

- Recreation guidelines are typical of the recreational needs of urban metropolitan areas, and therefore may overstate the needs of less densely developed areas, such as the County. As stated in *Outdoor Recreation in Florida 1989*, the "need (for recreation opportunities) exists primarily in the urban areas, and increases in proportion to the degree of urbanization."

Table 13.13 – Water-Oriented Public Access Recreational Facilities Summary

Facilities	No. of Facilities				
	Mainland	Upper Keys	Middle Keys	Lower Keys	Totals
Marinas & Dockage	1	72	55	30	158
Boat Ramps	5	45	25	42	117
Fishing Piers & Boardwalks	1	23	15	11	50
Public & Commercial Docks	1	4	1	3	9
Beaches, Shorelines Waterfront Parks	1	22	6	15	27
Scenic Overlooks	1	1	1	2	5

Note: Facilities indicated above are publicly-owned facilities plus privately-owned facilities which allow public access with or without a fee paid. Included are sites in the unincorporated County and the incorporated cities as well as the federal and State-owned facilities, and private conservation owned facilities.

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Table 13.14 – Monroe County – Population Calculations (2010) Including Cities for ROSPA

County Permanent Population	Unincorporated County Permanent Population	Cities Permanent Population (Difference)	Cities Permanent Population	Cities Seasonal Population	Unincorporated County Seasonal Population	County Seasonal Population
82601	35368	47233	NA	20762	35440	56202
		8002	Upper Keys- Vill. of Islamorada	-		
		202	Middle Keys- Layton	-		
		10496	Middle Keys- Marathon	5078		
		832	Middle Keys-Key Colony Beach	1768		
		27701	Lower Keys- Key West	13,916		

- The County's significant tourist population and age demographics would point to recreation needs for more facilities in the areas of small groups or individuals rather than larger gathering type facilities such as team sports; football, soccer, baseball etc. These later types of recreation facilities are generally provided in the County at the school sites.
- The SCORP 2008 typical system of park lands and its applicability to the County is discussed below.

13.3.2.1 Mini Parks

Mini parks are typically small (less than 1 acre) recreation areas developed with specialized facilities, such as equipped play areas. The SCORP guidelines suggest that between 0.25 and 0.5 acres of mini parks per 1,000 population be provided for a service area of less than one-quarter of a mile. According to the National Recreation and Park Association (NRPA), mini parks are typically sited within densely developed neighborhoods in close proximity to apartment complexes, townhouse development or housing for the elderly (NRPA, 1983). The purpose of mini parks is to provide relief from an urban setting at a local level and to provide public open space in densely developed areas in which there is very little private open space (i.e., front and back yards).

Mini parks are not considered to be a necessary component of a park system for the County. *The Monroe County Parks and Recreation Master Plan* (MCPRMP draft 2005) has not addressed mini parks. In general, the County has low population densities and there is a substantial amount of both public and private open space to provide relief to the County residents. The County largely consists of single-family residences, which provide a substantial amount of private open space approximately equal to that required by local

mini park. Although there are some townhouse and apartment complexes in the County, they are generally not situated in close proximity to each other or at a density sufficient to justify the establishment of a LOS standard for mini parks. The County's park system provides facilities, such as would be found in the Mini Park, in their other park lands and almost all the private tourist oriented businesses (hotels, camp grounds, resorts) provide recreation facilities such as swimming pools, play equipped areas, and picnic areas. Additionally there are numerous isolated mini park-type facilities within the County, such as boat ramps, fishing docks, scenic bridges, and historic landmarks, that fill the mini park need in the unique character of the Florida Keys.

13.3.2.2 Neighborhood Parks

Neighborhood parks generally range from 2 to 10 acres in size and provide areas for recreational activities such as court and field games. The SCORP guidelines suggest that between 1 and 2 acres per 1,000 population be provided within a ½ mile service area radius with a population of 5,000. According to the NRPA, neighborhood parks generally service a neighborhood population and are often associated with schools. In the County, the service population is spread out linearly and application of the ½ mile radius is not practical. Many of the bridged water gaps between the individual keys often exceed ½ mile.

However, neighborhood-type parks are an important element in the County's park system. Still the residents generally feel that there is a shortage of activity-based recreation areas which contain facilities such as ballfields. The typical concentration of population-based criteria may not apply in the County since "neighborhoods" are generally spread out due to the narrow configuration of the Keys and population densities do not approach 5,000 per 1/2 mile except in only 2 of the 5 the incorporated cities (Marathon and Key West).

In general, within the County the type of facility and the service population of the neighborhood park are incorporated into either a larger or smaller site or an associated school site than the NRPA guidelines indicate. For this reason also, the MCPRMP 2005 did not set up a hierarchy of parks. The LOS standard for neighborhood parks has been applied to all parks, regardless of size, to ensure recreation lands and facilities for the population.

13.3.2.3 Community Parks

Community parks generally service a population between 5,000 and 25,000 people within a radius of between 3 and 12 miles; the SCORP guidelines suggest that approximately 2 acres of community parks per 1,000 population be provided. Community parks typically include areas of diverse environmental quality, such as forested areas for walking, viewing, and picnicking, as well as areas typically found in neighborhood parks that are suited for intense recreational facilities. As with neighborhood parks, the typical population-based criteria, generally does not apply in the County due to the low population densities and the linear configuration of the Keys.

Community parks are generally at least 20 acres in size based on NPRA standards. The County has very few contiguous tracts of land that meet this size requirement that are not already dedicated regional level facilities of the Federal or State government. Due to this large number of resource-based regional parks; the low population density of the County; and linear service area as a result of the Keys configuration, community parks within the County generally resemble the traditional definition of a neighborhood park in terms of size, location and programming.

13.3.2.4 Regional Parks

Regional parks generally service several communities within a 30 minute to 1 hour drive. The SCORP guidelines suggest that approximately 20 acres/1,000 population be provided. Regional parks are generally larger than 200 acres and contain areas of natural quality for nature-oriented outdoor recreation. Generally, 80 percent of the land is reserved for conservation and natural resource management, with less than 20 percent used for recreation development. According to ORF 2008, the provision of resource-based recreation areas, such as regional parks, is largely considered the responsibility of state and local governments due to the broad natural resource implications, the extensive land requirements, and usually greater costs of the lands.

Numerous recreational areas within the County can be classified as regional parks by acreage (see **Tables 13.1, 13.2,** and **13.3**). All of these recreation sites throughout the County including the Mainland, Upper, Middle and Lower Keys have both conservation lands and resource-based lands.

The following two calculations on Federal and State Regional Parks were based on one-half the functional population of the County (69,400) for 2010. The regional parks of the County are located within a 1 hour drive from the center of the County (geographically in the MKROSPA). These show the significant abundance of Regional Parks available to the functional population in the County.

The Everglades National Park located in the MROSPA, alone has over 800,000 acres of upland conservation lands and the Big Cypress Preserve adds another 127,000 acres of land. These two regional parks equate to over 6675 acres per 1,000 function population for the entire County for 2010. In addition, these two parks are within a two hour drive of all of the Upper Keys, and most of the Middle Keys ROSPA.

In the UKROSPA, the Crocodile Lake National Wildlife Refuge, the John Pennekamp Coral Reef State Park, the Key Largo Hammock Botanical State Park, the Windley Key Fossil Reef Geological State Park, the Cowpens Rookery Preserve, the North Key Largo Hammock, and the Port Bougainville State Park equals approximately 24,000 acres of regional park or 345acres per 1,000 functional population. The Long Key State Park, the Curry Hammock State Park, the Lignumvitae Key Botanical State Park, and the Indian Key State Historic Site within the MKROSPA equal approximately 9,051 acres of regional park or 130 acres per 1,000 functional population. There is a total of 475 acres of Regional Park for 1,000 functional population in the upper one-half of the Keys.

In the LKROSPA, the Bahia Honda State Recreational Area (Park), the Key West National Wildlife Refuge, Coupon Bight State Aquatic Preserve, Florida Keys National Marine

Sanctuary, the Looe Key National Marine Sanctuary, the Great White Heron National Wildlife Refuge, the National Key Deer Wildlife Refuge, the Ft. Jefferson National Monument & Dry Tortugas National Park, and the Ft. Zachary Taylor Historic State Park equals approximately 98,210 acres of regional park or 1415 acres per functional population in the lower Keys.

Even excluding the totals for Everglades National Park and the Big Cypress Preserve on the Mainland, the total regional park acreage equals over 131,000 acres for a LOS of 943 acres per 1,000 of functional population and 1.59 acres per permanent resident population for 2010. These regional lands, inventoried in **Table 13.1** and **Table 13.2,** provide, in addition to conservation lands, recreational facilities such as hiking, camping, boating, scenic views, biking, exercise, fishing and related activities.

Since the County has such as a large amount of both regional parks and large conservation areas which provide a substantial amount of resource-based recreation opportunities for the County residents, there is no need to establish a local LOS standard for regional parks because it has been determined that no additional facilities are required through the planning period.

13.3.2.5 Recreation Facilities

Recreation facilities are usually found within a park site, although the type, quantity, and location of recreational facilities depend on the activity and the demand generated by the users. Recreational facilities may include such activities as bike paths, tennis courts, shuffleboard, swimming pools, playing fields, marinas, boat ramps, or any special facility needed to support a specific recreational activity. In the case of the County, many of these special facilities are sited independently of a park facility. SCORP guidelines for recreational facilities of interest to the County are listed in **Table 13.11**.

For the purposes of the County, the 20 types of recreation facilities surveyed in ORF 2008 have been reduced to 17 (**Table 13.15**) "Shuffleboard" and "Multi-purpose Courts" have not been reported and "Hiking and Nature Study" have been combined. The population ranges in the table are published in ORF 2008 and are based on a survey of existing facilities in counties and cities throughout Florida. The table indicates the acceptable maximum and minimum numbers of people that should be served by one facility LOS. These guidelines have been provided for a broad range of minimum and maximum recreation facility standards that reflect the State of Florida in general. However, to reflect natural resource constraints and the need to tailor the provision of recreation facilities to the needs of County, different guidelines within these ranges may be chosen.

The County has adopted the median LOS standards for its facilities for all 17 reported, as recommended by the SCORP guidelines, except for "Beaches" facility category. In the beach category, because of the wide range between the maximum and minimum, (211,000 and 25,000 population) and LOS standards that the SCORP guidelines chose as a "median" (which is not in the middle of the range), another LOS standard seemed more appropriate. Therefore the County the LOS adopted is 1 mile per 100,000 population as its facility guideline, which is approximately in the middle of the 211,000 to 25,000 population range.

Table 13.15 – Existing Recreation Facilities (activity-based) and Level of Service by ROSPA 2010

2010	MROSPA 0 (funct. Pop)			UKROSPA 36982 (funct. Pop.)			MKROSPA 20559 (funct. Pop.)			LKROSPA 81262 (funct. Pop.)			MONROE CTY. 138803(funct. Pop.)		
Facilities & Level of Service	**Exist.**	**LOS**	Surp./ **Defic.**	**Exist**	**LOS**	Surp./ **Defic**	**Exis t**	**LOS**	Surp./ **Defic.**	**Exist.**	**LOS**	Surp./ **Defic**	**Exist.**	**LOS**	Surp./ **Defic**
Baseball/Softball Fields- 1 Field/ 5,000 pop.	0	0	0	12	7.4	4.6	7	4.1	2.9	13	16.3	**(-3.3)**	32	27.8	4.2
Football/Rugby/ Soccer Fields- 1 Field/6,000 pop.	0	0	0	1	6.2	**(-5.2)**	4	3.4	.6	7	13.5	**(-6.5)**	12	23.1	
Tennis Courts 1 Court/ 2,000 pop.	0	0	0	63	18.5	44.5	68	10.3	57.7	50	40.6	9.4	181	69.4	111.6
Equipped Play Areas- 1 Area /10,000 pop.	3	0	3	17	3.7	13.3	14	2.1	11.9	18	8.1	9.9	52	13.9	38.1
Picnic Areas- 1 Area /6,000 pop.	6	0	6	16	6.2	9.8	25	3.4	21.6	27	13.5	13.5	74	23.1	50.9
Sandy Beaches- 1 mi. /100,000 pop.	3 mi 1*	0	3 mi	3 mi 29*	.4 mi	2.6 mi	1 mi 20*	.2 mi	.8 mi	5 mi 30*	.8 mi	4.2 mi	12 mi 80*	1.4 mi	10.6 mi
Basketball Courts- 1 Court /5,000 pop.	0	0	0	13	7.4	5.6	19	4.1	14.9	23	16.3	6.7	55	27.8	27.2
Volleyball Courts- 1 Court /6,000 pop.	0	0	0	7	6.2	.8	5	3.4	1.6	7	13.5	**(-6.5)**	19	23.1	**(-4.1)**
Racquetball/ Handball Courts- 1 Court/10,000 pop.	0	0	0	4	3.7	.3	2	2.1	**.1**	3	8.1	**(-5.1)**	9	13.9	**(-4.9)**
Golf- 9 hole/25,000 pop. & 18 hole/50,000 pop.	0	0	0	5-18 hole 10	1.5	8.5	1-9 hole 1	.8	.2	2-18 hole 4	3.2	.8	15	5.6	9.4
Swimming Pools- 1 Pool /25,000 pop.	0	0	0	43	15	41.5	33	.8	32.2	18	3.3	14.7	94	5.6	88.4

Table 13.15 – Existing Recreation Facilities (activity-based) and Level of Service by ROSPA 2010 (continued)

2010	MROSPA 0 (funct. Pop)			UKROSPA 36982 (funct. Pop.)			MKROSPA 20559 (funct. Pop.)			LKROSPA 81262 (funct. Pop.)			MONROE CTY. 138803(funct. Pop.)		
Facilities & Level of Service	**Exist.**	**LOS**	Surp./ **Defic.**	**Exist**	**LOS**	Surp./ **Defic**	**Exist**	**LOS**	Surp./ **Defic.**	**Exist.**	**LOS**	Surp./ **Defic**	**Exist.**	**LOS**	Surp./ **Defic**
Boat Ramps- 1 Ramp /5,000 pop.	5	0	5	72	7.4	64.6	55	4.1	50.9	30	13.7	11.7	158	13.2	78.2
Bicycling- 1 mi. /5,000 pop.	6 mi 2*	0	6 mi	25 mi 2*	7.4 mi	17.6 mi	40 mi 1*	4.1 mi	35.9 mi	40 mi 1*	16.3 mi	23.7 mi	111 mi. 6*	27.8 mi.	83.2 mi.
Camping Areas- 1 ac./6,750 pop.	2	0	2	10	5.5	4.5	12	3.0	9.0	16	12	4.0	40	25.6	14.4
Fishing (non-boat)- 800 l.f. /5,650 pop.	4000 5*	0	4000	1100 0 62*	5240	5760	850 0 61*	2904	5596	1370 0 21*	115 04	2196	3720 0 l.f.	1965 6l.f.	12544 l.f.
Physical Exercise- 1 Course /15,000 pop.	0	0	0	2	2.5	**(-.5)**	1	1.4	**(-.4)**	4	5.4	**(-1.4)**	7	9.3	**2.3**
Hiking/ Nature Trails- 1 mi. /6,750 pop.	3.3 mi 8*	0	3.3 mi	16 mi 9*	5.5 mi	10.5 mi	3.2 mi 7*	3.0 mi	.2 mi	15.5 mi 9*	12.0	3.5 mi	38.0 mi.	20.6 mi.	17.4 mi.
* represents the number of facilities, not the length, deficits are noted in **(-bold).**															
Note: Bicycling, fishing (non-boat), and hiking are estimated miles based on the total miles reported.															
MROSPA = Mainland Recreation and Open Space Planning Area.															
UKROSPA = Upper Keys Recreation and Open Space Planning Area.															
MKROSPA = Middle Keys Recreation and Open Space Planning Area.															
LKOSPA = Lower Keys Recreation and Open Space Planning Area.															

13.3.3 Monroe County Level of Service Standards

As of this writing, the County has yet to adopt the neighborhood and community park and recreation facility LOS standards described in this section as reflective of the recreational needs of permanent residents of and seasonal visitors to the County. In its 1986 Comprehensive Plan, the County did adopt a LOS of 3 acres of neighborhood and community parks per 1,000 permanent resident population only. At that time, the County also did not have a Parks Master Plan and the Comprehensive Plan did not address LOS surplus or deficits for individual recreation facilities. Further, privately-owned tourist-oriented businesses and their recreation facilities were not included at that time in the calculations. The LOS standard for the County that was established in the 1990 update was:

- .82 acres per 1,000 permanent resident population for passive, resource-based neighborhood and community parks and;
- .82 acres per 1,000 permanent resident population for activity-based neighborhood and community parks.

The activity-based parks LOS standard was to be applied to each of the three subareas; Upper, Middle, and Lower Keys as well as the overall County. The LOS standard for the resource-based parks was applied to only the overall County. In 1990 there were 52,032 permanent residents and 43,110 seasonal residents and tourists, for a functional population of 95,142. The 3.0 acres per 1,000 population divided equally between resource-based and activity-based parks yielded 1.5 acres per 1000 functional population; however, since the requirement of Rule 9J-5, F.A.C., at that time was for permanent resident population only, the 1.5 acres was pro-rated to .82 acres per 1,000 permanent resident population (52,032 is 54.7 percent of the 95,142 functional population x 1.5 acres of each park type equaled .82 acres). As of this writing, the County has not adopted the recommended LOS standards as described in this update. However, for the balance of this update the LOS standards of 1.5 acres per 1000 functional population for each of the resource-based and activity-based recreational lands will be used.

The following factors now require a new LOS standard be adopted for the 2010-2030 update.

- The requirements of Rule 9J-5, FA.C. now require the LOS standards to be calculated on the functional population which is the permanent population plus the seasonal population;
- The actual recreational needs of the County must now address both the resource-based and the activity-based areas whereas before they were combined; and
- Individual park facilities (activities), whether oriented to resource-based or activity-based parks must be addressed to the new LOS standards established by the SCORP 2008.

For comparison to the 1990 population figures, in 2010 there are 82,601 permanent residents and 56,202 seasonal residents and tourists, for a functional total population of 138,803.

13.3.3.1 Mini Park Level of Service Standards

Since the categories of "mini parks" are provided by the large quantity of such uses as historical sites, boat ramps, bridges, old highways, marinas, piers, and even portions of privately-owned businesses, these were not considered in the LOS calculations. The facilities normally contained in a mini park are found in the County on portions of sites of larger size. Therefore a separate LOS calculation for mini parks will not be included in this update.

13.3.3.2 Neighborhood and Community Park Level of Service Standards

Although recreation guidelines typically recommend separate standards for neighborhood and community parks, it is more reasonable for the County to establish a single LOS standard for all local recreation areas whether they are Neighborhood or Community Parks due to the following factors:

- It is extremely difficult to provide traditional neighborhood parks in the County since "neighborhoods" are generally spread out due to the narrow configuration of the Keys and population densities are generally too low to support neighborhood parks at the local level;
- To compensate for the larger service area travel radii, caused by the configuration of the Keys, several relatively small (less than 10 acres) Neighborhood and Community Parks which provide activity-based recreation facilities rather than one large Community Park are provided throughout the County; and
- To avoid duplicating the provision of resource-based recreation areas that is already amply provided by State and Federal agencies.

In order to provide an adequate amount of the active-recreation areas, new LOS standards have been developed (but not adopted) for the County which:

- Recognize that the County is a popular place to live and visit because of the extensive amount of existing resource-based conservation and recreation open space areas which provide unique opportunities for popular activities;
- Specifically address the provision of activity-based recreation areas; and,
- Are applicable to the permanent resident and seasonal and tourist populations of the County.

The first step is to establish a LOS standard of 3 acres of parks (of all categories)/1,000 functional population. Since the permanent population and the seasonal population are nearly identical, there is no need to establish separate LOS for each population type. In order to ensure a balance between the provisions of resource and activity-based recreation areas

by the County, the second step is to divide the LOS standard of 3.0 acres/1,000 functional population equally between resource- and activity-based recreation areas. This will ensure that an appropriate balance of both resource and activity-based recreation areas will be provided in the County. Therefore, the LOS standards are as follows:

- 1.5 acres of resource-based recreation areas/1,000 functional population; and
- 1.5 acres of activity-based recreation areas/1,000 functional population.

The final step is to apply the population-based recreation area LOS standards to geographic service areas to ensure that residents have equal access to recreation areas in close proximity to their homes. The application of service areas to LOS standards is especially important in the case of activity-based recreation areas, since activity-based recreation areas can be provided anywhere for the convenience of the user. Activity-based recreation areas do not require an existing significant natural resource for location. Many of these facilities require only a certain amount of relatively flat land for construction of the facility such as a field. Although the application of service areas to the activity-based recreation area LOS standard in the County should be considered in planning future recreation areas, the application of service areas to the resource-based recreation area LOS standard is not necessarily as important for planning in the County for the following reasons:

- The application of service areas to LOS standards is most important in densely developed urban areas in which there is a relative shortage of privately-owned open space. However, the County predominantly consists of low density development and access to open space and resource-based recreation areas is not considered to be a problem;
- The acquisition of resource-based recreation areas is to protect the natural resources and takes precedence over the application of service areas to the proximity of population concentrations. The County is already well-serve by resource-based recreation lands (see **Table 13.16**); and
- The analysis of the application of service areas to resource-based recreation areas shows that the County functional population is generally within a 15 – 30 minute drive of these parks. Access to Florida Bay and the Atlantic Ocean as the largest and most unique natural resource-based publicly-owned recreation land and water in the United States is available to the resident and seasonal population within a few hundred yards on either side of US 1.

In addition to the activity-based and resource-based lands described above, the County also has a tremendous amount of unique open space in the form of open waters and "undevelopable" vacant land of the MCLA.

13.3.3.2.1 Resource-Based Recreation Area LOS Standard

As discussed above, the County functional population is provided with an abundance of resource-based recreation areas and with adequate open space access to all of these areas. Due to the abundance of recreational lands and waters, the LOS standard for resource-based recreation areas of 1.5 acres/1,000 functional population should appropriately be viewed from the County as a whole. Most of the larger resource-based parcels of lands actually service a population well outside of any particular Recreation and Open Space Planning Area; therefore **Table 13.16** does not breakdown the LOS requirements for each ROSPA.

13.3.3.2.2 Activity-Based Recreation Area LOS Standard

Locations for activity-based parks (mini, neighborhood or community) within the County, can be provided almost anywhere, but the population service areas associated with these parks are linear in nature rather than the traditional circular radius. The considerable distance between land areas, population groupings, presence of incorporated cities, and physical narrow land configurations allows for appropriate division of the cities and the unincorporated County lands into Recreation and Open Space Planning Areas (ROSPA). These ROSPA do not totally correspond to the service areas of these recreational lands but do give a better picture of the surpluses and deficiencies in each as shown in **Table 13.17**.

Table 13.16 – Resource Based Lands and Facilities Analysis County-Wide

Year	Monroe County Functional Population (1)	LOS (2) ac./ population	Demand Assessment (acres)	Existing Facilities (acres) (3)	Surplus or (Deficit) (acres) (4)
2010	138,803	1.5 ac./1000	208.35	10,900.30	10,691.95
2015	140,325	1.5 ac./1000	210.45	10,900.30	10,689.85
2020	143,979	1.5 ac./1000	215.85	10,900.30	10,684.45
2025	144,737	1.5 ac./1000	217.05	10,900.30	10,683.25
2030	145,507	1.5 ac./1000	218.25	10,900.30	10,682.05
(1) Includes functional population of the incorporated cities (Villages of Islamorada, Layton, Marathon, Key Colony Beach, and Key West).					
(2) The resource-based recreation land LOS of 1.5/1,000 population (functional) demand is applied to the entire County.					
(3) Includes owned or leased lands of Monroe County, Monroe County School Board, the Incorporated Cities, and Roadside and Bridge Table 13.12. Additionally, from Table 13.2 the resource lands of John Pennekamp State Park, Curry Hammock State Park, Bahia Honda State Park, Great White Heron National Wildlife Refuge, Ft. Zachary Taylor State Park, and Ft. Jefferson National Monument.					
(4) Acreage Surplus or (- Deficit) equals Demand Assessment less Existing Acreage. This column shows that there is a surplus resource-based acreage Monroe County over the LOS (1.5 ac./1,000 func. Pop.).					

The LOS standard for the activity-based lands of 1.5 acres per 1,000 functional population should be applied to each of the ROSPA and the County as a whole. Surpluses in land LOS

requirements should not be applied to make up deficits from one ROSPA to another. However, in relation to recreation facilities, surpluses of one type of facility in one ROSPA could be used to compensate for deficits in facilities in an adjacent ROSPA depending on the facility and the proximity to the next ROSPA. For example, a deficit in the Upper Keys in camping facilities could be compensated for by the camping areas on the Mainland or on the Middle Keys, since the service population for camping is 6,750 population and the Mainland has 0 population, and the Middle Keys has a functional population (2010) of 20,559.

13.3.3.3 Recreation Facilities Level of Service (LOS) Standards

The recreational facilities LOS standards have been adopted by the County based on the 2008 SCORP median standards with one exception (Beaches) which are shown in **Table 13.15** for the year 2010. Using the same standards, tables have been developed for each of the years 2015, 2020, 2025, and 2030. Without a County Master Park Plan wherein project facilities are shown for these years, each of these subsequent tables have been prepared as if no new facilities are planned and that each year's existing facilities are the same as the year 2010.

13.3.3.3.1 Keys Planning Areas

The County's Keys Planning Areas, which are for the unincorporated areas of the County needed to be modified for this updated element, as they did not include the 5 incorporated cities of the County. The cities were included in the closest Keys Planning Area for the purposes of calculations for population and LOS for the Recreation and Opens Space areas and facilities. As described in the Introduction to this element, Recreation and Open Space Planning Areas, called ROSPA, were created which incorporate the city lands and facilities with specific Mile Marker delineations.

As shown in **Table 13.18**, separate LOS standards are set for each of the four ROSPA's for the existing conditions for the year 2010. **Table 13.18** indicates how the permanent and seasonal populations for the inclusion of the incorporated cities and the County populations were combined. The population within each ROSPA were then calculated for the population projections for years 2015, 2020, 2025, and 2030. . It should be noted that these projected LOS through year 2030 for the selected recreational activities in the County are not to be used for concurrency purposes.

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Table 13.17 – Activity Based Lands and Facilities Analysis by Recreation and Open Space Planning Areas (ROSPA)

Year	Planning Area	Functional Population	LOS ac./ population	Demand Assessment (acres)	Existing Land (acres)	Surplus or Deficit (acres)
2010	Monroe County	138,803	1.5 ac./1000	208.35	434.10	225.75
	Mainland ROSPA	0	1.5 ac./1000	0.00	0.00	0.00
	Upper Keys ROSPA	36,982	1.5 ac./1000	55.47	93.00	37.53
	Middle Keys ROSPA	20,559	1.5 ac./1000	30.83	135.20	104.37
	Lower Keys ROSPA	81,262	1.5 ac./1000	121.90	203.70	81.82
2015	Monroe County	140,325	1.5 ac./1000	210.40	434.10	223.61
	Mainland ROSPA	0	1.5 ac./1000	0.00	0.00	0.00
	Upper Keys ROSPA	37,522	1.5 ac./1000	56.28	93.00	36.72
	Middle Keys ROSPA	21,005	1.5 ac./1000	31.51	135.20	103.69
	Lower Keys ROSPA	81,798	1.5 ac./1000	122.70	203.70	81.00
2020	Monroe County	143,979	1.5 ac./1000	215.97	434.10	218.13
	Mainland ROSPA	0	1.5 ac./1000	0.00	0.00	0.00
	Upper Keys ROSPA	40,322	1.5 ac./1000	60.48	93.00	32.52
	Middle Keys ROSPA	21,448	1.5 ac./1000	32.17	135.20	103.03
	Lower Keys ROSPA	82,209	1.5 ac./1000	123.31	203.70	80.39
2025	Monroe County	144,242	1.5 ac./1000	216.36	434.10	217.74
	Mainland ROSPA	0	1.5 ac./1000	0.00	0.00	0.00
	Upper Keys ROSPA	40,620	1.5 ac./1000	60.93	93.00	32.10
	Middle Keys ROSPA	21,502	1.5 ac./1000	32.25	135.20	102.95
	Lower Keys ROSPA	82,620	1.5 ac./1000	123.93	203.70	79.77

Table 13.17 – Activity Based Lands and Facilities Analysis by Recreation and Open Space Planning Areas (ROSPA) (Continued)

Year	Planning Area	Functional Population	LOS ac./ population	Demand Assessment (acres)	Existing Land (acres)	Surplus or Deficit (acres)
2030	Monroe County	145,508	1.5 ac./1000	218.20	434.10	215.84
	Mainland ROSPA	0	1.5 ac./1000	0.00	0.00	0.00
	Upper Keys ROSPA	40,919	1.5 ac./1000	61.38	93.00	31.62
	Middle Keys ROSPA	21,558	1.5 ac./1000	32.34	135.20	102.86
	Lower Keys ROSPA	83, 031	1.5 ac./1000	124.55	203.70	79.15
(1) Includes functional population of the incorporated cities (Village of Islamorada, Layton, Marathon, Key Colony Beach, and Key West). Functional population projections are based on the Monroe County 2010-2030 Population Projections (MCPP 2010) for the unincorporated County plus seasonal and residential population as most currently provided by the incorporated cities.						
(2) The activity-based recreation land LOS of 1.5 ac./1,000 population (functional) demand should be applied to the entire Monroe County and not by Planning Area, even though that breakdown is shown here						
(3) Acreage Surplus or Deficit equals Demand Assessment less Existing Acreage. This equals the amount of surplus acreage provided in the County. Differences between sums of ROSPA. Acreage surplus and overall County surplus						

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Table 13.18 – Monroe County – Population by ROSPA 2010-2030

County Permanent Population	Unincorp County Perm Pop	Cities Perm Population	Cities Permanent Population	County Season Pop	Unincorp County Seasonal Population	Cities Seasonal Population
Year 2010 County-wide						
82,601	35,368	47,233	NA	56,202	35,440	20,762
Year 2010 County-wide Population by ROSPA--82,601 Permanent Population; 79,437 Seasonal Population						
			Recreational & Open Space P.A. (unincorporated & cities)			
22,432	14,430	8,002	Upper Keys Rec & Open Sp P. A.	14,550	14,550	-
12,591	1,061	11,530	Middle Keys Rec & Open Sp P.A.	7,968	1,122	6,846
47,578	19,877	27,701	Lower Keys Rec & Open Sp P.A.	33,684	19,768	13,916
Year 2015 County-wide						
83,303	35,696	47,607	NA	57,022	36,067	20,955
Year 2015 County-wide Population by ROSPA--83,303 Permanent Population; 57,022 Seasonal Population						
			Recreational & Open Space P.A. (unincorporated & cities)			
22,716	14,564	8,152	Upper Keys Rec & Open Sp P. A.	14,806	14,806	-
12,825	1,071	11,754	Middle Keys Rec & Open Sp P.A.	8,180	1,141	7,039
47,762	20,061	27,701	Lower Keys Rec & Open Sp P.A.	34,036	20,120	13,916

Table 13.18 – Monroe County – Population by ROSPA 2010-2030 (Continued)

County Permanent Population	Unincorp County Perm Pop	Cities Perm Population	Cities Permanent Population	County Season Pop	Unincorp County Seasonal Population	Cities Seasonal Population
Year 2020 County-Wide						
83,353	35,374	47,979	NA	60,626	37,120	23,506
Year 2020 County-wide Population by ROSPA--83,353 Permanent Population; 60,626 Seasonal Population						
			Recreational & Open Space P.A. (unincorporated & cities)			
22,735	14,433	8,302	Upper Keys Rec & Open Sp P. A.	17,587	15,235	2,352
13,037	1061	11,926	Middle Keys Rec & Open Sp P.A.	8411	1,173	7,238
47,581	19,880	27,201	Lower Keys Rec & Open Sp P.A.	34,628	20,712	13,916
Year 2025 County-wide						
83,018	35,052	47,966	NA	61,724	38,173	23,551
Year 2025 County-wide Population by ROSPA--83,018 Permanent Population; 61,724 Seasonal Population						
			Recreational & Open Space P.A. (unincorporated & cities)			
22,603	14,301	8,302	Upper Keys Rec & Open Sp P. A.	18,017	15,665	2,352
13,015	1,052	11,963	Middle Keys Rec & Open Sp P.A.	8,487	1,204	7,283
47,400	19,694	27,701	Lower Keys Rec & Open Sp P.A.	35,220	21,304	13,916
Year 2030 County-wide						
82,684	34,730	47,954	NA	62,724	39,227	23,497
Year 2030 County-wide Population by ROSPA--82,684 Permanent Population; 62,724 Seasonal Population						
			Recreational & Open Space P.A. (unincorporated & cities)			
22,472	14,170	8,302	Upper Keys Rec & Open Sp P. A.	18,447	16,095	2,352
12,993	1,042	11,951	Middle Keys Rec & Open Sp P.A.	8,465	1,236	7,229
47,219	19,518	27,701	Lower Keys Rec & Open Sp P.A.	35,812	21,896	13,916

13.4 Capacity Analysis

This section evaluates the County's present and future ability to meet the LOS standards for resource- and activity-based recreation lands and facilities. The capacity analysis is based on the functional population projections based on the hurricane capacity constraint. The projections for recreational lands and facilities for the year 2010 and subsequent years 2015 thorough 2030 generally show the recreation needs are adequately provided for, and with the planning suggested in **Section 13.5,** will meet future needs of the functional population of the County. However, it should be cautioned that any surpluses or deficits should not be used as the basis of concurrency planning.

13.4.1 Population Calculations 2010 through 2030

In order to analyze current and projected recreation lands and facilities, the reported permanent resident and tourist/seasonal populations for each ROSPA and for the entire County must be adjusted for inclusion of the five incorporated cities in their respective ROSPA. The Villages of Islamorada is in the UKROSPA. The cities of Layton, Marathon and Key Colony Beach are in the MKROSPA. The city of Key West is in the LKROSPA. The best reported or projected permanent residence populations and seasonal populations for each of these cities was added to each year's reported permanent and seasonal populations of the unincorporated County. This information on the cities was obtained, in general, from each city's comprehensive plans, but in 4 of the 5 cities these populations and projection were not complete. Only Key Colony Beach had projections for the years covered under the County's update years of 2010, 2015, 2020, 2025 and 2030. To fill in the missing years, the last reported populations were used to finish out the five reported year sequence. The following summarizes the population information available from the cities:

- Layton: Permanent Population years 2010, 2015 & 2020; Seasonal Population not reported. Permanent Population for 2025 & 2030 is the same as 2020; no seasonal population was used.
- Key Colony Beach: Permanent Population years 2010, 2015, 2020, 2025, 2030; Seasonal Population years 2010, 2015, 2020, 2025, 2030.
- Islamorada: Permanent Population years 2010, 2015, 2020; Seasonal Population years 2020, 2025, 2030. Both Permanent Population & Seasonal Population for years 2025 & 2030 is the same as 2020.
- Marathon: Permanent Population years 2010, 2015, 2020; Seasonal Population years 2010, 2015, 2020. Both Permanent population and Seasonal Population for years 2025 & 2030 is the same as 2020.
- Key West: Permanent Population years 2010; Seasonal Population years 2010. All years of 2015, 2020, 2025 & 2030 used the same Permanent and Seasonal Populations as 2010.

Table 13.19 – Recreation Facilities (activity-based) and Level of Service (LOS) by ROSPA 2015

2015	MROSPA 0 (funct. Pop)			UKROSPA 37522 (funct. Pop.)			MKROSPA 21005(funct. Pop.)			LKROSPA 81798(funct. Pop.)			MONROE CTY. 140325(funct. Pop.)		
Facilities & Level of Service	**Exist.**	**LOS**	Surp./ **Defic.**	**Exist.**	**LOS**	Surp./ **Defic.**	**Exist.**	**LOS**	Surp./ **Defic.**	**Exist.**	**LOS**	Surp./ **Defic.**	**Exist.**	**LOS**	Surp./ **Defic.**
Baseball/Softball Fields- 1 Field/ 5,000 pop.	0	0	0	12	7.5	4.5	7	4.2	2.8	13	16.4	3.4	32	28.1	3.9
Football/Rugby/ Soccer Fields- 1 Field/6,000 pop.	0	0	0	1	6.3	**(-5.3)**	4	3.5	.5	7	13.6	6.6	12	23.4	11.4
Tennis Courts 1 Court/ 2,000 pop.	0	0	0	63	18.8	44.2	68	10.5	57.5	50	40.9	9.1	181	70.2	110.8
Equipped Play Areas- 1 Area /10,000 pop.	3	0	3	17	3.8	13.2	14	2.1	11.9	18	8.2	9.8	52	14.0	38.0
Picnic Areas- 1 Area /6,000 pop.	6	0	6	16	6.3	9.7	25	3.5	21.5	27	13.6	13.4	74	23.4	50.6
Sandy Beaches- 1 mi. /100,000 pop.	3 mi 1*	0	3 mi	3 mi 29*	.4 mi	2.6 mi	1 mi 20*	.2 mi	.8 mi	5 mi 30*	.8 mi	4.2 mi	12 mi 80*	1.4 mi	10.6 mi
Basketball Courts- 1 Court /5,000 pop.	0	0	0	13	7.5	5.5	19	4.2	14.8	23	16.4	6.6	55	28.1	26.9
Volleyball Courts- 1 Court /6,000 pop.	0	0	0	7	6.3	.7	5	3.5	1.5	7	13.6	**6.6**	19	23.4	**4.4**
Racquetball/ Handball Courts- 1 Court/10,000 pop.	0	0	0	4	3.8	.2	2	2.1	**.1**	3	8.2	**5.2**	9	14.0	**5.0**
Golf- 9 hole/ 25,000 pop. & 18 hole/50,000 pop.	0	0	0	5-18 hole 10	1.5	8.5	1-9 hole 1	.8	.2	2-18 hole 4	3.3	.7	15	5.6	9.4
Swimming Pools- 1 Pool /25,000 pop.	0	0	0	43	1.5	41.5	33	.8	32.2	18	3.3	14.7	94	5.6	88.4

Table 13.19 – Recreation Facilities (activity-based) and Level of Service (LOS) by ROSPA 2015 (continued)

2015	MROSPA 0 (funct. Pop)			UKROSPA 37522(funct. Pop.)			MKROSPA 21005 (funct. Pop.)			LKROSPA 81798(funct. Pop.)			MONROE CTY. 140,325 (funct. Pop.)		
Facilities & Level of Service	**Exist.**	**LOS**	Surp./ **Defic.**	**Exist.**	**LOS**	Surp./ **Defic.**	**Exist.**	**LOS**	Surp./ **Defic.**	**Exist.**	**LOS**	Surp./ **Defic.**	**Exist.**	**LOS**	Surp./ **Defic.**
Boat Ramps- 1 Ramp /5,000 pop.	5	0	5	72	7.5	64.5	55	4.2	50.8	30	16.4	13.6	158	28.1	129.9
Bicycling- 1 mi. /5,000 pop.	6 mi 2*	0	6 mi	25 mi 2*	7.5 mi	17.5 mi	40 mi 1*	4.2 mi	35.8 mi	40 mi 1*	16.4 mi	23.6 mi	111 mi. 6*	28.1 mi.	82.9 mi.
Camping Areas- 1 ac./6,750 pop.	2	0	2	10	5.6	4.4	12	3.1	8.9	16	12.1	3.9	40	20.8	19.2
Fishing (non-boat)- 800 l.f. /5,650 pop.	4000 5*	0	4000	11000 62*	5312	5688	8500 61*	2976	5524	13700 21*	11600	2100 l.f.	37200 l.f.	19840 l.f.	17360 l.f.
Physical Exercise- 1 Course /15,000 pop.	0	0	0	2	2.5	**(-.5)**	1	1.4	**(-.4)**	4	5.5	**(-1.5)**	7	9.4	**2.4**
Hiking/ Nature Trails- 1 mi. /6,750 pop.	3.3 mi 8*	0	3.3 mi	16 mi 9*	7.5 mi	8.5 mi	3.2 mi 7*	4.2 mi	**(-1.0 mi)**	15.5 mi 9*	16.4 mi	(-**.9 mi)**	38.0 mi.	28.1 mi.	9.9 mi.

* represents the number of facilities, not the length deficits shown in **(-bold)**

Note: Bicycling, fishing (non-boat), and hiking are estimated miles based on the total miles reported.

MROSPA = Mainland Recreation and Open Space Planning Area.

UKROSPA = Upper Keys Recreation and Open Space Planning Area.

MKROSPA = Middle Keys Recreation and Open Space Planning Area.

LKOSPA = Lower Keys Recreation and Open Space Planning Area.

Table 13.20 – Recreation Facilities (activity-based) and Level of Service (LOS) by ROSPA 2020

2020	MROSPA 0 (funct. Pop)			UKROSPA 40322(funct. Pop.)			MKROSPA 21448(funct. Pop.)			LKROSPA 82209(funct. Pop.)			MONROE CTY. 140,979 (funct. Pop.)		
Facilities & Level of Service	**Exist**	**LOS**	Surp. / **Defic.**	**Exist**	**LOS**	Surp./ **Defic.**	**Exist.**	**LOS**	Surp. / **Defic.**	**Exist.**	**LOS**	Surp./ **Defic.**	**Exist.**	**LOS**	Surp./ **Defic.**
Baseball/Softball Fields- 1 Field/ 5,000 pop.	0	0	0	12	8.1	3.9	7	4.3	2.7	13	16.4	**(-3.4)**	32	28.8	3.2
Football/Rugby / Soccer Fields- 1 Field/6,000 pop.	0	0	0	1	6.7	**(-5.7)**	4	3.6	.4	7	13.7	**(-6.7)**	12	24.	**12**
Tennis Courts 1 Court/ 2,000 pop.	0	0	0	63	20.2	42.8	68	10.7	57.3	50	41.1	8.9	181	72.0	109
Equipped Play Areas- 1 Area /10,000 pop.	3	0	3	17	4.	13	14	2.1	11.9	18	8.2	9.8	52	14.4	37.6
Picnic Areas- 1 Area /6,000 pop.	6	0	6	16	6.7	9.3	25	3.6	21.4	27	13.7	13.3	74	24	50
Sandy Beaches- 1 mi. /100,000 pop.	3 mi 1*	0	3 mi	3 mi 29*	.4 mi	2.6 mi	1 mi 20*	.2 mi	.8 mi	5 mi 30*	.8 mi	4.2 mi	12 mi 80*	1.4 mi	10.6 mi
Basketball Courts- 1 Court /5,000 pop.	0	0	0	13	8.1	4.9	19	4.3	14.7	23	16.4	6.6	55	28.8	26.2
Volleyball Courts- 1 Court /6,000 pop.	0	0	0	7	6.7	.3	5	3.6	1.4	7	13.7	**(-6.7)**	19	24	**5.0**
Racquetball/ Handball Courts- 1 Court/10,000 pop.	0	0	0	4	4	0	2	2.1	**.1**	3	8.2	**(-5.2)**	9	14.4	**5.4**
Golf- (9 hole/18 hole)- 1 Course/25,000 pop.	0	0	0	5-18 hole 10	1.6	8.4	1-9 hole 1	.9	.1	2-18 hole 4	3.3	.7	15	5.8	9.2
Swimming Pools- 1 Pool /25,000 pop.	0	0	0	43	1.6	41.4	33	.8	32.2	18	3.3	14.7	94	5.8	88.2
Boat Ramps- 1 Ramp /5,000 pop.	5	0	5	72	8.1	63.9	55	4.3	50.7	30	16.4	13.6	158	28.8	129.2

Table 13.20 – Recreation Facilities (activity-based) and Level of Service (LOS) by ROSPA 2020 (continued)

2020	MROSPA 0 (funct. Pop)			UKROSPA 40322(funct. Pop.)			MKROSPA 21448 (funct. Pop.)			LKROSPA 82209(funct. Pop.)			MONROE CTY. 149,979(funct. Pop.)		
Facilities & Level of Service	**Exist.**	**LOS**	Surp./ **Defic.**	**Exist.**	**LOS**	Surp./ **Defic.**	**Exist.**	**LOS**	Surp./ **Defic.**	**Exist.**	**LOS**	Surp./ **Defic.**	**Exist.**	**LOS**	Surp./ **Defic.**
Bicycling- 1 mi. /5,000 pop.	6 mi 2*	0	6 mi	25 mi 2*	8.1 mi	16 .9 mi	40 mi 1*	4.3 mi	35.7 mi	40 mi 1*	16.4 mi	23.6 mi	111 mi. 6*	28.8 mi.	82.2 mi.
Camping Areas- 1 ac./6,750 pop.	2	0	2	10	6.	4.	12	3.2	8.8	16	12.2	3.8	40	21.3	18.7
Fishing (non-boat)- 800 l.f. /5,650 pop.	4000 5*	0	4000	11000 62*	5712	5288	8500 61*	3040	5460	13700 21*	11680	2020	37200 l.f.	20400 l.f.	16800 l.f.
Physical Exercise- 1 Course /15,000 pop.	0	0	0	2	2.7	**.7**	1	1.4	**(-.4)**	4	5.5	**1.5**	7	9.6	**(-2.6)**
Hiking/ Nature Trails- 1 mi. /6,750 pop.	3.3 mi 8*	0	3.3 mi	16 mi 9*	6 mi	10. mi	3.2 mi 7*	3.2 mi	0 mi	15.5 mi 9*	13.2	2.3 mi	38.0 mi.	21.3 mi.	16.7 mi.

* represents the number of facilities, not the length. Deficits shown in **(-bold)**

Note: Bicycling, fishing (non-boat), and hiking are estimated miles based on the total miles reported.

MROSPA = Mainland Recreation and Open Space Planning Area.

UKROSPA = Upper Keys Recreation and Open Space Planning Area.

MKROSPA = Middle Keys Recreation and Open Space Planning Area.

LKOSPA = Lower Keys Recreation and Open Space Planning Area.

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Table 13.21 – Recreation Facilities (activity-based) and Level of Service (LOS) by ROSPA 2025

2025	MROSPA 0 (funct. Pop)			UKROSPA 40620(funct. Pop.)			MKROSPA 21502 (funct. Pop.)			LKROSPA 82620 (funct. Pop.)			MONROE CTY. 144,242 (funct. Pop.)		
Facilities & Level of Service	**Exist.**	**LOS**	Surp./ **Defic.**	**Exist.**	**LOS**	Surp./ **Defic.**	**Exist.**	**LOS**	Surp./ **Defic.**	**Exist.**	**LOS**	Surp./ **Defic.**	**Exist.**	**LOS**	Surp./ **Defic.**
Baseball/Softball Fields- 1 Field/ 5,000 pop.	0	0	0	12	8.1	3.9	7	4.3	2.7	13	16.5	**(-3.5)**	32	28.8	3.2
Football/Rugby/ Soccer Fields- 1 Field/6,000 pop.	0	0	0	1	6.8	**5.8**	4	3.6	.4	7	13.8	**(-6.8)**	12	24.	**12**
Tennis Courts 1 Court/ 2,000 pop.	0	0	0	63	20.3	42.7	68	10.8	57.2	50	41.3	8.7	181	72.1	108.9
Equipped Play Areas- 1 Area /10,000 pop.	3	0	3	17	4.1	12.9	14	2.2	11.8	18	8.3	9.7	52	14.4	37.6
Picnic Areas- 1 Area /6,000 pop.	6	0	6	16	6.8	9.2	25	3.6	21.4	27	13.8	13.2	74	24	50.
Sandy Beaches- 1 mi. /100,000 pop.	3 mi 1*	0	3 mi	3 mi 29*	.4 mi	2.6 mi	1 mi 20*	.2 mi	.8 mi	5 mi 30*	.8 mi	4.2 mi	12 mi 80*	1.4 mi	10.6mi
Basketball Courts- 1 Court /5,000 pop.	0	0	0	13	8.1	4.9	19	4.3	14.7	23	16.5	6.5	55	28.8	26.2
Volleyball Courts- 1 Court /6,000 pop.	0	0	0	7	6.8	.4	5	3.6	**(-1.4)**	7	13.8	**(-6.8)**	19	24	**5**
Racquetball/ Handball Courts- 1 Court/10,000 pop.	0	0	0	4	4.1	**.1**	2	2.2	**.2**	3	8.3	**(-5.3)**	9	14.4	**5.4**
Golf- 9 hole/25,000 pop. & 18 hole/50,000 pop.	0	0	0	5-18 hole 10	1.6	8.4	1-9 hole 1	.9	.1	2-18 hole 4	3.3	.7	15	5.8	9.2
Swimming Pools- 1 Pool /25,000 pop.	0	0	0	43	1.6	41.4	33	.9	32.1	18	3.3	14.7	94	5.8	88.2
Boat Ramps- 1 Ramp /5,000 pop.	5	0	5	24	8.1	63.9	55	4.3	50.7	30	16.5	13.5	158	28.8	124.2

Table 13.21 – Recreation Facilities (activity-based) and Level of Service (LOS) by ROSPA 2025 (continued)

2025	MROSPA 0 (funct. Pop)			UKROSPA 40620 (funct. Pop.)			MKROSPA 21502 (funct. Pop.)			LKROSPA 82620 (funct. Pop.)			MONROE CTY. 144,242 (funct. Pop.)		
Facilities & Level of Service	**Exist**	**LOS**	Surp. / **Defic.**	**Exist**	**LOS**	Surp./ **Defic**	**Exist.**	**LOS**	Surp./ **Defic.**	**Exist.**	**LOS**	Surp./ **Defic.**	**Exist.**	**LOS**	Surp./ **Defic.**
Bicycling- 1 mi. /5,000 pop.	6 mi 2*	0	6 mi	25 mi 2*	8.1 mi	16.9 mi	40 mi 1*	4.3 mi	35.7 mi	40 mi 1*	16.5 mi	23.5 mi	111 mi. 6*	28.8 mi.	82.2 mi.
Camping Areas- 1 ac./6,750 pop.	2	0	2	10	6	4	12	3.2	8.8	16	12.2	3.8	40	21.4	18.6
Fishing (non-boat)- 800 l.f. /5,650 pop.	4000 5*	0	4000	11000 62*	5760	5240	8500 61*	3040	5460	13700 21*	11680	2020	37200 l.f.	20400 l.f.	16800 l.f.
Physical Exercise- 1 Course /15,000 pop.	0	0	0	2	2.7	**(-.7)**	1	1.4	**(-.4)**	4	5.5	**(-1.5)**	7	9.6	**2.6**
Hiking/ Nature Trails- 1 mi. /6,750 pop.	3.3 mi 8*	0	3.3 mi	16 mi 9*	6 mi	10 mi	3.2 mi 7*	3.2 mi	0 mi	15.5 mi 9*	12.2	3.3 mi	38.0 mi.	21.4 mi.	16.6 mi.

* represents the number of facilities, not the length. Deficits shown in **(-bold)**

Note: Bicycling, fishing (non-boat), and hiking are estimated miles based on the total miles reported.

MROSPA = Mainland Recreation and Open Space Planning Area.

UKROSPA = Upper Keys Recreation and Open Space Planning Area.

MKROSPA = Middle Keys Recreation and Open Space Planning Area.

LKOSPA = Lower Keys Recreation and Open Space Planning Area.

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Table 13.22 – Recreation Facilities (activity-based) and Level of Service (LOS) by ROSPA 2030

2030	MROSPA 0 (funct. Pop)			UKROSPA 60,168 (funct. Pop.)			MKROSPA 4,878 (funct. Pop.)			LKROSPA 97,571 (funct. Pop.)			MONROE CTY. 162,618 (funct. Pop.)		
Facilities & Level of Service	**Exist.**	**LOS**	Surp./ **Defic.**	**Exist.**	**LOS**	Surp./ **Defic.**	**Exist.**	**LOS**	Surp./ **Defic.**	**Exist.**	**LOS**	Surp./ **Defic.**	**Exist.**	**LOS**	Surp./ **Defic.**
Baseball/Softball Fields- 1 Field/ 5,000 pop.	0	0	0	12	8.2	3.8	7	4.3	2.7	13	16.6	**(-3.6)**	32	29.1	2.9
Football/Rugby/ Soccer Fields- 1 Field/6,000 pop.	0	0	0	1	6.8	**(-5.8)**	4	3.6	.4	7	13.8	**(-6.8)**	12	24.3	**12.3**
Tennis Courts 1 Court/ 2,000 pop.	0	0	0	63	20.5	42.5	68	10.8	57.2	50	41.5	8.5	181	72.8	108.2
Equipped Play Areas- 1 Area /10,000 pop.	3	0	3	17	4.1	12.9	14	2.2	11.8	18	8.3	9.7	52	14.6	37.4
Picnic Areas- 1 Area /6,000 pop.	6	0	6	16	6.8	9.2	25	3.6	21.4	27	13.8	13.2	74	24.3	49.7
Sandy Beaches- 1 mi. /100,000 pop.	3 mi 1*	0	3 mi	3 mi 29*	.4 mi	2.6 mi	1 mi 20*	.2 mi	.8 mi	5 mi 30*	.83 mi	4.2 mi	12 mi 80*	4.2 mi	7.8 mi
Basketball Courts- 1 Court /5,000 pop.	0	0	0	13	8.2	4.8	19	4.3	14.7	23	16.6	6.4	55	29.1	25.9
Volleyball Courts- 1 Court /6,000 pop.	0	0	0	7	6.8	.2	5	3.6	1.4	7	13.8	**(-6.8)**	19	24.3	**5.3**
Racquetball/ Handball Courts- 1 Court/10,000 pop.	0	0	0	4	4.1	**.1**	2	2.2	**.2**	3	8.3	**(-5.3)**	9	14.6	**5.6**
Golf- 9 hole/25,000 pop. & 18 hole/50,000 pop.	0	0	0	5-18 hole 10	1.6	8.4	1-9 hole 1	.86	**(-.1)**	2-18 hole 4	3.3	.7	15	5.8	9.2
Swimming Pools- 1 Pool /25,000 pop.	0	0	0	43	1.6	41.4	33	.9	32.1	18	3.3	14.7	94	5.8	88.2
Boat Ramps- 1 Ramp /5,000 pop.	5	0	5	72	8.2	63.8	55	4.3	50.7	30	16.6	13.4	158	29.1	128.9

Table 13.22 – Recreation Facilities (activity-based) and Level of service (LOS) by ROSPA 2030 (continued)

2030	MROSPA 0 (funct. Pop)			UKROSPA 40919 (funct. Pop.)			MKROSPA 21558 (funct. Pop.)			LKROSPA 83031 (funct. Pop.)			MONROE CTY. 145,508 (funct. Pop.)		
Facilities & Level of Service	**Exist.**	**LOS**	Surp./ **Defic.**	**Exist.**	**LOS**	Surp./ **Defic.**	**Exist.**	**LOS**	Surp./ **Defic.**	**Exist.**	**LOS**	Surp./ **Defic.**	**Exist.**	**LOS**	Surp./ **Defic.**
Bicycling- 1 mi. /5,000 pop.	6 mi 2*	0	6 mi	25 mi 2*	8.2	16.8 mi	40 mi 1*	4.3 mi	35.7 mi	40 mi 1*	16.6 mi	23.4 mi	111 mi. 6*	29.1 mi.	81.9 mi.
Camping Areas- 1 ac./6,750 pop.	2	0	2	10	6.1	3.9	12	3.7	8.8	16	12.3	3.7	40	21.6	18.4
Fishing (non-boat)- 800 l.f. /5,650 pop.	4000 5*	0	4000	11000 62*	5792	5208	8500 61*	3040	5460	13700 21*	11760	1940	37200 l.f.	20640 l.f.	16560 l.f.
Physical Exercise- 1 Course /15,000 pop.	0	0	0	2	2.7	**(-.7)**	1	1.4	**(-.4)**	4	5.5	**(-1.5)**	7	9.7	**2.7**
Hiking/ Nature Trails- 1 mi. /6,750 pop.	3.3 mi 8*	0	3.3 mi	16 mi 9*	6.1mi	9.9 mi	3.2 mi 7*	3.2 mi	0 mi	15.5 mi 9*	12.3 mi	3.2 mi	38.0 mi.	21.6 mi.	16.4 mi.

* represents the number of facilities, not the length. Deficits shown in **(-bold)**

Note: Bicycling, fishing (non-boat), and hiking are estimated miles based on the total miles reported.

MROSPA = Mainland Recreation and Open Space Planning Area.

UKROSPA = Upper Keys Recreation and Open Space Planning Area.

MKROSPA = Middle Keys Recreation and Open Space Planning Area.

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Table 13.23 – Recreation Facilities (activity-based) and Level of Service (LOS) by ROSPA 2010 - 2030 (Permanent Resident Population Only)

2010	MROSPA 0 (resident Pop)			UKROSPA 22,432 (resident Pop.)			MKROSPA 12,591 (resident Pop.)			LKROSPA 47,578 (resident Pop.)			MONROE CTY. 82,601(resident Pop.)		
Facilities & Level of Service	**Exist.**	**LOS**	Surp./ **Defic.**	**Exist.**	**LOS**	Surp./ **Defic.**	**Exist.**	**LOS**	Surp./ **Defic.**	**Exist.**	**LOS**	Surp./ **Defic.**	**Exist.**	**LOS**	Surp./ **Defic.**
Baseball/Softball Fields- 1 Field/ 5,000 pop.	0	0	0	12	4.5	7.5	7	2.5	4.5	13	9.5	3.5	32	16.5	15.5
Football/Rugby/Soccer Fields- 1 Field /6,000 pop.	3	0	3	1	3.7	**(-2.7)**	4	2.1	1.9	7	7.9	**(-.9)**	12	13.8	**(-1.8)**

2015	MROSPA 0 (resident Pop)			UKROSPA 22,716 (resident Pop.)			MKROSPA 12,610 (resident Pop.)			LKROSPA 47,762 (resident Pop.)			MONROE CTY. 83,088 (resident Pop.)		
Facilities & Level of Service	**Exist.**	**LOS**	Surp./ **Defic.**	**Exist.**	**LOS**	Surp./ **Defic.**	**Exist.**	**LOS**	Surp./ **Defic.**	**Exist.**	**LOS**	Surp./ **Defic.**	**Exist.**	**LOS**	Surp./ **Defic.**
Baseball/Softball Fields- 1 Field/ 5,000 pop.	0	0	0	12	4.5	7.5	7	2.5	4.5	13	9.6	3.4	32	16.6	15.4
Football/Rugby/Soccer Fields- 1 Field /6,000 pop.	3	0	3	1	3.8	**(-2.2)**	4	2.1	1.9	7	8.0	**(-1)**	12	13.8	**(-1.8)**

2020	MROSPA 0 (resident Pop)			UKROSPA 22,735 (resident Pop.)			MKROSPA 13,037 (resident Pop.)			LKROSPA 47,581 (resident Pop.)			MONROE CTY. 83,353 (resident Pop.)		
Facilities & Level of Service	**Exist.**	**LOS**	Surp./ **Defic.**	**Exist.**	**LOS**	Surp./ **Defic.**	**Exist.**	**LOS**	Surp./ **Defic.**	**Exist.**	**LOS**	Surp./ **Defic.**	**Exist.**	**LOS**	Surp./ **Defic.**
Baseball/Softball Fields- 1 Field/ 5,000 pop.	0	0	0	12	4.5	7.5	7	2.6	4.4	13	9.5	3.5	32	17.7	14.3
Football/Rugby/Soccer Fields- 1 Field /6,000 pop.	3	0	3	1	3.8	**(-2.8)**	4	2.2	1.8	7	7.9	**(-.9)**	12	14.7	**(-2.7)**

Table 13.23 – Recreation Facilities (activity-based) and Level of Service (LOS) by ROSPA 2010 - 2030 (Permanent Resident Population Only) (continued)

2025	MROSPA 0 (resident Pop)			UKROSPA 28,956 (resident Pop.)			MKROSPA 2,286 (resident Pop.)			LKROSPA 44,958 (resident Pop.)			MONROE CTY. 76,200 (resident Pop.)		
Facilities & Level of Service	**Exist.**	**LOS**	Surp./ **Defic.**	**Exist.**	**LOS**	Surp./ **Defic.**	**Exist.**	**LOS**	Surp./ **Defic.**	**Exist.**	**LOS**	Surp./ **Defic.**	**Exist.**	**LOS**	Surp./ **Defic.**
Baseball/Softball Fields- 1 Field/ 5,000 pop.	0	0	0	12	4.5	7.5	7	2.6	4.4	13	9.5	3.5	32	16.6	15.4
Football/Rugby/Soccer Fields- 1 Field /6,000 pop.	3	0	3	1	3.8	**(-2.8)**	4	2.2	1.8	7	7.9	**(-.9)**	12	13.8	**(-1.8)**

2030	MROSPA 0 (resident Pop)			UKROSPA 27,935 (resident Pop.)			MKROSPA 2,265 (resident Pop.)			LKROSPA 45,300 (resident Pop.)			MONROE CTY. 75,500 (resident Pop.)		
Facilities & Level of Service	**Exist.**	**LOS**	Surp./ **Defic.**	**Exist.**	**LOS**	Surp./ **Defic.**	**Exist.**	**LOS**	Surp./ **Defic.**	**Exist.**	**LOS**	Surp./ **Defic.**	**Exist.**	**LOS**	Surp./ **Defic.**
Baseball/Softball Fields- 1 Field/ 5,000 pop.	0	0	0	12	4.5	7.5	7	2.6	4.4	13	9.4	3.6	32	16.5	15.5
Football/Rugby/Soccer Fields- 1 Field /6,000 pop.	3	0	3	1	3.7	**(-2.7)**	4	2.2	1.8	7	7.9	**(-.9)**	12	13.8	**(-1.8)**

MROSPA = Mainland Recreation and Open Space Planning Area.

UKROSPA = Upper Keys Recreation and Open Space Planning Area.

MKROSPA = Middle Keys Recreation and Open Space Planning Area.

LKOSPA = Lower Keys Recreation and Open Space Planning Area.

13.4.2 Resource-Based Recreation Lands and Projections

There are approximately 10,900 acres of resource-based recreation lands currently available in the County for public use. Using the 2010 functional population of 138,803 (which includes the five incorporated cities) and the LOS standard of 1.5 acres/1,000 functional population, the current demand for resource-based recreation lands would be approximately 208.2 acres. This is the adopted LOS standard of the County which is ½ of the 3.0 acres/1,000 functional population allocated, combined for resource-based and activity-based recreation lands. Since the total existing acres of resource-based recreation lands provided in the County is 10,900, there is currently an extreme surplus of resource-based recreation lands of over 10,690 acres.

The current and projected ability to meet the proposed LOS standard for resource-based recreation lands are shown in **Table 13.16**. This surplus only drops to 10,682 acres by the year 2030, if no new acres are added to the totals. Based on population projections, the functional population of the County is expected to increase to 145,508 by 2030. Even assuming no additional acquisitions of resource-based recreation lands, there is sufficient resource-based recreation lands in the County through the year 2030. It should be noted that due to the extensive amount of federal- and state-owned conservation lands in the County which offer resource-based recreation opportunities, the provision of additional resource-based recreation lands is not considered to be of concern. Stated another way, there are approximately 78.5 acres of resource-based recreation lands per 1,000 population in the County in 2010.

13.4.3 Activity-Based Recreation Lands and Projections

There are currently approximately 434 acres of activity-based recreation lands in the County available to the public. Based upon the 2010 functional population of 138,803 and the LOS standard of 1.5 acres/1,000 functional population, the current demand for activity-based recreation lands is 208.26 acres county-wide and approximately 93 acres in the Upper Keys, 135 acres in the Middle Keys, and 203 acres in the Lower Keys. **Table 13.17** lists the LOS demands by ROSPA and county-wide for the year 2010 and the subsequent years of 2015, 2020, 2025, and 2030.

Since there is a total of 434 acres of activity-based neighborhood, community and all other recreation park lands currently provided in the County, this results in a surplus of approximately 225 acres for the year 2010. With the functional population expanding to 145,508 by the year 2030, the surplus of activity-based recreation lands is maintained and only drops to 215 acres in the year 2030. **Table 13.17** shows that there is a surplus in all ROSPA'S from 2010 thru 2030.

The projected future ability to meet the LOS standards for activity-based recreation lands as shown in **Table 13.17** indicates that even if no new lands were acquired by the County through 2030, activity-based LOS is met.

13.4.4 Recreation Facilities Projections

The existing and future LOS standards for specific recreation facilities are shown in **Tables 13.15, 13.19, 13.20, 13.21, and 13.22**. **Table 13.15** shows the activity-based recreation facilities inventoried current for the year 2010. All of the tables show surpluses in all 17 facilities, except for five specific cases which are noted in the discussions below. The numbers for these facilities (and lengths as appropriate) represent the actual facilities and lengths. No proposed facilities were included.

Each of the 17 recreation facilities are discussed below along with specific problems and criteria used in the inventory of those facilities. All the calculations were based on functional population projections which included the incorporated cities. Since these

facilities may be found on either public or private land, the inventory includes all such facilities that could be accurately located. Additionally, the facilities may occur on conservation or recreation lands and on either resource-based or activity-based lands also, and therefore were included.

Some facilities such as swimming pools, picnic areas, and play equipment areas are very difficult to inventory for the entire County, therefore the list is not all inclusive. Other facilities inventoried such as golf courses, tennis courts, and ball fields are complete. Facilities such as hiking/nature trails, fishing (non-boat), and sandy beaches are difficult to measure because the LOS is in length of the facility. Therefore, these latter facilities are a conservative measurement.

Finally, the few deficits that do occur (shaded cells) are discussed with each facility section from a practical and County-specific point of view. In the cases of the baseball/softball fields and football/rugby, soccer fields, an additional table has been added based upon LOS for permanent resident population only (see **Table 13.23**).

13.4.4.1 Baseball and Softball Fields

Baseball and softball fields, as activity-based recreation facilities, take up a larger land area than any of the other 17 reported facilities with the exceptions of golf courses, football, rugby, and soccer fields. These fields draw from a larger service area population than many of the other 14 reported recreation facilities. In 2010 there is a deficit of 3.3 fields in the LKROSPA which increases to 3.6 fields in 2030. From the same period of 2010 to 2030 the MDROSPA has a surplus of 2.9 to 2.7 fields; almost the equivalent. Since baseball and softball are facilities that are used by populations outside of the immediate areas, these deficits might be considered to be mitigated as travel from the Middle Keys to the Lower Keys is within reasonable driving distances.

The deficits shown in the LKROSPA is not significant in that these types of facilities, as team and spectator sports, draw from a larger population and geographic area than just the ROSPA in which they are located. Additionally, these recreation facilities cater more to permanent resident populations than the seasonal population, (largely tourists), which represent approximately 40% of the functional population. Tourists and seasonal visitors are less likely to attend or participate in these team-oriented sports; therefore, the true need for this deficit facilities would be reduced. **Table 13.23** shows the LOS standards applied by ROSPA and county-wide for baseball/softball fields if only the permanent resident population is used as the basis for calculations. A surplus of fields occurs in all ROSPA and county-wide in 2010 and through 2030.

13.4.4.2 Football, Rugby, and Soccer Fields

These three field-type recreation facilities are usually designed to overlap the same play areas as they are approximately the same size and shapes. As with baseball and softball, these facilities take larger portions of recreation lands, and require, as team and spectator sports, more land for parking and associated uses such as concessions. On a county-wide

basis, there is a deficit for these facilities of over 12 fields in 2010. Here again, the deficits by the ROSPA is in the Upper Keys with 5.8 and the Lower Keys with 6.8. The tourist and seasonal populations of each of these ROSPA will also not be the primary users of these facilities, and as in the above review of baseball/softball fields, they are less-likely to attend or participate in these types of team-oriented sports. Here the deficit will only partially be mitigated by this fact due to the overall larger deficit shown. **Table 13.23** has also shown these fields with a LOS standard based on only the permanent resident population and again the deficits are change to 2.7, .9, and 1.8 for overall County for the year 2010 and through 2030. The deficit of between 2 and 3 fields in the UKROSPA can be somewhat compensated by the almost 2 field surplus in the MKROSPA. Because of the regional character in the resident population attending these field events, it might be expected that 2 of the fields in the UKROSPA could be compensated by the almost 2 surplus fields in the MKROSPA. In like manner the 1 field deficit in the LKROSPA could be compensated by the surplus in the MKROSPA, but not both deficits; UKROSPA and LKROSPA.

13.4.4.3 Tennis Courts

Tennis courts, as presented in this update, show an extreme surplus in 2010 for the entire County and in each of the ROSPA. The majority of the inventoried courts county-wide are owned by private businesses such as camp grounds, resorts and hotels. All of the surplus facilities will remain through the year 2030. The accuracy of the count of courts was obtained through aerial review and may not be all inclusive, however with the surpluses as shown the guidelines are well-met. SCORP 2008 guidelines do not allow for the counting of racquetball/handball courts as tennis facilities and these courts were not double counted.

13.4.4.4 Equipped Play Areas

The SCORP 2008 guidelines do not define the size or amount of equipment needed for these facilities. For this update, any play area with any amount of children's play equipment was counted in the inventory. The majority of the play areas are actually on private camping areas, resorts, and hotels, but these are limited in the size and the children's age groups covered by the equipment. The play areas in the public parks usually have a more extensive area for this play equipment and have been designed for all ages of children's play. There is a surplus of these facilities in each of the ROSPA for 2010 and that surplus continues through 2030.

13.4.4.5 Picnic Areas

As in the equipped play areas, SCORP 2008 guidelines do not define how large a picnic area, number of tables, or quantity of any other furnishings (such as barbeques, trash receptacles, etc.) are needed to qualify under this facility type. Therefore, for this update, any facility that has a picnic table and is called out as such in advertising or on-site designation was counted in the inventory. A surplus of these facilities was noted for 2010 and that surplus remains through 2030.

13.4.4.6 Sandy Beaches

The State of Florida SCORP 2008 uses the term "Sandy Beaches" as the category for this recreation facility. In the County, beaches are physically of two different types. The natural beaches are generally not "sandy" but are composed of crushed shell ground by the wave action of Atlantic and the Gulf. The second type is a natural beach which has been enhanced and maintained with sand for the enjoyment of the permanent residents and seasonal populations. Both of these types are included in this facility category as existing and for LOS calculations. Of the 28 beaches reported in **Table 13.13** and **Table 13.5**, 14 are the enhanced sand beaches. Additionally, although 28 beaches are reported in this update, many of the beach sites actually have multiple beaches and some sites, such as John Pennekamp Coral Reef State Park have both natural and enhanced beaches at the same location.

13.4.4.7 Basketball Courts

Table 13.15 indicates that there is an overall county-wide surplus of basketball courts The SCORP 2008 guidelines do not say whether indoor courts should be counted; therefore, the few indoor courts (mostly in the schools) have not been counted in the 2010 existing inventory. To a certain extent, these indoor courts provide the same recreation facilities, at least for the permanent resident population, as the outdoor courts and consequently, the surplus for basketball courts is slightly higher in all ROSPA.

13.4.4.8 Volleyball Courts

There is an overall county-wide deficit of a little over 4 volleyball courts for 2010. The LKROSPA shows a deficit of 6.5 courts. The split in deficits between the LKROSPA and the overall County remains relatively the same through 2030. Volleyball is a unique recreation facility in that it can be played on grass or sand and that it does not have to have a defined permanent court upon which to be played. It is also different in that many players bring their own net and ball and can set up in any sized open area of at least 60 feet by 100 feet. The inventory of volleyball for 2010 only counted advertised or site delineated areas; therefore, the number of facilities inventoried is estimated to be under the actual total sites. The inventory also does not include indoor facilities for volleyball; both of these factors would mitigate this deficit in volleyball facilities.

13.4.4.9 Racquetball and Handball Courts

There is a deficit in the racquetball/handball court facilities of almost 5 courts County-wide for 2010. This also includes paddleball as a compatible sport which uses the same court layout. There is a deficit of 5-6 courts county-wide countywide through 2030 primarily deficit in the LKROSPA. These walled courts are often used as practice courts for one or two tennis players when tennis courts are not available (see Section 13.4.4.3 above). By the year 2030, the deficit in racquetball/handball/paddleball courts shows slight deficits in UKROSPA, MKROSPA and an increase to the 6 courts in the LKROSPA.

13.4.4.10 Golf Courses

A golf course services a population of 25,000 (9 hole) or 50,000 (18 hole). This population is truly split between permanent residents, tourists, and seasonal patrons. A golf course generally is either a 9 hole course or an 18 hole course, although there are some courses of a lesser number of holes (Cheeca Lodge for example). There also may be some single holes on private or public property as well as some stand-alone putting greens. The latter were not inventoried nor were the "miniature golf" courses in the County. For this update, the LOS of 25,000 population was used for the 9 hole courses and the 18 hole courses were counted as 2 courses at the LOS of 25,000. Using this method of converting the two courses to the LOS standard of the one 9 hole, the inventory of the existing facilities for 2010 shows a surplus for all ROSPA through the 2030 year. County-wide there is also shown a surplus using this calculation through the year 2030. All of the golf courses in the County are owned-privately, but both permanent residents and tourist and seasonal populations have access to these courses through guest privileges and greens fees.

13.4.4.11 Swimming Pools

An inventory of all swimming pools in the County would require extensive field work, aerial interpretation and searches of the tax roles. There are many private residences that have swimming pools as well as camping, resort and hotel sites and a few of the public parks. If a resort advertised "swimming" in a portion of the Bay or Ocean, it was not counted in this inventory. The 2010 inventory shows surpluses in each of the ROSPA and the overall County. This inventory surplus is maintained through the year 2030. It should also be noted that all of the functional population of the County has direct access to swimming in the numerous waters of the Gulf and Atlantic, many sounds, bights, canals and estuaries.

13.4.4.12 Boat Ramps

Per the SCORP 2008 guidelines, there is a large surplus of boat ramps for the overall County and for each of the ROSPA, especially in the Middle Keys. However, the residents of the County feel that there are not enough boat ramps as witnessed by the long lines to use these facilities at times. The majority of the boat ramps in the County are stand-alone, single ramps. Excluding the area needed for accessory facilities to the boat ramp, such as parking and dock space, to double or triple the ramps at any one site would only require a few thousand square feet of land area.

13.4.4.13 Bicycling

The existing inventory of miles of bicycle trails in the County for 2010 shows a surplus in all ROSPA. The existing and planned bicycle trails for the Keys, including the Overseas Heritage Trail, accounts for well over 100 miles of trails. All plans by FDOT, both current and future, for the major US 1 highway includes bike lanes. Additionally, all of the larger parks and Federal and State conservation areas have bike trails within their sites. Although the actual miles inventoried for each ROSPA may be a professional estimate, the large surplus shown, indicates that these facilities LOS are met through 2030.

13.4.4.14 Camping

For the 2010 update the camping facilities show a surplus for the overall County. After 2010, through 2030 there is a surplus in camping facilities. However, the SCORP 2008 does not define camping or camping areas as to the size (the number of sites that represent a "camp area" for LOS calculations). In the UPROSPA there are large conservation areas where one reported camp area may have three to four times as many sites as smaller areas of a few sites in another ROSPA or compared to state-wide averages. Additionally, SCORP 2008 does not define camping as to many of the types of "travel trailer" businesses in the Keys. For this inventory, these latter businesses which were often advertised as "resorts", were not counted towards meeting the LOS standard, unless they are specifically advertised as "camping" facilities.

13.4.4.15 Fishing (non-boat)

This recreational facility type could include many categories of physical facilities, especially as it relates to the unique geography and resources of the Keys. For example, for the 2010 inventory, marinas were not included in this facility type unless it was advertised as having fishing. But in general, fishing could be accomplished from any dockage, seawall or jetty that was used for the marina. Any site that advertised fishing, a dock, a pier, or other type of physical structure to fish from was included in this facility type and then an attempt to measure the length was made. In some of the natural areas, there are boardwalks over the water, but they were excluded unless advertised as fishing places. In like manner, beaches offer the opportunity for fishing, but were excluded from the count unless advertised as "fishing permitted". Private docks and fishing piers were excluded from the inventory due to the difficulty to measure without extensive field work. The overall County does show a surplus in length of fishing non-boat facilities through 2030.

13.4.4.16 Physical Exercise Courses

In this facility type, the 2010 inventory indicates a deficit of over 2 courses for the County overall and additional deficits in all the ROSPA through 2030. In the SCORP 2008 guidelines, these courses are not defined as to physical facilities contained in the courses, but are generally shown by example as being a path or trail with exercise stations along the path or trail. These are the types of facilities that were inventoried; however, the County has an abundance of hiking and nature trails, boardwalks, fishing piers, and even bike trails that offer physical exercise without the actual stations for exercise. In urban areas, where the possibility for having these four latter type facilities are limited, then exercise courses supplied with stations allow for the needed exercise recreational activity. However as in the County, where these other hiking and nature trails, fishing, bike trails, and boardwalks exist, the deficit shown in these courses would be mitigated.

13.4.4.17 Hiking and Nature Trails

In the SCORP 2008 guidelines, these two facilities are separate but have the same LOS per functional population. For the County, they have been combined as the sites within the County lend themselves to both classifications. The SCORP 2008 does not define either trail type as to a minimum length, surface material, or as to the kinds of experiences the user has on the trail to differentiate between the two. Only a few of the actual trails in the County are over one mile long, and many are only a few hundred feet in length due to the narrow geographic land areas along the Keys. Reported boardwalks were not included in this facility inventory as a separate facility. Boardwalks in the County usually are located in natural areas or on the edges of the natural water bodies and as such could be counted as either a nature trail type facility or as a fishing (non-boat) facility. The Overseas Heritage Trail is both a hiking trail and a bike trail and there are many converted old bridges and catwalks that are used for hiking, water and wildlife observation, and, of course, fishing (see **Table 13.6**). Both the individual ROSPA and the overall County show surpluses in miles of trails for 2010 and through 2030.

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13.5 Recreation and Open Space Planning

Recreation and open space planning in the County is currently undertaken by the Division of Growth Management and by the Division of Public Works. The 1986 Comprehensive Plan recommended creation of a Parks and Recreation Department; this recommendation was echoed in the 1990 update to the Comprehensive Plan. This department was created in 1990, but funding and staffing for this department was never provided. The County currently has a Parks and Recreation Advisory Board which reports to the County Commission and works with both Growth Management and Public Works Divisions.

The 1990 update recommended preparation of a Monroe County *Parks and Recreation Master Plan* along with a *Parks and Recreation Management and Maintenance Master Plan*. These two plans were never created or implemented after the1990 update. However, in 2005 the County did create a *Draft 2005 Monroe County Parks and Recreation Master Plan* (MCPRMP). The draft 2005 document was updated in March of 2010 and still remains in draft form. The initial surveys conducted with the residents of the County were not part of the update and the responses are five years out-of-date. This "final draft" of the document was submitted to the County for review and adoption, but has not been adopted as of March 2011.

Additionally, as of March2011, there is no funded and/or staffed Parks and Recreation Department, and without a final adopted Parks and Recreation Master Plan or a Parks and Recreation Management and Maintenance Master Plan, there are no documents to aids or guides in recreation and open space planning efforts.

13.5.1 Development of Recreation Lands and Facilities

As identified in **Section 13.3**, there is currently no shortage of lands in the County for either conservation or recreation uses. This will hold through the year 2030, providing the functional population projections remain approximately as shown in the tables provided herein. As noted earlier, projecting acquisitions based upon the specific categories of park lands (mini, neighborhood, community, and regional), do not work well with the geographic configuration of the County, nor does it accurately reflect the demographics of the County. Slight deficits do appear however within individual ROSPAs in the LOS projection of certain recreation facilities such as football, rugby, soccer, baseball, softball fields, volleyball courts, racquetball, handball courts, and physical exercise courses. These deficits are shown in bold in **Tables 13.19, 13.20, 13.21,13.22 and 13.23** and are discussed in detail in **Section 13.4.4**.

The draft 2005 MCPRMP specifies that the existing facilities in the County are in need of improvements and in some cases renovation, in order to provide the best opportunities to the County's functional population thorough 2030. Since Rule 9J-5 F.A.C. (the "Rule") only addresses recreation lands by general definition such as Community Park and Neighborhood Park, the ORF 2008 guidelines are appropriate for comparison for acreage LOS. The Rule does address facilities but only those requiring public access such as beaches, boat ramps and marinas, but again without establishing LOS standards. **Tables**

13.19, 13.20, 13.21, and 13.22 clearly show the County has a surplus of those types of facilities.

Section 163.3177 F.S. requires each jurisdiction in the State to prepare "…a recreation and open space element indicating a comprehensive system of public and private sites for recreation, including, but not limited to, natural reservations, parks and playgrounds, parkways, beaches and public access to beaches, open spaces, waterways, and other recreation facilities." Here also there is no established LOS standard; therefore, the ORF 2008 seems appropriate as a measurement. . The County has currently met all recreational and open space land criteria and, due to the population projections through 2030, will continue to meet those LOS standards.

Since there is a county-wide surplus in the categories of recreation lands, at this time, it does not seem appropriate to provide an extensive plan for increased county-wide resource-based land acquisitions. Therefore, in order to provide adequate recreation opportunities for the County's functional population through 2030, the County should focus upon the deficiencies identified in facilities and provide for a program continuing improvements to existing lands and facilities. To accomplish this, a complete program for addressing recreation lands and facilities should be implemented through the following mechanisms:

- Development of additional facilities on land which is already owned by the County, but is not currently being used for park and recreation purposes;
- Acquisition of new recreation sites should be on a very limited basis, with a focus upon the Upper Keys ROSPA;
- Provide inter-local agreements with the MCSD for use and development of existing school-based recreation facilities by the County functional population;
- Provide inter-local agreements with incorporated cities within the County for use of existing city-owned park facilities by the County functional population;
- Provide inter-local agreements with agencies of the State and Federal governments for adding County financed recreational facilities (specifically activity-based) on those lands. This will expand the activity-based facilities in the County without the County having to acquire additional lands;
- Provide long-term lease arrangements or joint use agreements with private entities for use of private recreation facilities by the County functional population;
- Adopt the draft 2005 MCPRMP and fully update the information so it can be used as a guide for the County lands and facilities planning;
- Create and implement a Monroe County Parks and Recreation Management and Maintenance Master Plan for recreation lands and facilities;
- Coordinate betweenthe Growth Management Department, the Publix works Division and the Parks and Recreation Advisory Board to implement the two master plans; and
- Complete a current County-wide user survey to determine the functional population's wishes for recreational lands and facilities. This should include or be accompanied with a public information program to allow the population to understand the quantity and status of the recreation lands and facilities within the County.

The County does have two inter-local agreements with two of the school sites and others for park facilities with the incorporated cities. Completing these agreements with the cities and the MCSD should be an important component of the County's Parks and Recreation programs. Also, without implementing all of the above steps, any acquisitions or construction of facilities might be incorrectly allocating public funds.

13.5.1.1 Planning for Recreation and Open Space Lands and Facilities

The first step, before any acquisition or development of land to address the County's land or facility needs, is to identify potential sites for land acquisitions and for facilities construction within the County for all types of recreation uses. Activity-based and resource-based recreation lands have different size and location criteria due to the different programming and management requirements. As previously shown in **Tables 13.12 and 13.17,** there are no deficits in either activity-based lands or resource-based lands. The County still has the responsibility for land acquisition and for providing facilities for the 2 unincorporated cities of Key Largo and Tavernier and the large development of Ocean Reef. But by comparison, in the Middle and Lower Keys ROSPA, the five incorporated cities contribute approximately 65 percent of the activity-based land area but represent only 56 percent of the functional population. For the overall County, no new activity-based lands or resource-based lands are needed except as to meet the physical site requirements of specific recreational facilities deficits.

13.5.1.1.1 Activity-based Lands and Facilities

In the categories of activity-based lands and facilities, the following criteria should be used to identify potential recreation lands to accommodate the deficits for these facilities:

- Priority should be given to areas that are not currently well served in either resource-based or activity-based lands;
- Priority should be given to lands that contain facilities that are at the end of their "life-cycle", or facilities that currently show a deficit in the activity-based facilities;
- Priority should be given to large land areas when available. However, due to the limited amount of available land, land costs, limited County budgets for facility development and the dispersed nature of the County population, several smaller parks of between 1 and 6 acres are more likely probable than large parks of over 10 acres in size; and
- Priority should be given to land which is already disturbed or has scarified vegetation in order to avoid disturbing environmentally sensitive lands or habitats.

13.5.1.1.2 Resource-based Lands

A comparison of **Tables 13.12** and **13.16** for resource-based lands indicates a large surplus of land in all the ROSPAs. This is somewhat misleading in that almost of these surplus lands are in the category of "beaches" and those beaches are primarily Federal and State owned. In removing the Federal and State owned beaches from the resource-based lands in **Table 13.16**, approximately 250 acres of resource-based lands remain. Although this would still result in a slight surplus in resource-based lands, it does show

some areas of the County that are not currently well-served by resource-based recreation lands. However, when deciding upon future resource-based land acquisitions, the County should consider the following:

- Priority should be given to lands containing naturally occurring and native habitats;
- Priority should be given to lands which enhance public access to the shoreline and water-dependent uses, such as beaches, marinas, docks and lands containing habitat critical to, or providing significant protection for, species designated as threatened or endangered by the U.S. Fish and Wildlife Service and/or the State of Florida;
- Priority should be given to lands containing unique geologic features;
- Priority should be given to lands whose conservation would enhance or protect water quality or would protect fish, wildlife or vegetative habitat; especially those which cannot be adequately protected through State and Federal regulatory programs; and
- Priority should be given to lands which offer the opportunity for preservation of significant archaeological or historical sites.

The identification of potential lands and sites in either resource-based or activity-based categories should be undertaken as a internal project of the Parks and Recreation Department of the County, if that department has been created, staffed and funded. If this is not a possibility, then an outside consulting firm could be contracted for this work. This first step should be undertaken and continually updated as part of the Parks and Recreation Master Plan programs even if funding for acquisitions of new lands is not contemplated under any budgetary period.

13.5.2 Parks and Recreation Master Plan and Park Management Plan

Although the County currently owns many recreation sites, as previously noted, the County does not currently have an adopted Parks and Recreation Master Plan (only a draft 2005 plan that did include some updates in 2010, but still remains in draft form) or a Parks and Recreation Management and Maintenance Master Plan for these recreation lands. The County does provide for facility planning within existing parks and for park maintenance and management as the need arises through the Division of Public Works. However, the adoption of both the Parks and Recreation Master Plan and creation of a Parks and Recreation Management and Maintenance Master Plan would best serve the County in the future with respect to all recreational and open space sites.

13.5.2.1 Monroe County Parks and Recreation Master Plan 2005 (draft)

The draft 2005 Parks and Recreation Master Plan (MCPRMP), with some updates in March of 2010, still remains in draft form. This draft document addresses much of the recreation lands and facilities issues previous discussed in this element. As of December 2010, the draft MCPRMP has not been adopted by the County BOCC and the draft copy contains information that is three to five years out-of-date. Also, the plan was prepared with the input from 3 workshops with the residents and a mailed survey throughout the County in 2004. The workshops and would of course not be valid for the current update. The draft MCPRMP was well prepared and comprehensive and is a key factor in any of the County's

plans for recreation acquisitions, development, and planning. Therefore, it is critical that the County update instigate a new survey and workshops for the MCPRMP update as necessary and adopt the plan in final form with the upgrades to the database and the findings in that plan.

13.5.2.2 Monroe County Parks and Recreation Master Maintenance and Management Plan

Maintenance and management is currently handled at a County staff level and only for specific parks and recreation facilities sites. The County should undertake the development of a Parks and Recreation Management and Maintenance Master Plan. When completed, this plan should evaluate and incorporate, among other factors, the following:

- Proper management techniques consistent with the updated elements of Future Land Use, Recreation and Open Space, Historic Sites, and Conservation and Coastal Management;
- Restoration of disturbed wetland areas;
- The removal of exotic species;
- Regular evaluation of recreation sites and facilities including equipment, planting and maintenance of native species; and
- General maintenance requirements and costs.

As noted above, the County's maintenance and management duties for the recreation lands and facilities are currently being handled under the Division of Public Works. If a separate Parks and Recreation Department is created, it would be advantageous to have maintenance and management handled through that department.

13.5.3 Recreation Capital Improvements and Acquisitions

13.5.3.1 Acquisitions and Capital Improvement Costs and Schedules

As identified in **Table 13.17**, there is currently (2010) a surplus of activity-based recreation lands for all the ROSPA. This is based on the FDNR, ORF 2008 LOS guidelines. For the overall County, there is no deficit and actually there is a 225 acre surplus. All the County's ROSPA show surpluses in activity-based recreation lands through the year 2030. Activity-based facilities and activity-based recreation lands are not subject to the concurrency requirements mandated in the Rule for park lands; thus the County is not required to address any deficits that occur. However, if desired, priority for any land acquisition should be given to the Upper Keys ROSPA as the surpluses based on current population projections indicate only an approximate 30 acre surplus through the year 2030.

However, for FY 2010, a deficit occurs in some of the recreation activity-based facilities across the County; specifically in the categories of baseball/softball fields, football/rugby/soccer fields, volleyball courts, racquetball/handball courts, and physical exercise courses. These deficits are comparable to those enumerated in the draft MCRPMP, which uses the same LOS population standards and the slight differences occur because the draft MCRPMP is calculated on the County's unincorporated population only.

These deficits are shown in **(-bold)** in **Table 13.15,** and are listed below for clarity:

- Baseball/Softball fields: 3.3 fields in the Lower Keys; no deficit in the overall County;
- Football/Rugby/Soccer fields: 5.2 fields in the Upper Keys and 6.5 fields in the Lower Keys; 11.1 overall County deficit;
- Volleyball Courts: 6.5 courts in the Lower Keys; 4.1 courts overall County deficit;
- Racquetball/Handball courts: courts in the Middle Keys and 5.1 courts in the Lower Keys; 4.9 court overall County deficit; and
- Physical Exercise courses: .5 courses in the Upper Keys, .4 courses in the Middle Keys and 1.4 courses in the Lower Keys; 2.3 courses overall County deficit.

In **Sections 13.4.4.1 and 13.4.4.2,** the deficits shown for baseball/softball and football/rugby/soccer respectively are discussed in terms of the County's population make-up. When considering that the County has such a high seasonal population, using the permanent population only is more realistic for these types of facilities. **Table 13.23** illustrates that these deficits for these two categories disappear when these recreation facilities are calculated on resident population only.

The other three recreation facilities categories deficits in 2010 are volleyball courts, racquetball/handball courts, and physical exercise courses. The draft MCRPMP indicates that the deficits for these facilities are considerably less, however when noting that those calculations are based on the unincorporated functional population only, it indicates that the majority of the deficit lies in the incorporated cities recreational facilities. These deficits are however a fairly inexpensive to build, and are also small in land area coverage. Therefore, the County could easily reduce or eliminate these deficits by adding these facilities to existing recreational lands.

For example, the County has a surplus of bike trails, nature trails, hiking trails, school tracks, and boardwalks. Exercise courses could be added to those existing facilities to make up the deficits. Another example is that the County has many miles of beaches. Volleyball Courts are sand facilities that uses only about 60' x 100' of that beach sand. These facilities could be added to almost all of the County's and cities beaches to eliminate the deficits. Finally, racquetball/handball courts are each about 25' x 60' and usually built in pairs or in squares of four. Although they require pavement and walls, there is no requirement for orientation and they can be built in unused portions of existing recreation lands. Usually these courts are associated with tennis, as they are often used by tennis players for practice. Acquisition costs would be eliminated for development of these facilities on existing County-owned land or on land leased by agreement.

The deficits shown in these three recreation facilities types for the FY 2015, 2020, 2025, and 2030, decrease through 2030. They are also in the Upper Keys ROSPA and the Lower Keys ROSPA only. The deficit decrease is primarily due to the population projections. The projections are based on no new facilities being built as there is no recreation master plan to indicate any future facilities. All other recreation facilities, except as noted above, show surpluses through 2030 and do not need to project funding except as "life-cycle" replacements for existing facilities.

13.5.3.2 Funding Sources

Funding for both the acquisition and development of County recreation lands and facilities has been available through a number of sources. These sources have been utilized by the County in the past but should now be expanded and under regular update and monitoring in order to provide funds for the goals, objectives and policies established for recreation. The key to this is to have the MCPRMP adopted and update the information contained within the document to the current date. The MVPRMP discusses funding sources as well as costs associated with the recreational facilities needs and the recreational lands available within the unincorporated County.

The following is an additional list of possible sources for funding, but is not intended to be comprehensive. This funding source list is marked with (A) for acquisition funding and (D) for developmental funding for facility financing.

- (A & D) Florida Recreation Development Assistance Program
- (A & D) Florida Forever (formerly Preservation 2000 Trust Fund)
- (A) Florida Forever (formerly Conservation and Recreation Lands (CARL) Program)
- (A & D) Land and Water Conservation Fund;
- (D) Urban Parks and Recreation Recovery (UPARR) Grant
- (A) Florida Greenways and Trails Acquisition Program
- (A) Florida Communities Trust
- (A & D) Florida Recreation Development Assistance Program
- (D) Federal Highway Administration (FHWA) National Scenic Byways Program
- (D) Florida Department of Transportation (FDOT) Highway Beautification Program
- (A & D) National Park Service (NPS) Outdoor Recreation-Acquisition, Development and Planning
- (D) Florida Boating Improvement Program
- (D) Transportation Enhancement Program
- (D) Florida State Historic Preservation Grants-in-Aid Program

In addition, acquisition of recreation lands could be funded, in part, through the Monroe County Natural Heritage and Park Program or through the Monroe County Land Authority (MCLA). Further funding for capital improvements and operational expenses to recreation lands, can and are being made available through:

- Unincorporated Parks and Beach Fund
- Park and Recreation Impact Fee Fund
- One cent Infrastructure Sales Tax Fund
- Fair Share Park User and Impact Fees
- Park Bonds
- Special Appropriation Funds by the Monroe County Board of County Commissioners

13.6 Summary and Findings

The analysis of the existing conservation and recreation lands and facilities contained in this Update shows that the County meets or exceeds the acceptable level of service (LOS) standards set by the State, with only minor exceptions. This update also revises those LOS standards from the previously used LOS in the 1986 Plan and the 1992 Update as well as using the now required functional population and projections. The County has an abundance of conservation and conservation open space lands and hundreds of thousands of acres of conservation waters which form the basis of its tourist/seasonal population attraction. Additionally the County has been diligent in providing recreation lands, both resource-based and activity-based for the use and enjoyment of its residents and the same tourist and seasonal population.

From the overall County perspective, all the conservation and recreation land requirements standards are met and will continue to be met through FY 2030. The analysis shows that baseball/softball and football/rugby/soccer recreation facilities are shown to be adequately served for all the resident population in the County and at least 50 percent of the seasonal population. Therefore of the total 17 recreation type facilities analyzed in this update, only the three categories of Volleyball Courts, Racquetball/Handball Courts, and Physical Exercise Courses, show deficits. These facilities are some of the least expensive facilities to build and the County already has more than adequate activity-based lands on which to place these facilities. Through proper planning and funding, these facility deficits could be easily eliminated.

The County already has an outstanding and diverse base of recreational opportunities for its populations and recognizes that the key to providing superior quality for those lands and facilities is through recreational planning. Recreational planning in the following major areas should be implemented:

- Preparation, update and adoption of a County Parks and Recreation Master Plan;
- "Life-cycle" analysis of all recreation lands and facilities under the County jurisdiction;
- Preparation of a County Parks and Recreation Maintenance and Management Master Plan;
- A short and long term facilities improvement and operational cost program;
- A formal survey on recreational needs and facilities with both the residents and the tourist/seasonal populations;
- A program to pursue and execute inter-local agreements with MCSB, other agencies, and the private sector for expansion of recreation lands and facilities and;

- Assigning a department to be responsible for plan implementation and recommendation to the County staff, Recreation Advisory Board, and the Board of County Commissioners.

The unique geography and population of the County has been more than adequately addressed in the provisions of the recreation lands, waters, and facilities. It is of the utmost importance to the County to preserve the existing recreational lands and facilities; maintain the high quality of these facilities; initiate replacement programs for some of these facilities; explore new partnerships for recreational development; and plan for better utilization of its current facilities.

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13.7 Bibliography

Florida Department of Natural Resources. 1991. Coupon Bight Aquatic Preserve Management Plan.

Florida Department of Natural Resources. 1989. Outdoor Recreation in Florida.

Florida Department of Natural Resources. 2000. Outdoor Recreation in Florida.

Florida Department of Natural Resources. 2008. Outdoor Recreation in Florida.

Monroe County Parks and Recreation Master Plan. (draft 2005). Wade and Trim.

National Recreation and Park Association. 1987, Recreation, Park and Open Space Standards and Guidelines.

U.S. Department of Commerce. National Oceanic and Atmospheric Administration. Memorandum: Recreation/Tourism for the Florida Keys 65.

Florida Statutes 163.3177, Recreation and Open Space.

Florida Statutes, 163.3133, Recreation and Open Space, rules 9J-5.

Monroe County 2010-2030 Population Projections, March 15, 2011; Fishkind & Associates and Keith and Schnars, PA

CHAPTER 13.0 – RECREATION AND OPEN SPACE – COMMENT RESPONSES

Commenter: Richard Jones, Director Marine Resources Office
Date Received: August 2010

Location	Comment	K&S Response
General 1	It will help when there is a Table of Contents.	Agree: Table of contents was not completed at time of 1st. submission. Next submission will have T. of C. for those sections completed.
General 2	We need to straighten out what a water related use is. I like to separate 'water dependent' from 'water related' from 'water enhanced'.	Agree: References to 'water related' and 'water dependent' uses will only be mentioned in Element 13. The issues will be discussed and defined in Element 2; Conservation
General 3	The 2005 Waterways Act requires amending this Element to include 'waterway' in the comprehensive system of public and private sites for recreation. I don't believe its mentioned anywhere in the Element.	Agree: Additional written documentation and tables on public access facilities to "waterways" have been added and references to the 2005 Waterway and Waterfront Improvement Act of the Florida Statutes has also been added.
General 4	I'm seeing a continued theme of calling sites water dependent", when I think the point trying to be made is that the sites are "water access". Lets re-think the point we are trying to make.	Agree: See comments on "General 1" above.
p. 1 Sec 13.0	What is a 'normal' oriented recreational facility? Third par- mentions that water related uses are 'enhanced' by the water. Not according to the definition you cite on p 227 of the Conservation and Coastal Element. Water enhanced uses are just that: water enhanced. That is different from water dependent or water related. You need to go by the def in 9J-5.003 as it mentions that water-related uses are 'associated' with the water. Like a fish market. Also it says "Water-related uses and lands are those…' Somebody threw the word land in there. Land is either on the water or its not. I think it's a stretch to say land can be water related. Also I don't know how you tie water related uses to contributing to the efficient activity of water dependent uses.	Agree: The word 'normal' was a typo-it is fixed. The rest of the water related etc. uses and comments are no longer in the Element 13 and are now in Element 2 the Conservation Element which has been clarified-see item 1 above.

Location	Comment	K&S Response
p. 3 Sec 13.1.1 Par. 2	Here it describes the recreational facilities as water dependent. Don't use that term- you should say 'water access or water-front' because that's what its about. It's providing public water access. Nobody cares if its water dependent.	Agree: Has been correct in both Element 13 and Element 2.
p. 12 Table 13.4	Sunset Pt park shows nothing under facilities. Why? There is a boat ramp facility there.	Agree: The information on this park has been corrected.
p. 15	Under Roadside and Bridge Rec. Lands and Facilities it mentions 'bridges have been modified used along US 1'. Bad sentence structure- maybe you mean 'modified for use along US 1'.	Agree: have revised the paragraph
p. 25 Table 13.9	Indicates that Sunset Pt is privately owned. Is that a different place that Sunset Pt Park, which is owned by the County? Where are all the mm numbers? Also the paragraph at the top of the page mentions water-dependent uses again. I think the point here is that they are 'water-access' sites, not water-dependent.	Agree: Sunset Pt Park was removed from the privately-owned table but was retained on the table for the County-owned parks. MM numbers have been added to all tables except the one on privately-owned facilities. The only use of the table on the privately-owned facilities for this update is for the facilities themselves and therefore the locations are too difficult to pinpoint and would not be needed. Paragraph has been changed.
General 4	Do the Rec & Open space Element and the Future Land Use Element both mention the need to amend according to the 2005 Waterway Act? It 's required to be in all three elements.	Disagree: The Recreation and Open Space Element mentions the Waterways Act 2005 but does not indicate that the Act needs to be updated.
General 7	Be prepared for an argument from the public concerning the LOS for boat ramps. See 3.24.3 says there are enough boat ramps, but we often have members of the public say we haven't created a new one in over 15 years.	Agree: However, this element update is just stating the fact that per state standards there exists over 3 times the required facilities. The SCORP guidelines do not differentiate between private and public boat ramps. If this is the issue that the public really is concerned with, then it should be addressed in the Parks Master Plans
	Note: The last two comments were from the Conservation and Coastal Element Remarks	

Commenter: Kathy Grasser, Comprehensive Planner

Location	Comment	K&S Response
Page 3, 2nd Paragraph	Under Conservation Lands, clarify 1st sent. Or separate out terrestrial and submerged lands. Somehow add the word "site" to this sentence.	Agree:
Page 4, 13.2.1.1.3 Monroe Cty. Conservation Lands	Replace this paragraph with the attachment (on MCLA). Also check Conservation Element and if it is there replace it too. Mark Rosch and Beth Leto need to add this statement.	Agree: Paragraph has been substituted in Element 13.
Page 6, Table 13.1 Inventory	Under US Fish and Wildlife Service: North Key Largo, replace the "e" with an "o"	Agree:
Page 6,	Under Florida Keys National Marine Sanctuary; should not be bold (type)	Agree:
Page 28	Table 13.9 Matecumbe Beach/ Anne's Beach is now leased to Islamorada	Agree: Moved from Table 13.9 to Table 13.4 with notes.
Pages 6-16 (Tables 13.1 & 13.2)	In Table 13.2 eliminate Ft. Jefferson National Monument	Disagree: Changed the name to Ft. Jefferson National Preservation but did not eliminate it because a search indicated that the State is leased this additional acres. This acreage is above that reported in Table 13.1
Pages 6-16 Tables 13.3	Ask The Nature Conservancy (TNC) & The Florida Keys Land & Sea Trust (FKL&ST) to verify acreages in Table 13.3	Disagree: The County has sent this Element to each organization for review and no response as yet. K&S attempted to contact these same agencies and could not get a response.
Pages 6-16 (Tables 13.1 & 13.2)	Please review the data in the tables for correctness.	Agree: These tables represent the best updates on acreages available through various sources. Contacts were made by phone and internet searches. Almost all of the major conservation areas I contacted were not able to give specific acreages, just round nos. such as included in the tables. It would be too time consuming to try to separate submerged waters from upland acreages. 9J-5 & FS 161 do not make the distinction between the two for the LOS calculations. Additionally, a few acres added or subtracted would not make any difference in meeting LOS standards. Even if only the Upland acreages for the Conservation lands were counted, the LOS is over 6,630 acres per 1000 functional population.

Commenter: Kathy Grasser, Comprehensive Planner
Date Received: Email, 10/12/10

Location	Comment	K&S Response
General 1	Italicized Text	Agree: This has been corrected with the word processing updates for the next submission document
General 2	Did not review the tables	Agree: All tables have changed along with new tables added for the new updated document
General 3	Shaded comments in yellow or purple	Agree: Have addressed all shaded areas. Corrections are shown in the new updated document. Some of those are also addressed at the end of this response form.
General 4	P. 71 (old) "maximum and minimum population". Population is high for the County	Agree: The State, in the 2008 Outdoor Recreation in Florida (draft) included results of the statewide survey on recreation facilities with the population numbers served by each type of facility. This was included in the Appendix D of this document. See the attached supplement for a more detailed answer.
General 5	P. 12 Conservation lands vs. the acres per 1,000 functional population.	Agree: This paragraph has been re-written for the updated document. The actual Conservation "lands and waters" is 4.07 million acres and the acres per 1,000 population is 25,824. The new document has been updated for more current acreage figures. No, this does not include Recreation lands.
General 6	P. 46 (old) Conflict with numbers in General 5	Agree: The new document page is 44 and that paragraph has been re-written slightly and reflects different numbers based on a different calculation.
General 7	Reference to Monroe County Parks and Recreation Master Plan dated March 2005 by Wade and Trim	Agree: Yes, this is a draft document which we will add the word "draft" in the new document. In the spring of 2010 Wade and Trim indicated to me that they had just re-submitted this document back to the County as the "final draft". Whether it has been implemented by Monroe County is unknown at this time.

Supplement for General Question 4.

The 2008 *Outdoor Recreation in Florida* (draft) may be adopted by DEP as of this writing but was not adopted when the Element 13 was begun in early 2010. The 2008 document differed from the 2000 document in that an apparent extensive survey was completed by the State of some 20 or so recreation type facilities (the document also called them "activity") throughout the state to determine the population served by each of these facilities. This information was included in the Appendix "D" of the document. This data was reported as "Use Guidelines". Associated with each of these facilities was a population served breakdown into 3 categories: "Minimum, Maximum, and Median".

The first problem is that no explanation as to how these population figures were derived or any weighting of the figures for example for locality within the state. The only indication would be by the title since a median figure should be in the middle of any data collected and the median on some of the figures was extremely skewed from the center. For example the activity of "freshwater and saltwater beach activities" showed a maximum of 211,000 population, a minimum of 25,000 population, and median of 25,000 population. Therefore two questions are obvious. How can the minimum and the median be the same number? How can saltwater beaches in a state totally surrounded by ocean be lumped with freshwater beaches in a state with relatively few lakes which are not sandy by geological development?

The second problem encountered in adopting these standards to Monroe County is very little was included as to the description of each of these facilities except but what the name implied. For example, one of the facilities is "hiking" measured in "linear mile of trail" and another is "Nature Study" also measured in "linear mile of trail". The question here is how does one hike on a trail measured in miles and <u>not</u> study nature?

From the above and other problems within the document's data for Element 13 update, it was necessary to make some reasonable and professional assumptions, choices, and consolidations. Some of the names of the state's guidelines were grouped or refined to suit Monroe County. Examples are the facilities called "Hiking/Nature Trails" and "Sandy Beaches".
Also the median population served figures were used in all cases except Sandy Beaches in which 100,000 was chosen because of the extreme skewed reported median figure. Incidentally, the 100,000 population was also used in the Monroe County Parks and Recreation Master Plan by Wade and Trim.

Finally, why is this important to understand in relation to Monroe County and its 2010 Comp Plan Update? There are two reasons.

First, the State is just now recognizing that recreation planning should be done by population served per facility or activity type, not by land acreage. They are still giving guidelines for acreages on park types (Mini, Neighborhood, Community, and Regional). Most recreation planners have been converting in their planning from planning acreages to facility planning, since about the mid 1990's. The reason for this is that the physical design of these facilities/activities can be done so that multiple activities can be accommodated in the same physical ground area, whereas this was not necessarily done by previous recreation planners. For example, Football, Soccer and Rugby can all be played on the same basic field (land area) with the only difficulty in scheduling for leagues etc. Another example is that a Nature Trail can be designed also for Hiking, Physical Exercise, and even fishing (non-boat) if the right environment is the site. In Monroe County, achieving multiple recreational uses for the same valuable land is the best planning practice.

Second, the traditional classifications of parks and the associated land required and population served does not fit with the physical or fiscal projections of Monroe County. Land acquisitions for recreation uses in the County would be extremely expensive as the cost to acquire land is high and developable land left is limited. The best approach is to add facilities to existing County recreation lands to create multiple activity uses in conjunction with existing

facilities. Examples of this approach would be to make sure all parks have picnic and volleyball facilities. These are very inexpensive activity uses. Also utilizing all trails, bicycling trails, and even school tracks, have areas for exercise stations.

Commenter: Christine Hurley, Director Marine Resources Office Date Received: 2/12/11		
Location	**Comment**	**K&S Response**
Bernstein Park Location	Bernstein park is indicated as being on Racoon Key on North Stock Island, but is on South Stock Island	Agree: This has been corrected in the tables.

Commenter: Christine Hurley, Director Marine Resources Office Date Received: May 2010		
Location	**Comment**	**K&S Response**
General 1	Shade cells where deficiencies exist.	Agree: Currently shown in BOLD but will consider shading.
General 2	Page one use bullets	Agree: Bullets have been added throughout the document.
General 3	Typo errors.	Agree: Have corrected typo errors throughout the document.
General 4	Need to add a separation of the conservation lands for the mainland and then a figure for the rest of the keys.	Agree: It will be in the body of the document by final submission.
General 5	Separation of "submerged" lands from "upland" lands for "conservation" lands.	Agree: The tables 13.1 & 13.2 for acreages. Note: this information is not always available nor accurate.
Federal-owned & Florida- owned	Correct numbers in text.	Agree: Have been correct to best possible available information in both document & tables.
MCLA parcels	Acreages & names of specific parcels	Disagree: MCLA parcels are very small (less than .5 ac usually) and change every few months, therefore it would be difficult to include and it was decided they would not have a bearing on the resource-based lands for the County. Will have to meet on whether to include a appendix list of MCLA lands.
Table 13.1, 13.2, 13.3	Use of the word "Partial" in title	Agree: have removed the word from the title of each table. The tables may not be 100% complete but are the best available information at the time of the document.
Reference Table 13.2	Is there a newer reference than 1991 for this table?	Agree: Will check for newer source but facilities are accurate.
Big Pine Ref.	Should Big Pine studies be included?	Agree: This will require a meeting to determine what specifically should or could have added data to this Element.
Private-Owned	Add abbreviations for FKLST & TNC	Agree:

Location	Comment	K&S Response
Planning Area Descriptions	General Question	Agree: It was determined that since the Cities were to be included in the Recreation & Open space Element, that a different planning area scheme needed to be created to roughly correspond to the Keys Planning Areas. This was done and the ROSPA are described early in the document and are used throughout this Element.
Monroe County-owned	General questions on numbers in this section.	Agree: This section has been re-written. Numbers are updated and are taken from Table 13.4
Table 13.4	Blanks in table & does County own all these lands	Agree: Table shows only the lands owned by the County. Blanks have now been filled in. Also the areas of the Recreation and Open Space Planning Areas (ROSPA) have been added.
City-owned Facilities Table 13.6	Show which City owns the parcels	Agree: City headings are now shown above each grouping of parcels. Also the Table is now 13.7
MC School Board	Acreages on the MCSB lands update?	Agree: Written document portion and the Table now 13.8 have been updated for the acreages and facilities finally received from the MCSB.
MC Leased Lands	Update to acreages.	Agree: The acreages in the document and in the Table (now 13.9) have been updated.
Privately-owned Lands	Quantify acreages (rather than %) for private facilities such as marinas, docks, fishing, boat ramps etc.	Disagree: Too difficult to get actual acreages on private facilities without extensive tax and aerial research. Number of facilities for marinas, docks, fishing, boat ramps are shown in Table 13.13. Also boat ramps and fishing reported in facilities LOS calculations.
Boat Ramps	Should we break-out Boat Ramps	Agree; Boat Ramps are broken out under the Facilities not by acreages, except in a few cases.
Summary of Recreation Lands & Facilities	Source for the .82 ac./1000 pop. Current functional population? Resource-based & activity-based? 2008 SCORP reported activities? Acres sources? Typos.	Agree; This section has been rewritten. The .82 ac. /1000 pop. Was used in the 1990 & 1992 update but was calculated wrong. New calculations based on 1.5 ac. /1000 functional pop. are presented in this Element now. Typos corrected, additional tables added, and specifics of deficits are discussed in later portions of the document.
Table 13.10	Using .82/1000 what are the deficits	Agree: This table has been updated and is now Table 13.12. There are no deficits on resource-based lands (Table 13.16) and only slight deficits on activity-based lands (Table 13.17)
Table 13.11	Should median of guidelines be used and what is the other source?	Agree; This table is described now in the document wherein the median is shown to be used except for "Beaches". The section on beaches describes why another standard is used.

Location	Comment	K&S Response
Table 13.13	Good question?	Agree: The table for which the comment was made has been eliminated and replaced with Table 13.17
Old Table 13.13	Round numbers. Deficiencies	Agree: This table has been eliminated and replaced with others to describe existing status on lands and facilities.

Commenter: Richard Jones, Director Marine Resources Office
Date Received: November 2010

Location	Comment	K&S Response
General 1	P. 29 Sect. 13.2.4, font size	Agree: This has been corrected with the word processing updates for the next submission document
General 2	P. 38 Table 13.10, Correct spelling of Swimming and of Vaca Key (on all tables)	Agree: All spelling has been check on these items as well as others for the new updated document
General 3	P. 45 mentions DNR & DNR 1989, clarify-there is no longer any DNR	Agree: The references for the 1989 DNR quote is an important one and is from 1989 when there was a DNR. All other references to DNR should have been removed from the new updated document unless it references an earlier document when the Dept. existed.
General 4	P. 47 Table 13.13 Boat ramps of 107 conflicts with Table 3.21 in Conservation Element	Disagree: There was a discrepancy in the original Conservation Element since it had not been updated. Both tables now agree at 107 for the new updated document.

Commenter: from Ms. Kathy Grasser, Comprehensive Planner
Comments received: May 13, 2011

Location	Comment	K&S Response
	Line spacing is uniform for total document to single space	Agree: Have revised.
	For all numbers in the tables showing deficits, please show as a negative number, not bold. Since this document is a 20 year document, the copying of the document over and over again might fade the bold.	Agree: Have incorporated three types to distinguish deficits. Have kept the **bold** but also added brackets and a negative sign. Example **(-3.5)**
Page 43,	Please cite source of functional population.	Agree: It is Monroe County 2010-2030Population Projections, March 15, 2011, Fishkind & Associates and Keith and Schnars, PA
Page 52,	Section 13.3.3 which standards are you referring to? If	Agree: Have changed the wording to indicate that the

	this is the new standards as stated in the May 2011 draft, then no, we have not adopted them yet . We are waiting for Phase III.	standards have not been adopted. However, the whole update calculations are based on the new standards. So the majority of the document references these standards as if they have been adopted.
Page 56	Our comp plan shows we still use the .82/1000 LOS standards. We have not adopted the 2008 SCORP median standards.	Agree: But here again the whole update is based on these standards. Also in a previous response it was noted that the .82/1000 LOS was arrived at in error and that it no longer applies since the requirements under the current update is for "functional population". Note that the .82/1000 LOS is not the same as the 2008 SCORP median standard.
Pages 61 -13.4 Capacity Analysis	What does this mean- functional population projects based on the hurricane capacity constraints- it doesn't seem to fit the other discussions of just functional population.	Agree: The "hurricane capacity" reference is a carryover from the previous document. This has been changed. Note new page # reference 65.
Pages 72 – 13.4.4	Please clarify the sentence "All of the tables show surpluses in all 17 facilities except in specific ROSPAs for the five of these facilities".	Agree: Have re-worded the referenced sentences based on the recalculation of the required facilities based on the new functional population figures. Note new page # reference 79.
Pages 82 -13.5.2.1	Please clarify the sentence "also, the plan was prepared with limited input from the residents of the County and without the benefit of any user surveys". Three public workshops were held in 2004 and a survey was mailed in the winter/spring of 2004 to 1000 residents.	Agree: Good catch. Our mistake. The paragraphs referencing this has been re-worded. Note new page # reference 90.
Pages 84	Change the volleyball court dimensions to match section 13.4.4.8	Agree: (60' x 100')
Page 5- 13.2	Confusion of ownership of the 4.07 million acres.	Agree: Changed the wording at this location and others where the 4.07 million acres are indicated.
Page 6 – 13.2.1.1.1	Federally-Owned Conservation Lands and Facilities	Agreed: See above. Note new page # referenced 4.
Page 14 – 13.2.2	Summary of Existing Conservation and Recreation Lands and Facilities. Other agencies listed here that are not under the other three section:	Agree: See above. Re-worded references
Page 45 – 13.3.1	General Recreation Demands	Agree: See above. Re-worded references
Page 44	Please make all footnote numbers superscript (inside the table)	Agree:
Page 48	The Everglades is 2 hours away from Marathon, Big Cypress is 3 hours away. It takes ½ to get to MM 73, the end of the MKROSPA.	Agree: This was just a general reference to driving time and not meant to be precise. However, a correction was made.
Page 56, Table 13.16, footnote (3)	Where does Dagny Johnson State Park go? Its an upper keys state park.	Agree: For this particular chart, not all state parks, etc. were used. It was felt that using only County lands was really too

		restrictive and that some of the state parks could be used to count towards the resource-based lands. Without using these state lands the County-owned lands alone would result in a deficit. At the same time it was felt that using all of the state parks would be "double-counting" as those parks fall under conservation lands.
Page 81	Delete line- this is not LOS related, but part of maintenance and upkeep.	Disagree: If existing facilities are not under a program of improvements, then the facilities deteriorate below the level of use and can no longer be counted towards meeting LOS standards.
Page 82	Not sure how feasible it is to fund a Parks and Recreation Department until the sewers are paid for and completed.	Agree: Have re-worded so that it reads without the Parks and Recreation Department. Note new page # reference 87.
Page 85	Where is the 4 acre deficit.	Agree: That line was a carryover from the previous calculations before the new functional population figures were available. There is no 4 acre deficit and it has been eliminated. Note new page # reference 88 & 90.
Page 88	Please re-write. "For the years….Exercise".	Agree: Re-wrote this paragraph and other references to make clear.
	Where numbers are over one thousands, please use commas	Agree:
	Various highlighted sentences	Agree: Re-wrote to clarify

Commenter: from Ms. Kathy Grasser, Comprehensive Planner
Comments received: June 21, 2011

Location	Comment	K&S Response
Page 4 – highlighted sentenced: Page 5: 13.2 There is 4.07 million acres of publicly-owned (*Federal*) conservation and recreation lands and waters provided in the County. *13.2.1.1.1 Federally-Owned Conservation Lands and Facilities* **Page 6:** There are approximately 4.07 million acres of lands or waters under *Federal* jurisdiction in the County (Table		Agree, have made all revisions as suggested.

13.1). **Other agencies listed here that are not under the other three section:** **Page 14:** *13.2.2 Summary of Existing Conservation and Recreation Lands and Facilities* In summary, currently the County boasts approximately 4.07 million acres of Conservation lands and waters under the ownership and maintenance of the *Federal Government, the State of Florida, private Conservation organizations and the MCLA.* **Page 45** *13.3.1 General Recreation Demands* The combination of climate, clean waters, coral reefs, abundant fish and wildlife and accessibility are the main attractions to both visitors and permanent residents of the Florida Keys. There are currently over 4.07 million acres of publicly-owned *Federal* conservation lands and waters in the County (including the Mainland ROSPA), primarily providing both water-dependent and water-related recreational opportunities. Page 44 – please make all footnote numbers superscript (inside the table) Page 48 – the Everglades is 2 hours away from Marathon, Big Cypress is 3 hours away. It takes ½ to get to MM 73, the end of the MKROSPA. *"In addition, these two parks are within a 1 hour drive of all of the Upper Keys, and most of the Middle Keys ROSPA."* Page 56, Table 13.16, footnote (3) Where does Dagny Johnson State Park go? Its an upper keys state park.		

http://floridastateparks.org/keylargohammock/default.cfm Page 81 Delete line – this is not LOS related, but part of maintenance and upkeep. Therefore, in order to provide adequate recreation opportunities for the County's functional population through 2030, the County should focus upon the deficiencies identified in facilities ~~and provide for a program continuing improvements to existing lands and facilities~~. Page 82 • Establish, staff and fund a Parks and Recreation Department to implement the two master plans; coordinate with Public Works and Growth Management Departments; and advise both the Parks and Recreation Advisory Board and the County Commission; and Rewrite: Coordinate between the Growth Management and Public Works Divisions and the Parks and Recreation Advisory Board to implement the two master plans. I'm not sure how feasible it is to fund a Parks and Recreation Department until the sewers are paid for and completed. Page 85: I don't know where the four acre deficit comes from. I only find that in 2010, activity based land for the upper keys have a surplus of 37.53 acres. *As identified in **Table 13.17**, there is currently (2010) a slight deficit of activity-based recreation lands in the Upper Keys ROSPA of four acres*		

Page 88 Please re-write: For the years 2010, 2020, 2025, and 2030, throughout Monroe County, there are four categories that show deficits. They are Football/Rugby/Soccer Fields, Volleyball Courts, Racquetball/Handball Courts and Physical Exercise. For the year 2015, throughout Monroe County, there are three categories that show deficits. They are Volleyball Courts, Racquetball/Handball Courts and Physical Exercise. *Of the total 17 recreation type facilities analyzed in this update, only three categories show deficits.* GENERAL COMMENTS: Where numbers are over one thousands, please use commas (i.e. 1,000) All tables with deficits: Please use this format with the negative numbers in (parentheses) and not bolded. It makes it an easier read. See part of your table from the sanitary sewer element.		

INTERGOVERNMENTAL COORDINATION ELEMENT
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14.0 INTERGOVERNMENTAL COORDINATION

[Rule 9J-5.015(1), (2) F.A.C]

The Intergovernmental Coordination Element of the Monroe County (County) Comprehensive Plan addresses the data inventory requirements of 9J-5.015(1), (2), and (3) of the Florida Administrative Code (F.A.C.). The data inventory requirement will support the development of goals, objectives, policies, and implementation programs for the Intergovernmental Coordination Element.

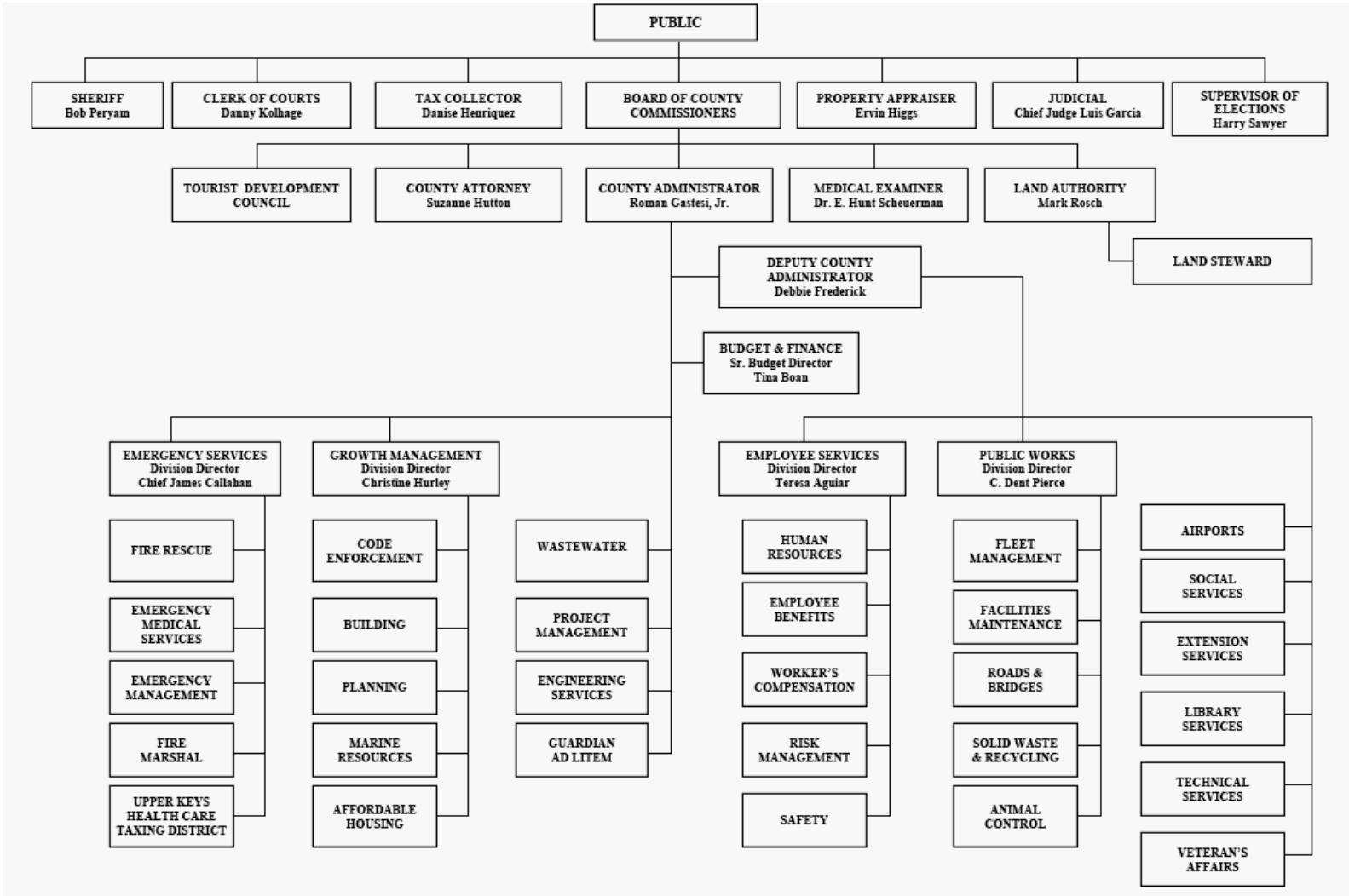
The purpose of this element is to increase the effectiveness, efficiency, and responsiveness of government; provide for consistency in decisions and actions between various departments and agencies; and to improve citizen awareness and participation.

14.1 Introduction

Monroe County Government Departments are interspersed throughout the County including offices in Key West, Stock Island, Marathon, and Key Largo. **Figure 14.1** (Monroe County Government Organization Chart) denotes the political and administrative structure of the County government.

Federal and State government involvement within the borders of the County is extensive due to land holdings and, among other legislation, the County's designation as an Area of Critical State Concern (380.0552, F.S.). The designation of the entire Florida Keys as a National Marine Sanctuary also provides an opportunity for coordinated efforts in research, regulation and enforcement on a variety of issues.

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Source: Monroe County 2011 Budget

Figure 14.1 - Monroe County Government Organizational Chart

14.2 Element Content

The Intergovernmental Coordination Element (ICE) is designed to address existing and future coordination procedures, processes, or actions intended to enhance the efficiency and effectiveness of governmental operations. The ICE addresses a variety of intergovernmental relationships, including those between the County and School Board, utilities, or adjacent jurisdictions. The ICE requirements of the *Growth Management Act of 1985*, as amended, emphasize strong intergovernmental coordination, provide for identification of coordination needs, and for the use of appropriate existing coordination procedures, processes, and actions.

For the purposes of the ICE, "intergovernmental coordination" has been defined as occurring along a continuum of activities, ranging from informal contacts to formal procedures, actions, or agreements. The term "coordinate with" has been defined to include any or all of the following which may be appropriate and applicable to a given circumstance or need:

- Verbal or written communication;
- Scheduled or unscheduled meetings;
- Requests for information or comments about plans, reports, etc. of other entities;
- Special purpose groups organized to plan for or implement a specific task;
- Standing committees, organizations, or groups, for example, South Florida Regional Planning Council, South Florida Water Management District, and other such entities; or
- Interlocal agreements, resolutions, contracts, ordinances, grants, etc.

As part of intergovernmental coordination, the County has entered into various interlocal agreements that address many of the functions of the County. **Table 14.1** provides an inventory of selected Interlocal Agreements with Monroe County. This table does not represent an extensive list of all interlocal agreements, but highlights some of the major agreements that are discussed further within this element.

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Table 14.1 – Existing Interlocal Agreement Inventory
[Rule 9J-5.015 (a)]

Name of Agreement	Between	Brief Purpose of Agreement
Local Option Gas Tax Sharing Interlocal Agreement	Monroe County, City of Key West, City of Key Colony Beach, City of Layton, City of Marathon, City of Islamorada	To provided revenue share allocations
Supplemental Gas Tax Interlocal Agreement	Monroe County and the City of Marathon	Amends May 20, 2009 agreement
Interlocal Agreement Between the Board of County Commissioners of Monroe County, Florida and the Key Largo Wastewater Treatment District	Monroe County and Key Largo Wastewater Treatment District	To continue cooperative efforts to develop centralized wastewater treatment, collection and disposal services on a regional basis, District to initiate and complete construction of the North Components to serve 2,500 EDUs, initially and 13,000 EDUs upon completion of entire regional system
First Amended and Restated Interlocal Agreement between the Board of County Commissioners of Monroe County, Florida and the Key Largo Wastewater Treatment District	Monroe County And Key Largo Wastewater Treatment District	Amend and restate in order to accurately describe sources of funds
Amendment Number One to First Amended and Restated Interlocal Agreement of July 20, 2005 between the Board of County Commissioners of Monroe County, Florida and the Key Largo Wastewater Treatment District	Monroe County And Key Largo Wastewater Treatment District	To reflect the agreement of the parties to increase the amount of advance funding available to the Key Largo Wastewater Treatment District

Table 14.1 – Existing Interlocal Agreement Inventory (continued)

Name of Agreement	Between	Brief Purpose of Agreement
Second Amendment to the Amended and Restated Interlocal Agreement between the Board of County Commissioners of Monroe County, Florida and the Key Largo Wastewater Treatment District	Monroe County And Key Largo Wastewater Treatment District	To amend and clarify the meaning of the defined term "North Components"
Interlocal Agreement Amendment for the Summerland/ Cudjoe/Upper Sugarloaf Regional Wastewater System to be Expanded to Cover Design for Big Pine Key through Ramrod Key and Lower Key	Monroe County and the Florida Keys Aqueduct Authority (FKAA)	Amends the September 20, 2006 Interlocal Agreement for the regional wastewater system
Interlocal Agreement between Monroe County and Florida Keys Aqueduct Authority for the Conch Key/Duck Key Regional Wastewater System	Monroe County and the Florida Keys Aqueduct Authority (FKAA)	Provides procedures for allocation, expenditures, and reimbursement of funds for wastewater treatment system
First Amendment to Interlocal Agreement between Monroe County and the Florida Keys Aqueduct Authority for the Big Coppitt Regional Wastewater System	Monroe County and Florida Keys Aqueduct Authority (FKAA)	Amends June 21, 2006 Interlocal Agreement

Table 14.1 – Existing Interlocal Agreement Inventory (continued)

Name of Agreement	Between	Brief Purpose of Agreement
Second Amendment to Interlocal Agreement for the Big Coppitt Regional Wastewater System	Monroe County and Florida Keys Aqueduct Authority (FKAA)	Amends June 21, 2006 Interlocal Agreement
Agreement between Monroe County and the Florida Keys Aqueduct Authority for Installation and Maintenance of Fire Hydrants in Unincorporated Monroe County	Monroe County and Florida Keys Aqueduct Authority (FKAA)	Installation of Fire Hydrants in Unincorporated Monroe County
Amendment and 1st Renewal of Franchise Agreement (Solid Waste and Recycling Collection)	Board of County Commissioners of Monroe County and Marathon Garbage Service, Inc. (f/k/a Mid-Keys Waste, Inc.)	Collaborate to help increase Monroe County's annual recycling rate to 40% by 2014 with various forms of assistance noted by Franchisee
Interlocal Agreement	Monroe County Waste Collection and Disposal District and City of Layton	Solid Waste Collection
Governmental Interlocal Agreement between the County of Monroe County, State of Florida and the Monroe County Housing Authority	County of Monroe and the Monroe County Housing Authority	Appoints MCHA to provide professional planning, management and administrative services for the County pursuant to HUD, DCA and FHFA affordable housing programs
Library Impact Fee Interlocal Agreement City of Marathon	Monroe County and City of Marathon	Collection of Library Impact Fees
Amendment to Impact Fee Interlocal Agreement	Monroe County and the City of Key Colony Beach	Amends previous Interlocal Agreements for impact fees, specifically transportation and fire protection/EMS impact fees

Table 14.1 – Existing Interlocal Agreement Inventory (continued)

Name of Agreement	Between	Brief Purpose of Agreement
Joint Use Park Interlocal Agreement	Monroe County and the School Board of Monroe County	Provide for the development of a joint use park on the Sugarloaf School grounds
Interlocal Agreement Monroe County and Key Largo Fire Rescue and Emergency Medical Services District	Monroe County and Key Largo Fire Rescue and Emergency Medical Services	Establish mutual obligations and responsibilities of the County and the District for use, ownership, title to property, and provision of services, with September 30, 2006 the date County transferred responsibility for fire, rescue and emergency medical services to the District
Agreement between the Board of Governors of Fire and Ambulance District 1 of Monroe County and Big Coppitt Volunteer Fire Department, Inc.	Board of Governors of Fire and Ambulance District 1 of Monroe County and Big Coppitt Volunteer Fire Department, Inc.	Establishes volunteer fire department to be primary provider of fire rescue services within their assigned geographical area
Agreement between the Board of Governors of Fire and Ambulance District 1 of Monroe County and Sugarloaf Key Volunteer Fire Department, Inc.	Board of Governors of Fire and Ambulance District 1 of Monroe County and Sugarloaf Key Volunteer Fire Department, Inc.	Establishes volunteer fire department to be primary provider of fire rescue services within their assigned geographical area
Agreement between the Board of Governors of Fire and Ambulance District 1 of Monroe County and the Big Pine Key Volunteer Fire Department, Inc.	Board of Governors of Fire and Ambulance District 1 of Monroe County and the Big Pine Key Volunteer Fire Department, Inc.	Establishes volunteer fire department to be primary provider of fire rescue services within their assigned geographical area

Table 14.1 – Existing Interlocal Agreement Inventory (continued)

Name of Agreement	Between	Brief Purpose of Agreement
Agreement between the Board of Governors of Fire and Ambulance District 1 of Monroe County and Layton Volunteer Fire Department, Inc.	Board of Governors of Fire and Ambulance District 1 of Monroe County and Layton Volunteer Fire Department, Inc.	Establishes volunteer fire department to be primary provider of fire rescue services within their assigned geographical area
Agreement between the Board of Governors of Fire and Ambulance District 1 of Monroe County and Tavernier Fire and Ambulance Corps, Inc.	Board of Governors of Fire and Ambulance District 1 of Monroe County and Tavernier Fire and Ambulance Corps, Inc.	Establishes volunteer fire department to be primary provider of fire rescue services within their assigned geographical area
Memorandum of Understanding between the Naval Air Station Key West Fire Department and Monroe County Mutual Fire and Emergency Services Assistance Agreement	Naval Air Station Key West Fire Department and Monroe County	Render mutual fire and emergency assistance to one another
Memorandum of Understanding between the Islamorada, Village of Islands and Monroe County Mutual Fire and Emergency Services Assistance Agreement	Islamorada, Village of Islands and Monroe County	Render mutual fire and emergency assistance to one another

Table 14.1 – Existing Interlocal Agreement Inventory (continued)

Name of Agreement	Between	Brief Purpose of Agreement
Memorandum of Understanding between the City of Marathon and Monroe County Mutual Fire and Emergency Services Assistance Agreement	City of Marathon and Monroe County	Render mutual fire and emergency assistance to one another
Memorandum of Understanding between the City of Key West, Florida and Monroe County Mutual Fire and Emergency Services Assistance Agreement	Monroe County and City of Key West	Render mutual fire and emergency assistance to one another
Agreement between Ocean Reef Volunteer Fire Department, Inc. and Monroe County for providing fire protection and emergency medical and rescue services	Ocean Reef Volunteer Fire Department, Inc. and Monroe County	Render mutual fire and emergency assistance to one another
Agreement	Florida Keys Electric Cooperative Association, Inc. and County of Monroe, Florida	To provide repair and replacement services for outdoor lighting and traffic signals
Interlocal Agreement	Monroe County and the City of Key West	City/County involvement in the FWC Mooring Field Pilot Program

Table 14.1 – Existing Interlocal Agreement Inventory (continued)

Name of Agreement	Between	Brief Purpose of Agreement
Memorandum of Understanding Between the Florida Department of Community Affairs and Monroe County for a Coordinated Permit Review Process for Development	State of Florida Department of Community Affairs and Monroe County	MOU implements the requirements of Ch. 380, F.S., due to the Area of State Critical Concern and designates mutually agreed upon procedures between DCA and the County
Interlocal Agreement for Public School Facility Planning in Monroe County	Monroe County, Islamorada, Village of Islands, Key Colony Beach, Layton, Key West, Marathon, and the School Board of Monroe County	Various public school facility coordination as required by Ch. 163 F.S.

Source: Monroe County Agencies and Monroe County Clerk of Court website

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14.3 Inventory
[Rule 9J-5.015 (b)]

Table 14.2 below, provides an inventory of the local, regional, State, and federal entities with which the County coordinates, along with a short description of their role.

Table 14.2 - Existing Government/Entities Inventory

Entity	Existing Coordination Mechanisms	Major Areas of Coordination
City of Key Colony Beach City of Key West City of Layton City of Marathon Village of Islamorada	• Municipalities located within Monroe County • Interlocal Agreements • Impact Fees	• Growth Management • Emergency Management • Transportation • Potable water • Waste Water • Environmental and Natural Resources • Parks and Recreation • Local Option Gas Tax • Airport Operations (Key West/Marathon)
Miami-Dade Collier	• Adjacent Counties	• Growth Management • Emergency Management • Potable water • Environmental and Natural Resources
Miami-Dade Mass Transit	• Adjacent County transit authority	• Provides mass transit routes to and within the County
Monroe County School District	• School Board facilities are located within unincorporated Monroe County • Interlocal Agreement	• Traffic Impacts (Ingress/Egress to Schools) • Projected need for new/improved facilities • Recreation Facilities and Programs
Monroe County Sheriff's Office	• Coordinates Law Enforcement Activities	• Policing • Code Enforcement
Monroe County Land Authority	• Agency Responsible for Land Acquisition	• Purchase of lands for conservation and affordable housing
Monroe County Housing Authority	• Agency Responsible for Housing Programs	• Affordable Housing
North Key Largo Utility Corporation	• Private Utility • Special District • Interlocal Agreement	• Water and Wastewater Services to the Ocean Reef Community

Table 14.2 - Existing Government/Entities Inventory (continued)

Entity	Existing Coordination Mechanisms	Major Areas of Coordination
Key Largo Wastewater Treatment District	• Public Utility • Special District • Interlocal Agreement	• Wastewater Service to the Upper Keys
Key West Resort Utilities Corp.	• Private Utility • Special District • Interlocal Agreement	• Key West Resort Utilities Wastewater Service to unincorporated Stock Island
Florida Keys Aqueduct Authority (FKAA)	• Private Utility • Interlocal Agreements	• Generation and distribution of adequate and dependable supply of potable water • Wastewater treatment facilities
Florida Keys Electric Cooperative	• Private Utility	• Electric service provider
Keys Energy Service	• Public Utility	• Energy services provider
Bell South (AT&T)	• Private Utility telephone provider	• Provides adequate telephone services
Comcast Cable Company	• Private Utility	• Cable and internet service provider
Waste Management, Inc.	• Private Utility	• Solid waste management
Mid-Key Waste, Inc.	• Private Utility	• Solid waste management
Keys Sanitary Services	• Private Utility	• Solid waste management
Card Sound Bridge & Road Authority	• Special District • Interlocal Agreement	• Bridge and Approach Maintenance • Right-of-way mowing and brush cutting along Card Sound Road • Waiving tolls under emergency circumstances.
Florida Keys Mosquito Control District	• Private Utility • Interlocal Agreement	• Pest control and treatment
South Florida Regional Planning Council (SFRPC)	• Regional Agency • Responsible for regional coordination	• Strategic Regional Policy Plan • Socio-economic data projections • Intergovernmental review • Emergency Management • Coastal High Hazard Areas

Table 14.2 - Existing Government/Entities Inventory (continued)

Entity	Existing Coordination Mechanisms	Major Areas of Coordination
South Florida Water Management District (SFWMD)	• Regional Agency • Special District • Oversees water resources, water quality, flood control, natural systems and water supply	• Surface water drainage • Wetland protection • Potable water supply • Environmental resources permits • Consumptive use permits
Department of Environmental Protection	• State Agency • Responsible	•
Department of Community Affairs (DCA)	• State Agency • Responsible for land planning and grant programs.	• County Plan must meet both statutory and administrative requirements. • Growth Management and Conservation issues per Chapter 380, F.S. • Funding assistance for Comprehensive Planning activities
Florida Department of Children and Family Services (DCFS)	• State Agency • Responsible for housing people with special needs	• Regulates community residential homes, foster care homes, and homes for special children
Florida Department of Health (DOH)	• State Agency • Responsible for administering heath related issues.	• Well and septic permits • Cesspit inventory and removal
Florida Department of Transportation (FDOT)	• State Agency • Responsible for all state roads	• U.S. 1 improvements and construction • Access management • Traffic control devices along U.S. 1
Florida Department of State (DOS)	• State Agency • Includes Division of Historic Resources	• Historic Survey Grants • Review of any project with Federal and/or State Involvement

Table 14.2 - Existing Government/Entities Inventory (continued)

Entity	Existing Coordination Mechanisms	Major Areas of Coordination
Florida Department of Environmental Protection (FDEP)	• State Agency • Responsible for protecting and conserving Florida's natural resources; managing State owned lands/ aquatic preserves, and regulating impacts on the environment.	• Monitoring/reporting on quality of drinking water supply and wastewater treatment • Air quality monitoring/reporting • Hazardous and solid waste disposal • Natural resources • Surface water drainage • Acquisition
Florida Fish and Wildlife Conservation Commission (FWC)	• Federal Agency • Regulatory control over hunting, fishing and taking of animals and fish.	• Comments on permit applications • Provides Technical assistance on endangered animals and habitats
U.S. Army Corp of Engineers (ACOE)	• Federal Agency • Has regulatory authority in the Keys	• Land use • Conservation • Regulation of dredge and fill permits
U.S. Navy	• Military	• Land use • Recreation • Natural Resources • Emergency Management
U.S. Coast Guard	• Military	• Law Enforcement • Emergency management
National Oceanic and Atmospheric Administration (NOAA)	• Federal Agency • National Weather Services • Florida Keys National Marine Sanctuary • National Hurricane Center	• Growth Management • Emergency Management • Environmental Management • Conservation and Coastal Management Element
U.S. Fish and Wildlife Service (FWS)	• Federal Agency • Regulatory control over certain habitats and wildlife	• Comments on permit applications related to endangered animals and habitats

Table 14.2 - Existing Government/Entities Inventory (continued)

Entity	Existing Coordination Mechanisms	Major Areas of Coordination
Federal Environmental Protection Agency (EPA)	• Federal Agency • Jurisdiction over all environmental issues of federal concern.	• Minimum federal standards for wastewater, drinking water, and air quality • Funding of wastewater facilities • Natural resources
Federal Emergency Management Agency (FEMA), Flood Insurance Administration	• Federal Agency • Responsible for all flood zone mapping.	• Compliance with federal flood regulations • Regulation of habitable structure below flood elevation
U.S. Department of Agriculture, Natural Resources Conservation Service (NRCS)	• Federal Agency • Maps soil types and describe their suitability for agricultural and development.	• Land Use • Growth Management • Agricultural Lands • Ensures land use activities occur consistent with specific soil properties
U.S. Department of Interior	• Federal Agency • Preservation of Everglades National Park, Big Cypress Preserve, and Dry Tortuga Keys	• Land Use • Conservation • Parks and Recreation

Source: Monroe County

14.3.1 Existing Coordination Mechanisms with Local Governments

14.3.1.1 Municipalities

City of Key Colony Beach

The City of Key Colony Beach is a municipality of approximately permanent and seasonal 3,236[1] residents situated entirely within the County. It coordinates with the County on land use, impact fees, recreation, recycling, gas tax distribution, emergency planning, and solid waste collection and disposal.

[1] Estimated 2010 population. Source: *Statewide Regional Evacuation Study Program*, South Florida Regional Planning Council, 2010.

City of Key West

The City of Key West is a municipality of approximately 33,656[2] permanent and seasonal residents within the boundaries of the County. It coordinates with the County on a broad range of issues, including land use, service delivery systems, infrastructure needs, solid waste, public and environmental health services, airport operation, emergency management, and recreation and open space.

City of Layton

The City of Layton is a municipality of approximately 451[3] permanent and seasonal residents located entirely within the boundaries of Monroe County. It coordinates with the County on land use, impact fees, gas tax distribution, emergency planning, EMS services and equipment storage, and recycling.

City of Marathon

The City of Marathon is a municipality of approximately 15,957[4] permanent and seasonal residents located entirely within the boundaries of the County. It coordinates with the County on land use, impact fees, gas tax distribution, airport operation, emergency planning, EMS services and recycling.

Village of Islamorada

The Village of Islamorada is a municipality of approximately permanent and seasonal 12,984[5] residents located entirely within the boundaries of the County. It coordinates with the County on land use, impact fees, gas tax distribution, emergency planning, EMS services and recycling.

14.3.1.2 Counties

Miami-Dade County

Miami-Dade County is adjacent to the north of the County. Areas of coordination include hurricane evacuation and preparedness, land use planning, climate change, aquifer recharge protection, water supply planning, bus service and solid waste management and disposal. The Miami-Dade Comprehensive Plan provides goals, objectives and policies (GOPs) that address coordination with Monroe County. They are as follows: Objective ICE-1, ICE-3, ICE-4, ICE-5; Policies ICE-1A, ICE-1J, ICE-4B, and CM-8K.

[2] Ibid.
[3] Ibid.
[4] Ibid.
[5] Ibid.

Collier County

Big Cypress National Preserve is within both Collier and Monroe Counties. Land use activities adjacent to the Preserve are an area of coordination between the Monroe and Collier Counties.

Miami-Dade Transit Authority

Miami-Dade Transit (MDT) Authority provides bus services in the County from Key Largo to the City of Marathon on two routes (#301 and #302).

14.3.1.3 Monroe County

Department of Airport Services

The department overseeing the county-owned airports in Marathon and Key West is administered through the County Administrator's Office. This department oversees each airport through a combination of local, State, and federal funding. That funding is supported by the collection of passenger fees, airport leases, and other airport fees. Numerous written agreements exist to administer funding through day-to-day operations, physical improvements, and provision of safety requirements.

Monroe County Transit

Monroe County Transit (MCT) is a door-to-door service designed for people who need transportation, and is available to the general public. The elderly and/or disabled individuals who are unable to access regular fixed route or commuter bus service are encouraged to use this service. MCT provides paratransit transportation within the Keys, available between Mile Marker 0 in Key West through Mile Marker 113 in Key Largo as well as Ocean Reef.

Lower Keys Shuttle

The Lower Keys Shuttle operates shuttle bus service between Key West and Marathon, connecting with Dade-Monroe Express in Marathon to provide bus service from Key West to Florida City (mainland Miami). Scheduled stops are made in Key West, Boca Chica, Big Coppitt, Bay Point, Sugarloaf, Cudjoe Key, Summerland Key, Big Pine Key, and Marathon.

Extension Services

The County and the University of Florida have partnered through the Extension Service for 20 years. The Extension Service partners with the County to provide a wide variety of learning opportunities and information to individuals, businesses, and agencies in marine, horticulture, and family and youth development.

The Green Initiative Task Force was created by the Board of County Commissioners (BOCC) and is under the auspices of Extension Services. The scope of the task force is to, "… provide recommendations to the BOCC of environmentally sound practices and techniques to protect the environment as well as climate change recommendations."[6]

Library Services

Library Services administers the County library system, and "…provides the Commission with accurate and comprehensive information, advice, and counsel relating to our Libraries."[7] The Board of County Commissioners appoints the Library Advisory Board to oversee this task.

Department of Project Management

Project Management is charged with providing engineering services, construction management, surveying and inspection of a variety of county projects; managing the County's Seven Year Roadway/Bicycle Path Plan and the Capital Improvement Plan.

Department of Wastewater

This department is charged with overseeing the implementation of the Waste Water Master Plan through the planning and construction of facilities.

The Office of Management and Budget

This Division is in charge of budgeting and financial planning for the County. Services include the development of the Annual Operations and Capital Budget; assisting in purchasing transactions, and competitive bidding of RFP's/RFQ's; oversight of the County's funding to non-profit organizations and certain pass-through grants, including monitoring.

Office of the County Attorney

The Office of the County Attorney provides legal advice and representation, including prosecution and defense of all lawsuits brought by and against the County; and represents the County at administrative hearings. Additional services include drafting and reviewing ordinances and resolutions, and approving all contracts, bonds and written instruments.

Department of Social Services

The Department oversees the health and welfare needs of the needy and disadvantaged citizens of the County. Services include providing meals for older adults throughout the

[6] "Green Initiative Task Force". (n.d., para.1). Retrieved May 26, 2010 from: http://monroecofl.virtualtownhall.net/Pages/MonroeCoFl_ExtenServ/GITF
[7] "Monroe County Library Services". (n.d., para. 2). Retrieved May 26, 2010 from: http://monroecofl.virtualtownhall.net/Pages/MonroeCoFL_Library/LAB/board

county and in-home care to frail, impaired residents over 60 years old and/or disabled adults (age 18-59 years).

A registry of Special Needs clients who may be in need of hurricane evacuation assistance is maintained by this department. Special Needs clients are transported to Florida International University (FIU) in Miami, the County's designated out-of-county shelter.

Division of Emergency Services

This division provides emergency medical services and transportation to medical facilities; fire safety, protection, suppression, cause investigation, and safety services; fire protection engineering; coordinates with the Growth Management Division for site plan review, occupancy inspections and fire and life safety code enforcement.

Emergency Management Services plans and implements all peacetime emergency preparedness plans, including emergency response activities to events, e.g., hurricanes, tornadoes, hazardous materials accidents, air crashes.

The Division also administers the Upper Keys Health Care Taxing District, which was created to ensure rapid transport and transfer of trauma alert victims to an appropriate state certified trauma center; specific details regarding the District are provided separately in this element. *Trauma Star*, an emergency air-ambulance helicopter, is jointly operated by Monroe County Fire Rescue and the Monroe County Sheriff's Department.

The Growth Management Division

Growth Management encompasses planning and development review, parks and recreation, building, and environmental resources. The Division Director oversees the operation of the Building, Code Enforcement, Marine Resources, Planning, Environmental Resources, and GIS Departments; the Office of Housing and Community Development; and the efforts of the Land Steward to administer and maintain conservation lands, including installing native vegetation, removing invasive exotics, site clean-up and debris removal, and other management activities.

The Building Department is charged with administering and ensuring compliance with the building code; issuing building and construction permits and Certificates of Occupancy; and supervising blasting within the County.

The Department of Code Enforcement has the responsibility to ensure compliance with and enforcement of all county codes, including the land use regulations, the Building Code, the Electrical Code, the Plumbing Code, Contractors Licensing and Floodplain ordinances.

The Department of Planning and Environmental Resources reviews all plans for new construction and development for compliance with the Land Development Regulations and Comprehensive Plan, including environmental compliance and makes subsequent recommendations to the Planning Commission; maintains and updates the Comprehensive

Plan and Land Development Regulations adopted by the Board of County Commissioners; and administers the *Livable CommuniKeys* Plans and coordinates the implementation of the *Florida Keys Overseas Heritage Trail Master Plan*, the *Florida Keys Scenic Highway Corridor Management Plan* and the *Florida Keys Scenic Highway Interpretive Plans*; and supports and provides historic preservation efforts county-wide.

The County's GIS department provides mapping, and geographic data modeling and analysis for specific County functions.

The Office of Housing and Community Development promotes the development of affordable housing, and coordinates with various levels of the County government and County Attorney to accomplish its tasks.

Division of Public Works

Within the Division of Public Works are several departments:

The Facilities Maintenance Department maintains and repairs County owned buildings, parks, and beaches.

The Detention Facilities Department is responsible for maintaining the correction facilities located on Stock Island, Marathon and Plantation Key; the Sheriff's Administration Building on Stock Island; the Sheriff substations on Cudjoe Key, Marathon, and Plantation Key; and the old jail facility in Key West.

The Engineering Department works with FDOT, SFWMD, FDEP, and utility companies when planning, designing, constructing, and inspecting projects.

The Fleet Management Department is responsible for vehicle maintenance and/or repairs, painting, etc.

The Road and Bridges Department is responsible for maintaining and improving county roads, rights-of-way, bike paths, and County bridges.

The Solid Waste Management Department is responsible for overseeing solid waste collection and disposal activities; providing residential and commercial recycling services; administering a household hazardous waste collection and disposal program and providing pollution control services Countywide, excluding Key West and the Village of Islamorada.

Animal Control is responsible for enforcing State and county animal control regulations, protecting the public from the dangers and nuisances of uncontrolled, dangerous or feral animals, and protecting animals from cruelty, abuse or abandonment.

The Card Sound Toll Authority is also under Public Works, but is addressed separately in this element.

Monroe County School District

Coordination on the use, location, and maintenance of school facilities is extensive, largely through the use of interlocal agreements and informal arrangements with the County Public Works, Planning, and Building Departments. A representative of the School District is a non-voting member of the Planning Commission; summer recreation programs require coordination with the County Clerk; and instructional help is coordinated with the Sheriff's Department. Joint use facility agreements have become and will continue to be a critical part of the County government's responsibility to provide active recreation opportunities to its citizens.

School Board members and the school superintendent are elected at large. Approximately 90 percent of the Board's funds come from the County and the remainder from State and Federal sources. These funds are used to maintain all public school facilities within the County.

Monroe County Sheriff's Office

The Sheriff's Office is managed by an elected official (the County Sheriff) and its budget is approved by the Board of County Commissioners; however, the Sheriff can appeal the budget to the Governor and Cabinet.

The Main Sheriff's Office Administration building is located on Stock Island, with patrol substations on Cudjoe Key, Marathon (Key Vaca), Islamorada, and Plantation Key. Detention facilities are located in Stock Island, Marathon and Plantation Key.

The Sheriff's Office has a Special Weapons and Tactics Team (SWAT), as well as a Dive Team, Bomb Squad, and Special Investigations Unit (specializing in drug investigations).

The Sheriff's Office coordinates with various levels of the County government and the State Attorney to accomplish its law enforcement tasks. Emergency management also coordinates extensively with the Sheriff's Department.

Monroe County Land Authority

The Monroe County Land Authority (Authority) was created under Chapter 380 of Florida Statutes. Funding has been provided by the County, the Department of Community Affairs, and through special taxes within the County. The Authority acquires land within the County for public purposes, including recreation, affordable housing, environmental protection, and the protection of private property rights.

The Board of County Commissioners sits as the Authority's directors; however, the Authority's actions are also addressed by its own advisory committee.

Monroe County Housing Authority

The Housing Authority administers State and Federal Housing Assistance Programs. Within unincorporated Monroe County, the Authority administers the rental rehabilitation program and Section 8 housing assistance, and develops and manages public housing.

Monroe County Tourist Development Council

The Monroe County Tourist Development Council (MCTDC) is a public body created by referendum of the electors. The MCTDC is a legislative extension of the Monroe County Board of County Commissioners, which appoints its nine members. Six of the Council's nine members must represent the five MCTDC taxing districts and are actively engaged in the tourism industry through ownership or managerial operation of a lodging establishment or employed by a tourism-dependent business.

A county commissioner and two other elected municipal officials fill the remaining three seats to represent the interests of the general public sector. The composition, membership qualifications, responsibilities and duties of all TDC's are defined by Florida Statute 125.0104. The MCTDC is further governed by Monroe County Ordinances 015-1988 and 017-1988 as amended.

Monroe County Property Appraiser

The Monroe County Property Appraiser is responsible for identifying, locating, and fairly valuing all property, both real and personal, within the County for tax purposes. Other responsibilities of the Property Appraiser's Office is tracking ownership changes; maintaining maps of parcel boundaries; providing updates to building and property characteristics; handles applications for property exemptions and other types of property tax relief; and analyzes trends in sales prices, construction costs and rents to best estimate the value of assessable property.

The Monroe County Growth Management Division should coordinate with the Property Appraiser's Office to continually update the existing database regarding land uses and densities and intensities of use in the County. The database should be updated to reflect the amount of development within the County as well as land use categories that are mapped on the Existing Land Use Map.

14.3.2 Existing Coordination Mechanisms with Public/Private Utilities

North Key Largo Utility Corporation

The North Key Largo Utility Corporation (NKLUC) is responsible for providing water and wastewater services to the Ocean Reef Community located on the northernmost tip of Key Largo. The Ocean Reef community is a gated membership-owned residential development with about 1,800 residential units and two golf courses.

The NKLUC coordinates with the County, through interlocal agreements to provide waste water services.

Key Largo Wastewater Treatment District

The Key Largo Wastewater Treatment District (KLWTD) is an independent utility created by the State of Florida in June 2002. The KLWTD service area extends from the north end of the Keys at the Dade County line [approximately U.S. 1 Mile Marker (MM) 124] south and westward to Tavernier Creek (approximately MM 91) and includes the properties along County Road 905 up to but not including the Ocean Reef District.

The District coordinates with the County, through interlocal agreements to provide central waste water services.

Key West Resort Utilities Corporation

Key West Resort Utilities Corp. is a private utility that provides advanced wastewater treatment service to approximately 2,672 Equivalent Dwelling Units (EDUs) on unincorporated Stock Island.

The utility coordinates with the County to provide waste water services.

Florida Keys Aqueduct Authority (FKAA)

The FKAA provides potable water to all residents of the County and has a legislative mandate to install and operate centralized sewer systems in the unincorporated areas.

FKAA coordinates with the County regarding the issuance of building permits, and through several interlocal agreements with the County, is tasked with installing and operating central sewer systems within the County. Additionally, FKAA, through an interlocal agreement, provides a portion of funding for hydrant installation, inspects and maintains hydrants, and furnishes water required for filling fire fighting apparatus. Informal agreements also exist with County Public Works.

Florida Keys Electric Cooperative

The electric cooperative purchases electricity from Florida Power & Light and sells it to residents of the County residing east and north of the Seven Mile Bridge. It maintains all equipment required to accomplish this task.

Florida Keys Electric Cooperative (FKEC) coordinates with the Building Department regarding electrical requirements of building permits and with County Public Works only when their facilities affect road maintenance.

Keys Energy Service

The Keys Energy Service generates and purchases electricity to sell to the residents of Key West and the County west and south of the Seven Mile Bridge. The utility is owned by the City of Key West and maintains all equipment required to accomplish its service provisions.

Keys Energy coordinates with the County Public Works Division regarding placement of facilities within County road right-of-way, and with the Building Department on the electrical requirements of building permits.

Bell South

Bell South (AT&T) provides phone and internet service to the Florida Keys.

Comcast Cable

Comcast Cable provides cable and internet service to the Florida Keys.

Waste Management, Inc.

Waste Management Inc. provides solid waste collection south of the Seven Mile Bridge and coordinates with the County through contract for services.

Mid-Key Waste, Inc.

Mid-Keys Waste Inc. provides solid waste collection in the middle keys and coordinates with the County through contract for services.

Mid-Keys Waste, Inc., as Marathon Garbage Service, Inc., provides services from MM 45 to MM 64 and as Island Disposal Service, serves the County from MM 65 to MM 72.

Keys Sanitary Services

Keys Sanitary Services provides solid waste collection from MM 91 to the County line and coordinates with the County through contract for services.

14.3.3 Existing Coordination Mechanisms with Local Independent Special Districts

Card Sound Bridge & Road Authority

The Authority is part of the County Public Works Department, but derives all its revenue from tolls collected at the Card Sound Bridge. The Authority maintains the bridge and its approaches, including right-of-way mowing and brush cutting along Card Sound Road and

also operates under state legislation allowing its tolls to be waived under emergency circumstances.

The Authority coordinates with Monroe County Emergency Management, Public Works, Planning, and E.M.S. Services; as well as the Florida Highway Patrol and the Florida Department of Transportation.

Florida Keys Mosquito Control District

The District is an independent district supported by a share of ad valorem taxes and governed by its own board which is elected at-large. Coordination exists at two levels. The District is subject to oversight by the Bureau of Etymology and Pest Control, Mosquito Control Section, Florida Division of Agriculture and Consumer Services.

The District coordinates with the Code Enforcement Department on the issue of the maintenance of private property.

14.3.4 Existing Coordination Mechanisms with Regional Authorities

South Florida Regional Planning Council

The SFRPC approves and oversees all comprehensive plans and developments of regional impact. Comprehensive plans are evaluated based on their consistency with the Council's Regional Policy Plan. The Council also offers conflict mediation services and promotes the completion of interlocal or other agreements between governmental bodies in South Florida.

The SFRPC is assisting the County with a number of planning efforts, including development of the County's *Working Waterfronts Preservation Master Plan* and *Marine Management Master Plan*. Additionally, the SFRPC is updating the South Florida Regional Hurricane Evacuation Model for Broward, Miami-Dade and Monroe Counties.

Coordination is generally limited due to the Council's advisory role. However, for projects specific to the County, the SFRPC has coordinated closely with various divisions within the County, including Growth Management and Emergency Services.

South Florida Water Management District

The SFWMD, an agency created by the State, is a multi-county independent special district responsible for flood-control and water conservation within the South Florida Region. As one of Florida's five regional water management districts, SFWMD issues permits for the consumptive use of water, well construction, surface water management, and artificial recharge. Besides its permitting activities, the district is authorized to:

- Construct and operate water control works;

- Engage in water resource planning;
- Participate in technical investigations of water resources;
- Gather water resource data;
- Environmental restoration; and
- Monitor Discharges into waterways.

The District coordinates within the County through its appropriation of water to the FKAA, review of selected drainage plans, technical assistance and provision of funds through various programs.

The Growth Management Division monitors proposed changes to SFWMD plans, policies and regulations, and provides comments.

14.3.5 Existing Coordination Mechanisms with State Agencies

Florida Department of Community Affairs

The Florida Department of Community Affairs (DCA) is headquartered in Tallahassee. A Secretary appointed by the Governor administers the Department. DCA administers a variety of grant programs designed to assist local governments in improving growth management resources, community infrastructure, and service delivery systems. DCA provides technical assistance to local governments in the areas of:

- Housing;
- Resource planning and management;
- Community services;
- Community development;
- Land and water management;
- Public safety;
- Post-disaster recovery; and
- Emergency management preparedness.

The Department of Community Affairs has the additional responsibility under Chapter 380, F.S. to administer the Area of Critical State Concern (ACSC) program. Geographical areas with significant environmental resources, historic resources or sites, or areas having a significant impact on, or being significantly impacted by an existing or proposed major public facility or other areas of major public investment may be designated as an area of critical state concern. The Florida Keys were designated an Area of Critical State Concern in 1972.

Since the County is designated an area of critical state concern, the DCA has an extensive role within the County's borders that includes direct involvement in development review, planning assistance, solid waste, the Land Authority, housing, and emergency preparedness. This work is accomplished through approval of building permits, participation in the County's Development Review Committee, technical assistance and

monitoring, in addition to the review and oversight of all changes to the County's Comprehensive Plan and land development regulations. Monroe County and DCA have entered into a Memorandum of Understanding that is noted in **Table 14.2** of this element.

Florida Department of Children and Family Services (DCFS)

DCFS provides a wide-range of services in relationship to their mission to "Protect the vulnerable, promote strong and economically self-sufficient families, and advance personal and family recovery and resiliency."[8]

In the County, the DCFS is responsible for in-home nursing care for vulnerable adults; licenses and inspects child care facilities; serves as a clearinghouse on domestic violence information; and administers food stamps, temporary cash assistance and Medicaid programs.

The DCFS coordinates with the County issues surrounding delivery of rehabilitative, social and medical services for children, family, and elderly, including services directed towards special needs.

Florida Department of Health (DOH)

The DOH is the state agency responsible for health related issues. The County's Health Department provides public health services in the Keys in partnership with Monroe County. Most services are available at no charge or a small fee based upon income.

Additionally, the DOH is charged with septic tank/cesspit inventory and regulation, water quality, and pollution control. The DOH coordinates with the County's Growth Management Department, including Code Enforcement and the Building Departments, the Sheriff's Office and the Development Review Committee relating to land use activities to assure on-site waste disposal systems, e.g. septic tanks and advanced treatment units (ATUs) are constructed as part of the building permitting and Certificate of Occupancy processes.

Florida Department of Transportation (FDOT)

The FDOT coordinates with the County regarding planning, design, construction, maintenance, improvement, access management, and traffic control along U.S. 1. FDOT also reviews development and environmental impacts as they relate to U.S. 1. They also provide technical assistance on transport programs involving public transit, aviation, and bicycle paths, among others. Joint participation and interlocal agreements exist regarding many of the items previously mentioned. Permits to operate bicycle paths are also coordinated with FDOT.

[8] "Our Mission", (n.d.). Retrieved May 26, 2010 from: http://www.dcf.state.fl.us/admin/

Florida Department of State Division of Historical Resources/Historic Florida Keys Preservation Board

The Preservation Board/Division of Historical Resources identifies and helps to preserve historic sites in the County. They currently coordinate with the County Public Works Division regarding the Historical Florida Keys Foundation's lease of the Armory Building, and with informal contacts, which usually involve sharing of information and/or documentation.

Florida Department of Environmental Protection (FDEP)

The FDEP is the principal agency for the implementation of state environmental policies and law. The FDEP established standards for the protection of natural systems through the permitting process of activities that may impact the environment, including permitting and monitoring potential sources of pollution and discharges for compliance with state standards. In the event of non-compliance or violation, the FDEP can take enforcement action.

The FDEP manages environmental regulatory programs administered mainly through field offices located throughout the state. The functions of the FDEP and its districts are coordinated through using joint application procedures. FDEP permitting programs require coordination with the Florida Department of Environmental Protection and the U.S. Army Corps of Engineers.

Florida Fish and Wildlife Conservation Commission (FWC)

The FWC enforces rules to protect fish and wildlife, keep waterways safe for millions of boaters and cooperate with other law enforcement agencies providing homeland security, and provide assistance when natural disasters occur.

The FWC coordinates with the County primarily through the review of projects which may have potential impacts on local fish and wildlife habitat or which may intrude on and disturb habitats of State protected species.

14.3.6 Existing Coordination Mechanisms with Federal Agencies

U.S. Army Corps of Engineers (ACOE)

The primary purpose of the ACOE Regulatory Program is to protect the Nation's aquatic resources. The ACOE evaluates permit applications for essentially all construction activities involving the discharge of dredged or fill material into the "waters of the United States" (including most wetlands), pursuant to Section 404 of the Clean Water Act. This evaluation is conducted in accordance with ACOE regulations and the CWA Section 404(b)(1) Guidelines. ACOE permits are also necessary for any work, including

construction and dredging, in the Nation's navigable waters pursuant to Section 10 of the Rivers and Harbors Act of 1899.

The ACOE provides public notices to the County and coordinates permit review through the Growth Management Division.

U.S. Navy

U.S. Navy facilities are located in 13 different areas of the lower Florida Keys. Boca Chica Field, NAS-Key West's primary site and airfield, is located on Boca Chica Key. Boca Chica Field is approximately 3 miles east of the City of Key West.

The U.S. Navy coordinates with the County on land use activities adjacent to their facilities; a U.S. Navy representative sits as ex-officio member of the County's Planning Commission.

U.S. Coast Guard

The Coast Guard coordinates with the Florida Marine Patrol on law enforcement issues, and with the County regarding hurricane response requirements, oil spill, and some hazard mitigation activities.

National Oceanic & Atmospheric Administration

The NOAA is a science-based federal agency within the Department of Commerce with regulatory, operational, and information service responsibilities. Their mission is to understand and predict changes in the Earth's environment and to conserve, protect, and manage coastal and marine resources.

NOAA's five service goals are:[9]

- Ecosystems: Protect, restore, and manage the use of ocean, coastal, and Great Lakes' resources through an ecosystem-based approach to management;
- Climate: Understand climate variability and change to enhance society's ability to plan and respond;
- Weather and Water: Serve society's needs for weather and water information;
- Commerce and Transportation: Support the nation's commerce with information for safe, efficient, and environmentally sound transportation; and
- Supporting NOAA's Mission: Provide critical support for NOAA's mission.

NOAA coordinates with the County through the County's Department of Marine Resources. They manage the Key Largo and Looe Key Marine Sanctuaries with the FDEP, as well as provide weather forecasting services. In addition, NOAA has an agreement with the

[9] "NOAA's Mission and Vision". (n.d. para.3), Retrieved May 26, 2020 from: http://www.legislative.noaa.gov/policybriefs/What%20is%20NOAA%202010%20-%20FINAL%20-%20021210.pdf

Florida Marine Patrol to enforce marine fisheries laws within Florida waters, and manages fisheries beyond those waters but within 200 miles of the coast. NOAA also oversees the following:

- National Weather Service**.** The National Weather Service provides weather forecasts for the entire Florida Keys, including boating forecasts;
- National Hurricane Center. The National Hurricane Center aids in emergency preparedness by providing watches and warnings through its hurricane tracking services; and
- Florida Keys National Marine Sanctuary. (FKNMS) manages the Key Largo and Looe Key Marine Sanctuaries as well as a management of off shore waters. The management of off shore waters includes addressing issues such as water quality.

Environmental Protection Agency - Region IV

The U.S. Environmental Protection Agency (EPA) an independent agency of the U.S. Government, with headquarters in Washington, D.C was established in 1970 to reduce and control air and water pollution, noise pollution, and radiation and to ensure the safe handling and disposal of hazardous materials.

The EPA has designated the waters within the boundaries of the Florida Keys National Marine Sanctuary as a no discharge zone. A no discharge zone designation prohibits the discharge of sewage, whether treated or not, from a vessel into state waters of the marine sanctuary.

The EPA coordinates with the County's Emergency Management Division when assistance is needed on clean up of hazardous waste spills. Additionally, although the EPA does not coordinate directly with the County Growth Management Division, it enforces wetland protection and mapping through its Advanced Wetland Identification Program.

Federal Emergency Management Agency (FEMA)

FEMA coordinates with Emergency Management and the Growth Management Division of Monroe County on emergency preparedness planning and flood plain management. Flood plain management coordination required County approval of a Flood Damage Prevention Ordinance in order to qualify for the National Flood Insurance Program. Consequently, compliance with flood plain management criteria is monitored by FEMA, particularly concerning land use designations in mobile home parks.

Natural Resources Conservation Service (NRCS)

The NRCS currently provides soil mapping services in the County.

U.S. Department of Interior (DOI)

The U.S. Department of the Interior (DOI) is a Cabinet-level agency that manages America's vast natural and cultural resources. Through the National Park Service, the DOI manages the Everglades National Park, Big Cypress Preserve, and Dry Tortuga Keys. Areas of coordination with the County include parks and recreation, and preservation efforts related to land use impacts.

14.4 Needs and Opportunities of Intergovernmental Coordination Inventory

As part of this analysis, a key component is gathering information regarding intergovernmental coordination, to find out the effectiveness of the existing mechanisms and agreements. It is important to note that governmental efficiency and coordination are difficult to measure accurately. One method is to count the number of interlocal agreements or memoranda of understanding. While signing an interlocal agreement may be legally binding and economically beneficial for the parties involved, it needs to be measurable and specific to be effective, and may not be appropriate if the problem involves a simple lack of communication or a temporary duplication of services.

14.4.1 Effectiveness of Intergovernmental Coordination [Rule 9J-5.015(2)(a)]

Comments related to intergovernmental coordination were collected at the Scoping Meeting and through interviews with County staff. Suggestions for coordination activities are provided below.

South Florida Water Management District (SFWMD)

Coordination is extensive considering the District's oversight of the County's drainage ordinance and its role as water quality manager; however future opportunities for coordination include:

- The SFWMD will begin the process of updating the Lower East Coast Water Supply Plan next year. The process will be closely coordinated with local governments and FKAA.

United States Army Corps of Engineers

Coordination is adequate; however future opportunities for coordination could be extensive:

- The County should coordinate with the Army Corps of Engineers to establish a review to monitor permit compliance.

- The County should coordinate with the Army Corps of Engineers to improve the photic zones in over dredged basins.
- The County should coordinate with the FKNMS and Park Service to promote in kind mitigation for resource loss.
- The County should coordinate with appropriate external agencies to develop a response plan for manmade and natural disasters which allow pre-authorizations to restore beaches and clean natural areas.

Everglades and Dry Tortugas National Parks

The County currently does not coordinate directly with the National Park Service; however, the County's Growth Management Division should incorporate and participate in the National Parks General Management Plans that are currently being operated.

Miami-Dade County Department of Planning and Zoning

The County's coordination with Miami-Dade County is adequate, but limited. Additional opportunities for coordination activities include:

- Miami-Dade County staff sharing experiences with Monroe County staff pertaining to the updated AICUZ Report and Joint Land Use Study prepared by Miami-Dade County, City of Homestead, and Homestead Air Reserve Base over the last three years.

- Continue to coordinate transit service between Miami-Dade and Monroe Counties and coordinate hurricane evacuation efforts, especially as the SFRPC's modeling efforts conclude in the next two to three months.

Florida Keys Aqueduct Authority (FKAA)

Coordination with the FKAA is currently adequate; however additional coordination activities include:

- The existing Interlocal Agreement for fire hydrants outlines how the FKAA is a partner with Monroe County in development and operation of wastewater facilities in unincorporated lower keys. This agreement is adequate in its effectiveness. It works, however it's not necessary and "*just adds more bureaucracy to the process".*

- Interagency involvement is needed between FKAA, municipalities, neighboring utilities (near the FKAA wellfield) to address wellfield protection issues.

- There is currently a monthly Utility Coordination meeting to address current and future utility work. From that meeting, a GIS user group meeting has evolved to share GIS data.

South Florida Regional Planning Council

Coordination is currently adequate but limited due to the Council's advisory role. However, additional coordination activities could be expanded:

- If issues arise in reviewing the Strategic Regional Policy Plan (SRPP) for South Florida, the SFRPC is available to coordinate and potentially address regional issues of interest to Monroe County through future updates to the SRPP.

Florida Department of Transportation

Coordination with FDOT is adequate, although presently a conflict exists regarding roadway construction activities. FDOT representation is unfortunately not evident on the County's Development Review Committee. Potential for better coordination is extensive due to the role of U.S. 1 in the County.

- Monroe County must weigh the priority and benefit of the hurricane evacuation as the local desire for livable communities. A potential restriction in the capacity up stream may have an overall impact to the evacuation time for the keys.

- Control coordination regarding road improvement projects.

Naval Air Station-Key West

Coordination with NAS-Key West is fair, but could be strengthened through additional goals, objectives and policies (GOPs) to improve intergovernmental coordination between the County and the military. Policies should include greater coordination during the building permit review process for development adjacent or proximate to military installation, and include the military as an ex-officio member of the Development Review Committee (DRC) since the DRC is a decision making body for development approvals.

NOTE: The above is a direct quote from the written documentation received at the Scoping Meeting. However, for clarification purposes, the Planning Commission is the decision making body (not the DRC) for development approvals.

General Comments

- The County, local municipalities, and agencies should be encouraged to work together to provide the best services to at the lowest costs. Empire building should be avoided at all costs (i.e. recent issues between Islamorada and the Key Largo wastewater district regarding sewer transmission).

- Coordination between Monroe County and Florida Power and Light is important with respect to the proposed project to expand FPL's Turkey Point nuclear facility.

14.4.2 Effectiveness of Interlocal Agreements

Comments related to interlocal agreements that are listed in **Table 14.2** of this element were obtained during 2010, through telephone interviews and email correspondence with key individuals, such as Monroe County Department Heads, Monroe County key departmental staff, and regional agencies.

The individuals were asked to provide input on the effectiveness of these agreements and provide recommendations to improve intergovernmental coordination, if needed. A large majority of those interviewed indicated that they were satisfied with the effectiveness of the agreements and intergovernmental coordination. However, there were a few suggestions for improvements. These suggestions are listed below:

Key Largo Wastewater Treatment District

The interlocal agreement, as amended, has worked very well. However, there are two issues which have caused continuing problems.

- The agreement provides reimbursement of $20 million in expenses associated with District capital projects. The County procedure first requires the Administrator's Engineering Department approval of expenditures submitted for reimbursement, and then approval by the Clerk's Finance Department before a reimbursement payment is made. Both functions do an extremely detailed analysis of every charge to be sure it complies with County policies. This is a double effort and it delays the review and approval process and typically requires 90 to 120 days to get a reimbursement request processed. In the District's opinion, the Engineering Department should focus primarily on construction and contract administration issues. Then the Finance Department should focus on details of the accounting and compliance issues. This is duplicate work.

- The agreement provides for certain County expenses associated with bonding the funds and administering the agreement to be charged as expenses to the grant award. The District has tried unsuccessfully for almost two years to obtain an accounting of actual expenses which have been charged to the grant, and an estimate of total expenses to be charged upon completion of the agreement. The County should provide this information to the District.

14.5 Coordination with Other Plan Elements

[Rule 9J-5.015 (2)(b)

Future Land Use Element

The County should continue coordination with DCA on all requirements related to Ch. 380, F.S., for the Area of State Critical Concern designation.

- Continue coordination with FDOT regarding traffic concurrency on U.S. 1.

- Continue coordination with Collier County regarding land uses adjacent to Big Cypress National Preserve.

- Continue coordination with Miami-Dade County regarding land uses adjacent to the Wellfields.

Conservation and Coastal Management Element

- Regarding abandoned mining sites, additional regulations are needed to more fully address the environmental and public safety issues. The County should undertake coordination with the Florida Department of Environmental Protection (FDEP) and the South Florida Water Management District (SFWMD) to review existing State and local mine reclamation standards for consistency and to determine the appropriate revisions to the County Code which will better protect the environment and residents of the County from the impacts of mining. The County should prepare an inventory of abandoned mining sites and, working where possible with landowners, develop plans for the cleanup and productive reuse of these sites.

- The County should continue coordination and participation with the United States Environmental Protection Agency (USEPA) and the Florida Department of Environmental Protection (FDEP) in the Florida Keys National Marine Sanctuary (FKNMS) Water Quality Protection Program (WQPP) studies and monitoring.

- The County should continue their coordination and partnering with the Florida Keys Invasive Exotics Task Force. Task Force partners include the County, State and federal agencies, non-profits and public utilities.

Traffic Circulation Element

- The County should continue to coordinate with FDOT to assure that the travel speed runs along U.S. 1 are completed each year.

- The County should continue to coordinate with FDOT to assure that if any segments of U.S. 1 are over capacity, that development approvals that would impact these segments would be halted until the necessary capacity improvements are implemented.

Mass Transit Element

- The County should work with Miami-Dade County and the City of Key West in an effort to coordinate the schedules between the Miami-Dade Transit (Route 301 from Homestead to Marathon) and the Lower Keys Shuttle.

Ports, Aviation and Related Facilities Element

- The County should continue to coordinate with the City of Key West and the FAA, in an effort to update the Key West International Airport's master plan. The plan should be updated within the next five years to be consistent with the County's planning horizon of 2030 and to re-assess demand and needs resulting from shifts in the economy and travel habits, and developing trends in aircraft technology.

- The County should coordinate with the City of Marathon and the FAA for periodic annual reviews and more detailed assessments (every 5 years) of operations at the Florida Keys Marathon Airport.

- The County should coordinate with the City of Key West on the Key West Bight Ferry Terminal. Due to the overall economic situation, the service has lost up to 40 percent of its ridership high mark achieved in FY 2006/2007. A detailed evaluation of the ferry operations and physical facilities should be made during the next two-year period. This service should also be included in the next update of the Transit Development Plan.

- The County should continue to coordinate with the U.S. Navy during the update of the 2004 Environmental Assessment and 2007 AICUZ map.

- The County should consider adding a military ex-officio member to the Development Review Committee.

Sanitary Sewer Element

- Coordination between the County and FKAA should continue to pursue a uniform fee structure to enable implementation to less dense areas to level out impact and connection fees.

- The County should coordinate with the State and FKAA on federal grants to supplement sanitary sewer costs.

CHAPTER 14.0 – INTERGOVERNMENTAL COORDINATION ELEMENT – COMMENT RESPONSE

Commenter: Commissioner David Rice, through Christine Hurley Comment Received: 2/14/11		
Location	**Comment**	**K&S Response**
14.3.5	The Armory Building is leased by the Historic Florida Keys Foundation, not by the County	Corrected.
Commenter: Ron Demes, NAS-Key West Comment Received: Written comments via Email 6/27/11		
14.3.6	Suggests an ex-officio member of the military be added to the Development Review Committee.	Agreed and added.

CAPITAL IMPROVEMENTS
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15.0 CAPITAL IMPROVEMENTS ELEMENT
[Rule 9J-5.016 F.A.C.]

The Capital Improvements Element (CIE) of the Monroe County (County) Comprehensive Plan addresses the data inventory requirements of 9J-5.002 and 9J5-006(1) and (2) of the Florida Administrative Code (F.A.C.). The data inventory requirement will support the development of goals, objectives, policies, and implementation programs for the Capital Improvements Element.

The purpose of the CIE is to provide the schedule of capital improvement projects as identified in other elements of this Comprehensive Plan so that improvements are made in a timely manner to meet the needs of the County within the financial capabilities of the County. The schedule identified in this Element identifies the plan for the time period from October 1, 2010 to September 30, 2015. For the purpose of the CIE, the long-term planning timeframe will be 2015, unless otherwise stated.

15.1 Introduction

In 1985 the Florida Legislature mandated that local governments plan for the availability of public facilities and services to support development concurrent with the impacts of such development. This element includes: (1) an inventory of capital improvement needs, financial resources, and local policies and practices; (2) a fiscal assessment of revenues and expenditures; (3) a discussion of issues and recommendations; (4) a listing of goals, objectives and policies; (5) a section detailing implementation, including a five year schedule of capital improvements; and (6) a section describing monitoring and evaluation strategies.

Based upon the inventory and analysis contained in this Element, a Five-Year Schedule of Capital Improvements has been developed which addresses the timing of the capital improvements required to support the Goals, Objectives, and Policies of the Comprehensive Plan. As required by Rule Chapter 9J-5, F.A.C., this schedule addresses the five years subsequent to plan adoption (Fiscal Year 2011, which begins on October 2010, to Fiscal Year 2015, which ends on September 2015). The Five-Year Schedule of Capital Improvements is also contained in Chapter 15.0 (Capital Improvements Implementation) of the Policy Document.

The scope of the CIE is based on the public facility needs as identified in the other comprehensive elements including roads, mass transit, port, and aviation facilities; potable water; solid waste; sanitary sewer; drainage; and parks and recreation; the CIE also supports the Future Land Use Element. By contrast, the County's current Capital Improvements Program (Fiscal Year 2010 – 2015) includes some of these facilities plus additional types required for government operations such as libraries, jails, fire stations and administrative buildings. Upon adoption as part of the Policy Document by the Board of County Commissioners, the Five-Year Schedule of Capital Improvements developed from the CIE will be incorporated into the County's Capital Improvements Program.

15.2 Current Local Practices Guiding Construction Extension or Increases in Capacity

[Rule 9J-5.016(2)(a) F.A.C.]

The County maintains a Capital Improvements Program which identifies public capital facility projects to be funded over a five year period. This program identifies each project the County plans to undertake during that time frame, along with estimates of the costs of each project. The Capital Improvements Program serves as a guide for planning the County's public facility projects, and is implemented through an annual capital budget.

The County plans for certain facility types through its Capital Improvements Program; while others are provided by independent agencies or by private development. This section describes the existing policies and practices governing the construction, extension, and increases in public facilities in the County. Included is a discussion of the Monroe County Land Development Code (MCLDC) Section 114.2, which controls the timing and location of all development or land by making development approval contingent upon the availability of adequate levels of certain types of public facilities.

15.2.1 Transportation

15.2.1.1 Roads

The Monroe County Division of Public Works maintains a *Seven Year Roadway/Bicycle Plan* which lists all planned roadway improvements to county roads by fiscal year. This plan is scheduled to be updated on an annual basis. Proposed roadway maintenance and improvement projects are evaluated and prioritized for inclusion in the plan based upon a point system developed by the County. New developments are assessed fair share transportation impact fees to assist in providing funding for roadway expansions required to accommodate new growth.

Improvements to U.S. 1 are addressed by the Florida Department of Transportation through a Five Year Work Program which is also updated annually. Roads are addressed by the MCLDC, Section 114-2.

15.2.1.2 Mass Transit

The County does not currently operate or have plans to construct mass transit facilities; however, residents and visitors are served by two main public transit systems:

- Miami-Dade Transit (MDT) in the northern region of the County with two routes (Dade-Monroe Express and Card Sound Express) serving the County from Key Largo to the City of Marathon; and

- The City of Key West Department of Transportation (KWDOT) which operates:

- Key West Transit (KWT) with four fixed-route bus routes serving the City of Key West and Stock Island,

- The Lower Keys Shuttle providing service in the southern portion of the County from the City of Marathon to Key West, and

- The Key West Park-N-Ride at the Old Town Garage.

The County currently does not provide any funding, equipment, or personnel for the provision of these services. The County-operated paratransit service for the transportation disadvantaged utilizes passenger vehicles and does not require capital expenditures.

15.2.1.3 Ports

Unincorporated Monroe County's port facility, located on Stock Island, is privately owned and operated. Therefore, facility expansions are governed by applicable county, State and federal regulations.

15.2.1.4 Aviation

The County operates two airports, the Key West International and Marathon Airports. Capital projects required at these facilities are identified by the County for inclusion in the County Capital Improvements Program.

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15.2.2 Potable Water

The FKAA is responsible for extending potable water service as necessary to serve existing or new development. The FKAA assesses System Development Fees to its customers in order to fund capital improvements necessary to support increased demands on the water system. In addition, the FKAA charges connection fees for new potable water line hookups.

Potable water service is addressed by the MCLDC, Section 114-2.

15.2.3 Solid Waste

Due to the lack of capacity, maintenance issues, and retrofitting necessary for existing volume reduction units, the County's three landfills were finally closed by 1991. Without the means of disposal, the County entered into a haul out contract with Waste Management Inc. (WMI) in 1990 to have its solid waste hauled out of the County.

Solid waste is collected by franchise and taken to the three historic landfill sites, which serve as transfer facilities. At the transfer stations, the waste is compacted and loaded on WMI trucks for haul out. The County charges user fees to finance the costs of solid waste collection and disposal fees. New developments are assessed fair share solid waste impact fees to assist in providing funding for expansions in solid waste facilities required to accommodate new growth.

The County has recently renewed to 2016 their current solid waste haul out contract with (WMI). Although the current contract includes an option for extension, the County will be considering other options that may increase services for residents and possibly lower the annual collection and disposal rates.

Solid waste service is addressed by the MCLDC Section 114-2.

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15.2.4 Sanitary Sewer

There are nine sanitary sewer service providers serving 15 associated service areas located throughout the County. For the most part, service areas within incorporated areas coincide with the limits of incorporation. The four service areas served by regional service providers within incorporated areas include Islamorada, Village of Islands (Islamorada), Key Colony Beach, City of Marathon, and the City of Key West; the City of Layton is served by FKAA. Within unincorporated Monroe County, there are five regional service providers: North Key Largo Utility Corp., Key Largo Wastewater Treatment District, Key West Resort Utilities Corp., Stock Island, and FKAA. FKAA provides service to seven of the 15 service areas previously identified.

For its *2010 Removal of Designation Report, Florida Keys Area of Critical County Concern*, the Department of Community Affairs (DCA) proposed the following updates (November 2010) to Rule 28-20 F.A.C. related to wastewater :

15.2.4.1 Key Largo Wastewater Treatment Facility

- *By July 1, 2011, Monroe County shall complete construction of the South Transmission Line;*
- *By July 1, 2011, Monroe County shall complete design of Collection basin C, E, F, G, H, I, J, and K;*
- *By July 1, 2011, Monroe County shall complete construction of Collection basins E-H;*
- *By July 1, 2011, Monroe County shall schedule construction of Collection basins I-K;*
- *By July 1, 2011, Monroe County shall complete construction of Collection basins I-K;*
- *By July 1, 2011, Monroe County shall complete 50 percent of hook-ups to Key Largo Regional WWTP;*
- *By July 1, 2012, Monroe County shall complete 75 percent of hook-ups to Key Largo Regional WWTP; and*
- *By July 1, 2013, Monroe County shall complete all remaining connections to Key Largo Regional WWTP.*

15.2.4.2 Hawk's Cay, Duck Key and Conch Key Wastewater Treatment Facility

- *By July 1, 2011, Monroe County shall complete construction of Hawk's Cay WWTP upgrade/expansion, transmission, and collection system;*
- *By July 1, 2011, Monroe County shall complete construction of Duck Key collection system;*
- *By July 1, 2011, Monroe County shall initiate property connections to Hawk's Cay WWTP;*
- *By July 1, 2012, Monroe County shall complete 50 percent of hook-ups to Hawk's Cay WWTP;*
- *By July 1, 2013, Monroe County shall complete 75 percent of hook-ups to Hawk's Cay WWTP; and*
- *By July 1, 2014, Monroe County shall complete all remaining connections to Hawk's Cay WWTP.*

15.2.4.3 South Lower Keys Wastewater Treatment Facility (Big Coppitt Regional System)

- *By July 1, 2012, Monroe County shall complete 75 percent hookups to South Lower Keys WWTP; and*
- *By July 1, 2013, Monroe County shall complete all remaining connections to the South Lower Keys WWTP.*

15.2.4.4 Cudjoe Regional Wastewater Treatment Facility

- *By July 1, 2011, Monroe County shall complete planning and design documents for the Cudjoe Regional Wastewater Treatment Facility for Phases 1 and 2 (WWTP; transmission main and collection system);*
- *By July 1, 2012, Monroe County shall complete construction of Wastewater Treatment Plant Phase 1 and collection systems (Phase 1 is the initial WWTP construction to treat flows from a central collection area);*
- *By July 1, 2012 Monroe County shall initiate construction of Wastewater Treatment Plant Phase 2 (Phase 2 is the planned WWTP expansion to provide additional capacity to treat flows from the expanded collection area);*
- *By July 1, 2013 Monroe County shall complete construction of Wastewater Treatment Plant Phase 2 Expansion; and*
- *By July 1, 2013, Monroe County shall complete construction of central collection lines and transmission main;*
- *By July 1, 2013, Monroe County shall initiate property connections – complete 25 percent of hook-ups to Cudjoe Regional WWTP;*
- *By July 1, 2012, Monroe County shall complete 50 percent of hook-ups to Cudjoe Regional WWTP;*
- *By July 1, 2014, Monroe County shall complete 75 percent of hook-ups to Cudjoe Regional WWTP; and*
- *By January 1, 2015, Monroe County shall complete all remaining connections to Cudjoe Regional WWTP.*

The Keys face the challenge of obtaining adequate funding sources to implement the extent of regional systems required to meet guidelines established by State and federal mandates.

Wastewater disposal is not currently addressed by the MCLDC, Section 114-2.

15.2.5 Drainage

In the past, the only controls on stormwater imposed by the County were those involving flood protection and floodplain encroachment in Section 122 of the MCLDC. Subsequently, the MCLDC has been revised, based on recommendations provided in the County's Stormwater Management Master Plan (SMMP), to not only provide stormwater controls for flood protection and floodplain encroachment, but also to include water quality controls in Section 114-3 of the MCLDC. This section of the MCLDC also includes water quality controls for existing and proposed residential development and addresses retrofitting of existing facilities and redevelopment activities. This meets the intent of Section 114-3(a) of the MCLDC, to protect the vital water resources of the County.

In conjunction with Section 114-3 of the MCLDC, the County has prepared a *Manual of Stormwater Management Practices* which provides information on acceptable forms of Best Management Practices (BMPs). This document was prepared with the assistance of the South Florida Regional Planning Council (SFRPC) and the South Florida Water Management (SFWMD) and includes BMPs consisting of rate control structures, catch basins with skimmers and baffles, and wet and dry detention/retention facilities. Drainage is not currently addressed by the MCLDC, Section 114-2.

For its *2010 Removal of Designation Report, Florida Keys Area of Critical County Concern*, the Department of Community Affairs (DCA) proposed updates to Rule 28-20 F.A.C. The Rule states that by July 1, 2011, the County must complete Card Sound Road stormwater improvements.

Drainage improvements to U.S. 1 are addressed through FDOT's Work Program.

15.2.6 Parks and Recreation

Planning for county park and recreation facility expansions is the responsibility of the County Public Works Division, in cooperation with the County Growth Management Division. Capital projects required, if any, to meet existing deficiencies and serve future development are identified for inclusion in the County's Capital Improvements Program. New developments are assessed fair share community park impact fees to assist in providing funding for new recreational facilities required to serve new growth.
Parks and recreation are not currently addressed by the MCLDC, Section 114-2.

15.2.7 Monroe County Land Development Code, Section 114-2

The County has in place an Adequate Public Facilities Ordinance which was codified in Section 114-2 of the MCLDC. The MCLDC, Section 114-2 mandates an annual assessment of the roads, solid waste, potable water and school facilities serving the unincorporated portion of the County. In the event that these public facilities have fallen or are below the level of service (LOS) required by the MCLDC, development activities must confirm to special procedures to ensure that public facilities are not further burdened. The MCLDC clearly state

that building permits shall not be issued unless the proposed use is or will be served by adequate public or private facilities. The *Public Facilities Capacity Assessment Report* distinguishes between areas of adequate, inadequate and marginally adequate facility capacity. Inadequate facility capacity is defined as those areas with capacity below the adopted LOS standard. Marginally adequate capacity is defined as those areas at the adopted LOS standard or that are projected to reach inadequate capacity within the next 12 months.

Chapter 163, F.S. requires that public facilities and services, including sanitary sewer, solid waste, drainage, potable water, and mass transit (if applicable), be available concurrent with the impacts of development. The MCLDC currently addresses only two (solid waste and water) of the public facility types required by Rule Chapter 9J-5. The Comprehensive Plan establishes new levels of service for all of the facility types with the exception of mass transit. Because mass transit service is not provided by the County, a level of service standard for mass transit is not established. *Chapter 5.0 Mass Transit* does establish a level of service for providing paratransit service to the transportation disadvantaged.

The MCLDC (cited below) requires that new development be served by adequate roads, potable water, solid waste, and school facilities as determined by the following level of service standards:

Section 114-2 – Adequate facilities and development review procedures.

(a) Service standards. After February 28, 1988, all development or land shall be served by adequate public facilities in accordance with the following standards:

(1) Roads.

a. County Road 905 within three miles of a parcel proposed for development shall have sufficient available capacity to operate at level of service D as measured on an annual average daily traffic (AADT) basis at all intersections and/or roadway segments. U.S. 1 shall have sufficient available capacity to operate at level of service C on an overall basis as measured by the U.S. 1 Level of Service Task Force Methodology. In addition, the segments of U.S. 1, as identified in the U.S. 1 Level of Service Task Force Methodology, which would be directly impacted by a proposed development's access to U.S. 1, shall have sufficient available capacity to operate at level of service C as measured by the U.S. 1 Level of Service Task Force Methodology.

b. All secondary roads to which traffic entering or leaving the development or use will have direct access shall have sufficient available capacity to operate at level of service D as measured on an annual average daily traffic (AADT) basis.

c. In areas that are served by inadequate transportation facilities on U.S. 1, development may be approved, provided that the development in combination with all other permitted development will not decrease travel speed by more than five percent below level of service C, as measured by the U.S. 1 Level of Service Task Force Methodology.

d. Within 30 days of the receipt of the official 1989 FDOT traffic counts of U.S. Highway 1 the county shall publish a notice informing the public of the available transportation capacity for each road segment of U.S. 1 as described in the county's annual public facilities capacity report. The available capacity shall be expressed in terms of number of trips remaining until the adequate transportation facilities standard is exceeded. The notice shall be published in the non-legal section of the local newspapers of greatest general circulation in the Lower, Middle and Upper Keys.

(2) Solid waste.

Sufficient capacity shall be available at a solid waste disposal site to accommodate all existing and approved development for a period of at least three years from the projected date of completion of the proposed development or use. The county solid waste and resource recovery authority may enter into agreements, including agreements under F.S. § 163.01, to dispose of solid waste outside of the county.

(3) Potable water.

Sufficient potable water from an approved and permitted source shall be available to satisfy the projected water needs of the proposed development or use. Approved and permitted sources shall include cisterns, wells, FKAA distribution systems, individual water condensation systems, and any other system that complies with state standards for potable water.

(4) Schools.

Adequate school classroom capacity shall be available to accommodate all school-age children to be generated by the proposed development or use.

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15.3 Public Facility Needs Identified in Other Plan Elements
[9J-5.016(1)(a) F.A.C.]

The analyses performed in the preceding County Comprehensive Plan elements have identified and inventoried facility improvements needed to meet the demands of existing and future development. This inventory sets forth needed improvements which are of relatively large scale, are of generally non-recurring high cost, and which may require multi-year financing. For the purposes of the CIE, a capital improvement is defined as a physical asset which has been identified as an existing or projected need in the individual comprehensive plan elements, has an expected life of several years and cost in excess of $1,000.

Capital improvements identified from other elements of the Comprehensive Plan are contained in the Schedule of Capital Improvements (Schedule) adopted as per Policy 1.1.7 of the Comprehensive Plan CIE. This is consistent with the provision of Rule 9J-5.016, F.A.C., which requires the element to address existing and future capital improvements needed for at least the first five fiscal years after the adoption of the Comprehensive Plan. Capital improvements needed for the latter part of the planning period will be evaluated during the required annual review of the element. The Schedule provides a brief description of each of the capital improvement projects, indicates whether the project is needed to correct existing deficiencies or address projected needs, and provides an estimate of the total project cost.

The capital improvement projects listed in the Schedule are not inclusive of all anticipated capital expenditures by the County during this time period. The scope of the CIE supports *Chapter 2.0 Future Land Use Element* and is usually limited to the following types of public facilities: transportation facilities, including roads, mass transit, port and aviation facilities; potable water; solid waste; sanitary sewer; drainage; schools ;and parks and recreation [9J-5.016(1)(a)]. However, the County has also included land acquisition as a goal of the Comprehensive Plan; therefore, this category is also included in the Schedule (see **Table 15.14**). Each of these public facility types are explained further in the section below.

The list of improvements derived from the preceding elements, and shown in **Table 15.14**, is limited to major components identified in each element that cost $1,000 or more and those improvements for which the County is responsible to provide, in order to mitigate existing deficiencies, replacement and new growth needs pursuant to *Chapter 2.0 Future Land Use Element*; or maintain and address adopted levels of service.

15.3.1 Transportation

15.3.1.1 Roads

The Division of Public Works is responsible for maintaining and improving County roads, while the Florida Department of Transportation (FDOT) is responsible for maintaining U.S. 1.

No roadway improvement projects impacting the level of service are required or planned for County-owned roads.

FDOT Five Year Work Program includes numerous projects in the County including the installation of bike paths; roadway reconstruction, widening and resurfacing; and adding turn lanes. Several bridge improvements are also planned, including:

- S.R. 5/Overseas Highway/U.S. 1 Indian Key Channel Bridge Project: At Mile Marker 78
  - This project is repairing concrete on the underside of the bridge;
  - Project start date: July 2010 ; and
  - Project estimated completion date: Spring 2011.
  - S.R. 5/Overseas Highway/U.S. 1 Big Pine Key/Spanish Harbor Channel Bridge Repair Project: From Mile Marker (MM) 33.0 to 33.7

  - This project is repairing the bridge. Work also includes painting the walls;
  - Project start date: August 2010; and
  - Project estimated completion date: Spring 2011.

- S.R. A1A/South Roosevelt Boulevard/Riviera Canal/Thompson Creek Channel Bridge Repair Project: At Mile Marker (MM) 2.5
  - This project is repairing the bridge and repaving the bridge;
  - Project start date: July 2010; and
  - Estimated project completion date: April 2011.

- S.R. 5/Overseas Highway/U.S. 1 Tom's Harbor Channel Bridge Repair Project: At Mile Marker (MM) 60.6
  - This project is repairing the underside of the bridge;
  - Project start date: July 12, 2010; and
  - Estimated project completion date: June, 2011.

15.3.1.2 Mass Transit

The County does not currently operate or have plans to construct mass transit facilities. Therefore, no mass transit capital improvements are required. Although the County does provide paratransit service to the transportation disadvantaged, the costs of providing this service are considered operating rather than capital expenses.

15.3.1.3 Ports

According to Rule 9J-5, a "port facility" is a harbor or shipping improvements used predominantly for commercial purposes (9J-5.003(70)). The only port facility meeting this definition in unincorporated Monroe County, is located on Stock Island. This port is privately owned and operated and explained further in *Chapter 6.0, Ports, Aviation and Related Facilities Element*.

15.3.1.4 Aviation

Within the County, there are eight airport facilities. One of these, Key West International Airport (KWIA) is the only commercial airport currently serving the community. The Florida Keys Marathon Airport (FKMA) provides only general aviation services, although non-scheduled air taxi service is provided. There are also four private airports or airstrips, one seaplane facility, and one military aviation facility: the U.S. Naval Air Station Key West (NAS Key West).

The KWIA and the Naval Air Station are situated in the Lower Keys. The FKMA is located in the Middle Keys. The seaplane facility is located on Stock Island. The four private airstrips are located throughout the Florida Keys ("The Keys").

There are currently no major programmed and/or budgeted projects planned for the near future at KWIA.

At FKMA, there are currently two proposed future airport enhancements: (1) a new hangar by the former Paradise Hangar, and (2) a new Emergency Center Operations facility. While these two facilities are planned for future implementation, neither are currently programmed or budgeted.[1]

15.3.2 Potable Water

Potable water service is provided to the County by the Florida Keys Aqueduct Authority (FKAA), an autonomous entity created by Chapter 76-441, F. S., as amended. The FKAA has a long range capital improvements plan which addresses both distribution systems and transmission and supply systems improvements through the year 2020. The program's projected expenditures total is $208.6 million, with $47.5 million earmarked for distribution system improvements and $33.5 million earmarked for pump and storage improvements. The FKAA capital improvements plan is to be funded by system development fees and the existing surcharge on water sales; the FKAA *Capital Improvement Plan Transmission & Supply System* is presented in **Table 15.1.**

The FKAA assesses System Development Fees to new and existing customers who modify, add to or construct facilities which impose a potential increased demand on the water system. This fee is charged in order to equitably adjust the fiscal burden of new pipeline and to expand or improve appurtenant facilities between existing customers and new water users. All system development fees are allocated to the direct and indirect cost of capital improvements made necessary by actual and expected increased demand on the water system. In addition, the FKAA is authorized to charge tapping fees, meter test fees, and investigation fees.

1 URS, Inc., September 2010.

Table 15.1 - FKAA Capital Improvement Plan Transmission & Supply System

Description	Est. Project Costs thru 2009	2010	2011	2012	2013	2014	5 Year Total Costs	Total Est. project Costs thru 2013
Distribution replacement	Ongoing	$1,790,000	$4,448,250	$3,058,850	$3,156,500	$3,030,550	$15,484,150	Ongoing
Navy Water Improvements	Ongoing	$800,000	$600,000	$600,000	$600,000	$600,000	$3,200,000	Ongoing
AMR Lower Keys through Big Pine	Ongoing	$2,000,000	$2,000,000	$1,500,000			$7,500,000	Ongoing
Marathon booster pump station & tank addition	$100,000	$1,500,000					$1,500,000	$1,600,000
36" transmission main replacement C-111		$700,000					$700,000	$700,000
Marathon RO improvements		$2,200,000					$2,200,000	$2,200,000
Stock island RO plant upgrades		$1,500,000					$1,500,000	$1,500,000
Boca Chica Bridge – 24"WM		$700,000					$700,000	$700,000
Prison Road pipe protection		$300,000					$300,000	$300,000
KW–18" main replace. (N. Roosevelt Blvd.)		$1,000,000	$2,000,000				$3,700,000	$3,700,000
Reclaimed water system – Duck Key, Big Coppitt	$3,663,500	$1,000,000					$1,000,000	$4,663,500
Hawk's Cay advanced water	$400,00	$2,100,000					$2,100,000	$2,500,000
Key Haven wastewater system upgrades		$3,400,000	$4,000,000				$8,600,000	$8,600,000
Pavex Property – Big Coppitt WWTP		$3,400,000					$3,400,000	$3,400,000
North Key Largo 12" water main replacement			$1,300,000				$1,300,000	$1,300,000
Florida City 5 mg storage tank			$2,600,000				$5,200,000	$5,200,000
Key West administration building improvements			$500,000				$500,000	$500,000
Marathon customer service building	$400,000		$3,000,000				$4,000,000	$4,400,000
	$4,563,500	**$22,390,000**	**$20,448,250**	**$11,158,850**	**5,256,500**	**3,630,550**	**$62,684,450**	**$41,263,500**

Source: FKAA 20-Year Water System CIP Master Plan, December 2006

$ $

15.3.3 Solid Waste

Solid waste collection, recycling and disposal in the County is managed by the Public Works Division. Until 1991, the County's solid waste disposal methods consisted of incineration and landfilling on sites on Key Largo, Long Key, and Cudjoe Key. In December 1990, the County entered into a five-year renewable contract with Waste Management, Inc. (WMI) to haul the County's solid waste to the contractor's private landfill in Broward County. In conjunction with this change in the County's solid waste disposal methods, capital expenditures were made to close the three landfills, establish transfer stations at the landfill sites for processing of waste prior to transport out of the County, and initiate recycling programs. Costs of the current haul out contract and recycling programs are considered to be operating rather than capital expenses.

15.3.4 Sanitary Sewer

Treatment of sewage and the disposal of wastewater within the County historically have been accomplished through septic tanks, on-site treatment and disposal systems (OSTDS), and small to intermediate sized privately-owned wastewater treatment package plants. With expansion and growth, regional systems consisting of treatment plants and centralized sewer have been built providing a greater level of collection and treatment. Several sewer districts, both private and municipal, have been formed to service more densely populated areas.

The *Monroe County Sanitary Wastewater Master Plan* (SWMP) was adopted in June of 2000 called for several measures including the following:

- Replacement or upgrade of onsite systems to Onsite Wastewater Nutrient Reduction Systems (OWNRS);
- Creation of 12 community collection systems, five of which are to be phased into regional systems;
- Address hot spots with community systems by 2010; and
- Upgrade 17 facilities to BAT/Advanced Wastewater Treatment (AWT) by 2010.

In addition, facilities were to be upgraded to accommodate water reuse programs and the distribution system was to be installed. The major drawbacks to reuse cited in the Master Plan include the lack of large users and economic feasibility. Although originally planned to provide compliance by July of 2010, the Master Plan has fallen short mainly due to a gap in funding.

In April 2010, the Florida Senate and House approved SB 2018 extending the deadline for compliance to the end of 2015, and postponing fines and potential liens against property owners. In addition, the bill authorized $200 million of State funding for improvements; however, the source of funding currently remains unresolved.

Through the SWMP, many regional improvements including facilities and collection systems have been identified; and these planned improvements are in various states of completion. The primary obstruction hindering implementation has been funding.

15.3.5 Drainage

Recognizing the present inadequacy regarding surface water management in the County, a Stormwater Management Master Plan (SMMP) was completed in 2001 to assess the need for design of drainage systems in the developed portions of the County; however, the focus of the SMMP is on public facilities, and does not address the needs of many of the private stormwater management systems throughout the County.

The County's present stormwater management practices have been revised, partially as a result of information and recommendations provided in the SMMP. However, these revised practices have not been adequate to solve all of the problems associated with stormwater management.

The SMMP did identify a significant number of stand alone improvements, some of which have been implemented, that have had positive water quantity and quality impacts in localized areas. A number of SMMP referenced projects are in various stages of completion with yet other needing funding Projects identified that have been completed or are in process include: El Prado Circle on Big Coppitt Key, Card Sound Road (SR905A), Marathon Government Center, Burton Drive at U.S. 1 in Tavernier, Jo-Jean Way in Tavernier and Veterans Park in Little Duck Key. It should be further noted, projects associated with U.S. 1 right-of-way are the responsibility of FDOT. The County has partnered with the FDOT on numerous occasions and look forward to maintain this partnership.

15.3.6 Parks and Recreation

The Recreation and Open Space Element (ROSE) classifies recreational areas as being either "activity-based" or "resource-based" (see *Chapter 13.0 Recreation and Open Space Element*). Activity-based recreational areas include areas developed with active recreational facilities which are not dependent upon the presence of a specific natural resource. Resource-based recreational areas are used for activities such as boating, fishing, and hiking which are dependent upon the presence of natural resources. The Recreation and Open Space Element establishes level of service standards for both activity-based and resource-based recreational land.

According to the ROSE, the projections for recreational lands and facilities for the year 2010 and subsequent years 2015 thorough 2030 generally show the recreation needs are adequately provided for and will meet future needs of the functional population of the County.

15.4 Public Education and Public Health Systems

[9J-5.016(2)(d) F.A.C.]

Expanding education and health systems can create demands on public infrastructure. This section describes existing education and health facilities in the County, the service areas of these facilities, and plans for future expansion.

15.4.1 Monroe County School System

The Monroe County District School Board (the "District") oversees the operation of 13 public schools including three high schools, one middle school, two middle/elementary schools, six elementary schools, and one school for exceptional students. The names, locations, and service areas of these schools are presented in **Table 15.2**. The schools are distributed among three subdistricts. Subdistrict 1 serves the Upper Keys from Key Largo to Matecumbe Key. Subdistrict 2 serves the Middle Keys from Long Key to the Seven Mile Bridge. Subdistrict 3 serves the Lower Keys from Bahia Honda to Key West. There is one charter school that does not provide bussing and serves the entire county. The Keys Center is an alternative program provided within the High Schools in the county and the Juvenile Detention facility provides education to the detained youth. There are no public schools located in mainland Monroe County.

The DCA can provide a waiver from the school concurrency planning requirements pursuant to Section 163.3177(12), to the County and to the municipalities with the Count if a) the capacity rate for all the schools within the District is no grater than 100 percent; and b) the projected five-year capital outlay full time equivalent student growth rate is less than 10 percent.

The Florida Inventory of School Houses (FISH) capacity for the County's schools is 11,229 students. During 2009-2010, the County's student population utilized 67.19 percent of the available capacity. Overall, the project growth utilization rate is 0.12 percent for the years 2009-2010 through 2013-2014. In April, 2010, the BOCC and the cities of Key West, Marathon, Key Colony Beach, Layton, Islamorada, and the District approved a waiver from the school concurrency planning requirements of Florida's growth management laws.

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Table 15.2 – Public Education Systems

Facility Name/Type	Location	Service Area
Subdistrict 1 (Upper Keys)		
Key Largo (Elementary Middle)	Key Largo	Dade County Line to MM 93
Plantation Key (Elementary Middle)	Plantation Key	MM 93 to Long Key
Treasure Village Montessori	Islamorada	Dade County Line to Marathon
Coral Shores (High)	Plantation Key	Dade County Line to Long Key
Subdistrict 2 (Middle Keys)		
Switlick (Elementary)	Marathon Key	Conch Key to 7 Mile Bridge
Marathon	Marathon Key	Conch Key to Big Pine Key
Subdistrict 3 (Lower Keys)		
Sand (Exceptional)	Key West	Sugarloaf Key to Key West
Adams (Elementary)	Stock Island	Rockland Key to Stock Island
Archer/Reynolds (Elementary)	Key West	Key West
Big Pine Academy* (Elementary)	Big Pine	Grassy Key to Big Coppitt Key
Poinciana (Elementary)	Key West	Key West
Sigsbee (Elementary)	Key West	Key West
Sugarloaf (Elementary/Middle)	Sugarloaf Key	Ohio Key to Boca Chica
O'Bryan (Middle)	Key West	Key Haven to Key West
Key West (High)	Key West	Lower Torch Key to Key West
Monroe County		
Montessori Charter (Elementary)*	Key West	Entire County
Keys Center (Middle/High)	Key West, Marathon, Islamorada	Entire County
Monroe County DJJ	Key West	Entire County

Table 15.2 – Public Education Systems (continued)

Facility Name/Type	Location	Service Area
Post-Secondary Facilities		
FKCC (main campus)	Stock Island	Primary Lower Keys
FKCC (branch campus)	Marathon	Primarily Middle Keys
FKCC (branch campus)	Plantation Key	Primarily Upper Keys

*Charter School
Source: Monroe County School Board, 2010

15.4.1.1 Enrollment

As of August 2010 total student enrollment was 8,043. Overall enrollment in the County school system is decreasing (see **Table 15.3**); however, charter schools are experiencing a slight increase in student enrollment (see **Table 15.4**).

For the 2010/2011 school year, Charter Schools enrolled 417 students. The District projects a 16 percent (484 students) increase in student population by 2014. The District, in planning for the future, is in negotiations for a charter school conversion of Sigsbee School. The District has approved the plan to close this elementary school in the most recent Monroe County School District *Educational Plant Survey*.

Table 15.3 – Fall School Enrollments, 1997-2007

Year	Student Enrollments
1997	9,343
1998	9,475
1999	9,175
2000	8,938
2001	8,847
2002	8,930
2003	8,838
2004	7,624
2005	8,040
2006	8,230
2007	7,992

Source: *Monroe County Public Facilities Capacity Assessment Report, 2008*

Table 15.4 – Fall School Enrollments for Charter Schools, 2004-2007

Year	Student Enrollments
2004	246
2005	332
2006	350
2007	365

Source: *Monroe County Public Facilities Capacity Assessment Report, 2008*

15.4.1.2 Capital Improvements

The District is planning to renovate the Plantation Key and Horace Bryant Schools by 2011. A new gym is also planned for the Plantation Key School and the Trumbo Administrative Complex is planned to relocated or renovated by 2011. No new schools are planned for the County.

Table 15.5 – Public School Capital Improvements, 2010-2013

Project Description	Location	2010-2011	2011 - 2012	2012 - 2013
K-8 Renovation	Plantation Key School	$ 2,000,000	$0	$0
Gym	Plantation Key School	$ 4,000,000	$0	$0
Renovate or Relocate Admin Facility	Trumbo Administrative Complex	$ 3,500,000	$0	$0
Middle School Renovation	Horace O'Bryant Middle	$ 35,000,000	$0	$0
TOTAL		**$44,500,000**	$0	$0

Source: *The Monroe County School Board 5-Year District Facilities Work Program, 2008*

15.4.1.3 Florida Keys Community College

Post-secondary education in the County is provided by the Florida Keys Community College (FKCC). FKCC has a main campus and two satellite campuses (see **Table 15.1**). There are no universities located in the County.

FKCC is currently planning to construct a Marine Sciences Building at its main campus. The college has budgeted for a new main entrance and plans to dredge the lagoon for the dive program. Student dormitories are proposed to be built and operated independently of the college.

15.4.2 Public Health Systems

Public health systems in the County include three hospitals, four public health units, three community mental health units, and an ambulance system. The locations and service areas

of these facilities are identified in **Table 15.6**. While most of the facilities have formally designated service areas, their functional service areas are determined in part by patient preferences and the lack of duplication of certain services.

Mariners Hospital is presently the only community based hospital in the County. Two privately owned hospitals which have merged, DePoo and Florida Keys Memorial, are now known as Lower Keys Medical Center (LKMC). The LKMC is funded to a small degree by ad valorem taxes. Fisherman's Hospital is also privately owned.

The ambulance system includes six stations operated by the County and two volunteer stations that receive County funding. Ocean Reef Club and Key West are each served by private ambulance services.

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Table 15.6 - Public Health Systems

Facility Name/Type	Location	Service Area
Hospitals		
Mariner's	Mariner's	Mariner's
Fisherman's	Fisherman's	Fisherman's
Lower Keys Medical Center	Key West/ dePoo Medical Center	Primarily Lower Keys
Public Health Units		
Main	Stock Island	Primarily Lower Keys
Branch	Key West	Entire County
Branch	Marathon	Primarily Middle Keys
Branch	Tavernier	Primarily Upper Keys
Community Mental Health Units		
Upper Keys	Tavernier	Primarily Upper Keys
Middle Keys	Marathon	Primarily Middle Keys
Lower Keys	Key West	Primarily Lower Keys
Ambulance Stations		
Station 23 Volunteer	Key Largo (MM92)	Monroe County Line to MM 95 Dove Lane
Station 22	Tavernier (MM92)	MM 95 to MM 90 Snake Creek Bridge
Station 18	Layton (MM68)	MM 72 to MM 65 Long Key Channel Bridge
Station 17	Conch Key (MM63)	MM 65 to MM 60 North end of Toms Harbor Bridge #4
Station 13	Big Pine Key (MM30.5)	MM 40 to MM25 Niles Channel Bridge
Station 11	Cudjoe Key (MM20.9)	MM 25 to north end Niles Channel bridge
Station 9	Big Coppitt (MM10.7)	South end of Saddlebunch No 3 Channel Bridge to MM 7.6
Station 8	Stock Island (MM5)	MM 40 to MM25 Niles Channel Bridge

Source: Monroe County Growth Management Division, 2010

15.5 Fiscal Assessment
[9J-5.016(2)(f) F.A.C.]

15.5.1 Existing Revenue Sources and Funding Mechanisms

This section provides an inventory of the general revenue sources available to the County. Each of these revenues is a potential funding source for public facilities. However, due to the County's many competing needs, gas taxes, the infrastructure surtaxes, and impact fees are the most likely means of funding the public facilities required by Rule 9J-5.

15.5.1.1 Property Tax (Ad Valorem)

An ad valorem tax is a tax levied in proportion to the assessed value of taxable property (taxable land, improvements thereon, and tangible personal property). The ad valorem tax is also known as the property tax. Property taxes are based on a millage rate (one mill is the equivalent of $1 per $1,000 of assessed value or 0.1 percent) which is applied to the total taxable value of all real and tangible personal property. Revenue from ad valorem taxes may be used to fund both operating costs and capital projects.

While property taxes are used to finance a variety of services, other County revenues are inked to specific programs; solid waste assessments finance the waste disposal programs; gasoline taxes finance public transportation, roadway construction and maintenance; and impact fees finance capital improvements related to transportation, parks, police, fire and solid waste programs.

FY 10-11 Status: As illustrated in **Table 15.7**, the current total aggregate millage rate for the County is set at 3.7787 mills, which will generate approximately $85.3 million.

Table 15.7 - Ad Valorem Taxes and Rates, FY2000 - FY2010

Fiscal Year	Taxable Assessed	% Change	Millage	Revenue
2000	$25,777,487,826.00		6.1742	$56,018,441.00
2001	$28,269,187,942.00	9.67%	5.3339	$53,250,299.00
2002	$33,958,417,829.00	20.13%	5.0102	$56,706,976.00
2003	$38,444,872,323.00	13.21%	4.7565	$60,434,484.00
2004	$48,930,949,912.00	27.28%	4.3830	$64,792,238.00
2005	$57,480,847,403.00	17.47%	4.0389	$70,462,343.00
2006	$60,780,050,234.00	5.74%	3.5623	$78,070,830.00
2007	$85,725,019,786.00	41.04%	3.1185	$83,764,246.00
2008	$62,761,669,474.00	-26.79%	2.7318	$79,164,337.00
2009	$77,757,152,226.00	23.89%	3.1705	$85,278,651.00
2010	$48,545,977,786.00	-37.57%	3.7787	$85,343,952.00

Source: Monroe County Office of Management & Budget, Dec. 2010.

15.5.1.2 Gas Taxes

State and local gas taxes are collected for each gallon of gasoline sold in the state. The term "gas tax" refers to any one of four separate taxes: 1) the "Constitutional" gas tax; 2) the County gas (one cent) tax; 3) the local option six cent gas tax; 4) the "Five Cents" tax as created in the Environmental Lands management (ELMS); and 5) the one cent "Ninth-Cent" voted gas tax.

FY 10-11 Status: The County levies the six cent local option gas tax, and therefore receives the benefit of FDOT district projects funded through the additional four cents per gallon. The County now levies ten of the twelve cents. The County budgets gas tax revenues for road construction and maintenance in the Road and Bridge Fund.

Estimated County revenues derived from gas taxes in FY 2010/11 are summarized in **Table 15.8**.

15.5.1.3 One-Cent Infrastructure Surtax

Counties may levy up to one cent of tax on all transactions subject to taxation under Chapter 212.054, Florida Statutes, for up to 15 years under the Local Government Infrastructure Commitment Act. The tax must receive majority approval by the County Commission (via ordinance) and by the voters (via referendum). Expenditure of the tax proceeds is limited to infrastructure, which the Act defines as "any fixed capital expenditure or fixed capital costs associated with the construction, reconstruction, or improvement of public facilities which have a life expectancy of five or more years and land acquisition, land improvement, design and engineering cost related thereto."

FY 10-11 Status: The Infrastructure Surtax expires in 2018. Revenue bonds issued in 2003 to finance construction of the Marathon Courtroom, Plantation Key Courtroom, Upper Keys Government Center, Big Pine Fire/EMS, Conch Key Fire/EMS, Key Largo North Fire, Ocean Reef Fire/Ambulance Replacement, Tavernier Fire & Medical Examiner Facility capital projects, are being repaid from the One Cent Infrastructure Surtax.

The estimated County revenue derived from the Infrastructure Surtax in FY 2010/11 is illustrated in **Table 15.8**.

15.5.1.4 State Revenue Sharing

State-shared revenue consists of cigarette tax, and intangible tax, which are collected by the State of Florida, then shared with local governments based on each county's percentage of the total sales tax collected. A portion of this revenue sharing program consists of the first and second guaranteed entitlement.

FY 10-11 Status: Revenue Bonds issued in 1988 and re-financed in 1993 and 2002 to finance the building of the Marathon and Plantation Key jails and the Marathon Regional Service Center. These notes are being repaid from State shared revenues.

As illustrated in **Table 15.8**, for 2010-11, the Department of Revenue estimated the County's growth money to be approximately $648,260.

15.5.1.5 Half Cent Sales Tax

The Local Government Half-Cent Sales Tax Program returns to cities and counties a portion of the sales tax proceeds remitted pursuant to Part 1, Chapter 212, F.S. The funds are distributed from the Local Government Half-Cent Sales Tax Clearing Trust Fund to allow for local discretion in providing public service needs.

FY 10-11 Status: Beginning in fiscal year 2000, the portion of this revenue source that by law is considered to be "derived on behalf of the unincorporated area" started to go into the general purpose municipal service taxing unit fund to be used for unincorporated area tax relief.

The estimated County revenue derived from the Half-Cent Sales Tax in FY 2010/11 is illustrated in **Table 15.8.**

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Table 15.8 – Other Major Revenue Sources, FY2010 -11

Revenue Source	FY – 2010/11
Infrastructure Surtax	$13,000,000.00
Constitutional Gas Tax	$2,225,000.00
County Fuel Tax/ Local Options	$1,600,000.00
Local Option/Ninth-Cent Fuel Taxes	$480,000.00
Tourist Development Taxes	$20,711,648.00
Franchise Fees- Solid Waste	$425,000.00
Local Communications Service Tax	$750,000.00
Prof/Occupancy Licenses	$425,000.00
Building Permits	$2,375,000.00
Special Assessments	$593,000.00
Sales Tax – Local 1/2 Cent	$8,685,952.00
State Revenue Sharing	$3,266,656.00
Solid Waste Assessments Tipping Fees	$16,367,450.00
Airport Fees	$6,696,000.00
State Grants	$2,000,000.00
Charges for Services	$35,798,746.00
Fines and Forfeitures	$509,000.00
Miscellaneous Revenues	$2,671,411.00

Source: Monroe County Office of Management & Budget, Dec. 2010.

15.5.1.6 Charges for Services

The County has a variety of charges for services. The most significant fees are charged for the collection and disposal of solid waste.

FY 10-11 Status: As an enterprise fund, operation of the Monroe County Municipal Service Districts (MSDs) is funded entirely by charges for services. Charges include franchise fees, local service fees, tipping fees, and delinquent service charges. Revenue Bonds issued in 1980 and refinanced in 1985, 1991, and 2002 for purchase of solid waste incinerators and finance of the Cudjoe Key, Long Key and Key Largo landfill closures. These notes are being repaid from solid waste assessment fees.

15.5.1.7 Special Revenue Sources

Special revenue sources include impact fees, special assessments, and special districts.

Impact fees are designed to pay for the infrastructure needs that result from development. The fee charged must reflect the cost of the improvements and fee expenditures must directly benefit the fee payer. Impact fees may not be collected or used for public facility deficiencies that existed prior to the development's impact. Historic fees collected by the County are illustrated in **Table 15.9.**

Special assessments provide a mechanism whereby a county or special district may levy a non-ad valorem assessment to finance public facilities, needed improvements to public facilities, and services utilized by the members of a special assessment district. Florida Statute 125.01(1)(q) grants counties the ability to levy special assessments in unincorporated areas for "fire protection, law enforcement, beach erosion control, recreation service and facilities, water, streets, sidewalks, street lighting, garbage collection and disposal, waste collection and disposal, drainage, transportation, indigent health care services, and other essential facilities and municipal services." To levy a special assessment, a county must create municipal service taxing or benefit units (MSTU's or MSBU's) by ordinance and approve them by public hearing. Special assessments are a non-ad valorem revenue source and are not restricted by the Florida constitutional prohibitions applicable to taxes.

Special districts are local government units which usually provide a single governmental service to the inhabitants of a specified area where the service or facility is needed. Special districts have been established under a number of separate statutes for a variety of purposes, including beach and shore preservation, community development, mobile home park recreation, navigation, port, recreation, drainage, water control, water management, and water and sewer improvement. Revenues generally consist of either benefit-driven special assessments or value-based ad valorem taxes. The services provided are specialized in nature, as opposed to general government improvements.

FY 10-11 Status: The County receives revenue from all three of the special revenue sources discussed above.

The County began charging impact fees in fiscal year 1986 to fund libraries, police, solid waste, parks, and transportation. As illustrated in **Table 15.9**. The County is expected to collect roughly $129,000 in combined impact fees.

The County has a number of MSTU's, which are considered dependent special districts, including for solid waste and wastewater. The County expects to collect approximately $593,000 from its wastewater MSTUs, (as previously shown in **Table 15.8**).

Table 15.9 – Impact Fee Revenues, Detailed by Fund, 2000 -2010

FUND	Roads	Parks/Rec	Solid Waste	Police	Library
Fiscal Year					
2000	$295,432.00	$75,190.00	$18,314.00	$41,560.00	$59,661.00
2001	$147,866.00	$52,365.00	$15,752.00	$27,254.00	$49,804.00
2002	$268,480.00	$41,490.00	$12,878.00	$24,673.00	$41,655.00
2003	$138,728.00	$59,398.00	$11,185.00	$24,345.00	$44,222.00
2004	$173,090.00	$76,728.00	$13,442.00	$26,693.00	$55,441.00
2005	$168,707.00	$66,640.00	$11,871.00	$24,011.00	$54,242.00
2006	$161,386.00	$46,921.00	$9,884.00	$21,234.00	$58,858.00
2007	$145,393.00	$56,440.00	$9,954.00	$22,961.00	$48,634.00
2008	$104,178.00	$38,080.00	$14,408.00	$31,508.00	$31,618.00
2009	$119,206.00	$40,460.00	$9,635.00	$19,651.00	$38,928.00
2010	$72,975.00	$32,640.00	$6,342.00	$14,773.00	$98,749.00

Source: Monroe County Office of Management & Budget, Dec. 2010.

15.5.2 Five-Year Projections of Tax Base, Assessment Ratio and Millage Rate

Table 15.10 summarizes the County's projected assessed valuation, millage rate, and property tax proceeds.

Table 15.10 – Projected Ad Valorem Taxes Rates, FY2011 - FY2015

Fiscal Year	Taxable Assessed	% Change	Millage	Revenue
2011	$42,979,624,672.00	-11.47%	4.1627	$82,208,269.00
2012	$42,979,624,672.00	0%	4.1627	$82,208,269.00
2013	$42,979,624,672.00	0%	4.1627	$82,208,269.00
2014	$42,979,624,672.00	0%	4.1627	$82,208,269.00
2015	$42,979,624,672.00	0%	4.1627	$82,208,269.00

Source: Monroe County Office of Management & Budget, Dec. 2010.

15.5.3 Projections of Impact Fees

Table 15.11 summarizes the County's projected impact fee revenues.

Table 15.11 – Impact Fee Revenue Projections, Detailed by Fund

Fund	FY – 2011	FY – 2012	FY – 2013	FY – 2014	FY – 2015	TOTAL
Roads	$63,000.00	$63,000.00	$63,000.00	$63,000.00	$63,000.00	$315,000.00
Park and Recreation	$24,000.00	$24,000.00	$24,000.00	$24,000.00	$24,000.00	$120,000.00
Solid Waste	$7,000.00	$7,000.00	$7,000.00	$7,000.00	$7,000.00	$35,000.00
Police	$15,000.00	$15,000.00	$15,000.00	$15,000.00	$15,000.00	$75,000.00
Library	$20,000.00	$20,000.00	$20,000.00	$20,000.00	$20,000.00	$100,000.00
TOTALS	**$129,000.00**	**$129,000.00**	**$129,000.00**	**$129,000.00**	**$129,000.00**	**$645,000.00**

Source: Monroe County Office of Management & Budget, Dec. 2010.

15.5.4 Projections of Other Major Revenues

Table 15.12 summarizes the County's projected revenues from other major revenue sources.

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Table 15.12 - Other Major Revenue Sources Revenue Projections, FY2011 - FY2015

Revenue Source	FY - 2011	FY - 2012	FY - 2013	FY - 2014	FY - 2015	Total
Infrastructure Surtax	$13,000,000.00	$13,000,000.00	$13,000,000.00	$13,000,000.00	$13,000,000.00	$65,000,000.00
Constitutional Gas Tax	$2,225,000.00	$2,225,000.00	$2,225,000.00	$2,225,000.00	$2,225,000.00	$11,125,000.00
County Fuel Tax/ **Local Options**	$1,600,000.00	$1,600,000.00	$1,600,000.00	$1,600,000.00	$1,600,000.00	$8,000,000.00
Local Option/**Ninth-Cent Fuel Taxes**	$480,000.00	$480,000.00	$480,000.00	$480,000.00	$480,000.00	$2,400,000.00
Tourist Development Taxes	$20,711,648.00	$20,711,648.00	$20,711,648.00	$20,711,648.00	$20,711,648.00	$103,558,240.00
Franchise Fees- Solid Waste	$425,000.00	$425,000.00	$425,000.00	$425,000.00	$425,000.00	$2,125,000.00
Local Communications Service Tax	$750,000.00	$750,000.00	$750,000.00	$750,000.00	$750,000.00	$3,750,000.00
Prof/Occupancy Licenses	$425,000.00	$425,000.00	$425,000.00	$425,000.00	$425,000.00	$2,125,000.00
Building Permits	$2,375,000.00	$2,375,000.00	$2,375,000.00	$2,375,000.00	$2,375,000.00	$11,875,000.00
Impact Fees	$147,000.00	$147,000.00	$147,000.00	$147,000.00	$147,000.00	$735,000.00
Special Assessments	$593,000.00	$593,000.00	$593,000.00	$593,000.00	$593,000.00	$2,965,000.00
Sales Tax - Local 1/2 Cent	$8,685,952.00	$8,685,952.00	$8,685,952.00	$8,685,952.00	$8,685,952.00	$43,429,760.00
State Revenue Sharing	$3,266,656.00	$3,266,656.00	$3,266,656.00	$3,266,656.00	$3,266,656.00	$16,333,280.00
Solid Waste Assessments/ Tipping Fees	$16,367,450.00	$16,367,450.00	$16,367,450.00	$16,367,450.00	$16,367,450.00	$81,837,250.00
Airport Fees	$6,696,000.00	$6,696,000.00	$6,696,000.00	$6,696,000.00	$6,696,000.00	$33,480,000.00
State Grants	$2,000,000.00	$2,000,000.00	$2,000,000.00	$2,000,000.00	$2,000,000.00	$10,000,000.00
Charges for Services	$35,798,746.00	$35,798,746.00	$35,798,746.00	$35,798,746.00	$35,798,746.00	$178,993,730.00
Fines and Forfeitures	$509,000.00	$509,000.00	$509,000.00	$509,000.00	$509,000.00	$2,545,000.00
Miscellaneous Revenues	$2,671,411.00	$2,671,411.00	$2,671,411.00	$2,671,411.00	$2,671,411.00	$13,357,055.00

Source: Monroe County Office of Management & Budget, Dec. 2010.

15.5.5 Debt Capacity

The high cost of many capital improvements requires local governments to utilize borrowing, whether through short-term or long-term financing. Short-term financing is one option available to raise required revenue for short periods generally ranging from one to five years. The more customary method, however, is to authorize long-term bond issues, normally for 5 to 40 years. One of the rationales for borrowing in a state that is experience tremendous growth is that the residents who are enjoying the benefits of the capital improvements in the future are responsible for paying part of the cost. Furthermore, that all cost is not borne by those residents currently residing in the County, but cost is spread out over the life of the particular improvement. Ideally there should be a direct correlation between the terms of the bond and the expected life of the capital improvement.

The County's debt capacity and obligations are illustrated in **Table 15.13**.

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Table 15.13 - Projected Debt Capacity and Debt Service Obligations

Bond Issue	Original Amount of Issue	Pledge	FY 10-11	FY 11-12	FY 12-13	FY 13-14	FY 14-15
Non Ad-Valorem Supported Debt							
Infrastructure Sales Surtax, Rev. 2003	$21,455,000.00	One Cent Infrastructure Tax	$1,861,683.00	$1,876,670.00	$1,887,540.00	$1,904,865.00	$1,918,165.00
Infrastructure Sales Surtax, Rev. 2007	$29,415,000.00	One Cent Infrastructure Tax	$3,725,200.00	$3,707,800.00	$3,696,800.00	$3,681,800.00	$3,667,800.00
Clean Water SRF Loan	$25,094,842.00	One Cent Infrastructure Tax	$2,868,274.00	$2,868,274.00	$2,868,274.00	$2,868,274.00	$2,868,274.00
Self-Supporting Debt							
MSD Refunding Notes, 2002	$4,143,945.00	Solid Waste Assessment Fees	$553,760.00	$0.00	$0.00	$0.00	$0.00
Airport Variable Rate Rev. Bonds, 2006	$30,455,000.00	Passenger Facilities Charges	$2,033,120.00	$1,932,370.00	$1,985,820.00	$1,961,070.00	$1,936,320.00
Total	$110,563,787.00		$11,042,037.00	$10,385,114.00	$10,438,434.00	$10,416,009.00	$10,390,559.00
General Obligation Bond Debt Capacity							
10 - Mill Statutory Debt Limit			10.0000	10.0000	10.0000	10.0000	10.0000
Less: Projected Millage Committed			0.0000	0.0000	0.0000	0.0000	0.0000
Projected Available G.O. Debt Capacity			10.0000	10.0000	10.0000	10.0000	10.0000

Source: Monroe County Office of Management & Budget, Dec. 2010.

15.5.5.1 Outstanding Debt

The County has several outstanding bond issues pledging specific revenue sources, as summarized below:

MSD Refunding Notes, 2002
Purpose: Purchase of solid waste incinerators and finance Cudjoe Key, Long Key and Key Largo landfill closures.
Pledge: Solid waste special assessments
Average Annual Debt Service:
Outstanding Principal: $1,107,520

Revenue Bonds, 2003
Purpose: Construction of the Marathon Courtroom, Plantation Key Courtroom, Upper Keys Government Center, Big Pine Fire/EMS, and Conch Medical Examiner Facility.
Pledge: One Cent Infrastructure Surtax
Average Annual Debt Service:
Outstanding Principal: $17,151,355

Key West Airport Variable Rate Revenue Bonds, 2006 Series
Purpose: Construction of new Key West International Airport Terminal (McCoy Terminal Complex)
Pledge: Passenger Facilities charges, and Federal/State grants
Average Annual Debt Service:
Outstanding Principal: $17,765,980

Revenue Bonds, 2007
Purpose: Construction of Big Pine Park, Big Pine Key Fire Station, Conch Key Fire Station, Stock Island Fire Station, Public Works Compound Rockland Key, Cudjoe Regional Wastewater System, and payment obligation to the Key Largo Wastewater Treatment District.
Pledge: One Cent Infrastructure Surtax
Average Annual Debt Service:
Outstanding Principal: $33,117,050

15.5.5.2 Anticipated Future Debt

At the present time, the only anticipated future debt involves a potential bond offering to finance the proposed Card Sound Bridge reconstruction project. However, no formal preparation has been initiated to date concerning this potential financing.

Table 15.13, above shows the County's projected debt capacity and anticipated debt service obligations.

15.6 Costs of Required Capital Improvements

[9J-5.016(2)(c)(d)& (e) F.A.C.]

The costs of required capital improvements identified in other elements of the plan are summarized in **Table 15.14**. Required capital improvements identified for transportation, potable water, solid waste, sanitary sewer, drainage, and recreation shown in **Table 15.14** during the 2011-2015 planning horizon total approximately $92.3 billion dollars. Potable water and a portion of transportation improvement costs are funded by agencies independent of the County, offsetting a substantial portion of total identified costs.

15.6.1 Sanitary Sewer

Through the Wastewater Master Plan, many regional improvements including facilities and collection systems have been identified; these planned improvements are in various states of completion. The primary obstruction hindering implementation has been funding. **Table 15.14** identifies the planned sanitary sewer capital improvement projects totaling $76.9 million dollars. After potable water, sanitary sewer facilities are the second largest cost component of the needed capital improvements.

15.6.2 Potable Water

Potable water is provided by the Florida Keys Aqueduct Authority (FKAA). The potable water facilities identified in **Table 15.14** are taken from the Capital Improvement Plan prepared and adopted by the FKAA. Planned potable water capital improvements costs total nearly $218.8 million, as shown in **Table 15.14**. At the time of this writing, February 2011, these costs are only projected by FKAA through the year 2014. It is anticipated that the FKAA will update their Capital Improvement Plan and continue to provide the funding necessary to carry out the planned improvements for potable water.

15.6.3 Transportation

Capital improvements related to transportation facilities account for a total of approximately $66.6 million or about 38 percent of costs listed in **Table 15.14**. County road improvement projects account for a large portion of this total, approximately $26.6 million.

15.6.4 Land Acquisition

As identified in **Table 15.14**, the Monroe County Land Authority has budgeted $9.8 million for acquisition of lands, primarily for conservation purposes.

15.6.5 Schools

The school facilities improvements identified in **Table 15.14** are taken from the Capital Improvement Plan prepared and adopted by the School District. Planned school capital improvements costs total nearly $4.9 million, as shown in **Table 15.14**.

15.6.6 Parks

The County has identified in **Table 15.14** capital improvement projects totaling $1.47 million. FDOT has identified in their Five Year Work Plan $637,000 in planned recreational capital improvements (boat ramps).

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Table 15.14 – Capital Improvement Schedule, 2011-2015

5-Year Schedule of Capital Improvements

Community Name: **Monroe County**

Fiscal Year: **10/10-9/15**

Infrastructure Category:		**Project Cost (Total Budget)**	**Start FY**	**Finish FY**	**Prior Year Expense**	**Funding Source**	**2,011**	**2,012**	**2,013**	**2,014**		**2,015**	
							Committed Funds	**Committed Funds**	**Committed Funds**	**Committed Funds**	**Planned Funds**	**Committed Funds**	**Planned Funds**
WASTEWATER													
REVENUE													
	Fund 310 - Big Coppitt		FY 08	FY 11		310	2,463,324						
	Fund 304 - Big Coppitt		FY 07	FY 08		304	4,906,913						
	Big Coppitt Total	**$36,770,400**			**29,400,163**								
	Fund 311 - Duck Key		FY 08	FY 12		311	8,144,315	3,050,000					
	Fund 304 - Duck Key		FY 07	FY 08		304	1,500,000						
	Duck Key Total	**$16,428,500**			**3,734,185**								
	Fund 308 - Cudjoe Regional	**$3,700,000**			**3,146,589**		553,411						
	Fund 308 - Key Largo		FY 08	FY 11	**10,080,985**	308	2,864,813						
	Fund 304 - Key Largo		FY 05	FY 08	**7,054,202**	304							
	Key Largo Total	**$20,000,000**											
TOTAL Revenues		**76,898,900**					20,432,776	3,050,000					
EXPENDITURES													
	Duck Key		FY 07	FY12		311	8,144,315	3,050,000					
	Big Coppitt		FY 07	FY11		310	2,463,324						
	Key Largo		FY 08	FY11		308	2,864,813						
	Cudjoe Regional		FY 09	FY11			553,411						
TOTAL Expenditures							14,025,863	3,050,000					
ANNUAL BALANCE							**6,406,913**						

Table 15.14 – Capital Improvement Schedule, 2011-2015 (continued)

Community Name:						**Monroe County**							
Fiscal Year:						**10/10-9/15**							
Infrastructure Category:	**Project Cost (Total Budget)**	**Start FY**	**Finish FY**	**Prior Year Expense**	**Funding Source**	**2,011**	**2,012**	**2,013**	**2,014**		**2,015**	
						Committed Funds	**Committed Funds**	**Committed Funds**	**Committed Funds**	**Planned Funds**	**Committed Funds**	**Planned Funds**
5 YEAR PLANNING PERIOD BALANCE						**6,406,913**						
POTABLE WATER												
REVENUE												
FKAA						49,802,000	50,759,000	51,692,000	52,725,840		53,780,357	
FKAA Revenues TOTAL						49,802,000	50,759,000	51,692,000	52,725,840		53,780,357	
EXPENDITURES												
J. Robert Dean Floridan Wells						2,415,000						
J. Robert Dean RO Facility								1,836,400				
J. Robert Dean New Storage Tank							4,855,000	-				
Key largo Booster Pump Station							-	-			251,850	
Plantation Key Booster Pump Station							4,209,000	4,209,000				
Marathon Transmission Main Replacements								300,000				
Marathon Booster Pump Station												
Ramrod Booster PS											104,000	
Upsize Mains						2,500,000	2,500,000	2,500,000	250,000		2,500,000	
Ocean Reef Storage Tank								860,000	860,000		-	
Lake Surprise Pub Station and Storage Tank											1,126,500	-
Rockharbor Pump Station Replacement							538,000	538,000				
Rock Harbor Storage Tank							405,000	405,000				
Tavernier Pump Station Replacement & Storage Tank						1,318,500						
Tavernier Water Lines						722,000	722,000					

Table 15.14 – Capital Improvement Schedule, 2011-2015 (continued)

Community Name:							**Monroe County**							
Fiscal Year:							**10/10-9/15**							
Infrastructure Category:		**Project Cost (Total Budget)**	**Start FY**	**Finish FY**	**Prior Year Expense**	**Funding Source**	**2,011**	**2,012**	**2,013**	**2,014**		**2,015**	
							Committed Funds	**Committed Funds**	**Committed Funds**	**Committed Funds**	**Planned Funds**	**Committed Funds**	**Planned Funds**
	Vaca Cut Storage Tank						810,000		-	-	-	-	-
	33rd Street Storage Tank Replacement						-	1,138,000	-	-	-	-	-
	Stock Island Pump Station Replacement						-	2,070,000	-	-	-	-	-
FKAA Expenditures TOTAL							7,765,500	16,437,000	10,648,400	1,110,000	-	3,982,350	-
ANNUAL BALANCE							**42,036,500**	**34,322,000**	**41,043,600**	**51,615,840**	**-**	**49,798,007**	**-**
5 YEAR PLANNING PERIOD BALANCE							**218,815,947**						
DRAINAGE													
REVENUE													
							-	-	-	-	-	-	-
							-	-	-	-	-	-	-
							-	-	-	-	-	-	-
							-	-	-	-	-	-	-
TOTAL Revenues							-	-	-	-	-	-	-
EXPENDITURES													
							-	-	-	-	-	-	-
							-	-	-	-	-	-	-
							-	-	-	-	-	-	-
TOTAL Expenditures							-	-	-	-	-	-	-
ANNUAL BALANCE							**-**	**-**	**-**	**-**	**-**	**-**	**-**
5 YEAR PLANNING PERIOD BALANCE							**-**						

Table 15.14 – Capital Improvement Schedule, 2011-2015 (continued)

Community Name:						**Monroe County**							
Fiscal Year:						**10/10-9/15**							
Infrastructure Category:		**Project Cost (Total Budget)**	**Start FY**	**Finish FY**	**Prior Year Expense**	**Funding Source**	**2,011**	**2,012**	**2,013**	**2,014**		**2,015**	
							Committed Funds	**Committed Funds**	**Committed Funds**	**Committed Funds**	**Planned Funds**	**Committed Funds**	**Planned Funds**
SOLID WASTE													
REVENUE													
							-	-	-	-	-	-	-
							-	-	-	-	-	-	-
							-	-	-	-	-	-	-
							-	-	-	-	-	-	-
TOTAL Revenues							-	-	-	-	-	-	-
EXPENDITURES													
							-	-	-	-	-	-	-
							-	-	-	-	-	-	-
							-	-	-	-	-	-	-
TOTAL Expenditures							-	-	-	-	-	-	-
ANNUAL BALANCE							**-**	**-**	**-**	**-**	**-**	**-**	**-**
5 YEAR PLANNING PERIOD BALANCE							**-**						
PARKS AND REC													
REVENUE													
County													
	Fund District 1 Parks and Rec.					131	117,165	47,165	47,165	-	47,165	-	47,165
	Fund District 2 Parks and Rec.					131	216,581	179,581	179,581	-	179,581	-	179,581
	Fund District 3 Parks and Rec.					131	46,195	46,195	46,195	-	46,195	-	46,195

Table 15.14 – Capital Improvement Schedule, 2011-2015 (continued)

Community Name:		**Monroe County**												
Fiscal Year:							**10/10-9/15**							
Infrastructure Category:		**Project Cost (Total Budget)**	**Start FY**	**Finish FY**	**Prior Year Expense**	**Funding Source**	**2,011**	**2,012**	**2,013**	**2,014**		**2,015**	
							Committed Funds	**Committed Funds**	**Committed Funds**	**Committed Funds**	**Planned Funds**	**Committed Funds**	**Planned Funds**
	County Revenues						379,941	272,941	272,941	-	272,941	-	272,941
	FDOT Revenues									-	-	-	-
TOTAL Revenues							379,941	272,941	272,941	-	272,941	-	272,941
EXPENDITURES													
County													
	District 1 Parks and Rec. Projects	235,825			-	131	47,165	47,165	47,165	-	47,165	-	47,165
	District 2 Parks and Rec. Projects	897,905			-	131	179,581	179,581	179,581	-	179,581	-	179,581
	District 3 Parks and Rec. Projects	230,975			-	131	46,195	46,195	46,195	-	46,195	-	46,195
	Palm Village Park	25,000			-	131	25,000	-	-	-	-	-	-
	Watson Field	12,000			-	131	12,000	-	-	-	-	-	-
	Bay Point Park	50,000			-	131	50,000	-	-	-	-	-	-
	Big Coppitt Park	20,000			-	131	20,000	-	-	-	-	-	-
	County Expenditures	**1,471,705**					379,941	272,941	272,941	-	272,941	-	272,941
TRANSPORTATION													
REVENUE													
County													
	Road and Bridge Fund County Capital Proj.					102	1,427,404	1,933,488	1,933,488	-	1,933,488	-	1,933,488
	Bike / Shared Used path					130	1,800,000	-	-	-	-	-	-
	Key Colony Beach Roadway Project					130	32,102	32,102	32,102	-	32,102	-	32,102
	Truman Pedestrian Bridge						430,000	-	-	-	-	-	-
	County Revenues						3,689,506	1,965,590	1,965,590	-	1,965,590	-	1,965,590
	FDOT Revenues						-						

Table 15.14 – Capital Improvement Schedule, 2011-2015 (continued)

Community Name:						**Monroe County**							
Fiscal Year:						**10/10-9/15**							
Infrastructure Category:	**Project Cost (Total Budget)**	**Start FY**	**Finish FY**	**Prior Year Expense**	**Funding Source**	**2,011**	**2,012**	**2,013**	**2,014**		**2,015**	
						Committed Funds	**Committed Funds**	**Committed Funds**	**Committed Funds**	**Planned Funds**	**Committed Funds**	**Planned Funds**
TOTAL Revenues						3,689,506	1,965,590	1,965,590	-	1,965,590	-	1,965,590
EXPENDITURES												
County												
Road and Bridge Fund County Capital Proj.	9,630,058			468,702	102	1,427,404	1,933,488	1,933,488	-	1,933,488	-	1,933,488
Bike / Shared Used path	1,800,000	FY 11	FY 15	-	130	1,800,000	-	-	-	-	-	-
Key Colony Beach Roadway Project	160,510	FY 11	FY 15		130	32,102	32,102	32,102	-	32,102	-	32,102
Truman Pedestrian Bridge	430,000	FY 11	FY 15		130	430,000	-	-	-	-	-	-
County Expenditures	11,551,866					3,689,506	1,965,590	1,965,590	-	1,965,590	-	1,965,590
FDOT												
JEWFISH Design Built FROM ABACO RD: KEY LARGO TO N OF JEWFISH CK BRIDGE: design build						$4,000.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
SR 5/BIG COPPITT KEY FROM ROCKLAND CHNL BRIDGE TO OLD BOCA CHICA CHANNEL Turn Lanes Construction						$69,000.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
SR 5/BIG COPPITT KEY FROM ROCKLAND CHNL BRIDGE TO OLD BOCA CHICA CHANNEL						$20,000.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
SR A1A/S. ROOSEVELT FROM BERTHA STREET TO SR 5/US-1 Flexible Pavement Construction: ROW						$4,986,000.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
SR A1A/S. ROOSEVELT FROM BERTHA STREET TO SR 5/US-1 Flexible Pavement Construction: Construction						$18,103,000.00	$2,774,000.00	$0.00	$0.00	$0.00	$0.00	$0.00
Bike Path Trail SR 5/N. ROOSEVELT FROM EISENHOWER DRIVE TO SR 5/US-1: Construction						$1,073,000.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00

Table 15.14 – Capital Improvement Schedule, 2011-2015 (continued)

Community Name:		**Monroe County**											
Fiscal Year:							**10/10-9/15**						
Infrastructure Category:		**Project Cost (Total Budget)**	**Start FY**	**Finish FY**	**Prior Year Expense**	**Funding Source**	**2,011**	**2,012**	**2,013**	**2,014**		**2,015**	
							Committed Funds	**Committed Funds**	**Committed Funds**	**Committed Funds**	**Planned Funds**	**Committed Funds**	**Planned Funds**
	SR 5/US-1/LONG KEY V-PIERS REPL. & DEVIATION BLOCK REPAIRS: Prelim Eng.						$20,000.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
	SR 5/OVRSEAS HRT.TRL FROM MM 15-BAY POINT TO MM 16.5-SUGARLOAF KEY: Construction						$883,000.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
	SR 5/OVR BIG SPANISH CHANNEL (BAHIA HONDA) Bridge repair and rehab: Construction						$60,000.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
	SR 5/OVERSEAS HWY ON PLANTATN KEY(MM85.7-86.7) FLEXIBLE PAVEMENT RECONSTRUCT.						$2,000.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
	SR 5/INDIAN KEY CHANNEL BRIDGE #900095 SUBSTRUCTURE REPAIRS: Preliminary Engineering and Construction						$27,000.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
	SR 5 FROM SHIPS WAY TO SANDS RD AND FM SANDS RD TO W OF KEY DEER CRSNGWIDEN/RESURFACE EXIST LANES/ Construction						$11,000.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
	SR 5/OVERSEAS HWY. FROM MM86.80/S OF E RIDGE RD TO MM90/POINCIANA BVD resurfacing: construction						$182,000.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
	SR 5/OVRSEAS HRT.TRL AT MM 106 (NEW TRAILHEAD) BTWN US-1 & CARD SOUND RD (bike paht and trail) construction						$2,620,000.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
	SR 5/OVRSEAS HRT.TRL KEMP CHANNEL BRIDGE (MM 23.6) LAP: Construction						$0.00	$1,350,000.00	$0.00	$0.00	$0.00	$0.00	$0.00
	SR 5/OVERSEAS HWY. FROM MM103/HIALEAH LANE TO MM107/LAKE SURPRISE RD: resurfacing						$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
	SR 5/OVERSEAS HWY. FROM MM 93 TO MM 97: resurfacing						$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00

Table 15.14– Capital Improvement Schedule, 2011-2015 (continued)

Community Name:		**Monroe County**											
Fiscal Year:							**10/10-9/15**						
Infrastructure Category:		**Project Cost (Total Budget)**	**Start FY**	**Finish FY**	**Prior Year Expense**	**Funding Source**	**2,011**	**2,012**	**2,013**	**2,014**		**2,015**	
							Committed Funds	**Committed Funds**	**Committed Funds**	**Committed Funds**	**Planned Funds**	**Committed Funds**	**Planned Funds**
	SR 5/OVERSEAS HWY. FROM 270'S OF HARBOR VIEW TO 760' N OF MM 93 (S/B) Resurfacing - Prelim Eng.						$9,000.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
	SR 5/OVERSEAS HWY. FROM 270'S OF HARBOR VIEW TO 760' N OF MM 93 (S/B) Resurfacing - Construction						$23,000.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
	SR 5/OVERSEAS HWY. FROM SR A1A TO 320' NORTH OF CROSS ST: resurfacing construction						$11,000.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
	SR 5/OVERSEAS HWY. FROM 2580' S. OF MM97 TO 2000'S.OF MM100(S/B ONLY) Resurfacing - Prelim Eng.						$16,000.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
	SR 5/OVERSEAS HWY. FROM 2580' S. OF MM97 TO 2000'S.OF MM100(S/B ONLY) Resurfacing - Construction						$26,000.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
	SR 5/OVERSEAS HWY. FM N OF 37 ST./MM49.1 TO N OF COCOPLUM DR./MM 54.6: Resurfacing - Prelim Eng.						$33,000.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
	SR 5/OVERSEAS HWY. FM N OF 37 ST./MM49.1 TO N OF COCOPLUM DR./MM 54.6: Resurfacing - Construction						$17,000.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
	SR 5/OVERSEAS HWY. FROM MM99.7/S OF LAGUNA AVE TO MM103.1/HIALEAH LN: Resurfacing - Prelim Eng						$12,000.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
	SR 5/OVERSEAS HWY. FROM MM99.7/S OF LAGUNA AVE TO MM103.1/HIALEAH LN: Resurfacing - ROW						$35,000.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
	SR 5/OVERSEAS HWY. FROM MM99.7/S OF LAGUNA AVE TO MM103.1/HIALEAH LN: Resurfacing - Construction						$0.00	$0.00	$7,777,000.00	$0.00	$0.00	$0.00	$0.00
	SR 5/OVRSEAS HRT.TRL (WINDLEY KEY) FROM MM 83.5 TO MM 84.8" Bike Path Construction						$0.00	$825,000.00	$0.00	$0.00	$0.00	$0.00	$0.00

Table 15.14– Capital Improvement Schedule, 2011-2015 (continued)

Community Name:		**Monroe County**											
Fiscal Year:							**10/10-9/15**						
Infrastructure Category:		**Project Cost (Total Budget)**	**Start FY**	**Finish FY**	**Prior Year Expense**	**Funding Source**	**2,011**	**2,012**	**2,013**	**2,014**		**2,015**	
							Committed Funds	**Committed Funds**	**Committed Funds**	**Committed Funds**	**Planned Funds**	**Committed Funds**	**Planned Funds**
	SR 5/OVRSEAS HRT.TRL AT SPANISH HARBOR HISTORIC BRIDGE (MM 33): Bike Path Construction						$0.00	$1,300,000.00	$0.00	$0.00	$0.00	$0.00	$0.00
	SR 5/OVRSEAS HRT.TRL AT SOUTH PINE CHANNEL HISTORIC BRIDGE (MM 29): Bike Path Construction						$0.00	$920,000.00	$0.00	$0.00	$0.00	$0.00	$0.00
	SR 5/US-1 BOCA CHICA NAVAL BASE RAMPS Resurfacing						$38,000.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
	SR 5/OVERSEAS HWY. FM 950' E OF JADE DRIVE TO 680' E OF SHARK KEY: Resurfacing Prelim Eng						$2,000.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
	SR 5/OVERSEAS HWY. FM 950' E OF JADE DRIVE TO 680' E OF SHARK KEY: Resurfacing Construction						$776,000.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
	SR 5/OVERSEAS HWY. FM 4890'E OF E.CIRCLE DR. TO 510'E OF CRANE BLVD: Resurfacing						$3,346,000.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
	SR 5/OVERSEAS HWY. FROM BAY DRIVE TO OCEAN DRIVE: Intersection Improvement: prelim eng. & construction						$18,000.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
	SR 5/OVERSEAS HWY. AT TARPON BASIN DRIVE INTERSECTION IMPROVEMENT						$1,000.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
	SR 5/OVRSEAS HRT.TRL FROM MM 15 TO MM 16.5 (LOWER SUGARLOAF) Bike path construction						$0.00	$0.00	$0.00	$0.00	$900,000.00	$0.00	$0.00
	SR 5/OVRSEAS HRT.TRL FROM MM 96 TO MM 106 (KEY LARGO) Bike path construction						$0.00	$0.00	$0.00	$0.00	$1,400,000.00	$0.00	$0.00
	SR A1A/S. ROOSEVELT BLVD, BRIDGE #900054 OVER THOMPSON CREEK: Bridge repair, prelim eng, construction						$5,000.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
	SR 5/TOMS HBR CHNL TOMS HARBOR CHANNEL IN LITTLE DUCK KEY: Prelim Eng						$9,000.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00

Table 15.14– Capital Improvement Schedule, 2011-2015 (continued)

Community Name:		**Monroe County**											
Fiscal Year:							**10/10-9/15**						
Infrastructure Category:		**Project Cost (Total Budget)**	**Start FY**	**Finish FY**	**Prior Year Expense**	**Funding Source**	**2,011**	**2,012**	**2,013**	**2,014**		**2,015**	
							Committed Funds	**Committed Funds**	**Committed Funds**	**Committed Funds**	**Planned Funds**	**Committed Funds**	**Planned Funds**
	SR 5/TOMS HBR CHNL TOMS HARBOR CHANNEL IN LITTLE DUCK KEY: Construction						$11,000.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
	SR 5/OVERSEAS HWY. AT TOMS HARBOR CUT IN LITTLE DUCK KEY: Bridge repair and rehab						$1,167,000.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
	SR 5/SPANISH HARBOR BIG PINE KEY AT BAHIA HONDA: bridge repair and rehab						$293,000.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
	SR 5/OVERSEAS HWY. FROM 50' S OF FONTAINE DR TO S OF TAVERNIER CRK BDG: resurfacing - prelim eng.						$25,000.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
	SR 5/OVERSEAS HWY. FROM 50' S OF FONTAINE DR TO S OF TAVERNIER CRK BDG: resurfacing - construction						$0.00	$1,263,000.00	$0.00	$0.00	$0.00	$0.00	$0.00
	SR 5/OVERSEAS HWY. FROM BLU ISLE BLVD,MM59.9 TO N OF BEACH ENT.,MM73.4 Resurfacing - Prelim Eng.						$63,500.00	$560,000.00	$0.00	$0.00	$0.00	$0.00	$0.00
	SR 5/OVERSEAS HWY. FROM BLU ISLE BLVD,MM59.9 TO N OF BEACH ENT.,MM73.4 Resurfacing - Const.						$0.00	$0.00	$9,320,000.00	$0.00	$0.00	$0.00	$0.00
	SR 5/OVERSEAS HWY. FROM WHALE HARBOR,MM84.04 TO SMUGLERS CV ENT,MM85.6: Resurfacing - Prelim Eng.						$250,000.00	$125,000.00	$0.00	$0.00	$0.00	$0.00	$0.00
	SR 5/OVERSEAS HWY. FROM WHALE HARBOR,MM84.04 TO SMUGLERS CV ENT,MM85.6: Resurfacing - Const.						$0.00	$0.00	$1,141,000.00	$171,000.00	$0.00	$0.00	$0.00
	SR 5/OVERSEAS HWY. FROM JEROME AVE MM 81.42 TO WHALE HBR CHN,MM84.045: Resurfacing - Prelim Eng.						$270,000.00	$200,000.00	$0.00	$0.00	$0.00	$0.00	$0.00
	SR 5/OVERSEAS HWY. FROM JEROME AVE MM 81.42 TO WHALE HBR CHN,MM84.045: Resurfacing - Construction						$0.00	$0.00	$3,351,000.00	$0.00	$0.00	$0.00	$0.00

Table 15.14 – Capital Improvement Schedule, 2011-2015 (continued)

Community Name:		**Monroe County**											
Fiscal Year:							**10/10-9/15**						
Infrastructure Category:		**Project Cost (Total Budget)**	**Start FY**	**Finish FY**	**Prior Year Expense**	**Funding Source**	**2,011**	**2,012**	**2,013**	**2,014**		**2,015**	
							Committed Funds	**Committed Funds**	**Committed Funds**	**Committed Funds**	**Planned Funds**	**Committed Funds**	**Planned Funds**
	SR 5/OVERSEAS HWY. FROM N DOLPHIN AVE,MM54.5 TO S OF KYLE AVE, MM57.50 : Resurfacing Prelim Eng						$0.00	$55,000.00	$0.00	$0.00	$0.00	$0.00	$0.00
	SR 5/OVERSEAS HWY. FROM N DOLPHIN AVE,MM54.5 TO S OF KYLE AVE, MM57.50 : Resurfacing Construction						$0.00	$0.00	$0.00	$3,360,000.00	$0.00	$0.00	$0.00
	SR 5/OVERSEAS HWY. FROM KNIGHTS KEY, MM47.0 TO COAST GUARD ENT,MM48.0: Resurfacing Prelim Eng						$0.00	$290,000.00	$0.00	$0.00	$0.00	$0.00	$0.00
	SR 5/OVERSEAS HWY. FROM KNIGHTS KEY, MM47.0 TO COAST GUARD ENT,MM48.0: Resurfacing Construction						$0.00	$0.00	$0.00	$1,867,000.00	$0.00	$0.00	$0.00
	SR 5/OVERSEAS HWY. FROM N OF OLD SR4A/MM77.5 TO JEROME AVE/MM81.42: Resurfacing - Prelim Eng						$0.00	$626,000.00	$0.00	$0.00	$0.00	$0.00	$0.00
	SR 5/OVERSEAS HWY. FROM N OF OLD SR4A/MM77.5 TO JEROME AVE/MM81.42: Resurfacing - Const.						$0.00	$0.00	$0.00	$4,892,000.00	$0.00	$0.00	$0.00
	SR 5/OVERSEAS HWY. FROM S OF W CRCLE/MM14.69 TO N OF E CRCLE DR/MM15.2: Resurfacing - Prelim Eng.						$47,000.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
	SR 5/OVERSEAS HWY. FROM S OF W CRCLE/MM14.69 TO N OF E CRCLE DR/MM15.2: Resurfacing - Const.						$0.00	$1,165,000.00	$0.00	$0.00	$0.00	$0.00	$0.00
	SR 5/OVERSEAS HWY. FROM TAVNIR CRK BRDG/MM91 TO JO-JEAN WAY/MM 92: Resurfacing - Prelim Eng						$198,000.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
	SR 5/OVERSEAS HWY. FROM TAVNIR CRK BRDG/MM91 TO JO-JEAN WAY/MM 92: Resurfacing - Const						$0.00	$0.00	$1,378,000.00	$0.00	$0.00	$0.00	$0.00

Table 15.14 – Capital Improvement Schedule, 2011-2015 (continued)

Community Name:		**Monroe County**											
Fiscal Year:							**10/10-9/15**						
Infrastructure Category:		**Project Cost (Total Budget)**	**Start FY**	**Finish FY**	**Prior Year Expense**	**Funding Source**	**2,011**	**2,012**	**2,013**	**2,014**		**2,015**	
							Committed Funds	**Committed Funds**	**Committed Funds**	**Committed Funds**	**Planned Funds**	**Committed Funds**	**Planned Funds**
	SR 5/OVERSEAS HWY FROM N. PINE CHL(MM 29.5) TO SPANISH HRBR CHL(MM33) ROW ACQ						$1,795,000.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
	SR 5/US-1 BAHIA HONDA BRIDGE rehab							$4,512,000.00	$0.00	$0.00	$0.00	$0.00	$0.00
	SR 5/US-1 HARRIS CHANNEL - SUGARLOAF KEY rehab						$863,000.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
	SR 5/OVRSEAS HRT.TRL AT MM 47 (KNIGHTS KEY) PEDESTRIAN UNDERPASS/ADA Bike Path						$0.00	$0.00	$1,150,000.00	$0.00	$0.00	$0.00	$0.00
	SR 5/OVRSEAS HRT.TRL FROM MM 54.5 TO MM 60 (GRASSY KEY) Bike Path						$0.00	$0.00	$1,635,000.00	$0.00	$0.00	$0.00	$0.00
	SR 5/OVRSEAS HRT.TRL & SCENIC HWY - VISTAS AT VARIOUS LOCATIONS Bike Path						$0.00	$0.00	$1,225,000.00	$0.00	$0.00	$0.00	$0.00
	SR 5/OVRSEAS HRT.TRL ALL AMERICAN ROAD MM 0 TO MM 106 Bike Path						$1,020,000.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
	SR 5/OVERSEAS HWY. FROM MM11.7/SHARK KEY ENT TO MM14.6/WEST CIRCLE DR. Resurfacing - Prelim Eng						$410,000.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
	SR 5/OVERSEAS HWY. FROM MM11.7/SHARK KEY ENT TO MM14.6/WEST CIRCLE DR. Resurfacing - Prelim Eng							$0.00	$2,696,000.00	$0.00	$0.00	$0.00	$0.00
	CR 931/BOOT KEY BRIDGE repair and rehab - prelim eng						$5,000.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
	CR 931/BOOT KEY BRIDGE DEMOLITION						$318,000.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
	GLENN ARCHER DRIVE FROM SR 5/N ROOSEVELT BLVD TO FLAGLER AVE bike path construction						$0.00	$1,979,000.00	$0.00	$0.00	$0.00	$0.00	$0.00
	SAFE RTS. TO SCHOOL GERALD ADAMS ELEMENTARY KEY WEST - Ped improvement						$557,000.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
	SAFE RTS. TO SCHOOL POINCIANA ELEMENTARY KEY WEST - ped. Improv. Prelim eng.						$66,000.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00

Table 15.14 – Capital Improvement Schedule, 2011-2015 (continued)

Community Name:							**Monroe County**						
Fiscal Year:							**10/10-9/15**						
Infrastructure Category:		**Project Cost (Total Budget)**	**Start FY**	**Finish FY**	**Prior Year Expense**	**Funding Source**	**2,011**	**2,012**	**2,013**	**2,014**		**2,015**	
							Committed Funds	**Committed Funds**	**Committed Funds**	**Committed Funds**	**Planned Funds**	**Committed Funds**	**Planned Funds**
	SAFE RTS. TO SCHOOL POINCIANA ELEMENTARY KEY WEST - ped. Improv. Construction.						$0.00	$372,000.00	$0.00	$0.00	$0.00	$0.00	$0.00
	GEIGER KEY BR#904110 ON BOCA CHICA ROAD: Bridge repair						$128,000.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
	FDOT Expenditures						$39,923,500.00	$18,316,000.00	$29,673,000.00	$10,290,000.00	$2,300,000.00	$0.00	$0.00
TOTAL Expenditures							$39,923,500.00	$18,316,000.00	$29,673,000.00	$10,290,000.00	$2,300,000.00	$0.00	$0.00
ANNUAL BALANCE							**- $36,233,994.00**	**- $16,350,410.00**	**- $27,707,410.00**	**- $10,290,000.00**	**-$334,410.00**	**$0.00**	**$1,965,590.00**
5 YEAR PLANNING PERIOD BALANCE							**- $88,950,634.00**						
GROWTH MANAGEMENT													
REVENUE													
	General Fund - Ad Valorum Taxese						260,000	260,000	260,000	-	-	-	-
TOTAL Revenues							260,000	260,000	260,000	-	-	-	
EXPENDITURES													
	Comp Plan 2010		FY 10	FY 12			260,000	260,000	260,000	-	-	-	-
TOTAL Expenditures							260,000	260,000	260,000	-		-	
ANNUAL BALANCE							-	-	-	-	-	-	
5 YEAR PLANNING PERIOD BALANCE							-						
LAND ACQUISITION													
REVENUE													
	Property Acquisition in Key West ACSC						1,668,878	-	-	-	-	-	-

Table 15.14 – Capital Improvement Schedule, 2011-2015 (continued)

Community Name:		**Monroe County**											
Fiscal Year:							**10/10-9/15**						
Infrastructure Category:		**Project Cost (Total Budget)**	**Start FY**	**Finish FY**	**Prior Year Expense**	**Funding Source**	**2,011**	**2,012**	**2,013**	**2,014**		**2,015**	
							Committed Funds	**Committed Funds**	**Committed Funds**	**Committed Funds**	**Planned Funds**	**Committed Funds**	**Planned Funds**
	Property Acquisition in FL Keys ACSC						1,677,690	-	-	-	-	-	-
	Unreserved						6,835,400	-	-	-	-	-	-
	Administration						131,500	-	-	-	-	-	-
	Interest Income						40,000	-	-	-	-	-	-
	Less 5%						(536,048)	-	-	-	-	-	-
TOTAL Revenues							9,817,420	-	-	-	-	-	-
EXPENDITURES													
	Property Acquisition in Key West ACSC						4,064,528	-	-	-	-	-	-
	Property Acquisition in FL Keys ACSC						1,668,878	-	-	-	-	-	-
	ROGO Reserve						3,084,014	-	-	-	-	-	-
	Contingency						1,000,000	-	-	-	-	-	-
TOTAL Expenditures							9,817,420	-	-	-	-	-	-
ANNUAL BALANCE							**-**	**-**	**-**	**-**	**-**	**-**	**-**
5 YEAR PLANNING PERIOD BALANCE							**-**						
SCHOOLS													
REVENUE													
	Property Taxes						21,981,852,537	22,903,454,289	23,599,596,349	23,599,596,349	-	-	-
	1/2 cents sales surtax						11,000,000	11,000,000	11,000,000	11,000,000	-	-	-
TOTAL Revenues							21,992,852,537	22,914,454,289	23,610,596,349	23,610,596,349	-	-	-

Table 15.14 – Capital Improvement Schedule, 2011-2015 (continued)

Community Name:							**Monroe County**						
Fiscal Year:							**10/10-9/15**						
Infrastructure Category:		**Project Cost (Total Budget)**	**Start FY**	**Finish FY**	**Prior Year Expense**	**Funding Source**	**2,011**	**2,012**	**2,013**	**2,014**		**2,015**	
							Committed Funds	**Committed Funds**	**Committed Funds**	**Committed Funds**	**Planned Funds**	**Committed Funds**	**Planned Funds**
EXPENDITURES													
	Plantation Key School Renovation	733,320		FY 11			733,320	-	-	-	-	-	-
	Horace O'Bryant Middle Renovation	4,212,680					1,012,680	-	-	-	3,200,000	-	-
TOTAL Expenditures							1,746,000	-	-	-	3,200,000	-	-
ANNUAL BALANCE							**21,991,106,537**	**22,914,454,289**	**23,610,596,349**	**23,610,596,349**	**(3,200,000)**	**-**	**-**
5 YEAR PLANNING PERIOD BALANCE							**92,123,553,524**						

15.7 Fiscal Implications of Funding Existing Deficiencies and Future Needs

[9J-5.016(2)(b) F.A.C.]

Tables 15.10, **15.11**, **15.12**, and **15.3** provides a five-year assessment of the County's ability to fund the transportation capital improvement needs identified in **Table 15.4** for which the County has fiscal responsibility. Improvements to Highway U.S. 1 and the potable water system are outside the County's fiscal responsibility, as they are maintained by the Florida Department of Transportation (FDOT) and the Florida Keys Aqueduct Authority (FKAA), respectively.

Capital improvements for which the County has fiscal responsibility, namely those to County roads, wastewater, parks and land acquisition, will be funded via various funds in the County budget. County road improvements within the Card Sound Road and Toll District are funded by tolls in the Card Sound Bridge Fund. All other County road improvements are funded by gas taxes in the Road and Bridge Fund. All solid waste improvements are funded by enterprise revenues, an escrow account, the infrastructure sales tax, and a community development block grant, as listed in the Municipal Service District (MSD) Fund.

County funding of other projects identified in this plan and not funded by other entities, including park improvements and development and sanitary sewer/drainage projects, are drawn from a variety of sources, including infrastructure taxes, impact fees, and general funds. The evaluation of the County's current and projected revenues, expenses and debt obligations indicate that with the exception of the sanitary sewer projects, the County has the funding capacity available to meet identified capital project needs.

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Bibliography

Monroe County Board of County Commissioners. *Fiscal Year 2011 Proposed Annual Operating & Capital Budget.* 2010.

Monroe County Board of County Commissioners. 2010. Land Development Code. Monroe County, Key West, Florida.

Monroe County Planning Department. 2010. *Monroe County Public Facilities Capacity: 2010 Assessment.* Monroe County, Key West, Florida.

Florida Keys Aqueduct Authority. *FKAA 20-Year Water System CIP Master Plan*, December 2006.

The Monroe County School Board. *5-Year District Facilities Work Program*, 2010

CHAPTER 15.0 - CAPITAL IMPROVEMENT – COMMENT RESPONSES

Location	County Comment	K&S Action
Commenter: Kathy Grasser, Comprehensive Planner, Monroe County Planning and Env. Resources Date Received: Email, March 30, 2011, 5:11 PM		
15.1	• At the end of the 3rd paragraph add "which are adequate to fund the projected costs of the capital improvements". • CIE's Schedule of Capital Improvements Table may not be included in the CIP	• Agree, this language has been added. • The Table is not required; however, the projects in the CIE Schedule must be incorporated into the CIP; have revised the text to clarify.
15.2	Throughout this section, remove all references to the County's Adequate Public Facilities Ordinance and replace those references with Monroe County Land Development Code Section 114-2, since the ordinance dates back to 1992 and is now codified in Sec. 114-2	Agree, references changed, as requested.
15.2.7	New language was provided for most of the first paragraph in this section.	Agree, this new language has been added.
15.3.5	Update drainage projects that have been completed.	Agreed. Have updated accordingly.
Table 15.4	Update Table to reflect adopted 2010 adopted CIE	Have replaced and updated the associated narratives.
Commenter: Kathy Grasser Date Received: Via email 6-17-11		
Section 15.1	No need to be financially feasible anymore. Should note that fact.	Agree. Have deleted this section of text.
Section 15.3	Where is the schedule in the Comprehensive Plan?	Have revised to clarify that Policy 1.1.7 requires the adoption of a Capital Improvement Schedule. Not that the schedule is actually included in the policy document.
Section 15.5.5	This section is unclear; does it mean: that the people who live here now pay for future capital improvements for the people that will move here in the future? Or is it the people who live here now, pay now and enjoy later?	This reflects that the anticipated population is responsible for paying a portion of the capital improvements they will enjoy in the future.

ENERGY CONSERVATION AND CLIMATE
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16.0 ENERGY CONSERVATION AND CLIMATE ELEMENT

The Energy Conservation and Climate Element is an optional element developed pursuant to Section 163.3177(1) F.S. to address the unique issues and challenges facing Monroe County (the "County") relating to energy conservation and climate impacts.

16.1 Introduction

On a global level, the long-term weather patterns and global climate of the Earth has continually changed over its five billion year history, including periods of extreme cold with glacier advancement and warming where the oceans rose and covered much of the Earth. Traditionally, sea levels were much lower than today. While extreme, these changes have usually occurred over many thousands of years.

For over 200 years, the global need for energy has steadily increased. Much of the energy used for light, heat and vehicles comes from fossil fuels like coal and oil. Burning these fuels releases greenhouse gases ("GHGs"). The U.S. Environmental Protection Agency (EPA) defines "greenhouse gases" as any gas that absorbs infrared radiation in the atmosphere. Greenhouse gases include, but are not limited to water vapor, carbon dioxide (CO_2), methane, nitrous oxide, cholorofluorocarbons, hydrochlorofluorocarbons, ozone, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride.

EPA defines "greenhouse effect" as a general warming effect felt on Earth's surface produced by GHGs. This process occurs naturally and has kept the Earth's temperature about 60 degrees Fahrenheit warmer than it would be otherwise. The greenhouse effect is important; without it, the Earth would not be warm enough for humans to live.

Most climate scientists think that human activity, such as burning fossil fuels, deforestation and certain changes to land use are causing an increase in GHGs in the Earth's atmosphere. Earth's climate has warmed by about 1 degree Fahrenheit over the past 100 years. Scientists are trying to fully understand why and how this is occurring. The increased GHGs lead to warming in general as well as greater variability and lower predictability of weather patterns in many places around the world.

The U.S. in general is struggling with the issue of GHG regulation and climate change preparedness. Approaches to these issues continue to evolve based on significant policy and regulatory debate. State level climate change and greenhouse gas management policy was first adopted in 2007 when the Governor of Florida hosted a climate change summit. Executive Orders (E.O.) were then signed that established a call to action and set targets for the reduction of greenhouse gas emissions within the State, and also established a Governor's Action Team on Energy and Climate Change. This action team was charged with developing a Florida Energy and Climate Change Action Plan to meet statewide targets for greenhouse gas reductions. During the preparation of the action plan, the Florida Legislature passed House Bill (HB) 697, which amended portions of Chapter 163, F.S. and required GHG emissions

reduction strategies to be included in a local government's Comprehensive Plan, among other mandates.

Although HB 7207, which became effective July 1, 2011, and revises requirements to address energy conservation , Monroe County desires to move forward in a proactive manner to address energy conservation and climate change in its role as a signatory to The Southeast Regional Climate Compact. For Monroe County, the "appropriate" and "professionally accepted" data required for Comprehensive Plans still requires some level of analysis related to energy conservation and climate change issues. *See* Section 163.3177(1)(f)1-2, F.S.

Additionally, among other requirements to address infrastructure planning, conservation and coastal management, Section 163.3177(6)(a)9.a., F.S. includes indicators for analysis that a plan or plan amendment does not discourage the proliferation of sprawl which include land use patterns or timing which disproportionately increase the cost in time, money, and energy of providing and maintaining facilities and services. Section 163.3177(6)(a)9.b., F.S. states that the future land use element or plan amendment shall be determined to discourage the proliferation of sprawl if it incorporates a development pattern or urban form that achieves four (4) or more criteria including whether or not the plan or plan amendment promotes conservation of water and energy.

Specifically the new legislation provided local governments the option of designating an "adaptation action area" and developing policies for areas experiencing coastal flooding and vulnerability to rising sea level. "Adaptation Action Areas" are defined in Chapter 163.3164 as:

"A designation in the coastal management element of a local government's comprehensive plan which identifies one or more areas that experience coastal flooding due to extreme high tides and storm surge, and that are vulnerable to the related impacts of rising sea levels for the purpose of prioritizing funding for infrastructure needs and adaptation planning."

Gaining an understanding of the relationships, effects and impacts related to energy conservation and climate change will necessitate implementing the critical policies and practices that will reduce GHG emissions and prepare for some of the unavoidable impacts of climate change. Simultaneously, the State and federal regulatory landscape is constantly evolving to address energy use and climate change. While GHGs produced within the County constitute only a small fraction of national and global quantities, because of its unique vulnerabilities to sea-level rise[1] and its status as a premier tourist destination the County has a vested interest in demonstrating leadership on these critical issues.

[1] "Most of Monroe County has natural elevations of about 4 to 7 feet above mean sea level. This makes the area vulnerable to coastal flooding." Monroe County and Incorporated Municipalities Key West, Marathon, Key Colony Beach, Layton, and Islamorada Village of Islands, "Local Mitigation Strategy", 2010 Update.

16.2 Existing Impact of Energy Use Upon Climate Change and Global Warming

16.2.1 Energy Use

Within the U.S., fossil fuel combustion accounts for the majority of carbon dioxide (CO_2) emissions. Fossil fuels are generally combusted for the purpose of producing energy for useful heat and work (U.S. EPA Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990–2008). The five major fuel consuming sectors contributing to CO_2 emissions from fossil fuel combustion are electricity generation, transportation, industrial, residential, and commercial. Changes in land use and forestry practices can also emit CO_2 (e.g., through conversion of forest land to agricultural or urban use) or can act as a sink for CO_2 (e.g., through net additions to forest biomass). The term "sink" used in this context is any process, activity or mechanism which removes greenhouse gases from the atmosphere. Transportation and electricity generation are typically the largest contributors of CO_2 emissions from fossil fuel combustion.

16.2.2 Global Warming

Global warming is the gradual rise of the Earth's surface temperature. The Earth's average temperature has increased by about 1°F (0.5°C) over the past century. An increase in global warming has occurred in the distant past as the result of natural influences, but today, the term is most often used to refer to the warming as a result of increased emissions of GHGs. There are six GHGs regulated under the Kyoto Protocol. These GHGs are: carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6). Although the direct GHGs CO_2, CH_4, and N_2O occur naturally in the atmosphere, human activities have changed their atmospheric concentrations.

Much of the sunlight that reaches the Earth's surface is reflected upward again as infrared radiation. The heat caused by infrared radiation is absorbed by gases such as water vapor, carbon dioxide, ozone and methane, thus retaining some of that heat in the Earth's atmosphere. This action regulates the Earth's climate. The increased accumulation of GHGs results in more infrared radiation trapped and held in the Earth's atmosphere. It is this warming trend that causes other climate change impacts.

16.2.3 Climate Change

Anthropogenic (human induced) activity is now widely accepted by the overwhelming majority of the world's scientists as the major cause of recent and predicted future global climate change (Karl et al., 2009; IARU, 2009). Climate change is not only driven by the accumulation in the atmosphere of GHGs from the burning of fossil fuels, but also deforestation, land use, and agricultural practices (Heimlich et al., 2009). These influences on GHG emissions result in changes to regional climate characteristics, including atmospheric and ocean temperatures, humidity, precipitation, wind, and severe weather events. The changes are occurring at different rates and levels across the world.

16.2.4 Responses to Climate Change and Global Warming

Historically, societies and ecosystems have responded to climate change by adjusting and adapting to the natural variability of climate conditions, but the rate that climate change has been occurring in the last century has begun outpacing the conditions of the past. Our ability to mitigate[2] GHG emissions will affect the magnitude of the climate change impacts to which we will need to adapt.[3] "Vulnerability" to climate change refers to the exposure, sensitivity, and adaptive capacity of systems to climate change (Intergovernmental Panel on Climate Change).[4] Mitigation of GHG emissions and adaptation to climate change are inextricably linked, and both are required to reduce the impacts we have been, and will be, seeing.[5] Resilience to climate change is the capability to anticipate, prepare for, respond to, and recover from significant multi-hazard threats with minimum damage to social well-being, the economy and the environment (Council on Environmental Quality "CEQ" 2010). It is this final response of "resilience" that the County seeks to achieve with this Energy Conservation and Climate Element.

16.3 Existing County Actions

The County is on the front lines of climate change impacts such as sea level rise and increased hurricane intensity. Recognizing the need to simultaneously mitigate GHGs attributable to energy use and prepare for the gradual but accelerating impacts of climate change, the County has already proactively taken several actions.

16.3.1 *County Operations and Facilities*

The County has adopted a GHG target for county operations (Resolution 067-2010), including a reduction of countywide GHGs of 20 percent by 2020 as measured from a 2005 baseline inventory. The County has adopted green building standards for County Facilities with Resolution 147-2010; building upon the energy requirements in the Florida Building Code by incorporating the Florida Green Building Coalition's green commercial building standard for county buildings, as the standard to be used for construction of all public buildings. Finally, the County established the "Employee Green Team" in December 2009 to develop a government operations climate action plan.

---

[2] Mitigation is an intervention to reduce the causes of of changes in climate, such as through reducing emissions of greenhouse gases in the atmosphere. The White House Council on Environmental Quality, "Progress Report of the Interagency Climate Change Adaptation Task Force: Recommended Actions in Support of a National Climate Change Adaptation Strategy" (October 5, 2010).

[3] Adaptation is the adjustment in natural or human systems to a new or changing environment that exploits beneficial opportunities or moderates negative effects. *Id.*

[4] Differences in geological, oceanographic and biological processes can also lead to substantially different impacts on a single coastal system at different locations. Some global patterns and obvious areas of vulnerability are clear, however, estuaries, coral reefs, and ice-dominated coasts appear most vulnerable to either climate change or associated sea-level rise and changes. Low-lying coastal wetlands, small islands, sand and gravel beaches and soft rock cliffs may also experience significant changes (IPCC, 2001).

[5] *Id.*

Although not traditionally considered a strategy to address energy conservation and climate change, State and federal guidance and regulations pertaining to mitigation planning already require the identification of mitigation goals that are consistent with other goals, mission statements and vision statements (a Local Mitigation Strategy "LMS"). The previous Comprehensive Plan included Goal 217: "Monroe County shall develop and implement a program of hazard mitigation and post-disaster redevelopment to increase public safety and reduce damages and public expenditures." The LMS Working Group first developed a set of goals as part of the 1999 LMS. These goals were reviewed and confirmed for the LMS revision in 2005, with one minor addition. The goals were discussed and reconfirmed for the 2010 Update. Monroe County Local Mitigation Strategy Goals include[6]:

- Preservation of sustainability of life, health, safety and welfare;
- Preservation of infrastructure, including power, water, sewer and communications;
- Maintenance and protection of roads and bridges, including traffic signals and street signs;
- Protection of critical facilities, including public schools and public buildings;
- Preservation of property and assets;
- Preservation of economy during and after disaster, including business viability; and
- Preservation and protection of the environment, including natural and historic resources.

Much of the LMS can provide baseline information in terms of what the County vulnerabilities are related to storm events, and additionally, projected impacts from climate change.

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[6] Monroe County and Incorporated Municipalities Key West, Marathon, Key Colony Beach, Layton, and Islamorada Village of Islands, "Local Mitigation Strategy", 2010 Update.

16.3.2 The Green Initiative Task Force

The Green Initiative Task Force was created on June 18, 2008 (Resolution 177-2008) by the Board of County Commissioners ("BOCC".) Originally called the Green Building Code Task Force, the name and mission, was officially changed with the adoption of Resolution 121-2009 on April 15, 2009. Membership of the task force consisted of two appointments made by each Commissioner (the BOCC had the discretion to nominate one member from their own district and one member from the County at large), and one member from each of the municipalities, utilities and the Navy (Resolution 024-2010). The task force was sunsetted on October 1, 2010 (Resolution 345-2008). The task force was coordinated by the Extension Services under the office of the County Administrator (Resolution 446-2009). The scope of the task force was to provide recommendations to the BOCC on environmentally sound practices and techniques to protect the environment as well as address climate change mitigation and adaptation needs. The task force also provided recommendations on green standards for implementation to improve quality of life and create more efficiency in County government.

The Green Initiatives Task Force completed a *Sustainable Vision Statement* in September 2010 with several key recommendations to address energy conservation and climate change. In the development of *Sustainable Vision Statement*, the Green Initiatives Task Force reviewed much of the data shaping energy and climate policy and management approaches in Florida. This data included recent analysis by the South Florida Water Management District, the U.S. Army Corps of Engineers, other local government energy/climate change initiatives and State and federal laws. That best available data serves as the basis for this Energy Conservation and Climate Element.

In relation to the Comprehensive Plan, the task force made the following recommendation: "The Monroe County Comprehensive Plan should include strategies to address the impacts of climate change. Adaptive management principles should be used to continually review and revise climate mitigation and adaptation policies, objectives, and Land Development Regulations. Revisions to the Plan may include:

- Create a Climate Change Element or Sub-Element within the Monroe County Comprehensive Plan which can be a model to other local government efforts;
- Address greenhouse gas reduction and energy conservation strategies that promote compact, bicycle and pedestrian-friendly development; increase public transportation; reduce reliance on automobiles, the construction of energy efficient buildings; and address the potential effects of rising sea levels, tropical storms, storm surge, and other climate change issues; and
- Consider climate change impacts as a factor in determining whether or not to permit additional intensity or density in land use plan changes."

An additional recommendation was also made:

> *Monroe County should continue to support the livable communities concept which promotes functional, walk-able mixed use development designs and projects by providing flexibility in development review for these projects, revising the zoning and land development codes to allow and encourage these projects, establishing incentives for this type of development, and adopting specific goals in the Comprehensive Plan to support and establish sustainable development patterns.*

Because the *Sustainable Vision Statement* was accepted by the BOCC on September 15, 2010, those recommendations also provide a basis for the development of this Element.

16.3.3 The Southeast Regional Climate Compact

The Southeast Florida Regional Climate Change Compact (the "Compact") is a joint commitment of Monroe, Broward, Miami-Dade and Palm Beach Counties to partner in mitigating the causes and adapting to the consequences of climate change. The Compact was formalized in 2009 following the Southeast Florida Climate Leadership Summit, when elected officials came together to discuss challenges and strategies for responding to the impacts of climate change. The Compact outlines a collaborative effort to participate in a Regional Climate Team toward the development of a Southeast Florida Regional Climate Change Action Plan. Specifically, the Compact includes seven commitments on the part of the participating counties:

- Each county shall work in close collaboration to develop a joint policy position urging the United States Congress to pass legislation that recognizes the unique vulnerabilities of Southeast Florida to the impacts of climate change and to further a joint policy position that includes specific recommendations regarding the allocation of federal climate change funding based on vulnerability to climate change impacts.

- Each county shall work in close collaboration with the other counties to develop additional legislative policy statements relating to global climate change and future legislation to be considered by Congress for transmittal to the local delegation members.

- Each county shall work in close collaboration to develop joint position statements on proposed State legislation and energy/climate policies.

- Each county shall work to develop joint position statements for future State legislation.

- Each county shall commit appropriate staff resources and expertise, within budget constraints, to participate in a Regional Climate Team with other counties toward the development of a Southeast Florida Regional Climate Change Action Plan.

- Each county shall work to develop a Southeast Florida Regional Climate Change Action Plan. The Action Plan could, at a minimum, include the following components:

    - A baseline of greenhouse gas emissions for Southeast Florida;
    - Strategies for coordinated emission reductions throughout the built environment to include the use of energy efficiency, energy conservation, and the use of demand-side renewable energy resources;
    - Strategies for coordinated emission reductions from the transportation sector to include increased reliance on public transit, emerging vehicle technologies, and advanced biofuels;
    - Strategies for coordinated emission reductions resulting from changes in local and regional land use;
    - Strategies for the coordinated regional preparation for and adaptation to a rapidly changing global environment based upon regional mapping of projected sea-level rise and any resulting amplification of localized impacts of tropical cyclone events. Such strategies shall incorporate climate preparation concerns for the regional economy, regional infrastructure and the built environment, social and cultural needs, and natural systems within the four counties party to this compact; and
    - Each county shall commit to participating with other counties party to this compact in hosting the Second Southeast Florida Regional Climate Change Summit in October 2010.

There are also several work groups and sub-groups compiling information to complete work products including a Greenhouse Gas Work Group, Vulnerability Work Group, Sea Level Rise Work Group. Finally, the Regional Climate Change Action Plan is being developed with a strategy of focusing on priority planning areas, narrowing that focus through vulnerability and risk analysis and integrating it with the concepts of mitigation and adaptation. The Focal Areas of the Plan include: Land and Natural Systems, Transportation and the Built Environment. A Draft document is anticipated for completion by December 2011.

16.3.4 Florida Energy and Climate Commission Grant Funds

In 2010, the County, along with the City of Marathon, City of Key West and Islamorada, Village of Islands, received a state grant from the Florida Energy and Climate Commission. The collective grant application known as the "Keys Energy Conservation Initiative" identified different projects for use of the grant funds. The County's projects included: an Energy Efficiency and Conservation Strategy for County Operations and Facilities, energy retrofits at four buildings, and the purchase of five hybrid vehicles for its fleet. Across all jurisdictions, the Grant includes funds for a low-income solar hot water heating installation program and a public awareness and outreach strategy on energy conservation and climate mitigation strategies. The Grant activities will be concluded by 2012.

16.3.5 Climate Change Advisory Committee

In January 2011, the BOCC adopted Resolution No. 002 - 2011 forming the Climate Change Advisory Committee. The purpose of the Climate Change Advisory Committee is to make recommendations to the BOCC regarding appropriate mitigation and adaptation policies needed to address climate change issues and to provide input to staff regarding implementation of those components of a Florida Energy & Climate Commission Grant received by the County and multiple partners. The Grant includes funds for community input and intergovernmental coordination on energy and climate issues. The Committee will also provide input on climate action plans and other climate related draft reports as needed.

16.4 Existing Data on Energy Use and GHG Emissions

16.4.1 Energy Consumption Generally

Trends in CO_2 emissions from fossil fuel combustion are influenced by many long-term and short-term factors. Year in and year out, the overall demand for fossil fuels generally shifts in response to changes in general economic conditions, energy prices, weather, and the availability of non-fossil alternatives. Longer-term changes in energy consumption patterns, however, tend to be more a function of aggregate societal trends that affect the scale of consumption (e.g., population, number of cars, size of houses, and number of houses), the efficiency with which energy is used in equipment (e.g., cars, power plants, steel mills, and light bulbs), and social planning and consumer behavior (e.g., walking, bicycling, or telecommuting to work instead of driving) (U.S. EPA Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2008). Direct GHG emissions are emissions from sources that are owned or controlled by the reporting entity such as energy use for the electricity generation by utilities. Indirect GHG emissions are emissions that are a consequence of the activities of the reporting entity, but occur at sources owned or controlled by another entity. The residential and commercial end-use sectors are reliant on electricity consumption for lighting, heating, air conditioning, and operating appliances and as such are indirect emissions sources. Direct emissions, used in industrial, commercial and residential sectors, represent the greatest share of U.S. GHG emissions.

16.4.2 Transportation

Energy use from the transportation sector is approximately 32 percent of CO_2 emissions, 24 percent of CH_4 emissions, and 65 percent of N_2O emissions from fossil fuel combustion, respectively. Among domestic transportation sources, light duty vehicles (including passenger cars and light-duty trucks) represents 62 percent of CO_2 emissions, medium-duty and heavy-duty trucks 22 percent, commercial aircraft seven percent, and other sources nine percent. From 1990 to 2008, transportation GHG emissions rose due to increased demand for travel and the stagnation of fuel efficiency across the U.S. vehicle fleet.

Over the 1990s through early this decade, growth in vehicle travel substantially outweighed improvements in vehicle fuel economy; however, the rate of Vehicle Miles Traveled growth slowed considerably starting in 2005 (and declined rapidly in 2008) while average vehicle fuel economy increased. The number of vehicle miles traveled by light-duty motor vehicles (passenger cars and light-duty trucks) increased 37 percent from 1990 to 2008, as a result of a confluence of factors including population growth, economic growth, urban sprawl, and low fuel prices over much of this period. A similar set of social and economic trends has led to a significant increase in air travel and freight transportation. But, with EPA and the National Highway Traffic Safety Administration (NHTSA) taking regulatory steps toward mandating reductions in GHG emissions, and fuel use from cars and light trucks, coupled with future regulatory steps related to fuel economy standards, transportation related emissions could see future decreases.

16.4.3 Land Use and Land Use Changes

The Intergovernmental Panel on Climate Change *2006 Guidelines for National Greenhouse Gas Inventories* (IPCC 2006) recommends consideration of the effects on changes within, and conversions between, certain land-use types such as undeveloped or forest land to development. The impact of considering these changes is significant. Land use, land-use change, and forestry activities in 2008 resulted in a net carbon sequestration offset of approximately 13.5 percent of total U.S. CO_2 emissions.

Alternative development scenarios demonstrate that location, density, proximity, connectivity, diversity of land uses and other concepts can be important in reducing GHG emissions. The overall composition of development patterns, housing and buildings types such as single-family, multi-unit and multi-story also have an influence over energy use. Transit Oriented Development and Transit Ready Development and transit served neighborhoods are all strategies that have been used in other communities to reduce vehicles miles traveled. When considering GHG emissions from land use, a land-use or management trend factor estimates the rate at which land-use or management changes are occurring within the geographic area during a specific timeframe. The land-use trend factor is then applied to the baseline to reflect the changing land-use or management practices in an area.

16.4.4 Commercial and Residential Energy Use

Energy use in homes and businesses is typically a large sector of GHG emissions. The U.S. Energy Information Administration (EIA) indicates total energy use from these sectors at 7 percent of electricity sales.[7] In homes, several factors influence energy use: the physical characteristics of the housing units, the appliances utilized including space heating and cooling equipment, demographic characteristics of the household, the types of fuels used, and other information that relates to energy use.

[7] Electric Power Monthly, Table 5.1, April 22, 2009.

According to the EIA, commercial buildings include all buildings in which at least half of the floor space is used for a purpose that is not residential, industrial, or agricultural; therefore, they include building types that might not traditionally be considered "commercial," such as schools, correctional institutions, and buildings used for religious worship. This includes retail and wholesale stores, hotels and motels, restaurants, and hospitals. Excluded from the sector are the goods-producing industries: manufacturing, agriculture, mining, forestry and fisheries, and construction. Analysis of the structures, activities, and equipment associated with different types of buildings is the clearest way to evaluate commercial sector energy use.

16.4.5 Waste Management

Generally, a large portion of GHG emissions is related to energy use in resource acquisition, manufacturing, transportation, and end-of-life life-cycle stages. The total energy consumed related to waste management activities is a result of direct fuel and electricity consumption associated with raw material acquisition and manufacturing, fuel consumption for transportation, and embedded energy. Not all GHG emissions are related to energy, however, and the effects of GHG are not directly translatable to energy impacts. Alternative materials management practices, source reduction, recycling, combustion, composting, and landfilling strategies all can be used to reduce GHGs. The EPA Office of Solid Waste and Response found that 42 percent of U.S. 2006 GHG emissions were associated with the manufacturing, use and disposal of materials and products. As a result, changing materials management patterns is an important strategy to help reduce or avoid GHG emissions. Reducing the amount of materials used to make products, extending product life spans and maximizing recycling rates are examples of possible materials management strategies that can significantly reduce GHG emissions.

Source reduction, or waste prevention, refers to practices that reduce the amount of materials entering the waste stream, including changes in the design, manufacture, purchase or use of materials. When a material is source reduced, GHG emissions associated with producing the material and/or manufacturing the product and managing the post-consumer waste are avoided. Consequently, source reduction provides GHG emission benefits by: (1) avoiding the "upstream" GHGs emitted in the raw material acquisition, manufacture and transport of the source-reduced material; (2) increasing the amount of carbon stored in forests (when wood and paper products are source reduced); and (3) avoiding the downstream GHG emissions from waste management.

EPA defines recycling as "minimizing waste generation by recovering and reprocessing usable products that might otherwise become waste (i.e., recycling of aluminum cans, paper and bottles, etc.)" (EPA, 2008). In evaluating the relative GHG reduction benefits of recycling compared to an existing materials management practice (i.e., evaluating the benefits of recycling relative to source reduction, composting, combustion or landfilling), the recycling GHG emissions must be compared against the corresponding emission factors for the existing management practice. According to the EPA, source reduction techniques, such as double-sided copying and reducing the weight of products (light-weighting) are

important in reducing energy because source reduction significantly lowers energy consumption associated with raw material extraction and manufacturing processes.

During composting, microbial decomposition aerobically transforms organic substrates into a stable, humus-like material (Brown and Subler, 2007). Composting results in some carbon storage (associated with application of compost to agricultural soils), as well as minimal CO_2 emissions from transportation and mechanical turning of the compost piles. The GHG reduction benefits from composting include a comparison between composting and other possible disposal options for yard trimmings (i.e., landfilling and combustion).

According to the EIA, the solid waste industry currently produces more than half of America's renewable energy, more than combined energy outputs of the solar, geothermal, hydroelectric, and wind power industries. Landfill-gas-to-energy projects involve capturing methane and waste-to-energy activities displace fossil fuel sources and lower landfill methane emissions by diverting waste from landfills helping to reduce GHG emissions.

In the County, disposal of solid waste is currently handled by three transfer station operations where waste is prepared for transportation and disposal at an out of county location. The County provides recycling services for residential properties but businesses must arrange for service with local providers as outlined in the Solid Waste Element.

16.5 Present and Projected Impacts from Climate Change: Land and Habitat

Almost all impacts from climate change relate to increasing air temperatures with global sea level rise largely attributable to the thermal expansion of the oceans and melting of glaciers and ice sheets.[8] Altered precipitation patterns, heat waves, floods and droughts are all related impacts. Not all impacts will be uniform and there will be some variation by location due to differences in atmospheric and oceanic circulation. Inundation, erosion and flooding are also resulting impacts. Areas with greater precipitation will see more sewer overflows, more runoff and nonpoint pollution, and infrastructure overloading. Areas of lesser precipitation with struggle with meeting water demands and habitat shifts. A great area of uncertainty is the combination and interrelationships of these impacts in the future. In particular, predicted changes in storm intensity and sea level rise create the need for integrated potable water, storm water, and wastewater infrastructure planning and greater interagency coordination.

[8]If global atmospheric temperatures rise, the oceans will absorb more of that heat and expand known as "thermal expansion". A greater volume of ocean water due to thermal expansion will lead to a rise in sea level. Lombard, A.; Cazenave, A.; Le Traon, P., Contribution of Thermal Expansion to 1993-2003 Sea Level Rise (2005).

16.5.1 Sea Level Rise

Approximately 100 years ago, early in the Industrial Revolution, sea level rise began to accelerate, averaging about 2 mm/yr during the 20th century and 3.1 mm/yr since 1993 based on satellite altimetry (Cazenave et al., 2008). On average, globally, the sea level has risen by approximately 200 mm (8 inches) during the past century (IPCC, 2007). As illustrated in **Table 16.1**, a Florida Institute of Technology Report (Maul, 2008) shows an average rate of sea level rise of 2.27 ± 0.04 mm per year from 1915 to 2005 based upon tide gauge readings in Key West, which has the Western Hemisphere's longest sea level record.

Table 16.1 - Average Rates of Historical Sea Level Rise (Heimlich et al., 2009)

Location	Rate	Source
Global average sea level rise, 1870-1990	2.0 mm/yr	Church and White, 2006
Global Average sea level rise, 1993-2007	3.1 mm/yr	Cazenave et al., 2008
Miami, Florida, 1931-1999	2.39 ±0.22 mm/yr	US EPA, 2009
Key West, Florida, 1913-1999	2.27 ±0.09 mm/yr	Maul, 2008

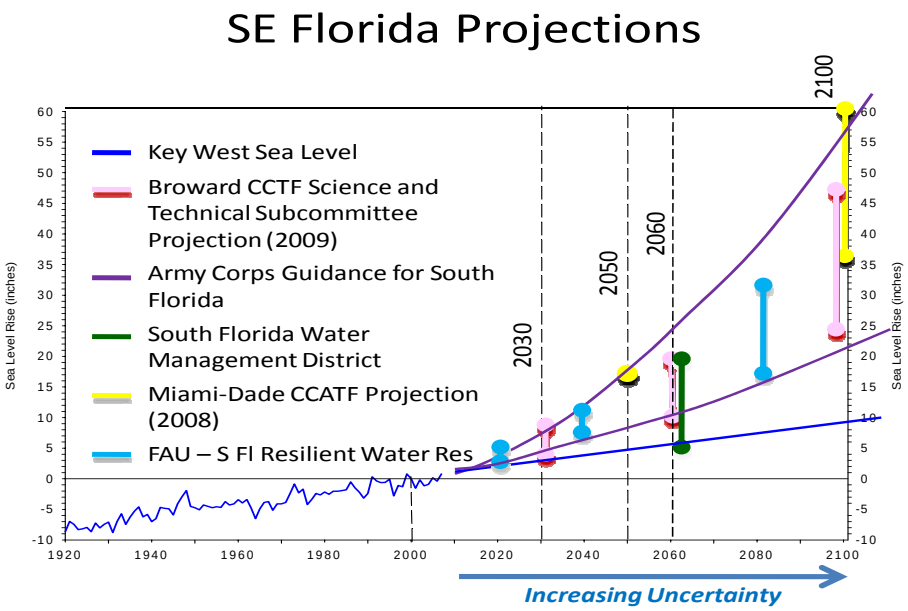
Source: Heimlich et al., 2009

The rate of sea level rise is accelerating, although scientists differ on that rate of acceleration; over the past 2,500 years south Florida has experienced an average rate of sea-level rise of 3.8 centimeters per century. From 1932 to 2000, tide-gauge data reveals that the sea level rose by 22 centimeters, a rate equivalent to 30 centimeters per century or 8 times higher than the average rate over the past 2,500 years. Today, analysis of satellite data suggests the sea level is rising 50 percent faster than it was just 15 years ago (IPCC 2007). An increasing number of papers concerning future sea level rise due to climate change are appearing in the scientific literature. Publications and reports about future rates of sea level rise to date apply relatively simple empirical correlations and extrapolations based upon limited historical data.

Sea level rise data is generally considered to be a conservative estimate of the impacts for the following reasons:

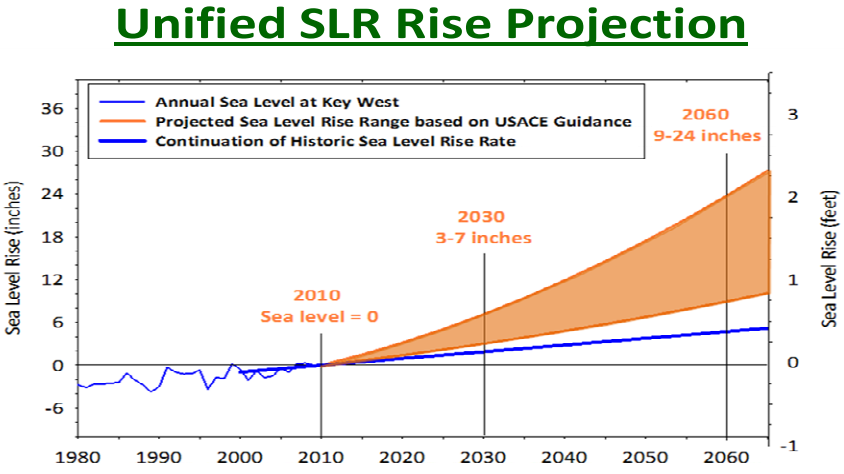
- Most of the sea level rise in the 20th century was due to thermal expansion as a result of rising global temperatures;
- A relatively small contribution was from the melting of ice sheets and glaciers and may not be a reliable guide for the increasing contributions due to melting in the 21st Century; and
- The mechanisms of glacial melt and flow are not well understood (Heimlich et al., 2009) but numerous scientific publications point to acceleration.

Extensive research is underway on this important issue and better projections will no doubt be forthcoming. There does not appear to have been a significant difference in sea level rise during the 20th Century between Southeast Florida and globally; therefore, published predictions for global sea level rise are applicable locally. **Figure 16.1** shows the diversity of some of these predictions. **Figure 16.2** shows the current Unified Sea Level Rise Project agreed to by the participants in the Southeast Regional Climate Compact.



Source: Southeast Florida Regional Climate Change Compact (2011).

Figure 16.1 – Sea Level Rise Predictions, (SE Regional Climate Compact)



Source: Southeast Florida Regional Climate Change Compact (2011).

Figure 16.2 - Unified Sea Level Rise Projections of the Southeast Regional Climate Compact

16.5.2 Impacts on Property Loss

The Nature Conservancy (TNC) evaluated the impacts of sea level rise on Big Pine Key and the Florida Keys (Bergh, 2009). In 2007, TNC acquired high-resolution Digital Elevation Models derived from airborne Light Detection and Ranging (LIDAR) data for Big Pine Key and the best-available Digital Elevation Model for the entire archipelago. Future shoreline locations and distribution of generalized habitats of Big Pine Key in the year 2100 were estimated using sea level rise scenarios described in the scientific literature. Property value loss estimates for Big Pine Key were based on the same 2100 sea level rise projections using 2008 property values. In every scenario, the island becomes smaller, marine and intertidal habitat moves upslope at the expense of upland habitat, and property values are diminished.

In the best-case scenario, 18 cm (7 in.) of sea level rise, 1,840 acres (34 percent) of Big Pine Key are inundated resulting in the loss of 11 percent of the island's upland habitat. This degree of inundation would displace native species dependent on upland habitat and threaten $40 million of property value. Four other scenarios are modeled for Big Pine Key using the same high-resolution data. With a rise of 140 cm (4.6 ft.), the highest modeled rise, about 5,950 acres (96 percent) of the island would be inundated with all upland habitat and $1.6 billion in property value lost (Bergh, 2009).

Under the most optimistic Intergovernmental Panel on Climate Change scenario (a rise of 18 cm over the next 100 years), $11 billion in property value and 58,800 acres are at risk of inundation in the Florida Keys (Bergh, 2009). Under the highest Rahmstorf (2007) estimate (a 140 cm rise by 2100), approximately $35 billion in property value and 142,000 acres are at risk from sea level rise or are already inundated in the Florida Keys (Bergh, 2009).

16.5.3 Impacts on Habitat

Plant and animal species and natural processes of ecological systems have evolved to fit specific climate regimes. Certain biological processes (e.g. flowering of plants, migration of birds) and ecological processes (e.g. natural fire regimes, aquifer recharge) are dictated by seasonality and these processes are sensitive to changing climate regimes. Some species may have the ability to adapt to slower changes by dispersing to habitat that meets their needs, but the insular nature of the Keys will prevent species that cannot fly or swim long distances from dispersing naturally and more abrupt climate related shifts may threaten even highly mobile plant and animal species. Ecological disturbances related to climate change (e.g. flooding, storms) also invite an increase in non-native species which compete for resources with native species.

The effects of sea level rise on the natural habitats of the Keys are already apparent. In the publication, "Sea Level Rise and the Reduction in Pine Forests in the Florida Keys," Ross et al. (1994) surveyed upper Sugarloaf Key elevations, vegetation distribution, groundwater

salinity and other factors and examined historic aerial photographs from 1935 to 1991, ultimately learning that the area of pine forest on Sugarloaf Key declined from an initial 88 hectares ("ha") (217 acres) before 1935 to 30 ha (74 acres) by 1991. Transformation of pine forest to more salt-tolerant vegetation types proceeded continuously over that time period and advanced from lower to higher elevation, leading the authors to attribute the decline in pine forest area to sea level rise.

Simply stated, as sea level rises, water over land displaces tidal habitat, which moves upslope and in turn displaces transitional habitat, which moves upslope and displaces upland habitat (Bergh, 2009). As sea level rises, some habitats will change rapidly and others will disappear. Although not well documented in the literature yet, it is widely believed that many native plants and animals, particularly the already imperiled species, those with limited ability to disperse naturally and those dependent upon freshwater or other climate or sea level-sensitive habitat requirements for all or a portion of their lifecycle will have an increasingly precarious existence as sea level rises.

16.5.4 Hurricane Intensity and Frequency

There is ongoing debate regarding whether global warming will increase the frequency or intensity of hurricanes. Regardless, hurricanes are likely to be more destructive to coastal areas because an elevated sea level will cause higher storm surges that will penetrate further inland. Hurricane Wilma caused $215 million in damage to the County. (2005) Based on work by Harrington and Walton (2008), when a similar storm hits the County after sea level rise of 1.02 ft, the damage costs are predicted to be 39 percent higher ($298 million). When a similar storm hits the County after sea level rise of 2.13 ft, the damage costs are predicted to be 72 percent higher ($370 million). The County is more susceptible to increased damage costs than neighboring Miami-Dade County. For the latter storm described above, the percent increases in damage costs are substantially higher for the County (72 percent) than Miami-Dade County (31 percent) (Harrington and Walton, 2008).

Hurricane return periods were evaluated by FEMA in a Flood Insurance Study for the County (FEMA, 2005). The purpose of the County *Flood Insurance Study* was to develop flood risk data for various areas of the County, to establish actuarial flood insurance rates, and assist the county in promoting sound floodplain management. Hurricane Wilma resulted in a 2.76-foot (0.84 m) high surge in the County. Based on FEMA's study, it was classified as a 7.35-year hurricane event. For sea level rise scenarios of 0.28 ft (8.53 cm) and 1.02 ft (0.31 m) (Florida State University's Beaches and Shores Resource Center estimates for years 2030 and 2080), the same hurricane storm surge as Wilma would be reduced from 7.35 years to 6.04 years and 3.61 years, respectively. For a 0.49-foot (14.9 cm) and 2.13-foot (0.65 m) scenario (Intergovernmental Panel on Climate Change estimates for years 2030 and 2080), the same hurricane storm surge would be reduced to 5.22 years and 1.65 years, respectively. It is important to note that at a given elevation, sea-level rise increases the likelihood of storm-surge flooding and synergistic effects between these two variables could cause upland habitat to be reduced more rapidly than predicted. For example, sea-level rise has rendered pine forests in the Keys more

vulnerable, by reducing the area capable of capturing precipitation and recharging fresh groundwater supplies. Droughts that sometimes follow late- season hurricanes can further diminish the volume of freshwater available to dilute salts deposited by storm surge. A second mechanism that may exacerbate the situation is that the background level of the water table is brought closer to the surface resulting in reduced drainage capacity. The interaction between sea-level rise and storm surge will soon reach a tipping point with respect to the maintenance of freshwater ecosystems in the County.[9]

16.5.5 Ocean Acidification and Coral Reef Degradation

Oceans are being acidified by carbonic acid formed from dissolved carbon dioxide and a corresponding decrease in pH; this is detrimental to marine resources. The oceans have absorbed about 50 percent of the carbon dioxide released from the burning of fossil fuels, resulting in chemical reactions that lower ocean pH. This has caused an increase in hydrogen ion (acidity) of about 30 percent since the start of the industrial age through a process known as ocean acidification. A growing number of studies have demonstrated adverse impacts on marine organisms, including (1) the rate at which reef-building corals produce their skeletons decreases, (2) the ability of marine algae and free-swimming zooplankton to maintain protective shells is reduced, and (3) the survival rate of larval marine species, including commercial fish and shellfish, is reduced. The reduced rate of coral reef building could lead to diminished resiliency from bleaching, disease, and coral death. Reef building rates could decrease to levels insufficient to maintain reefs in any oceans when atmospheric carbon dioxide levels reach approximately 840 parts per million, which may be reached by the year 2100 (NOAA, 2008).

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[9] Michael S Ross, Joseph J O'Brien, R Glenn Ford, Keqi Zhang, and Anne Morkill, "Disturbance and the rising tide: the challenge of biodiversity management on low-island ecosystems", Front Ecol Environ 2009; 7, doi:10.1890/070221.

16.6 Present and Projected Impacts from Climate Change: Infrastructure and Services

16.6.1 Water Supply Impacts

While the precise level of sea level rise, or speed with which it rises, may not be known, sea level rise will reduce the amount of fresh water available for potable water use. The County's wellfields in Miami-Dade County are at risk from sea level rise impacts because of the low elevation of southern Miami-Dade County and the elevation of the groundwater within the Biscayne Aquifer close to the surface level. The easterly wellfields of Miami-Dade County are at risk from saltwater intrusion caused by sea level rise, and to the west, inundation of the southern Everglades with seawater would also affect the Biscayne Aquifer (Heimlich et al., 2009). This impact will be even more pronounced during the dry season potentially impacting the location and continued productivity of certain wellfields. The relationship between future growth and alternative water supply planning will become an even more important consideration as traditional water resources will become impacted in the future from sea level rise.

In the future, increased water conservation through demand management will become even more important as supplies could become scarce. Cutting the demand for landscape irrigation, generally the highest type of water use becomes more of a priority. Given the County's history related to water conservation, additional focus could be placed on upgrades to the efficiency of water use such as in buildings and irrigation infrastructure. Recent 2008 legislation (Senate Bill 2080/494) provides a source of model ordinances for assuring water efficiency for landscape irrigation.

16.6.2 Wastewater Impacts

Wastewater treatment contributes CO_2, CH_4, and N_2O in quantities totaling approximately 3.4 percent of total US GHGs. CO_2 and N_2O are generated in aerobic (e.g. activated sludge) treatment. CH_4 and CO_2 are generated in anaerobic (e.g. biosolids digestion) treatment. Wastewater treatment facilities use a great deal of electricity to run the equipment. Greater power consumption efficiency in wastewater treatment can significantly lower GHG emissions.

Encouraging full utilization of the energy products from the wastewater treatment process, such as biosolids and methane gases can mitigate some of the impacts from process energy use. The decomposition of the sludge generated in the treatment of wastewater causes significant contributions of methane to the atmosphere. Sludge can be shipped off-site to a landfill or treated on-site by composting, incineration or digestion. Methane emissions generated in these processes are normally lost to the atmosphere, but the process of anaerobic digestion allows the methane to be captured. Due to global interest in reducing greenhouse gas emissions, it is anticipated that anaerobic digesters could be installed to reduce methane emissions from wastewater treatment facilities more commonly. Methane is not only a greenhouse gas; it is also a source of energy when it is burned. As a result, power generators can be installed at wastewater treatment facilities to burn the methane

emitted from anaerobic digesters and the electricity can be used to power equipment at the facility.

Impacts to treatment processes, system hydraulics and conveyance facilities may occur at pump stations, plants and distribution lines. Another impact to wastewater infrastructure could stem from increased chlorides in raw wastewater which will result in different treatment requirements depending on whether the wastewater is injected or reused. Flooding may impact wastewater infrastructure as well necessitating protective improvements to maintain capacity and processing of wastewater. In particular, it is noted that the anticipated service life of infrastructure becomes an increasingly important consideration given anticipated climate change.

16.6.3 Stormwater Impacts

As sea level rise occurs, drainage and stormwater structures will diminish in their effectiveness to direct and capture stormwater flows. Since the rate of sea level rise is uncertain, this loss of effectiveness will take place over a gradual progression reducing the difference between water levels on either side of a flood control structure (Heimlich et al., 2009). Eventually, a structure could lose its entire operational capacity if the water levels upstream and downstream are equal. Effects of the loss of this operational capacity could occur with as little as three to six inches of sea level rise predicted as soon as the next 10 to 25 years (Heimlich et al., 2009). Additionally, the capacity of the ground to absorb stormwater is reduced.

The lower topography of a region will result in even more challenges for operating flood control structures. The gradual loss of operational capacity of flood control structures could be exacerbated by the increased frequency and intensity of major storm events. These considerations will need to be factored into the design of flood control structures with further specific vulnerabilities identified.

16.6.4 Water Quality Impacts

More intense storms will result in increased storm water and non-point runoff. Water quality vulnerabilities will also occur such as increased algae growth, higher levels of water quality indicators such as fecal coliform bacteria and turbidity, pH changes and higher water temperatures. Aquatic life will be impacted by the change in water temperature and changes in seasonality; changes in nutrient loading; and increased eutrophication. Warmer water temperatures will reduce assimilative capacities of surface waters and increase the impacts of certain pollutants, leading to more impaired waters and more complex water quality and regulatory challenges.

16.6.5 Additional Infrastructure Considerations

Other infrastructure could be impacted in the future including, but not be limited to, hospitals, libraries, transportation facilities, multi-modal stations and commercial centers. Additional infrastructure impacts that also need to be considered include: historic or

archaeological resources, existing landfills, abandoned dump sites, remnant septic tanks and underground storage or petroleum tanks. Determining the life expectancy of a project, as related to capital investment, is also a critical factor to consider for decisions related to the development, or improvement to, infrastructure in the face of sea level rise and other climate change impacts. Economic decisions related to the funding of capital improvements will have to be made in the context of strategies to mitigate impacts to infrastructure.

16.6.6 Green Infrastructure Considerations

It is also important to consider the value of the County's "green infrastructure" and the corollary benefits it provides when considering energy and climate issues. Practices such as aggressive onsite water conservation, wetlands and habitat enhancement/maintenance, transportation systems with alternative paving materials and onsite stormwater retention have long been known for their benefits related to heat island effect, water quality improvement, improved air quality, lower energy demand and increased carbon storage. But now, green infrastructure approaches have been recognized to help achieve GHG mitigation and climate change adaptation goals because their benefits are also generally related to their ability to moderate the impacts of climate change such as extreme precipitation or temperature.[10] In many instances, maintenance and enhancement of green infrastructure involves stewardship of the natural setting (e.g. preventing and controlling exotic species invasions, maintaining fire regimes, restoring wetlands, etc.). This concept is also known as Ecosystem Based Adaptation (EBA). For instance in the context of the County, the reefs, natural beaches, coastal berms, wetlands and other natural communities are just as important for protecting people and the built environment from the negative consequences of climate change as "grey infrastructure" such as seawalls, stormwater drains.

A concurrent benefit is that green infrastructure attributes provide these resiliency benefits at a much lower cost than constructed infrastructure components.[11] Green infrastructure approaches can be implemented at the macro level with larger centralized public projects or at the micro level on private property.[12] Economic values can also be placed on green infrastructure assets in terms of carbon sequestration and the cost savings with maintaining certain habitat functions as opposed to constructed solutions such as sea walls.[13] The County could benefit from considering how green infrastructure practices can achieve resiliency goals with less adverse impact and cost.

[10] Foster, Lowe and Winkelman, "The Value of Green Infrastructure for Urban Climate Adaptation", February 2011.
[11] *Id.*
[12] *Id*.
[13] For instance a 20% tree canopy over a house results in annual cooling savings of 8-18%. *Id.*

16.7 Needs, Goals and Opportunities

16.7.1 The Need for Baseline Data

CEQ suggests that where climate change effects are likely to be important, but there is significant uncertainty about such effects, it may be useful to consider the effects of a proposed action or its alternatives against a baseline of reasonably foreseeable future conditions that is drawn as distinctly as the science of climate change effects will support. Baseline information is helpful on two levels. First it is helpful in terms of understanding and prioritizing energy use to reduce GHG emissions. Second, it is helpful in terms of understanding what is vulnerable to the impacts of climate change. Without such baseline information on the mitigation or adaptation level, it is difficult to assess the types of strategies to employ to alleviate future impacts.

16.7.2 Mitigating County and Community GHG Emissions

To date, the County has initiated an effort to quantify energy use for its facilities and operations with the aforementioned grant funds. While local government GHG emissions are typically a small percentage of the overall communitywide footprint, this sector of emissions is critical for two reasons. First the County leads by example. Second, knowing a local government's GHG emissions provides a mechanism to prioritize GHG emissions and energy use. Typically, water and wastewater facilities are among the largest and most energy-intensive systems owned and operated by local governments and account for approximately 30-50 percent of municipal energy use according to EPA. Streamlining, retrofitting and implementing efficiency projects at the County level, based on prioritized energy use data, will be critical to meet the County's GHG target for county operations (Resolution 067-2010). Additional countywide GHG emissions data will be useful to help meet the County's goal of a 20 percent countywide reduction of GHGs by 2020 as measured from a 2005 baseline inventory.

16.7.3 Evaluating County Infrastructure Assets

The consequences of climate change impacts and strategies to address those impacts must be planned for in the future. This includes identification of infrastructure deemed to be "vulnerable" or susceptible to adverse impacts and the resilience factors to be considered. The capacity of that infrastructure to maintain levels of service can then be evaluated. An Asset Management Plan, or harmonizing the County's LMS process with achieving this goal, could establish a comprehensive baseline of infrastructure under the County's control. This process should also include an inventory of green infrastructure under the County's control. Building upon the existing LMS, additional protection, accommodation, adaptation or resiliency strategies could then be developed to address access and operation of this infrastructure.

But complicating the identification of vulnerable infrastructure and facilities, social and economic diversity issues will also warrant further review. Different populations will be impacted in various ways and this will be evidenced by issues related to access to

affordable housing, infrastructure dependence, wealth and age. Physical as well as social impacts can be identified.

16.7.4 Opportunities to Develop Strategies and Regional Approaches

Upon mapping and prioritizing areas that may be vulnerable to sea level rise impacts, protection, accommodation and retreat strategies can be developed. Protection strategies should include the green infrastructure principles discussed as a means of managing systems to prevent the landward migration of tidally influenced water bodies. This could include shoreline stabilization via shoreline armoring, protection of wetlands and other natural communities that minimize erosion or a combination of engineered and nature-based solutions. This could require analysis of current and future land acquisition practices. Accommodation strategies may include adaptation of buildings or infrastructure to the periodic impacts of storm surges that also account for rise of sea levels. This could include increased or improved management of flood management systems. Retreat strategies include relocation of structures and infrastructure from areas that will be subject to increased and repeated impacts. A County planning effort such as this will also provide necessary information to dovetail with the various Work Groups of the Southeast Regional Climate Compact and the existing LMS. More data based on specific planning horizons will assist in determining which strategies to implement and consider in the future.

16.7.5 The Need for Additional Monitoring Data

The County will strive to reach the goal of becoming a resilient community by anticipating, preparing for, responding to, and recovering from significant multi-hazard threats with minimum damage to social well-being, the economy and the environment. To reach this goal, the County will employ the "Guiding Principles for Climate Change Adaptation" developed by the CEQ:[14]

- Adopt integrated approaches;
- Prioritize the most vulnerable;
- Use best-available science;
- Build strong partnerships'
- Apply risk-management methods and tools;
- Apply ecosystem-based approaches;
- Maximize mutual benefits; and
- Continuously evaluate performance.

Many of these Guiding Principles are already being implemented by the County such as using best available science and building partnerships and adoption of integrated approaches through maintaining the LMS. But, it is also important to continue monitoring for impacts from climate change throughout the County to achieve better understanding of

[14] Council on Environmental Quality, Implementing Climate Change Adaptation Planning in Accordance with Executive Order 13514, "Federal Agency Climate Change Adaptation Planning", Support Document, March 4, 2011.

the timeframe and rate at which impacts will be experienced. This can be done through updating the energy use and infrastructure asset baselines mentioned earlier. Capital improvement planning decisions are made over the long term and as better data and more certain projections become accepted, such as those for sea level rise, the County will develop more specific assumptions in relation to capital improvement planning decisions. Even though certain County and community-level GHG emissions data is unknown, and specific capital infrastructure vulnerabilities have not been entirely inventoried, the County will utilize the recommendations of the Green Initiatives Task Force, the new Climate Change Advisory Committee, and the strategies developed from the Southeast Regional Climate Compact, to develop a more robust response strategy incorporating the concept s of mitigation of GHG emissions, adaptation and resilience to climate change impacts based on the CEQ Guiding Principles.

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Chapter: 16.0 Energy Conservation and Climate – Comment Responses

Commenter: Chris Bergh, The Nature Conservancy
Date Received: Email, Friday, March 04, 2011 9:04 AM

Section Number	County Comment	K&S Action
16.1	TNC: Add the language, "and sea levels much lower than today"	Agree, this language has been added or addressed in Section 16.1
16.1	TNC: Address comment regarding "Earth's warming" language being a red herring	Addressed comment in 16.1 by eliminating first part of sentence and starting sentences with "Most climate scientists believe…"
16.1	TNC: Add language regarding greater variability and lower predictability of weather patterns.	Agree, language added to Section.
16.1	TNC: Change "presence" to "status"	Agree, language changed in Section 16.1.
16.1	TNC: L anguage revision to final paragraph of "Gaining understanding" versus "Gained understanding".	Change made.
16.1	Add "c" to cholorofluorocarbons	Agree, spelling corrected.
16.2.1	TNC: Language change from "highest sources" to "largest contributors"	Change made.
16.2.2 (now 16.2.3)	TNC: a dd atmospheric and ocean and precipitation as adjectives relating to regional climate characteristic.	Change made.
16.2.3	Revise sentence as follows: "There are six GHGs regulated under the Kyoto Protocol."	Agree, change made.

16.2.4	TNC: This last sentence sounds like the introduction to a new and important paragraph or section about vulnerability. It is important to flesh out what is meant by each of these terms (exposure, sensitivity, adaptive capacity) and to point out the ways in which Monroe Co is vulnerable, or not, in general terms.	Agree, changes made to better define terms.
16.3	TNC: qualify impacts of climate change as "accelerating"	Agree, change made.
16.3.1	TNC: move phrase, " building upon the energy requirements in the Florida Building Code by"	Agree, change made.
16.3.1	Suggested clarifications regarding building code.	Agree, changes made.
16.3.2	TNC: "It would be useful to insert a statement about the BOCC creation of a new Climate Change Advisory Committee and that group's mandate. It would be useful to insert a statement about Mo. Co.' formal participation in the SE FL Climate Compact with Miami-Dade, Broward and Palm Beach Counties and that group's mandate."	Both changes addressed with additional language.
16.4.1	TNC: change "as" to "are"	Agree, change made.
16.4.3	"Monroe County does not have TODs, TRDs. We have a height limit of 35 feet."	Somewhat agree, clarified that TODs and TRDs have been used in other communities. Did not address height comment because discussion is broader regarding land use changes and impacts to energy use.
16.4.5	Refer to the Solid Waste element.	Agree, added, "as outlined in the Solid Waste Element."
16.5	TNC: comment modifying thermal expansion, "This is pretty high tech. An explanation is warranted."	Agree, added footnote defining term.
16.5	TNC: comment "The Keys are more likely to respond to CC like the Caribbean Basin as opposed to the SE USA. Predictions for the Caribbean are for dryer conditions than present. If you need and can't find citation for this let me know and I'll dig it up."	Agree, added following sentence after comment: "Areas of lesser precipitation with struggle with meeting water demands and habitat shifts."
16.4.3	"Monroe County does not have TODs, TRDs. We have a height limit of 35 feet."	Somewhat agree, clarified that TODs and TRDs have been used in other communities. Did not address height comment because discussion is broader regarding land use changes and impacts to energy use.
16.4.5	Refer to the Solid Waste element.	Agree, added, "as outlined in the Solid Waste Element."

16.5	TNC: comment modifying thermal expansion, "This is pretty high tech. An explanation is warranted."	Agree, added footnote defining term.
16.5	TNC Comment: "The Keys are more likely to respond to CC like the Caribbean Basin as opposed to the SE USA. Predictions for the Caribbean are for dryer conditions than present. If you need and can't find citation for this let me know and I'll dig it up."	Agree, added following sentence after comment: "Areas of lesser precipitation with struggle with meeting water demands and habitat shifts."
16.5.1	TNC comment on paragraph: "This paragraph switches back and forth between global and local SLR. If this last statement is about global average SLR that should be made more clear."	Agree, reorganized paragraph and clarified sentence, " On average, globally, the sea level has risen by approximately 200 mm (8 inches) during the past century (IPCC, 2007)."
16.5.1	TNC comment on Mozumder citation: "These social scientists were citing a biophysical science publication by someone else. It would be worth citing that here instead of them."	Agree, changed reference IPCC 2007.
16.5.1	TNC comment: add language "about future rates of sea level rise" modifying publications and report.	Agree change made.
16.5.1	TNC comment: "The bullets below do not all relate to the reliability of the publications and reports. They relate to the conservative nature of the predictions of future SLR."	Agree, revised language as follows: "Sea level rise data is generally considered to be a conservative estimate of the impacts for the following reasons" & incorporated suggested language into last bullet.
Table 16.2	TNC comment: modifications to copied table from publication.	New table used at County request, comment no longer relevant.
16.5.2	TNC comments: various language changes to Impacts on property loss section.	Agree, all changes accepted.
16.5.3	TNC comments: various language changes to Impacts on habitat section	Agree, all changes accepted.
16.5.3	Capitalize publication title and define or spell out hectares-ha.	Agree, changes made.
16.5.4	TNC comment: change International to Intergovernmental.	Agree, change made.
16.5.4	TNC comment: "Please review "Disturbance and the rising tide…" by Ross et al. and consider summarizing the discussion about the interactions between SLR and storm surges in this area. This relationship is really important identifying "tipping points" for natural areas, native species and even the built environment and human communities. I'll attach the document to my email with this modified draft."	Agree, reviewed document and incorporated summary of concepts commented upon.
16.5.5	Add "rate" in paragraph.	Agree, change made.

16.5.6.1 (new Section 16.6.1)	Spell out Senate Bill.	Agree, change made.
16.5.6.2 (new Section 16.6.2)	Superscript greenhouse gas abbreviations.	Agree, change made.
16.5.6.4 (new Section 16.6.4)	TNC comments: language changes in section, eliminate streams reference, spell out TMDL reference.	All changes made.
16.5.6.5	"Not sure if this goes in this section or in Water Quality above, but the need to deal with the disposition of the existing landfills (4), informal/illegal/abandoned dump sites (many), and other sources of pollution that will be mobilized into the environment by SLR needs to be highlighted."	Landfills, etc. dealt with in later in another Section 16.6.5.
16.5.6.6	TNC comment: "I would like to suggest that this document should embrace the idea of "green infrastructure" as co-equal with the traditional "built environment" infrastructure that this paragraph is focused on. The Keys' reefs, natural beaches, coastal berms, wetlands and other natural communities are just as important for protecting people and the built environment from the negative consequences of climate change as seawalls, stormwater drains and so forth, but they provide their services to people at no cost. Rather, the cost is minimal and it involves good stewardship of nature (e.g. preventing and controlling exotic species invasions, maintaining fire regimes, restoring wetlands, etc.). This idea, that if people make our natural systems more resilient to climate change impacts they in turn will help make us more resilient to the same impacts, is more fully explored in the recommendations found in my 2009 report on SLR impacts on the Keys which is cited in this document as well as the Ross et al. paper that I will attach with this draft. The latest term of art for this "nature helping people" concept is Ecosystem Based Adaptation (EBA). "	Researched and added "green infrastructure" see new draft Section 16.6.6
16.5.6.6	TNC comment: "This sentence is weird. I think it's because the last group of ideas relates to the diversity mentioned at the beginning, not impacts mentioned in the middle."	Agree, paragraph reorganized now see Section 16.7.1.2
16.5.6.6 (new Section 16.7.1.3)	TNC comment: additional language suggested regarding shoreline armoring, wetlands, etc.	Agree language added.

Commenter: Mayte Santemaria
Date Received: 3-30-11

Section Number	County Comment	K&S Action
Commenter: Last Stand **Date Received:** June 27, 2011		
16.4.1	Next to last sentence: change "as" to "are".	Agree. Revised.
16.4.2	Use superscript for N2O.	Agree. Revised.
16.5	Delete "But" from 3rd sentence.	Agree. Deleted.
16.6.1	Rearrange second sentence to begin "The County's wellfields…"	Agree. Revised.
16.6.2	Use superscripts.	Agree. Revised.
16.6.3	Second sentence: Revise "Because" to "Since".	Agree. Revised.
16.6.4	Spell out "TMDL".	Deleted, replaced with "water quality".
16.5.6.6 (new 16.7.5)	This section has been rewritten.	Changes have been incorporated into new section.
Commenter: Chris Bergh, The Nature Conservancy **Date Received: Email,** Monday, June 27, 2011		
Section Number	**County Comment**	**K&S Action**
	1. Add overview of Adaptation Action Areas 2. Propose that the Sea Level Rise Vulnerability Analysis mapping completed by Monroe County for the Four County Compact Steering Committee in February be added to the Map Atlas.	Agree. Have revised to reflect suggestion. The 2030 data by the committee reflects a 3-7" rise (see Figures 16.1 & 16.2 in the Technical Document). The reference maps reflects rise by the foot, not inches. There is currently no mapping available from the County to reflect the 3-7" rise. No change to map atlas at this time.

Commenter: Last Stand **Date Received:** June 27, 2011		
Section Number	**County Comment**	**K&S Action**
	Last Stand is pleased to see that the Comprehensive Plan update proposes a new element focusing on energy conservation and climate change.	