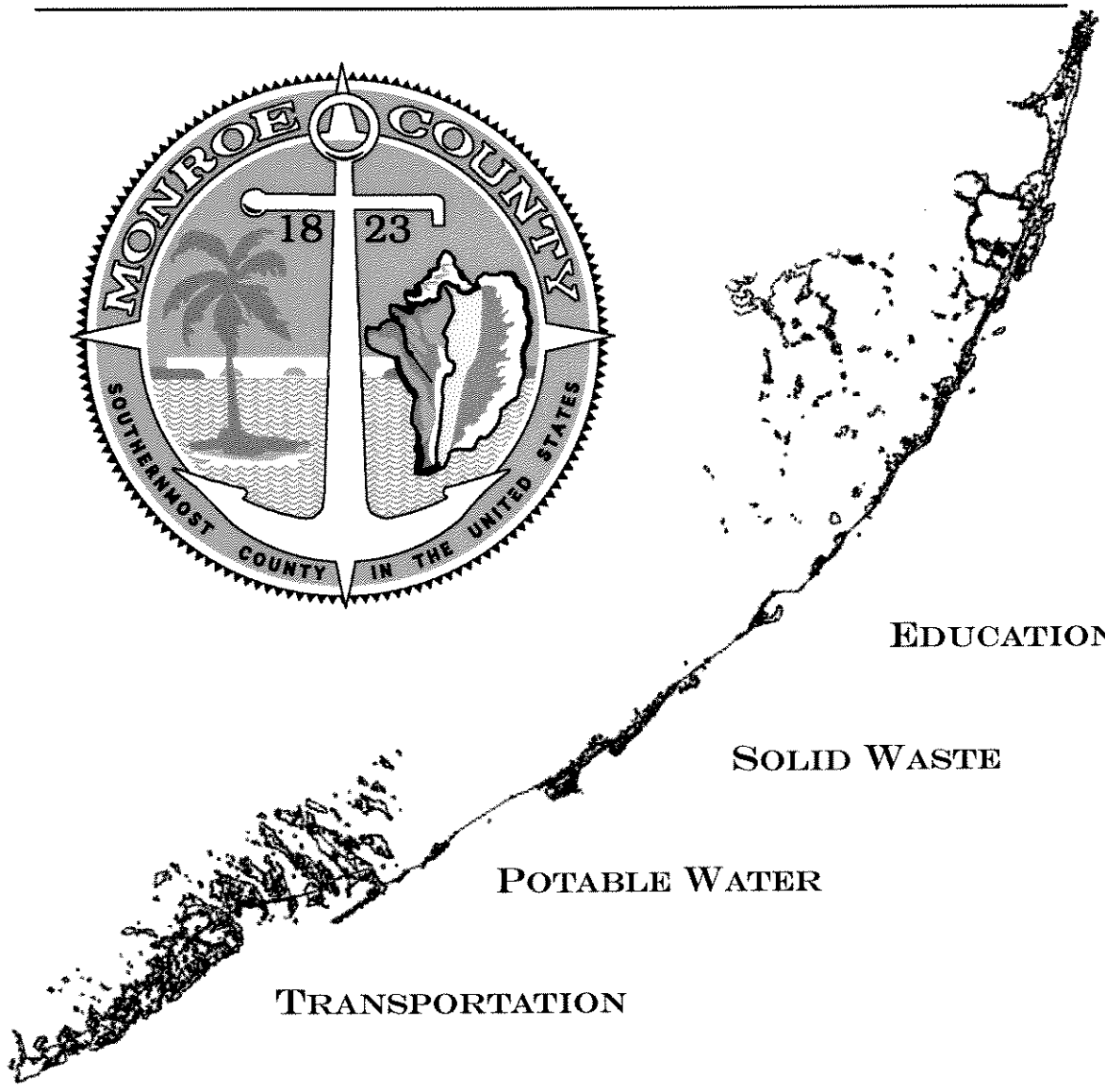
2004
Monroe County Public Facilities Capacity Assessment Report



Education

Solid Waste

Potable Water

Transportation

Parks and Recreation

July 2004

Prepared by the Department of Planning and Environmental Resources

TABLE OF CONTENTS

EXECUTIVE SUMMARY 2

INTRODUCTION 6

I. GROWTH ANALYSIS 10

II. TRANSPORTATION FACILITIES 25

III. POTABLE WATER 38

IV. EDUCATION FACILITIES 44

V. SOLID WASTE FACILITIES 49

VI. PARKS AND RECREATION 53

EXECUTIVE SUMMARY

The Monroe County Land Development Regulations (hereafter referred to as "the Code") mandate an annual assessment of the roads, solid waste, potable water, and school facilities serving the unincorporated portion of Monroe County. In the event that these public facilities have fallen or are projected to fall below the level of service (LOS) required by the Code, development activities must conform to special procedures to ensure that the public facilities are not further burdened. The Code clearly states that building permits shall not be issued unless the proposed use is or will be served by adequate public or private facilities.

As required by the Code, the Board of County Commissioners (BOCC) shall consider and approve the annual report, with or without modifications. Any modifications that result in an increase of development capacity must be accompanied by findings of fact, including the reasons for the increase and the funding source to pay for the additional capacity required to serve the additional development. Once approved, this document becomes the official report of public facilities upon which development approvals will be based for the next year.

This report distinguishes between areas of inadequate facility capacity and marginally adequate 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 twelve months.

Residential and Nonresidential Growth for 2004

For the 2004 assessment, a population model that uses a 1990 Census base data and Monroe County Certificates of Occupancy to estimate and forecast population growth is used. The model is based upon the actual number of residential units built, and is therefore more accurate than previous models. The projected functional population of unincorporated Monroe County is expected to reach 75,801 people in 2004, a slight increase from 2003.

Policy 101.3.1, the County's nonresidential ROGO policy in the 2010 Comprehensive Plan, was passed by the Board of County Commissioners in September of 2001 and was approved by the Department of Community Affairs (DCA) in December of 2001, but was subsequently appealed. The appeal was withdrawn in August 2002. The policy remains as stated, non-residential growth, over the 15 year planning horizon, is limited to 239 square feet of development for each new residential unit.

Assessment of Public Facilities for 2004

This year's report finds that education, solid waste, potable water, parks and recreation, and transportation facilities all have sufficient capacity to serve anticipated growth. Although, State and county roads meet level of service standards, two segments: Tea Table (segment 18) and Cross Key (segment 24), are below the threshold. However both segments are presently operating within their 5% reserve capacity. The status of each facility is summarized below.

Solid Waste:

The combination of the existing haul-out contract and the space available at the Cudjoe Key landfill provides the County with

sufficient capacity to accommodate all existing and approved development for up to nineteen years.

Parks and Recreation:
The level of service (LOS) standard for neighborhood and community parks in unincorporated Monroe County is 1.64 acres per 1,000 functional population. To ensure a balance between the provisions of resource- and activity-based recreation areas the LOS standard has been divided equally between these two types of recreation areas.

Unincorporated Monroe County has enough resource- and activity–based recreation areas to serve the functional population and therefore has a LOS that is adequate. Additionally, there is adequate reserve capacity to accommodate future population increases.

Schools:
Although enrollment figures for the 2003-2004 school year and projected enrollment figures for the 2004-2005 school year, show that O'Bryant Middle School, and Adams Elementary School exceed their recommended capacity and that Key West School is projected to exceed its recommend capacity for the 2004-2005 school year, school facility plans are based on enrollment projections 5 years out (2008-2009 school year), at which time sufficient capacity will be available. The remaining schools have more than sufficient capacity to accommodate all fall enrollment in 2004 and future years.

Potable Water:
A comparison between 2002 and 2003 shows an increase in water consumption of 1.57%. In October 2002, South Florida Water Management District approved the FKAA's increase in Water Use Permit (WUP). The WUP increased FKAA's potential withdraws to an average of 19.93 and a maximum of 23.79 Million Gallons per Day (MGD). In 2003, the FKAA distributed an average of 17.29 and a maximum of 22.2 MGD to the Florida Keys. Water distribution for 2004 is projected to average 17.57 with a maximum distribution of 22 MGD. An analysis of data shows that the residential and overall LOS standards for water consumption, as set out in Objective 701.1 of the Monroe County Year 2010 Comprehensive Plan, are being met.

As a condition of the WUP, the FKAA is constructing a Floridian Aquifer Storage and Recovery (ASR) system. This system is designed to recharge and store water from the Biscayne Aquifer during the wet season (May through November) in the Floridian Aquifer which is approximately 800-1,000 feet below the ground surface, and then recover fresh water to supplement the Biscayne Aquifer during the dry season (December through April). Unless the projected future water demands decrease, the FKAA must also consider an alternative source of water supply such as a brackish or salt water source which will require a new water treatment plant.

Roads:
The adopted level of service (LOS) standard for US-1 is LOS C. The overall 2004 level of service for US-1 is LOS C based on the findings of the 2004 US-1 Arterial Travel Time and Delay Study for Monroe County, as prepared by URS Inc., . The table on the next page shows the LOS and "status" of US-1 by segment.

County regulations allow development activities to continue in "areas of inadequate facility capacity" provided traffic speeds do not fall below the standard by more than

five percent. Tea Table (Segment 18), and Cross Key (Segment 24) are below the LOS C threshold, consistent with the past two years of data. However both segments have reserve capacities within 5%. Travel speed on Cross Key segment is likely to improve with the implementation of a high level fixed bridge, construction of which is anticipated to begin early next year.

This year's report indicates that ten segments are "marginally adequate" and any applications for new development which would generate traffic in marginally adequate areas must submit a detailed traffic report for consideration during review. Please see table titled "marginally adequate segments".

County roads are subject to a lower standard (LOS D) than US-1. Based on the analysis found in the Technical Document of the Monroe County Year 2010 Comprehensive Plan, all County roads are operating at or above LOS D.

Overall, public facilities meet adequacy requirements; however demands on these facilities continue to grow. The Growth Management Division is committed to monitoring changes in public facility demand and responding to changes in consumption patterns. The ability to coordinate with public facility providers and other municipalities in the Keys will become more and more critical as we strive to maintain the quality of life we all enjoy.

Highway Capacity on U.S. 1 by Segment				
#	Segment	Mile Marker Range	2004 LOS	2004 Status
1	Stock Island	4-5	B	Adequate
2	Boca Chica	5-9	A	Adequate
3	Big Coppitt	9-10.5	C	Marginal
4	Saddlebunch	10.5-16.5	B	Adequate
5	Sugarloaf	16.5-20.5	C	Marginal
6	Cudjoe	20.5-23	A	Adequate
7	Summerland	23-2	B	Adequate
8	Ramrod	25-27.5	B	Adequate
9	Torch	27.5-29.5	A	Adequate
10	Big Pine	29.5-33	C	Marginal
11	Bahia Honda	33-40	B	Adequate
12	7-Mile Bridge	40-47	C	Marginal
13	Marathon	47-54	A	Adequate
14	Grassy Key	54-60.5	C	Marginal
15	Duck Key	60.5-63	B	Adequate
16	Long Key	63-73	B	Adequate
17	Lower Matecumbe	73-77.5	C	Marginal
18	Tea Table	77.5-79.5	D	Inadequate
19	Upper Matecumbe	79.5-84	C	Marginal
20	Windley	84-86	A	Adequate
21	Plantation	86-91.5	C	Marginal
22	Tavernier	91.5-99.5	A	Adequate
23	Largo	99.5-106	A	Adequate
24	Cross	106-112.5	D	Inadequate
Source: 2004 Arterial and Travel Time/ Delay Study, URS Inc.				

"Marginally Adequate" Segments			
#	Name	Mile Marker Range	Reserve Speed
3	Big Coppitt	9.0 - 10.5	0.9
5	Sugarloaf	16.5 - 20.5	0.7
10	Big Pine	29.5 - 33.0	1.2
12	7-Mile Bridge	40.0 - 47.0	2.6
14	Grassy	54.0 - 60.5	0.4
17	Lower Matecumbe	73.0 - 77.5	0
18	Tea Table	77.5 - 79.5	-1.1
19	Upper Matecumbe	79.5 - 84.0	0.4
21	Plantation	86.0 - 91.5	1.8
24	Cross	106 - 112.5	-2.3
Source: 2004 Arterial and Travel Time/ Delay Study, URS Inc.			

INTRODUCTION

This report is the annual assessment of public facilities capacity mandated by Section 9.5-292 of the Monroe County Land Development Regulations (hereafter referred to as "the Code"). The State of Florida requires all local jurisdictions to adopt regulations ensuring "concurrency". Concurrency means "that the necessary public facilities and services to maintain the adopted LOS standards are available when the impacts of development occur" (Chapter 9J-5 of the Florida Administrative Code). In other words, local governments must establish regulations to ensure that public facilities and services that are needed to support development are available concurrent with the impacts of development. In Monroe County, these regulations are contained within Section 9.5-292 of the Code.

Section 9.5-292, titled *Adequate facilities and development review procedures*, contains two main sets of requirements: the minimum service standards for the four primary public facilities (roads, solid waste, potable water, schools), and an annual assessment process to determine the available capacity of these public facilities. In addition, Section 9.5-292 includes an equitable procedure for issuing permits when the rate of growth is likely to outpace the current capacity of these public facilities.

Section 9.5-292 also requires the Director of Planning to prepare an annual report to the Board of County Commissioners on the capacity of available public facilities. This report must determine the potential amount of residential and nonresidential growth expected in the upcoming year, and make an assessment of how well the roads, solid waste facilities, water supply, and schools will accommodate that growth. The report has a one-year planning horizon, or only considers potential growth and public facility capacity for the next twelve months. In addition, the report must identify areas of unincorporated Monroe County with marginal and/or inadequate capacity for some or all public facilities.

In the event that some or all public facilities have fallen or are projected to fall below the LOS standards required by the Code, development activities must conform to special procedures to ensure that the public facilities are not further burdened. The Code clearly states that building permits shall not be issued unless the proposed use is or will be served by adequate public or private facilities.

Board Action Required

Section 9.5-292(b)(4) requires the County Commission to consider this report and approve its findings either with or without modifications. The County Commission cannot act to increase development capacity beyond that demonstrated in this report without making specific findings of fact as to the reasons for the increase, and identifying the source of funds to be used to pay for the additional capacity.

Once approved by the County Commission, this document becomes the official assessment of public facilities upon which development approvals will be based for the next year.

Public Facility Standards

Section 9.5-292(a) of the Code pertains to the minimum standards for public facilities. It states, *"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 (3) 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 intersection and/or roadway segments. US-1 shall have sufficient available capacity to operate at level of service C on an overall basis as measured by the US-1 Level of Service Task Force Methodology. In addition, the segment or segments of US-1, as identified in the US-1 Level of Service Task Force Methodology, which would be directly impacted by a proposed development's access to US-1, shall have sufficient available capacity to operate at level of service C as measured by the US-1 Level of Service Task Force Methodology.

b. All secondary roads where traffic is entering or leaving a development or 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 which are served by inadequate transportation facilities on US-1, development may be approved provided that the development in combination with all other development will not decrease travel speeds by more than five (5) percent below level of service C, as measured by the US-1 Level of Service Task Force Methodology.

(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 (3) years from the projected date of completion of the proposed development or use. The Monroe County Solid Waste and Resource Recovery Authority may enter into agreements, including agreements under section 163.01, Florida Statutes, to dispose of solid waste outside Monroe County.

(3) Potable Water:

Sufficient potable water from an approved and permitted source shall be available to satisfy the projected water needs of a proposed development, or use. Approved and permitted sources shall include cisterns, wells, FKAA distribution systems, individual water condensation systems, and any other system which complies with the Florida standards for potable water.

(4) Schools:

Adequate school classroom capacity shall be available to accommodate all school age children to be generated by a proposed development or use.

These are the four primary public facilities that must be monitored for adequate capacity according to the Code. The available capacity for each of these facilities may be either sufficient to accommodate projected growth over the next year, marginally adequate, or inadequate. In situations where public facilities serving an area are projected to be only marginally adequate or inadequate over the next year, the Code sets out a review procedure to be followed when issuing development permits in that area.

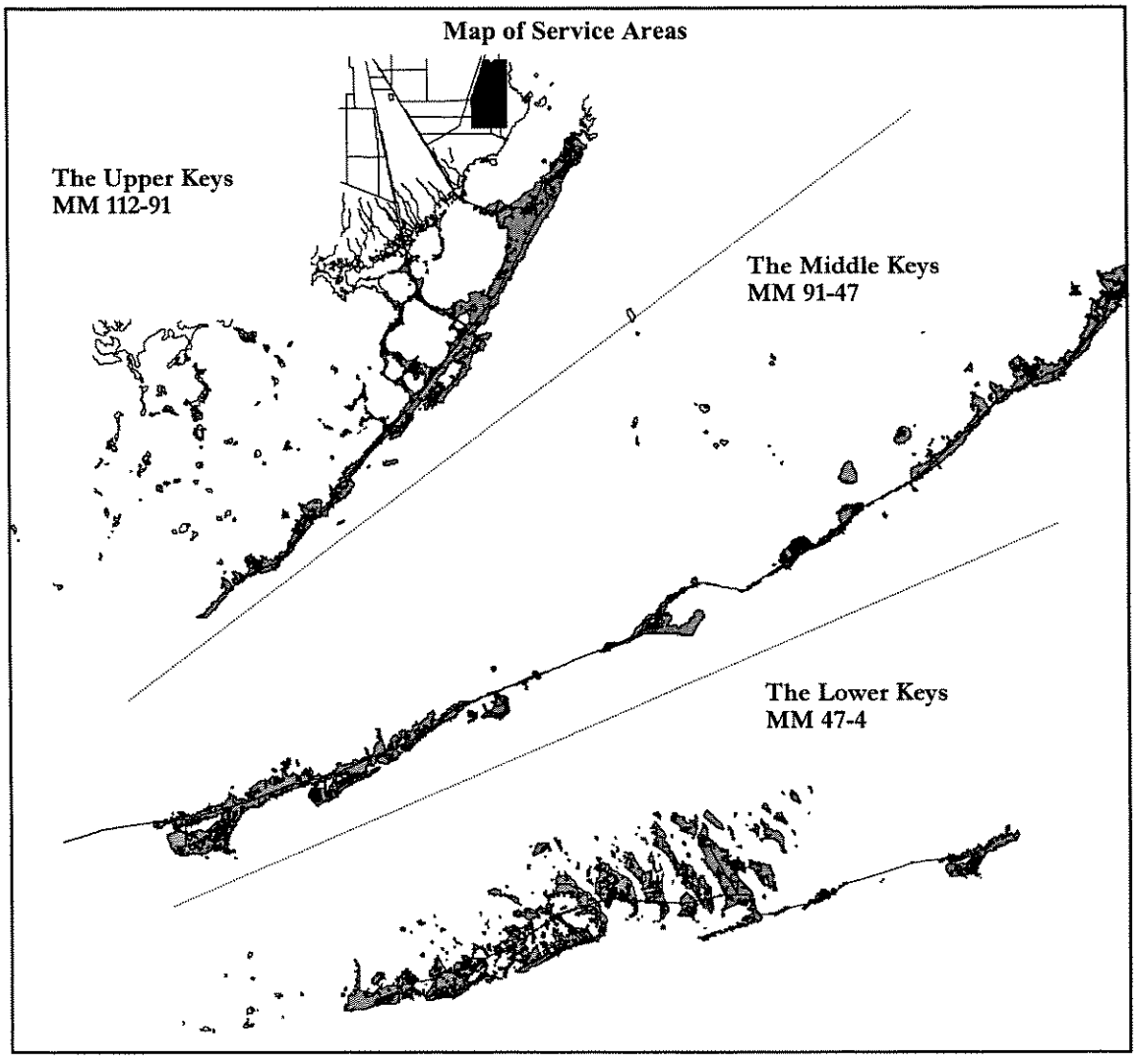
The Code states that "the county shall not approve applications for development in areas of the county which are served by inadequate facilities identified in the annual adequate facilities (Public Facility Capacity Assessment) report, except the county may approve development that will have no reduction in the capacity of the facility or

where the developer agrees to increase the level of service of the facility to the adopted level of service standard." The Code goes on to state that "in areas of marginal facility capacity as identified in the current annual adequate facilities report, the county shall either deny the application or condition the approval so that the level of service standard is not violated." The determination of an additional development's impact on existing public facilities in areas with marginal or inadequate capacity is determined by a "facilities impact report" which must be submitted with a development application.

Service Areas

Section 9.5-292(b)(2) of the Code divides unincorporated Monroe County into three service areas for the purposes of assessing potential growth and how public facilities can accommodate that growth. The boundaries mentioned in the Code have been revised to account for recent incorporations. The map below shows the three service areas of the Keys as they are currently recognized.

The Upper Keys service area includes all unincorporated Monroe County north of the



Tavernier Creek Bridge. The Middle Keys includes the area of Unincorporated Monroe County between the Seven-Mile Bridge and the Tavernier Creek Bridge. The Lower Keys is Unincorporated Monroe County south of the Seven Mile Bridge.

Unfortunately, the data available on population, permitting, and public facilities does not always conform to the above boundaries for the Upper, Middle, and Lower Keys. Additionally, due to the recent incorporation of Islamorada and Marathon (which are excluded from this assessment where specified) the boundaries identified in Section 9.5-292(b) are no longer valid for unincorporated Monroe County. This report makes use of the best available data, aggregated as closely as possible to the boundaries shown in on the following page.

Previous Board Action

The County was required to impose a moratorium in 1995 on any new development on Big Pine Key due to a lack of any reserve capacity for traffic on US-1. In December 1997, as a result of a change in the methodology used to determine level of service, the moratorium on Big Pine Key was lifted. However, the results of the 1999 Travel Time and Delay Study indicated that the segment of US-1 through Big Pine Key once again fell below the adopted LOS standard. Due in part to the re-timing of the intersection of US 1 and Key Deer Boulevard, the level of service on the Big Pine segment of US 1 improved in 2000, but decreased again in 2001 and 2002. Based on the 2003 Arterial Travel Time and Delay Study the LOS had increased to 'C'. Meaning, there was sufficient reserve capacity, and the moratorium on traffic generating development was lifted. The improvement in the LOS is due in part to further re-timing of the intersection and an intersection improvement project, which was completed by FDOT this year. It is not anticipated that these improvements will permanently improve the LOS on Big Pine Key, but a 3-laning project is being designed by FDOT to achieve a longer term acceptable level of service. The Planning and Environmental Resources Department has completed a proposed Master Plan for Big Pine Key and No Name Key, that will address future solutions to traffic problems within the community.

Areas of Critical County Concern

At the County Commission's discretion, areas with marginally adequate facilities may be designated as Areas of Critical County Concern (ACCC), pursuant to Sections 9.5-473 and 9.5-473.1 of the Code. The rationale behind this designation is to assure that development in ACCC areas does not impact existing public facilities to the extent that development must be halted in the area.

Should the Board initiate the ACCC designation process, the Development Review Committee and Planning Commission must review the proposed designation. Section 9.5-473(c) requires the designation to include "*Specific findings regarding the purpose of the designation, the time schedule for the planning effort to be implemented, identification of the sources of funding for the planning and potential implementing mechanisms, delineation of a work program, a schedule for the work program and the appointment of an advisory committee, if appropriate.*"

I. GROWTH ANALYSIS

This section of the report examines the growth of Monroe County over the last year. This analysis considers the changes in population, the number of residential building permits issued, and the amount of non-residential floor area permissible. Growth trends will be examined for both the unincorporated as well as the incorporated portions of the County.

Population Composition

There are three different measurements of population in Monroe County: the functional population, the permanent population, and the seasonal population. The capacity of most public facilities is designed based on potential peak demand. To help assess peak demand, the permanent and seasonal populations are often combined to give a "functional" population, or the maximum population demanding services.

The projected permanent population is based on a methodology created by The Department of Planning and Environmental Resources, and is based on 1990 Census data. Permanent population figures received from the 2000 Census data reflect a discrepancy in the estimates made by the planning model and actual census figures. At this time the Planning and Environmental Resources is revising the methodology for population projection to accurately reflect the permanent population figures published by the 2000 Census.

Projected permanent residents spend most or all of the year in the County, while the seasonal population includes seasonal residents and the tourist population. The seasonal population includes the number of seasonal residents, the number of people staying in hotels, motels, vacation rentals, campsites, recreational vehicles, live aboard vessels, and those staying with friends and relatives.

It is important to remember that permanent population figures are for the entire calendar *year*, while the seasonal population figures used here is the number of seasonal residents and visitors in the Keys on any given *evening*. Seasonal population figures are not the total number of seasonal residents or visitors in the county over the calendar year, but the estimated number who stay on any given night.

The Tourist Development Council indicate that Monroe County hosts around three million visitors a year, however not all of these people are in the Keys on the same evening. Peak seasonal population figures represent the number of people who could stay on any given evening based upon peak occupancy rates, and therefore represent the peak demand which could be placed on public facilities from seasonal visitors on any given evening.

When the peak seasonal population figures are combined with the permanent resident population, the result is the functional population. Actual 2000 Census data for the permanent population indicates a trend towards a higher seasonal percentage of the functional population.

Planning Area Enumeration Districts (PAEDs)

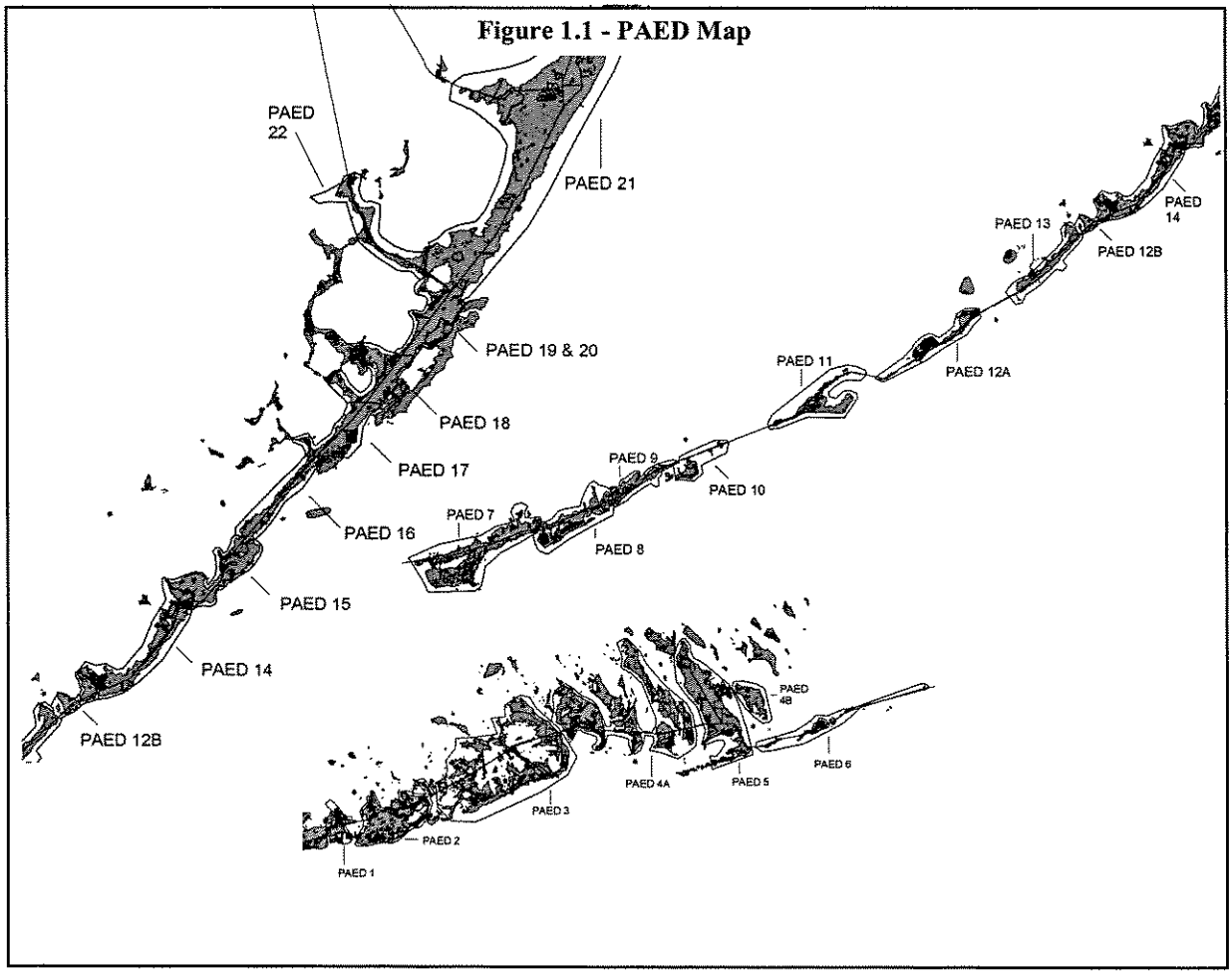
PAEDs, or Planning Area Enumeration Districts, are the basic unit of geographical analysis used by the Planning and Environmental Resources Department. The PAEDs are a combination of the "planning areas" utilized by the Planning Department in the early 1980s and the US Census Bureau's "enumeration districts". These two levels

of analysis were combined in 1987 for ease of use. Since most PAEDs follow island boundaries, they can be aggregated to match most service districts for public facilities.

There are a total of twenty-two (22) PAEDs in Unincorporated Monroe County:

- The City of Key West (including northern Stock Island) is not contained within any PAED boundaries; and
- The City of Key Colony Beach is contained within the geographic area of PAED 8, but is not included with the PAED population figures; and
- The City of Marathon encompasses PAEDs 7, 8, & 9, and its population is contained within unincorporated Monroe County until 2000; and
- The City of Layton falls within PAED 11, but its population is removed from Unincorporated Monroe County; and
- The Village of Islamorada occupies PAEDs 12A, 12B, 13, & 14, and has its own population figures starting in 1998; and
- PAEDs 19 and 20 are the last PAEDs before the "bend" in US-1, and have been grouped together in this report because of data constraints. The dividing line be-

Figure 1.1 - PAED Map



tween PAEDs is the center of US-1.

As mentioned earlier, Section 9.5-292 of the Land Development Regulations (LDRs) divides Monroe County into three service areas. The Upper Keys service area includes PAEDs 12B through 22, or the area from Mile Marker 83.5 to 112, the Middle Keys includes PAEDs 7 through 13 (Mile Marker 47.5 to 83.4), and the Lower Keys service area is composed of PAEDs 1 through 6 from Mile Marker 4 to 47.4.

Figure 1.2 below shows the individual PAEDs by their mile marker ranges, and also shows the islands included within a particular PAED's boundary.

Functional Population

The functional population is the sum of the permanent residents and the peak seasonal population. Figure 1.3 shows the functional population for all of Monroe County (including the incorporated areas), excluding Mainland Monroe County and the population in the Dry Tortugas. The functional population of Monroe County is expected to grow by 3,325 people from 2005 to 2015. This represents an increase of two percent (2%) over the fifteen year period.

Figure 1.4 shows the trend in Functional Population Changes from 1990 to 2015.

However, the numerical and percent change columns show that the *rate* of increase is expected to slow dramatically over the same time period (see Figure 1.5).

Figure 1.2 - PAED/Mile Marker Chart

PAED	Islands	Approx. Mile Marker Range
1	Stock Island	4-6
2	Boca Chica, East Rockland, Big Coppitt, Geiger, Shark	7-12.4
3	Saddlebunch Keys, Lower Sugarloaf, Upper Sugarloaf	12.5-20.5
4a	Cudjoe, Summerland, Ramrod, Big-Middle-Little Torch	20.6-29
4b	No Name Key	N/A
5	Big Pine Key	29.5-33
6	W. Summerland, Spanish Harbor, Bahia Honda, Ohio, Missouri, Little Duck, Pigeon Key	34.5-46
7	Knight, Hog, Vaca, Boot, Stirrup (Marathon)	47.5-53.2
8	Fat Deer, Little Crawl, Crawl #5, (Marathon) & (Key Colony Beach)	53.3-56.4
9	Grassy Key (Marathon)	56.5-60
10	Duck Key, Little Conch Key, Conch Key	61-64
11	Long Key, Fiesta Key, (Layton)	65-71
12a	Craig Key, Lower Matecumbe (Islamorada)	72-78
12b	Windley Key (Islamorada)	83.5-85.5
13	Teatable Key, Upper Matecumbe (Islamorada)	79-83.4
14	Plantation Key (Islamorada)	85.6-91
15	Key Largo (Tavernier area)	91.1-94.5
16	Key Largo	94.6-98
17	Key Largo (Rock Harbor)	98.1-100.6
18	Key Largo	100.7-103.5
19-20	Key Largo	103.6-107.5
21	Key Largo (North Key Largo, Ocean Reef, Card Sound area)	N/A
22	Cross Key (18 Mile Stretch area)	107.6-112

Source: Monroe County Planning Depertment, 2004

Figure 1.3 - Projected Functional Population of Monroe County			
Year	County-Wide Functional Population	Numerical Change	Percentage Change
2005	162,041	*	*
2010	164,769	2,728	1.66%
2015	165,366	597	0.36%
Source: Monroe County Planning Department, 2004			

Figure 1.4 -Trend in Functional Population Changes

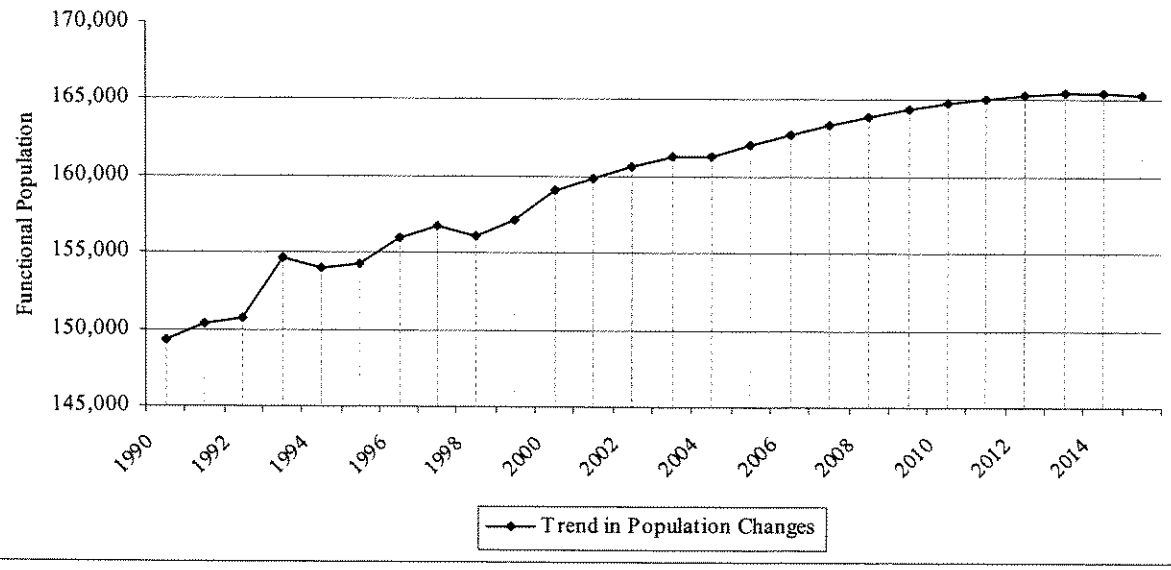


Figure 1.5 -Functional Population Rate of Increase

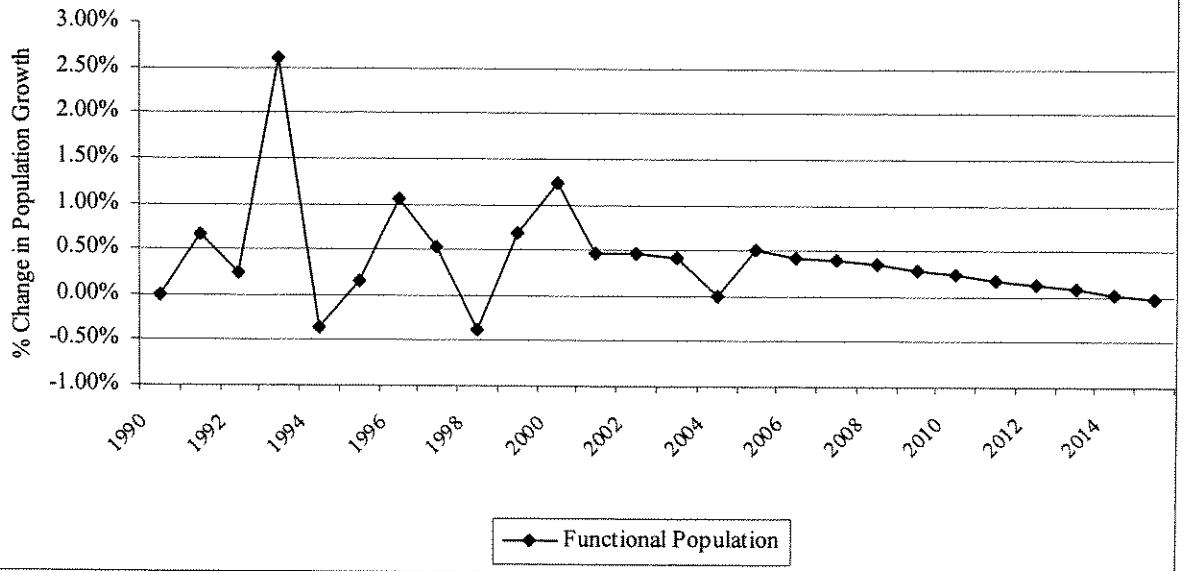


Figure 1.6 - Projected Functional Population by Service Area 1990-2015

Service Area	1990		2005		2010		2015	
	Functional Population	% of Unincorp. Total	Functional Population	% of Unincorp. Total	Functional Population	% of Unincorp. Total	Functional Population	% of Unincorp. Total
Upper Keys	42,171	40.94%	37,541	36.45%	38,303	37.19%	38,362	48.66%
Middle Keys	30,443	29.56%	4,154	4.03%	4,204	4.08%	4,206	5.34%
Lower Keys	30,387	29.50%	34,639	33.63%	35,770	34.73%	36,263	46.00%
Unincorporated Subtotal	*103,001*	*100.00%*	*76,334*	*74.11%*	*78,277*	*76.00%*	*78,831*	*100.00%*
Incorporated Areas	46,348		85,707		86,492		86,535	
County Total	***149,349***		***162,041***		***164,769***		***165,366***	

Source: Monroe County Planning Department, 2004

Figure 1.6 shows the breakdown in functional population by the three service areas. Regionally, the Upper Keys accounted for the largest portion of the 1990 unincorporated functional population (42,171 people, or 40.9% of the total). This is followed by the Middle Keys, which is comprised of 29.6% (30,443 people) of the total 1990 functional population; and finally, the Lower Keys, which contained 30,387 people, or 29.5% of the unincorporated functional population.

Based on projected functional population projections for the year 2015, the Upper Keys is expected to have the largest population (38,362 or 48.7% of the total), followed by the Lower Keys (36,263 or 46.0% of the total) and lastly the Middle Keys (4,206 or 5.34% of the total). In the year 1997, the Upper Keys service area lost twelve percent (12%) of its functional population to the incorporation of Islamorada. In the year 1999, the unincorporated functional population of the Middle Keys dramatically decreased by more than eighty-seven percent (87%), due to the incorporation of the City of Marathon.

Projected Permanent and Seasonal Population:

The total permanent resident population in Monroe County is projected to grow from 78,855 people in 1990 to a potential 90,654 people in 2015, an increase of fifteen percent (15%) over the twenty-five year period. The projected permanent resident population as a percentage of the functional population fluctuates between 53% and 55% from 1990 to 2015. The years 1991 and 1993 were the only years in which the county-wide permanent resident growth rate exceeded one percent (1%) per year.

The peak seasonal population in Monroe County is projected to grow from 70,493 people in 1990 to 74,712 people by 2015, an increase of six percent (6%) over the twenty-five year period. The peak seasonal

Figure 1.7 - Projected Permanent and Seasonal County-wide Population 1990-2015

	1990	2000	2005	2010	2015
Seasonal Population	70,493	73,491	73,737	74,533	74,712
Permanent Population	78,855	85,622	88,305	90,236	90,654
Functional Population	***149,348***	***159,113***	***162,042***	***164,769***	***165,366***

Source: Monroe County Planning Department, 2004

population as a percentage of the functional population fluctuates between 47.20% in 1990 to 45.2% by 2015. The county-wide peak seasonal population growth rate exceeded four percent (4%) in 1993. Growth rates fluctuated between -1.7% and 1.9% for the remainder of the years under study, and are expected to continue to decline.

The incorporation of Islamorada and Marathon has created substantial reductions in both permanent and seasonal population for the Upper and Middle Keys service areas. As mentioned above, the Upper Keys service area lost 12% of its functional population, and the Middle Keys service area is lost 87% of its functional population as a result of the incorporation of the City of Marathon.

The functional population in the Upper Keys service area is expected to increase from 37,061 to 37,314 (0.68%) from 2003 to 2004. This projected increase results from the addition of 86 permanent residents and 167 in the seasonal population.

The functional population in the Lower Keys service area is expected to increase from 34,034 to 34,347 (0.92%) from 2003 to 2004. This projected increase results from the addition of 235 permanent residents and 78 in the seasonal population.

2000 Census Population

The projected population data through 2015 presented in this report (both the permanent and seasonal populations) has been based on 1990 census data. The population projection model has not yet been updated to incorporate the Census 2000 data that was released in late 2001. However, a comparison of the projected 2000 permanent population and the actual population reported in the 2000 census shows that the projection overestimated the population of the unincorporated area by 3,298 people. Figure 1.8 shows that the difference between the projected 2000 data and the actual permanent population reported by the 2000 census for the entire Monroe County to be 6,093 persons. Taking this discrepancy into account, the permanent population of Monroe County is not growing as rapidly as predicted. However, the functional population remains a valid estimate for planning pur-

Figure 1.8 - Comparision of Census data to Permanent Population Projections

	1990 Actual	2000 Actual	2000 Projected	2000 Actual - 2000 Projected
Unicorporated Area				
Upper Keys	19,740	15,168	17,435	-2,267
Middle Keys	13,948	800	1,098	-298
Lower Keys	18,062	20,008	20,741	-733
Incorporated Areas				
Islamorada	N/A	6,846	7,665	-819
Layton	183	186	208	-22
Key Colony Beach	977	788	1,101	-313
Marathon	N/A	10,255	11,272	-1,017
Key West	24,832	25,478	26,102	-624
Total	***77,742***	***79,529***	***85,622***	***-6,093***

Source: U.S Census Bureau and Monroe County Planning Department, 2004

poses because of an increase in the amount of seasonal residents. In other words, although the permanent population was estimated to be larger than what was actually reported in the 2000 Census, the number of seasonal residents has increased. Therefore, the functional population estimates remain valid, and indicates an increase in the percentage of the seasonal population.

Number of Residential Permits

The second major component of the Growth Analysis Section is the number of residential permits issued. The majority of the new residential permits issued are for permanent residential use. However, some of the permits issued for permanent dwellings are used by the seasonal population.

One issue to remember when considering growth based upon building permits is the time lapse that occurs between when a permit for a new residence is issued, and when that residence is ultimately occupied. The knowledge that the Rate of Growth Ordinance (ROGO) was about to be adopted in the early 1990s caused many property owners to obtain building permits prior to when they were prepared to construct their dwellings. As a result, there are many dwellings in the Keys that have permits, but are not yet fully constructed or are only partially complete. Based upon this time lapse, the number of residential permits issued overstates the actual number of new residential dwellings that currently require public facilities.

The number of dwelling units (permanent and seasonal) which can be permitted in Monroe County has been controlled by ROGO since July of 1992. ROGO was developed as a response to the inability of the road network to accommodate a large-scale hurricane evacuation in a timely fashion. A series of complex models developed during the first evacuation study identified an approximate number of additional dwelling units which could be permitted and which would not have a detrimental effect on the amount of time needed to evacuate the Keys. The ROGO system was developed as a tool to equitably distribute the remaining number of permits available both geographically and over time.

The ROGO system distributes a set number of allocations for new residential permits on a yearly basis from July 14 of one year to July 13th of the following year. Each service area of unincorporated Monroe County and several of the incorporated areas receive a set number of allocations for new residential permits that can be issued during that particular ROGO year. The number of allocations available to a particular area was based upon the supply of vacant buildable lots located in that area prior to the start of the ROGO system. The Ocean Reef area of north Key Largo is exempted from the ROGO system due to its proximity to Card Sound Road, an alternate evacuation route.

The ROGO system allowed 255 allocations for new residential units in unincorporated Monroe County each year for the first six years of the ROGO system. The number of allocations available was reduced by the State of Florida Administration Commission during Year 7 of ROGO based upon a lack of progress on the implementation of the Year 2010 Comprehensive Plan. Available allocations were reduced by twenty percent (20%), taking the available figure from 255 to 204 new residential units.

The number of available allocations in unincorporated Monroe County was further reduced by the incorporation of Islamorada, which now receives 22 residential alloca-

tions per year. The incorporation of Islamorada reduced the number of available allocations in unincorporated Monroe County from 204 to 182. This number was further reduced by the incorporation of Marathon, which received a total of 24 new residential allocations. The incorporation of Marathon reduced the number of available new residential allocations in unincorporated Monroe County from 182 to 158.

Based on the 158 allocations, the ROGO system, in unincorporated Monroe County, now allocates 46 units to the Upper Keys service area, 7 units to the Middle Keys service area, and 74 units to the Lower Keys, for an annual total of 127 market rate residential units each ROGO year. The remaining 31 allocations are for affordable housing. Thirty-six (36) affordable allocations were rolled over from Year 12 making a total of 67 affordable allocations available for year 13.

Figure 1.9, on the following page, shows the breakdown of new and replacement residential permits issued for unincorporated Monroe County since 1992. The data presented in the table does not include permits issued in Key West, Key Colony Beach, Layton, or Islamorada. Also, the boundaries between the Upper and Middle Keys service areas, and the boundaries used for this data are slightly different. The chart below compares the boundaries. Basically, the service areas from the Code breaks at Whale Harbor Channel, and does not include Upper and Lower Matecumbe in the Upper Keys, while the permitting records break at Channel Five and do include Upper and Lower Matecumbe in the Upper Keys. Figure 1.10 explains these differences.

Figure 1.10 - Boundary Comparison Table

Area	Service Areas		Permit Office	
	PAEDs Included	Mile Marker Range	PAEDs Included	Mile Marker Range
Upper Keys	12B-22	83.5-112	12A-22	71-112
Middle Keys	7-13	47.5- 83.4	7-13	47.5-70.9
Lower Keys	1-6	4-47.4	1-6	4-47.4

Source: Monroe County Building Department, 2004

According to Building Department records 3,501 residential permits were issued from 1992 to 2003, with 84% (2,779) being issued to single family residences. Only 12% (408) of the residential permits were issued to duplex, multifamily, or mobile home projects. Almost 37% (1,369) of all the residential permits issued in the past decade were issued in 1991 to 1992 as applicants were attempting to obtain permits prior to ROGO. A total of 235 residential permits were issued in unincorporated Monroe County in 2003, a slight increase from 2002. There were more new residential permits issued in 1999 than any previous year back to 1992.

Figures 1.11 and 1.12 show the distribution of new residential permits issued in unincorporated Monroe County during 2001 and 2002.

Figure 1.11 shows a decrease in the total number of permits issued in the Upper and Lower Keys service areas relative to the number issued in the Middle Keys from 2002 to 2003. There were 42 more new residential permits issued in 2003 than 2002.

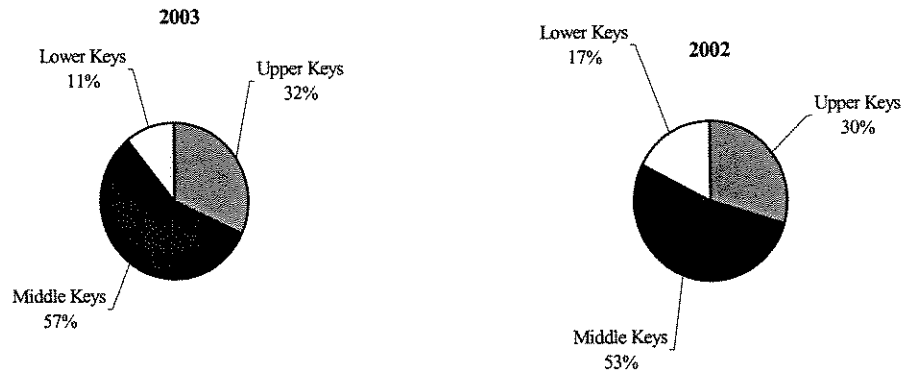
Figure 1.12 shows the composition of residential permits issued in 2002 and 2003. No new duplexes were permitted in either year. Single family residential permits occupy the largest percentage in both years, with 42 more single-family permits being issued in 2003. The number of mobile home, RV, and multi-family permits de-

Figure 1.9 - New and Replacement Residential and Seasonal Units Permitted by Year for Unincorporated Monroe County

		Single Family	Duplex	Multi-Family	Mobile Home/RV	Hotel/Motel	Total
1992	Upper Keys	190	38	0	6	23	257
	Middle Keys	67	0	0	1	0	68
	Lower Keys	189	0	14	0	0	203
	Subtotal	*446*	*38*	*14*	*7*	*23*	*528*
1993	Upper Keys	104	0	0	5	0	109
	Middle Keys	55	2	0	1	0	58
	Lower Keys	80	0	0	1	0	81
	Subtotal	*239*	*2*	*0*	*7*	*0*	*248*
1994	Upper Keys	109	0	0	3	0	112
	Middle Keys	94	0	0	0	0	94
	Lower Keys	36	0	0	1	0	37
	Subtotal	*239*	*0*	*0*	*4*	*0*	*243*
1995	Upper Keys	131	2	0	4	0	137
	Middle Keys	27	2	2	1	5	37
	Lower Keys	144	0	0	0	0	144
	Subtotal	*302*	*4*	*2*	*5*	*5*	*318*
1996	Upper Keys	114	0	3	3	0	120
	Middle Keys	40	0	15	0	0	55
	Lower Keys	83	0	0	6	0	89
	Subtotal	*237*	*0*	*18*	*9*	*0*	*264*
1997	Upper Keys	89	0	12	0	0	101
	Middle Keys	27	4	0	0	77	108
	Lower Keys	73	0	0	0	0	73
	Subtotal	*189*	*4*	*12*	*0*	*77*	*282*
1998	Upper Keys	78	0	0	3	0	81
	Middle Keys	13	0	0	0	110	123
	Lower Keys	66	0	0	0	0	66
	Subtotal	*157*	*0*	*0*	*3*	*110*	*270*
1999	Upper Keys	138	0	0	2	0	140
	Middle Keys	20	0	0	24	63	107
	Lower Keys	87	0	0	0	1	88
	Subtotal	*245*	*0*	*0*	*26*	*64*	*335*
2000	Upper Keys	67	0	35	0	0	102
	Middle Keys	4	0	0	0	34	38
	Lower Keys	75	0	0	0	0	75
	Subtotal	*146*	*0*	*35*	*0*	*34*	*215*
2001	Upper Keys	62	0	13	7	1	83
	Middle Keys	9	0	0	10	0	19
	Lower Keys	80	0	0	38	0	118
	Subtotal	*151*	*0*	*13*	*55*	*1*	*220*
2002	Upper Keys	75	0	0	14	0	89
	Middle Keys	111	0	25	22	0	158
	Lower Keys	7	0	0	45	0	52
	Subtotal	*193*	*0*	*25*	*81*	*0*	*299*
2003	Upper Keys	72	0	0	17	0	89
	Middle Keys	138	0	0	22	0	160
	Lower Keys	25	0	0	5	0	30
	Subtotal	*235*	*0*	*0*	*44*	*0*	*279*
TOTAL		***2,779***	***48***	***119***	***241***	***314***	***3,501***

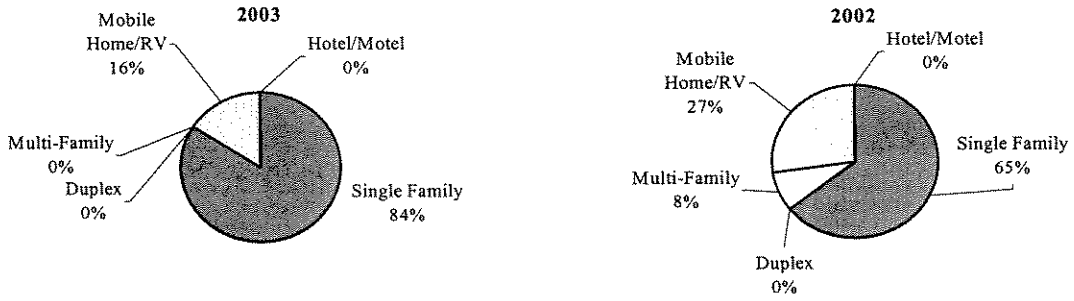
Source: Monroe County Building Department, 2004

Figure 1.11- Comparison of Residential Permits by Service Area 2002-2003



Source: Monroe County Building Department, 2004

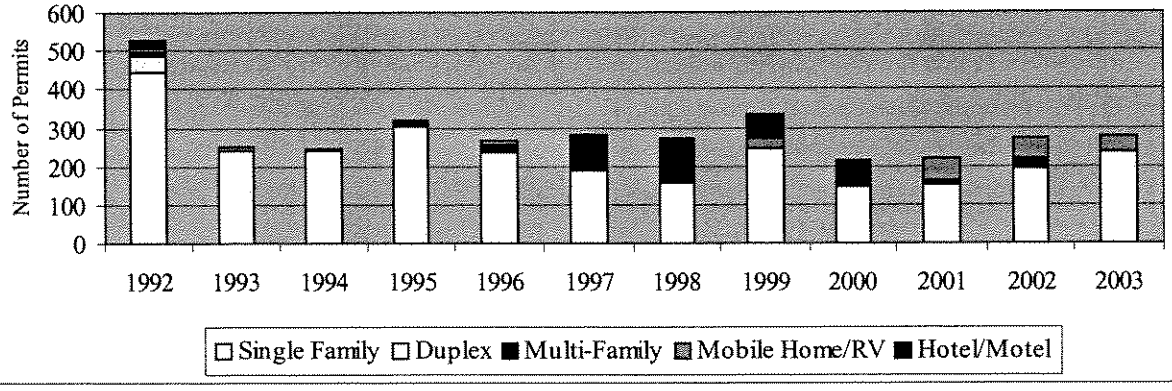
Figure 1.12 - Comparison of Residential Permit Types 2002-2003



Source: Monroe County Building Department, 2004

	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	Total
Single Family	446	239	239	302	237	189	157	245	146	151	193	235	2779
Duplex	38	2	0	4	0	4	0	0	0	0	0	0	48
Multi-Family	14	0	0	2	18	12	0	0	35	13	25	0	119
Mobile Home/RV	7	7	4	5	9	0	3	26	0	55	52	44	212
Hotel/Motel	23	0	0	5	0	77	110	64	34	1	0	0	314

Figure 1.13-Comparison of Residential Permit Types 1992-2003



creased.

Figure 1.13 shows the total number of permits issued in unincorporated Monroe County from 1992 to 2003. The chart shows a swell in permitting activity prior to the adoption of ROGO, and then declines following its adoption.

Figure 1.14 - Types of Permits Issued 1992-2003

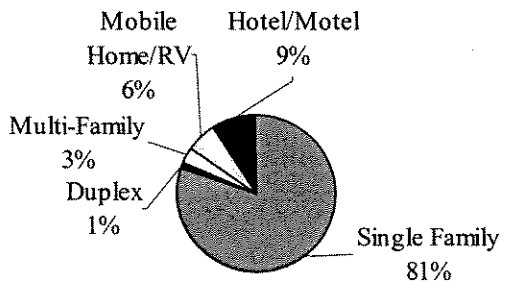


Figure 1.14 shows the breakdown in the types of residential permits issued over the last decade.

Non-Residential Square Footage

Nonresidential permitting also plays a role in growth analysis. Nonresidential permits include everything that is not residential, like: industrial, commercial, nonprofit & public buildings, and replacement or remodeling of existing nonresidential structures. Also included are vested and ROGO exempt hotels, motels, campgrounds, marinas and other commercial facilities.

With very little industrial and agricultural activity in the Keys, the predominant form of nonresidential development is commercial. In Monroe County, there are two primary types of commercial development: retail trade and services (which includes tourism-related development such as marinas and restaurants). Therefore, the impact of nonresidential development on public facilities varies significantly based on the type of commercial use.

Nonresidential and residential development tend to fuel one another. Residential populations provide markets for nonresidential activities. Nonresidential development, in turn, helps to drive population growth by providing services and employment. Certain types of nonresidential development also concentrate the demand for public facilities within certain locations and during peak periods.

The Monroe County Building Department tracks the number of nonresidential permits by subdistrict in unincorporated Monroe County. In addition to the number of permits, the Building Department tracks the amount of square footage affected in each nonresidential building permit issued.

Figure 1.15, on the following page, shows the trends in nonresidential permitting from 1992 to 2003. The subdistricts shown in the chart do not directly correspond to the service areas mandated in section of 9.5-292 of the Land Development Regulations. Refer to the boundary descriptions found in Figure 1.10 of this report to compare the two areas. Forty-four (44) non-residential building permits were issued in 2003 as compared to twenty-nine (29) in 2002.

Figure 1.15 - New and Redevelopment Nonresidential Permits by Year			
		# of Permits Issued	Floor Area (Sq. Ft.)
1992	Upper Keys	15	40,506
	Middle Keys	2	7,263
	Lower Keys	5	1,529
	Subtotal	*22*	*49,298*
1993	Upper Keys	4	16,334
	Middle Keys	4	24,812
	Lower Keys	4	27,236
	Subtotal	*12*	*68,382*
1994	Upper Keys	4	24,648
	Middle Keys	7	31,079
	Lower Keys	4	0
	Subtotal	*15*	*55,727*
1995	Upper Keys	24	147,319
	Middle Keys	12	109,331
	Lower Keys	8	10,004
	Subtotal	*44*	*266,654*
1996	Upper Keys	17	102,795
	Middle Keys	6	93,334
	Lower Keys	2	14,149
	Subtotal	*25*	*210,278*
1997	Upper Keys	14	93,503
	Middle Keys	83	8,420
	Lower Keys	2	18,327
	Subtotal	*99*	*120,250*
1998	Upper Keys	4	60,936
	Middle Keys	73	16,304
	Lower Keys	1	24,152
	Subtotal	*78*	*101,392*
1999	Upper Keys	8	14,861
	Middle Keys	68	84,715
	Lower Keys	1	2,054
	Subtotal	*77*	*101,630*
2000	Upper Keys	8	33,873
	Middle Keys	68	75,584
	Lower Keys	5	19,168
	Subtotal	*81*	*128,625*
2001	Upper Keys	31	73,307
	Middle Keys	1	4,998
	Lower Keys	4	8,575
	Subtotal	*36*	*86,880*
2002	Upper Keys	3	3,773
	Middle Keys	0	0
	Lower Keys	26	110,805
	Subtotal	*29*	*114,578*
2003	Upper Keys	7	13,651
	Middle Keys	37	110,446
	Lower Keys	0	0
	Subtotal	*44*	*124,097*
TOTALS		***562***	***1,427,791***

Source: Monroe County Building Department, 2004

	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	Total
Upper Keys	40,506	16,334	24,648	147,319	102,795	93,503	60,936	14,861	33,873	73,307	3,773	13,651	625,506
Middle Keys	7,263	24,812	31,079	109,331	93,334	8,420	16,304	84,715	75,584	4,998	0	110,446	566,286
Lower Keys	1,529	27,236	0	10,004	14,149	18,327	24,152	2,054	19,168	8,575	110,805	0	235,999
Total	49,298	68,382	55,727	266,654	210,278	120,250	101,392	101,630	128,625	86,880	114,578	124,097	1,427,791

Figure 1.16-Commercial Square Footage by Service Area 1992-2003

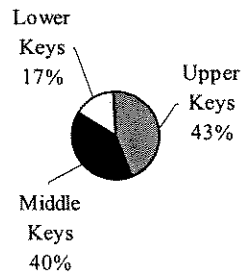


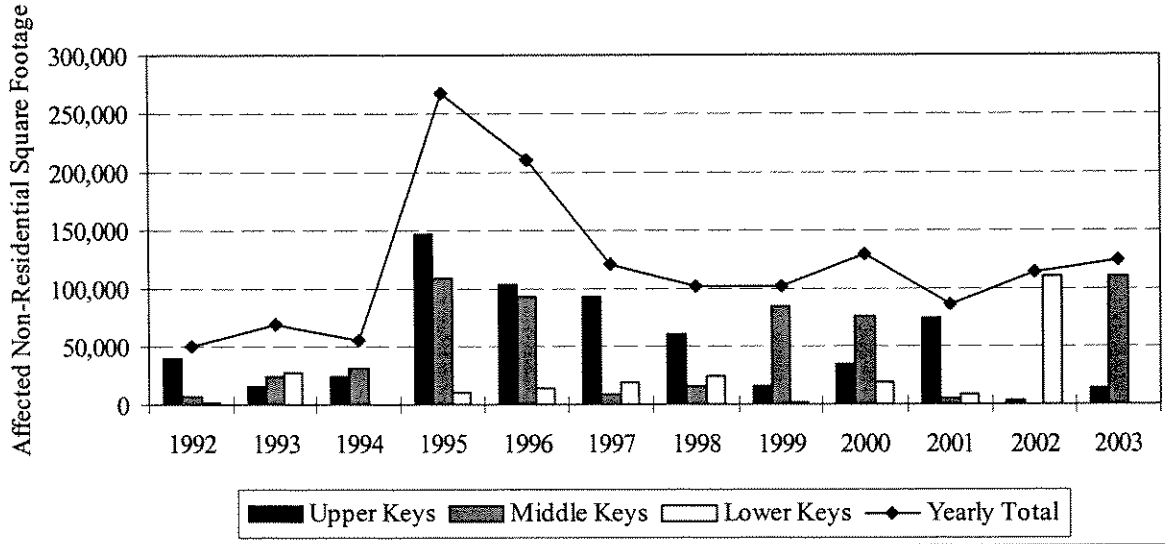
Figure 1.16 shows the relative amount of square footage permitted in each of the three service areas from 1992 to 2003.

Figure 1.17 shows the trends in the amount of nonresidential permitting activity have fluctuated throughout the last decade. The permitting activity based on square footage affected generally declined from 1990 through 1994 with a major jump in affected area occurring in 1995 which resulted from the knowledge of an impending implementation of a nonresidential permit allocation system similar to the ROGO system for residential development. Non-residential development slightly declined in 2000 and 2001 and increased again in 2002 and 2003 as the amount of development in the Upper, Middle, and Lower Keys has fluctuated.

Since residential development is constrained through the Rate of Growth Ordinance and the Permit Allocation System, it was thought that nonresidential (commercial) development should also be constrained in the interest of maintaining a balance of land uses.

At the time the Comprehensive Plan was prepared in 1991, 17.6% of the land was under residential use, while 4.6% was used for commercial development as indicated in Table 2.1, Monroe County Existing Land Uses, in the Monroe County Year 2010 Comprehensive Plan Technical Document. It was determined that this balance was ap-

Figure 1.17 - Nonresidential Permits by Service Area 1992-2003



propriate given the knowledge available at the time the Comprehensive Plan was prepared.

To assure that balance was maintained, the Comprehensive Plan proposed Policy 101.3.1, which states:
"Monroe County shall maintain a balance between residential and nonresidential growth by limiting the gross square footage of nonresidential development over the 15 year planning horizon in order to maintain a ratio of approximately 239 square feet of nonresidential development for each new residential unit permitted through the Permit Allocation"

In other words, the Comprehensive Plan limits the square footage of new commercial development that may be permitted. The commercial square footage allocation is 239 square feet for each (1) new residential permit issued. This equates to around 37,762 square feet of new commercial development per year throughout unincorporated Monroe County.

Between adoption of the 2010 Comprehensive Plan on April 15, 1993, and December 31, 2001, permits were issued for 462,529 square feet of non-residential floor space, which was not exempted from the comprehensive plan defined non-residential permit allocation system. This amount of non-residential floor space includes permits for development within the Village of Islamorada and City of Marathon prior to their respective incorporation.

Of the total square feet permitted, 276,641 square feet was permitted after April 15, 1993 (adoption of the 2010 Comprehensive Plan) and prior to January 4, 1996. The remaining 185,888 square feet was permitted after that date for projects vested from the non-residential permit allocation system provisions of the 2010 Comprehensive Plan.

The BOCC adopted NROGO in September 2001. The approval was challenged, but subsequently a settlement was reached and NROGO became effective November 2002. Applicants were requesting 18,222 square footage of floor area for the year 10 NROGO allocation. There was 44,292 SF of non-residential floor area available for year 10 (July 2001-July 2002). The BOCC approved 22,150 SF to be allocated for year 10. At the end of the allocation period for year 10 there was a total of 26,090 SF to be carried over to year 11.

By year 12 (July 2003-July 2004), there was approximately 85,858 SF of non-residential floor area available for allocation. The Board of County Commissioners approved the Planning Commission's recommendation that 10,700 square feet of floor area be made available for Year 12. Monroe County Board of County Commissioners later amended the Year 12 annual allocation. By Resolution, passed and adopted on March 18, 2004, the Board of County Commissioners increased the annual allocation for Year 12 to 16,000 square feet of floor area, all of which was made available for applicants in a single allocation in January, 2004. Of the 16,000 square feet, 11,913 were granted NROGO allocations. The remaining 4,587 square feet is to be allocated in July of 2004. The BOCC will recommend in the fall of 2004 the amount of square feet to be allocated for Year 13 (July 14, 2004 through July 13, 2005).

Summary

To summarize, this growth analysis is based upon projected changes in population as well as residential and nonresidential permitting in unincorporated Monroe County.

There are two groups that compose the population in Monroe County: the permanent resident population, and the peak seasonal population. The sum of these two groups gives the functional population, or the maximum number of people in the Keys on any given evening.

The functional population of all Monroe County is expected to grow by more than 6,000 people from 1990 to 2015, an increase of 11% over the period. Planning Department projections show the rate of increase in functional population is expected to slow after the year 2000.

The functional population of unincorporated Monroe County is expected to reach 75,801 people in 2003, a decrease of 27% from 1990 due to the incorporations of Islamorada in 1997 and Marathon in 1999. The Upper Keys portion of unincorporated Monroe County accounts for 49.3% of the unincorporated functional population, while the Lower Keys portions accounts for 45.3% in 2003. These percentages are expected to remain relatively constant through 2015.

The permanent population of all of Monroe County, according to the 2000 Census was reported as 79,529, an increase of 1,787 from the 1990 Census. This is 6,093 less than the projected 2000 population.

A total of 270 residential permits (including vested or ROGO exempt hotel rooms) were issued in 2002, a slight increase from 2001.

From 1992 to 2002, 80% of the residential permits (2,544) were issued to single family residences, while only 10% (335) were issued for multifamily, duplex, or mobile homes. A total of 193 permits (70%) were issued for single family residences in 2002.

The current rate of growth guidelines indicate that unincorporated Monroe County has a total of 182 permits it may issue during the ROGO year (not including the additional 90 replacement affordable housing units which were allowed by the DCA based upon the lower enclosure removal program). After the incorporation of Marathon, this number fell to 158 permits a year.

The Nonresidential Rate of Growth Ordinance (NROGO) was approved and became

II. TRANSPORTATION FACILITIES

This section of the report investigates the current capacity of the transportation network in Monroe County. This analysis includes changes in traffic volumes, the level of service on U.S. 1, the reserve capacity of the highway and county roads, and the Florida Department of Transportation Five Year Work Program for Monroe County.

Roads are one of the four critical public facilities identified for annual assessment in the Land Development Regulations. In fact, roads are the only public facility with clear and specific standards for level of service measurements identified in the Land Development Regulations and Comprehensive Plan. The regulations require all segments of U.S. 1 to remain at a level of service of 'C', and all County roads to be remain at a level of service 'D'. Subsequent portions of this section will explain the level of service measurements, and how the level of service is calculated.

Existing Roadway Facilities

Monroe County's roadway transportation system is truly unique. Nowhere else is there a chain of islands over 100 miles long connected by 42 bridges along a single highway. This single highway, the Overseas Highway (U.S. 1), functions as a collector, an arterial, and the "Main Street" for the Keys. U.S. 1 is a lifeline for the Keys, from both economic and public safety perspectives. Each day it carries food, supplies, and tourists from the mainland. In the event of a hurricane, it is the only viable evacuation route to the mainland for most of Monroe County.

U.S. 1 in Monroe County is predominantly a two-lane road. Of its 112 total miles, approximately 80 miles (74%) are two-lane segments that are undivided. The four-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).

In addition to U.S. 1, there are 450 miles of County (secondary) roads with 38 bridges. U.S. 1 and the County (secondary) roads have a combined total of approximately 340 intersections in the Keys. 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 Florida Department of Transportation (FDOT) is responsible for maintaining U.S. 1.

Figure 2.1 identifies the traffic signals in operation along the U.S. 1 corridor (excluding those found on the island of Key West).

Figure 2.1 - Fully-Signalized Intersections

Mile Marker	Key	Street
4.4	Stock Island	College Road
4.6	Stock Island	Cross Street
4.8	Stock Island	MacDonald Avenue
30.3	Big Pine Key	Key Deer Blvd.
48.5	Marathon	School Crossing
50	Marathon	Sombrero Beach Blvd.
52.4	Marathon	107th Street
52.5	Marathon	109th Street
53	Marathon	Pedestrian Crossing
53.5	Fat Deer Key	Key Colony Causeway
54	Fat Deer Key	Coco Plum Drive
90	Plantation Key	Woods Avenue
90.5	Plantation Key	Sunshine Road
91.5	Tavernier	Ocean Boulevard
99.5	Key Largo	Atlantic Boulevard
101	Key Largo	Tradewinds
105	Key Largo	Pedestrian Crossing

Source: 2004 Arterial and Travel Time/ Delay Study, URS Inc.

Traffic Volumes

Traffic counts can be very useful in assessing the capacity of the road network, and help determine when capacity improvements need to be made. The two primary measurements for determining traffic volumes are the average daily traffic in an area (referred to as an "ADT"), and the annual average daily traffic (referred to as an "AADT"). Average daily traffic counts are collected from both directions over seven twenty-four hour periods which usually include a weekend. The amount of traffic counted over the week is then divided by five or seven to yield the average daily traffic for a particular location. The "5-day ADT" measurement considers only weekdays, and the "7-day ADT" includes the weekend. The ADT information can then be used in a formula called a "weekly factor" to estimate the annual average daily traffic, which is an estimate of the average amount of traffic at a particular location on any given day of the year.

In Monroe County, traffic counts have been conducted in the same locations since 1992. These counts occur at Mile Marker 84 on Upper Matecumbe, Mile Marker 50 in Marathon, and at Mile Marker 30 on Big Pine Key. The counts are usually performed during the six-week peak tourist season which begins in the second week of February. This year's counts were completed between March 1 and March 21, 2004. Figure 2.2, on the following page, compares the traffic counts for 2004 with those for 2003.

The average weekday (5-Day ADT), average weekly (7-Day ADT), and the annual average daily traffic (AADT) volumes, compared to last year, have increased at the Marathon and Upper Matecumbe locations. While the 5-Day ADT, 7-Day ADT and the AADT, when compared to last year, have decreased at the Big Pine location.

Figure 2.2 - Traffic Counts for 2003 and 2004

	2003	2004	% Change
Big Pine Key (MM 30)			
5-Day ADT	23,341	23,108	-1.00%
7-Day ADT	22,788	22,538	-1.10%
AADT	22,788	22,538	-1.10%
Marathon (MM 50)			
5-Day ADT	36,817	37,604	2.14%
7-Day ADT	35,984	36,563	1.61%
AADT	31,763	32,274	1.61%
Upper Matecumbe (MM 84)			
5-Day ADT	26,759	27,194	1.63%
7-Day ADT	26,514	27,561	3.95%
AADT	23,404	24,328	3.95%

Source: 2004 Arterial and Travel Time/ Delay Study, URS Inc.

A detailed historical comparison of the AADT traffic counts at all three locations for the period from 1994 to 2004 is shown in Figure 2.3.

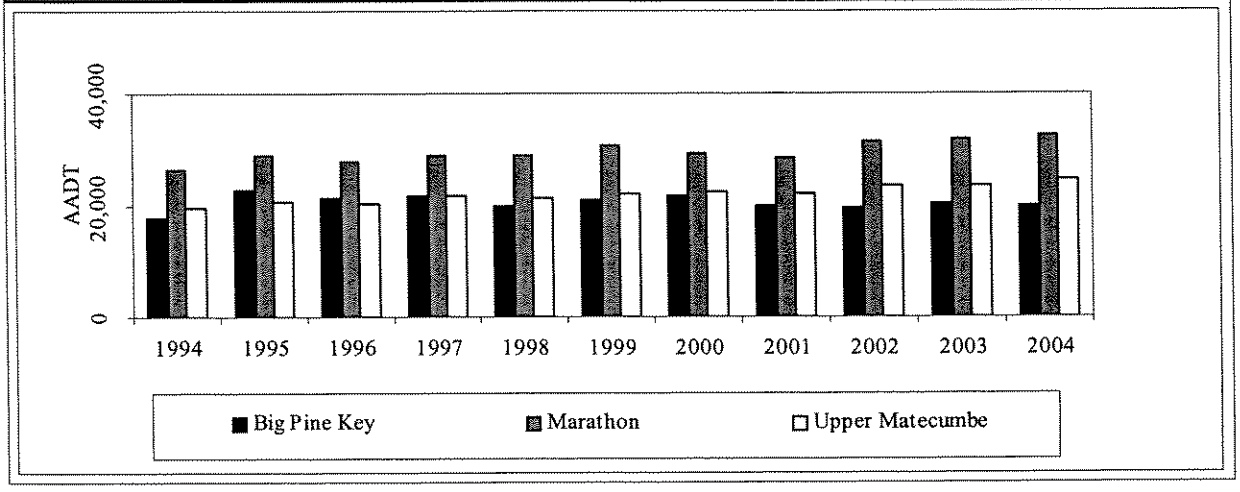
Figure 2.3 shows that the Marathon location consistently records the highest traffic volumes throughout the period, with counts generally in the upper 20,000 to 30,000 range. The AADT counts for Big Pine hover in the low 20,000 range over the period. Meanwhile Upper Matecumbe has been gradually increasing from 1994 to 2004 from a range of 20,000 up to around 25,000.

A regression analysis of the AADT at each of the three locations over the last eleven years indicate that traffic volumes in the Big Pine Key segment have been increasing at a rate of 0.07% per year. Traffic volumes in the Marathon and Upper Matecumbe segments of U.S. 1 have been increasing at a

Figure 2.3 -Historical Comparison of AADTs 1994-2004

Area	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Big Pine Key	17,743	22,688	21,186	21,496	19,866	20,843	21,774	19,991	19,364	20,115	19,894
Marathon	26,297	28,927	27,924	28,930	28,651	30,750	29,017	28,340	31,285	31,763	32,274
Upper Matecumbe	19,593	20,473	20,083	21,599	21,301	22,103	22,410	21,819	23,369	23,404	24,328

Source: 2004 Arterial and Travel Time/ Delay Study, URS Inc.

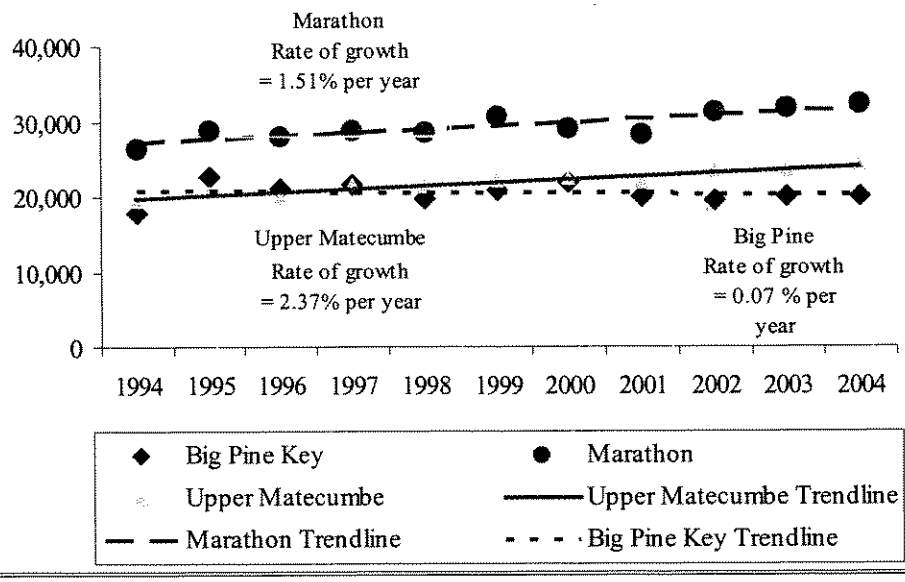


rate of 1.51% and 2.37% per year respectively. The Big Pine Key rate of growth is lower, while the Marathon and Upper Matecumbe rates of growth are higher than last year's. U.S. 1 historic traffic growth is depicted in a regression analysis graph in Figure 2.4.

Level of Service Background

Monroe County has conducted travel time and delay studies of U.S. 1 on an annual basis since 1991. The primary objective of the U.S. 1 Arterial Travel Time and Delay Study is to monitor the level of service on U.S. Highway 1 for concurrency management purposes pursuant to Chapter 163,

Figure 2.4 - Regression Analysis of AADTs 1994-2004



Source: 2004 Arterial and Travel Time/ Delay Study, URS Inc.

Florida Statutes and Section 9.5-292 of the Land Development Regulations. The study utilizes an empirical relationship between the volume-based capacities and the speed-based level of service methodology developed by the U.S. 1 Level of Service Task Force.

The U.S. 1 Level of Service Task Force is a multi-agency group with members from Monroe County, the Florida Department of Transportation, and the Florida Department of Community Affairs. A uniform methodology was developed in 1993 and amended December 1997. The methodology adopted considers both the overall level of service from Key West to the mainland, and the level of service on 24 selected segments. The methodology was developed from basic criteria and principles contained in Chapters 7 (Rural Multilane Highways), Chapter 8 (Rural Two-Lane Highways) and Chapter 11 (Urban and Suburban Arterials) of the 1985 Highway Capacity Manual.

Overall Level of Service on U.S. 1

Overall speeds are those speeds recorded over the 108-mile length of the Keys between Key West and Miami-Dade County. Overall speeds reflect the conditions experienced by long distance traffic traveling the entire length of the Keys. Given that U.S. 1 is the only principal arterial in unincorporated Monroe County, the movement of long distance traffic is an important consideration.

The overall level of service or capacity of the entire length of U.S. 1 is measured in the average speed of a vehicle traveling from one end to the other of U.S. 1. The level of service (LOS) criteria for overall speeds on U.S. 1 in Monroe County, as adopted by the U.S. 1 Level of Service Task Force, are as follows:

LOS A = 51 mph or greater
LOS B = 48 mph to 50.9 mph
LOS C = 45 mph to 47.9 mph
LOS D = 42 mph to 44.9 mph
LOS E = 36 mph to 41.9 mph
LOS F = below 36 mph

Both Monroe County and the Florida Department of Transportation have adopted a level of service 'C' standard for the overall length of U.S. 1. In other words, a vehicle traveling from Mile Marker 4 to Mile Marker 112 (or vice versa) must maintain an average speed of at least 45 mph to achieve the level of service 'C' standard.

The median overall speed during the 2004 study was 45.4 mph, which is 0.7 mph lower than the 2003 median speed of 46.1 mph. The mean operating speed was 45.1 mph with a 95% confidence interval of plus or minus 0.8 mph. All of these measurements correspond to LOS C conditions.

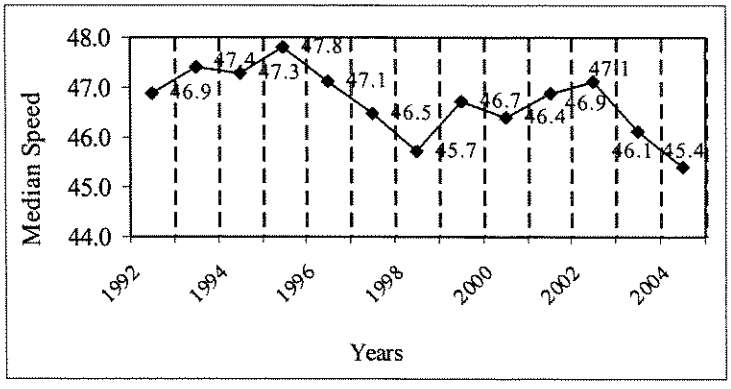
The highest overall speed recorded in the study was 47.9 mph (1.1 mph lower than 2003 highest overall speed), which occurred on Wednesday, March 10, 2004 between 11:00 a.m. and 1:30 p.m., in the northbound direction. The lowest overall speed recorded was 39.3 mph (2.2 mph lower than the 2003 lowest overall speed), which occurred on Saturday March 13, 2004 between 9:30 a.m. and 12:29 a.m. in the southbound direction.

Figure 2.5 shows that the overall median speed for U.S. 1 has remained between 45.4 mph and 47.8 from 1992 to the present. Should the overall median speed fall ever below 45 mph (the minimum LOS C standard), then the U.S. 1 capacity would be considered inadequate.

Figure 2.5 - Changes in Overall Median Speed

Year	Median Speed	Level of Service	Numeric Change in Speed
1992	46.9	C	-
1993	47.4	C	0.5
1994	47.3	C	-0.1
1995	47.8	C	0.5
1996	47.1	C	-0.7
1997	46.5	C	-0.7
1998	45.7	C	-0.8
1999	46.7	C	1
2000	46.4	C	-0.3
2001	46.9	C	1
2002	47.1	C	-0.2
2003	46.1	C	-1
2004	45.4	C	-0.7

Source: 2004 Arterial and Travel Time/ Delay Study, URS Inc.



Level of Service on U.S. 1 Segments

In addition to a determination of the overall capacity throughout the entire 108 mile length of U.S. 1 between Mile Marker 4 and 112, Section 9.5-292 of the Land Development Regulations requires that the capacity of portions or "segments" of U.S. 1 also be assessed annually. There are a total of twenty four (24) segments of U.S. 1 from Mile Marker 4 to Mile Marker 112. A description of the segment boundaries can be found in Figure 2.6 on the following page. The segments were defined by the U.S. 1 Level of Service Task Force to reflect roadway cross sections, speed limits, and geographical boundaries.

The capacity or level of service for a U.S. 1 segment is measured in median speeds, similar to the overall capacity measurement. Segment speeds are the speeds recorded within individual links of U.S. 1, and reflect the conditions experienced during local trips. However, the determination of the median speed on a segment is a more involved process than determining the overall level of service since different segments have different conditions. Segment conditions depend on the flow characteristics and the posted speed limits within the given segment.

The Land Development Regulations require each segment of the highway to maintain a level of service of 'C' or better. The level of service criteria for segment speeds on U.S. 1 in Monroe County depends on the flow characteristics and the posted speed limits

Figure 2.6 - Description of US 1 Roadway Segments

Segment Number	Mile Marker Range		Control Points		Key(s)	Approx. PAED
	Begin	End	Begin	End		
1	4	5	Cow Key Bridge (N)	Key Haven Boulevard	Stock Island, Key Haven	1
2	5	9	Key Haven Boulevard	Rockland Drive	Boca Chica, Rockland	2
3	9	10.5	Rockland Drive	Boca Chica Road	Big Coppitt	2
4	10.5	16.5	Boca Chica Road	Harris Channel Bridge (N)	Shark, Saddlebunch	3
5	16.5	20.5	Harris Channel Bridge (N)	Bow Channel Bridge (N)	Lower & Upper Sugarloaf	3
6	20.5	23	Bow Channel Bridge (N)	Spanish Main Drive	Cudjoe	4A
7	23	25	Spanish Main Drive	East Shore Drive	Summerland	4A
8	25	27.5	East Shore Drive	Torch-Ramrod Bridge (S)	Ramrod	4A
9	27.5	29.5	Torch-Ramrod Bridge (S)	N. Pine Channel Bridge (N)	Little Torch	4A
10	29.5	33	N. Pine Channel Bridge (N)	Long Beach Drive	Big Pine	5
11	33	40	Long Beach Drive	7- Mile Bridge (S)	W. Summerland, Bahia Honda, Ohio	6
12	40	47	7- Mile Bridge (S)	7- Mile Bridge (N)	7-Mile Bridge	6
13	47	54	7- Mile Bridge (N)	Cocoa Plum Drive	Vaca, Key Colony Beach	7
14	54	60.5	Cocoa Plum Drive	Toms Harbor Ch Bridge (S)	Fat Deer Crawl, Grassy	8
15	60.5	63	Toms Harbor Ch Bridge (S)	Long Key Bridge (S)	Duck, Conch	10
16	63	73	Long Key Bridge (S)	Channel #2 Bridge (N)	Long, Fiesta, Craig	11
17	73	77.5	Channel #2 Bridge (N)	Lignumvitae Bridge (S)	Lower Matecumbe	12A
18	77.5	79.5	Lignumvitae Bridge (S)	Tea Table Relief Bridge (N)	Fill	12A
19	79.5	84	Tea Table Relief Bridge (N)	Whale Harbor Bridge (S)	Upper Matecumbe	13
20	84	86	Whale Harbor Bridge (S)	Snake Creek Bridge (N)	Windley	12B
21	86	91.5	Snake Creek Bridge (N)	Ocean Boulevard	Plantation	14
22	91.5	99.5	Ocean Boulevard	Atlantic Boulevard	Tavernier	15 & 16
23	99.5	106	Atlantic Boulevard	C-905	Key Largo	17 - 20
24	106	112.5	C-905	County Line Sign	Key Largo, Cross Key	22

NOTE: (N) and (S) refer to the north and south side of the bridges respectively

Source: 2004 Arterial and Travel Time/ Delay Study, URS Inc.

within the given segment. Flow characteristics relate to the ability of a vehicle to travel through a particular segment without being slowed or stopped by traffic signals or other devices. Segments with a series of permanent traffic signals or other similar traffic control devices in close proximity to each other are considered to be "Interrupted Flow Segments", and are expected to have longer travel times due to the delays caused by these signals or control devices. Roadway segments without a series of signals or control devices are considered to be "Uninterrupted Flow Segments". Uninterrupted segments may have one or more traffic signals, but they are not in close proximity to one another as in the interrupted segment case.

The methodology used to determine median speed and level of service on a particular segment is based upon that segment's status as an interrupted or uninterrupted flow segment. The criteria, listed by type of flow characteristic, are explained in Figure 2.7.

The Marathon and the Stock Island segments are considered "interrupted" flow facilities, the remainder of the segments are considered uninterrupted. For all "uninterrupted" segments containing isolated traffic signals, the travel times were reduced by 25 seconds to account for lost time due to signals.

The segments, 2003 and 2004 median travel speeds, and the 2003 and 2004 LOS are shown on Figure 2.8. The median segment speeds recorded a range from 58.0 mph in the Boca Chica segment to 32.0 mph in the Stock Island segment. LOS ranged from A to D. Compared to last year's (2003) study results, there are level of service changes to eight segments, three resulted in positive level of service changes while five resulted in negative level of service changes. Figure 2.9 is a map of the segment boundaries indicating 2004 LOS.

Compared to 2003, the median segment speeds decreased in fourteen (14) of the twenty-four (24) segments ranging between 0.2 mph to 3.8 mph lower. Eight segments experienced an increase in median speeds, ranging from 0.2 mph to 1.5 mph, compared to last year's data.

None of the changes in speed could be attributed to any specific change in conditions except the changes in traffic volumes and minor signal timings.

Reserve Capacities

The median overall speed of U.S. 1 in 2004 is 45.4 mph, which is a decrease of 0.7 mph from the 2003 overall median speed of 46.1 mph. The difference between the median speed and the LOS C standard gives the reserve speed, which is converted into an estimated reserve capacity of additional traffic volume and corresponding additional development. The median overall speed of 45.4 mph compared to the LOS C standard of 45 mph leaves an overall reserve speed of .4 mph. The reserve speed is then converted into an estimated reserve capacity (**7,419 daily trips**).

The estimated reserve capacity is then converted into an estimated capacity for additional residential development (**1,159 units**), assuming balanced growth of other land uses. Applying the formula for reserve volume to each of the 24 segments of U.S. 1 individually gives maximum reserve volumes for all segments totaling 85,986 trips. These individual reserve volumes may be unobtainable, due to the constraints imposed by the overall reserve volume.

Figure 2.7 - Level of Service Standards Based on Flow Characteristics

Level of Service	Interrupted Flow Segment	Uninterrupted Flow Segment
A	>= 35 mph	>= 1.5 mph above speed limit
B	>= 28 mph	1.4 mph above to 1.5 mph below speed limit
C	>= 22 mph	1.6 mph below to 4.5 mph below speed limit
D	>= 17 mph	4.6 mph below to 7.5 mph below speed limit
E	>= 13 mph	7.6 mph below to 13.5 mph below speed limit
F	< 13 mph	> 13.5 mph below speed limit

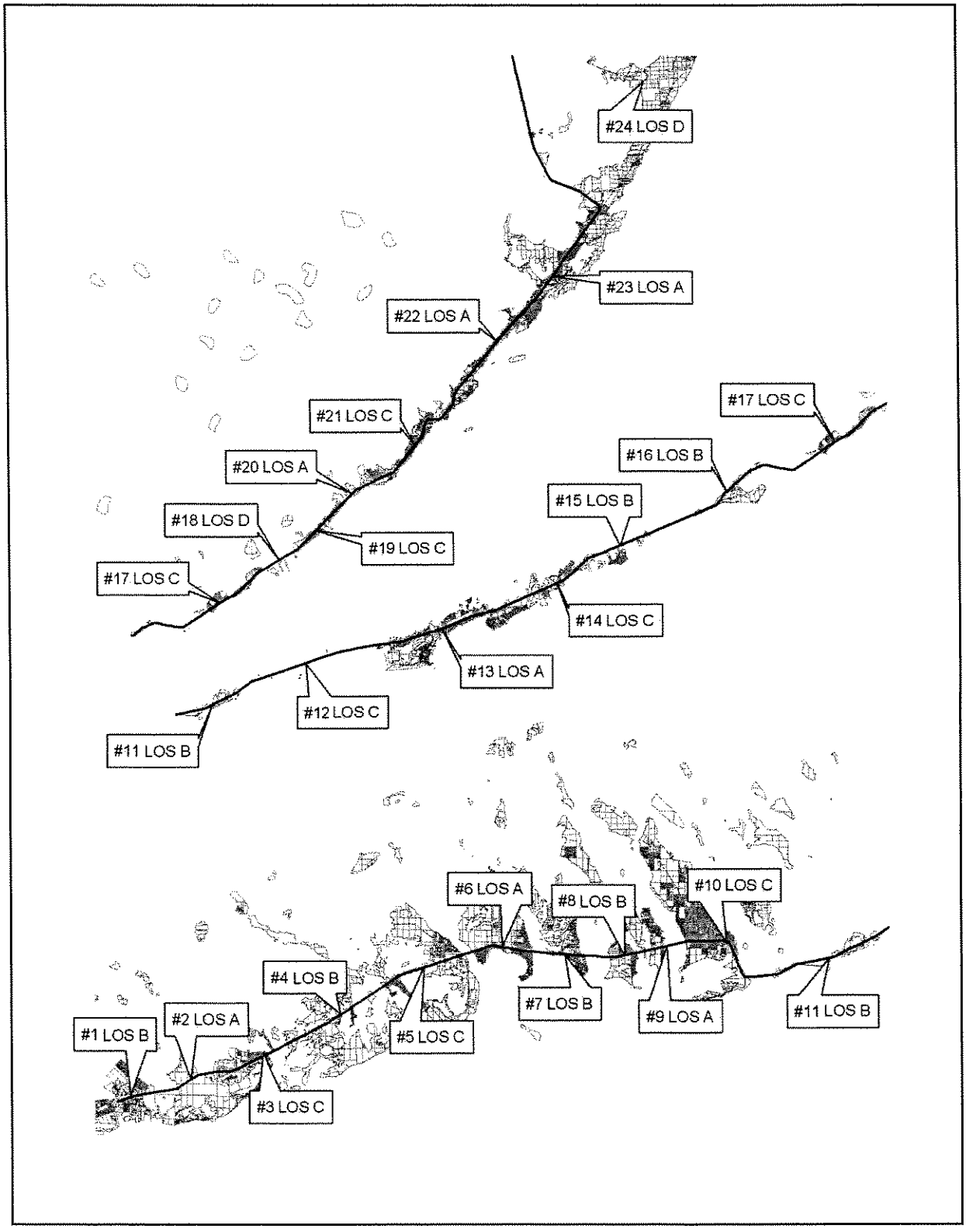
Source: 2004 Arterial and Travel Time/ Delay Study, URS Inc.

Figure 2.8
US 1 Segment Status, Median Speeds, and Change 2003-2004

#	Segment	2003 LOS	2004 LOS	2003 Median Speed	2004 Median Speed	Numeric Change
1	Stock Island	A	B	35.8	32.0	-3.8
2	Boca Chica	A	A	58.0	58.2	0.2
3	Big Coppitt	C	C	46.1	46.1	0.0
4	Saddlebunch	C	B	52.3	53.7	1.4
5	Sugarloaf	C	C	47.9	48.3	0.4
6	Cudjoe	A	A	47.5	48.1	0.6
7	Summerland	B	B	45.3	46.4	1.1
8	Ramrod	A	B	46.7	46.4	-0.3
9	Torch	A	A	47.2	47.6	0.4
10	Big Pine	C	C	39.7	38.4	-1.3
11	Bahia Honda	A	B	54.2	52.5	-1.7
12	7-Mile Bridge	B	C	54.3	53.1	-1.2
13	Marathon	A	A	38.2	35.2	-3.0
14	Grassy	C	C	50.9	50.3	-0.6
15	Duck	C	B	53.0	54.4	1.4
16	Long	B	B	52.3	52.9	0.6
17	L. Matecumbe	D	C	50.1	50.5	0.4
18	Tea Table	D	D	49.2	49.0	-0.2
19	U. Matecumbe	C	C	41.7	40.9	-0.8
20	Windley	A	A	42.2	41.8	-0.4
21	Plantation	B	C	41.3	40.0	-1.3
22	Tavernier	A	A	49.9	48.3	-1.6
23	Largo	A	A	48.4	45.5	-2.9
24	Cross	D	D	46.2	45.0	-1.2
	Overall	C	C	46.1	45.4	-0.7

Source: 2004 Arterial and Travel Time/ Delay Study, URS Inc.

Figure 2.9 -Map of US1 Segments



As stated earlier, the Land Development Regulations mandate a minimum level of service of 'C' for all roadway segments of U.S. 1. However, 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 will allow a limited amount of additional land development to continue until traffic speeds are measured again next year or until remedial actions are implemented. These segments are candidates for being designated either "backlogged" or "constrained" by FDOT. Applications for new development located within backlogged or constrained segments are required to undergo a thorough traffic analysis as part of the review process.

Based on this year's results, Tea Table (Segment 18), and Cross Key (Segment 24) are below the LOS C threshold, consistent with past two years of data. However, both segments have reserve capacities within the 5% allocation. Although both segments have reserve capacities within the 5% allocation, continuous degradation of travel speeds in these segments should be of concern. The travel speeds on Cross Key segment is likely to improve with the implementation of a high level fixed bridge, construction of which is anticipated to begin early next year. The Tea Table segment does not have any planned improvements to curtail the travel speed reductions. Florida Department of Transportation and/or Monroe County should conduct a special study along this segment to determine what improvements, if any can be implemented to improve the declining travel speeds. A detailed summary table displaying level of service and reserve capacity values for each segment is contained in the "2004 U.S. 1 Arterial Travel Time and Delay Study".

When no additional trips can be allocated to a particular roadway segment, then it is considered as "inadequate" from a public facility standpoint. The Land Development Regulations indicate that no additional development which could impact an inadequate public facility may be permitted. No facilities were designated as "inadequate" under this guideline.

In addition to the requirement that areas with inadequate public facilities be identified in the annual assessment, the Land Development Regulations also require those areas with marginally adequate public facilities to be identified. For the purposes of this report, U.S. 1 segments with reserve speeds of less than or equal to 3 mph in 2004 will be considered as "marginally adequate".

This year's report indicates that ten segments are "marginally adequate" and any applications for new development which would generate traffic in marginally adequate areas must submit a detailed traffic report for consideration during review. Please see Figure 2.11 for "marginally adequate" facilities.

"Marginally Adequate" Segments
Figure 2.11

#	Name	Mile Marker Range	Reserve Speed
3	Big Coppitt	9.0 - 10.5	0.9
5	Sugarloaf	16.5 - 20.5	0.7
10	Big Pine	29.5 - 33.0	1.2
12	7-Mile Bridge	40.0 - 47.0	2.6
14	Grassy	54.0 - 60.5	0.4
17	Lower Matecumbe	73.0 - 77.5	0
18	Tea Table	77.5 - 79.5	-1.1
19	Upper Matecumbe	79.5 - 84.0	0.4
21	Plantation	86.0 - 91.5	1.8
24	Cross	106 - 112.5	-2.3

Source: 2004 Arterial and Travel Time/ Delay Study, URS Inc.

Level of Service on County Roads
Section 9.5-292 of the Land Development Regulations establishes a level of service standard of LOS D for all County roads, as measured on a volume or annual average daily traffic (AADT) basis.

Based on the results of this analysis as shown on Table 4.7 in the Monroe County Year 2010 Comprehensive Plan Technical Document, all of the County roads examined are operating at or above the County standard of LOS D.

Improvements to Roadway Facilities
Major improvements scheduled for U.S. 1 are outlined in the Florida Department of Transportation Five-Year Work Program. The major project for unincorporated Monroe County in the current FDOT Work Program (2004/2005 to 2008/09) is to replace the Jewfish Creek drawbridge with a high-level fixed-span bridge and the installation of culverts to improve the tidal flow to the surrounding wetlands. The construction phase for this project is scheduled for 2004/05.

Additionally, the 18 mile stretch between the Jewfish Creek Bridge and Florida City is also scheduled for reconstruction beginning in 2004/05. These road projects are pending final approval of environmental permits.

Another major project on the 5-year Work Program is the reconstruction of the Card Sound Road/County Road 905 intersection scheduled for 2007/08.

Other road projects in the current FDOT Work Program include the preliminary engineering phase for adding a center turn lane on US-1 at Big Coppitt Key, Knights Key (MM 46.9-49.1), Grassy Key (MM 57.5-59.9), Long Key (MM 65.3-66.0), and Plantation Key (MM 85.7-86.7). These projects are scheduled to begin construction in 2006, with the exception of Long Key and Plantation Key, which are scheduled for construction in 2007/08.

In addition to the turn lane projects, numerous resurfacing projects are scheduled throughout the Keys over the span of the 5-year Work Plan.

In addition to the road projects on U.S. 1, the construction of different segments of the Florida Keys Overseas Heritage Trail are included in the current 5-year Work Plan. These construction projects include:

- the segment from MM 5.2-Key Haven to MM 9.6-Big Coppitt Key
- the segment from MM 16.5-Sugarloaf Key to MM 24.5-Summerland Key
- the segment from MM 25-Summerland Key to MM 26.2-Ramrod Key
- the segment from MM 26.2-Ramrod Key to 29.9 Big Pine Key,
- the segment from MM 33.3 Spanish Harbor Bridge to MM 40.5 (south end of the 7-mile bridge),
- the segment from MM 59.2 on Grassy Key to MM 65.2 Long Key
- the segment from City of Layton MM 68.4 to MM 70.8-Channel 5 Bridge, and
- the segment from Channel 5-Bridge to Anne's Beach.

The following historic bridges are also scheduled for reconstruction to be used as part of the Overseas Heritage Trail:

- The old Park Channel Bridge at MM 18.7,
- The old South Pine Channel Bridge at MM 29,

- The Ohio-Missouri Historic Bridge at MM 39.1, and
- The old Long Key Bridge at MM 63.

Copies of the FDOT's most recent Five Year Work Program are available at the Florida Department of Transportation offices in Marathon.

Summary

The Land Development Regulations provide clear guidance for assessing the capacity of the roadway system in Monroe County. U.S. 1 is required to maintain at least a level of service of 'C', while County roads must maintain a level of service of 'D'. Level of service is determined using the speed-based methodology developed by the U.S. 1 Level of Service Task Force in 1993. The speed based methodology utilizes the empirical relationship between volume-based capacities, and median vehicle speeds. The level of service for U.S. 1 is measured for the overall 108 miles of the roadway as well as for the 24 individual segments making up the roadway in the Keys.

The traffic volumes recorded at Big Pine, Marathon and Upper Matecumbe have increased as compared to the traffic volumes during the 2003 study. Using the historical traffic data, incorporating the 2003 data (based on a regression analysis), the three count locations on U.S. 1 have shown a traffic growth of 0.07%, 1.51%, and 2.37% per year respectively.

The overall travel speed on U.S. 1 for 2004 is .7 mph lower compared to the 2003 overall travel speed. The reserve speed for the entire length of U.S. 1 is .4 miles per hour. This means that the entire segment is operating with only **marginal capacity**.

Compared to 2003 data, the travel speeds on 10 of the 24 segments increased. These segments are:

Boca Chica (+0.2 mph)
Torch (+0.4 mph)
Saddlebunch (+1.5 mph)
Duck (+1.4 mph)
Sugarloaf (+0.1 mph)
Long (+0.7 mph)
Cudjoe (+0.5 mph)
L. Matecumbe (+0.4 mph)
Summerland (+1.1 mph)
Big Coppitt (+0.1 mph)

Travel speeds in 14 segments have decreased. These segments are:

Stock Island (-3.8 mph)
Tea Table (-0.2 mph)
Ramrod (-0.3 mph)
U. Matecumbe (-0.5 mph)
Big Pine (-1.4 mph)
Windley (-0.4 mph)
Bahia Honda (-1.7 mph)
Plantation (-1.2 mph)
7-Mile Bridge (-1.2 mph)
Tavernier (-1.8 mph)
Marathon (-3.0 mph)
Largo (-2.8 mph)
Grassy (-0.8 mph)
Cross (-2.7 mph)

Compared to last year's (2003) study results, there are changes in LOS to eight of the segments. The Stock Island, Ramrod, and Bahia Honda segments experienced decreases in LOS from A to B. The Saddlebunch and Duck segments experienced increases in LOS from C to B. The 7-Mile Bridge and Plantation segments decreased from LOS B to LOS C. The Lower Matecumbe segment increased from LOS D to LOS C.

The largest speed increase of 1.5 mph was

recorded in the Saddlebunch segment, while the largest speed decrease was 3.8 mph and was recorded at both Stock Island and Marathon.

In 2004 there were two segments which are considered "inadequate": Tea Table (Segment 18), and Cross Key (Segment 24) are below the LOS C threshold, consistent with the past two years of data. However, both segments have reserve capacities within the 5% allocation.

In 2004 there were ten segments which are "marginally adequate" in terms of reserve capacity.

All County roads have levels of service above the required standard of 'D'.

III. POTABLE WATER

The Florida Keys Aqueduct Authority (FKAA) is the provider of potable water in the Florida Keys. The Biscayne Aquifer is the groundwater supply source for the FKAA. The wellfield is located in a pineland preserve west of Florida City in Miami-Dade County. The FKAA wellfield contains some of the highest quality groundwater in the State, meeting or exceeding all regulatory standards prior to treatment. Strong laws protect the wellfield from potentially contaminating adjacent land uses. Beyond the County's requirements, FKAA is committed to comply with and surpass all federal and state water quality standards and requirements.

The groundwater from the wellfield is treated at the J. Robert Dean Water Treatment Facility in Florida City, which currently has a maximum water treatment design capacity of 22 million gallons per day (MGD). The water treatment process consists primarily of lime softening, filtration, disinfection and fluoridation. The treated water is pumped to the Florida Keys through a 130 mile long pipeline at a maximum pressure of 250 pounds per square inch (psi). The pipeline varies in diameter from 36 inches in Key Largo to 18 inches in Key West. The FKAA distributes the treated water through 648 miles of distribution piping ranging in size from ¾ inch to 12 inches in diameter. In 2003, the FKAA replaced over 141,000 feet of various size distribution water mains. The FKAA's Water Distribution System Upgrade Plan calls for the upgrade or replacement of 59,960 feet of water main during fiscal year 2003-04.

The FKAA maintains storage tank facilities which provide an overall storage capacity of 45.2 million gallons system wide. The size of the tanks vary from 0.2 to 5.0 million gallons. These tanks are utilized during periods of peak water demand and serve as an emergency water supply. Since the existing transmission line serves the entire Florida Keys (including Key West), and storage capacity is an integral part of the system, the capacity of the entire system must be considered together, rather than in separate service districts.

Also, the two saltwater Reverse Osmosis (RO) plants, located on Stock Island and Marathon, are available to produce potable water under emergency conditions. The RO desalination plants are capable of producing their designed capacities of 1.8 and 0.9 million gallons per day (MGD) of water, respectively.

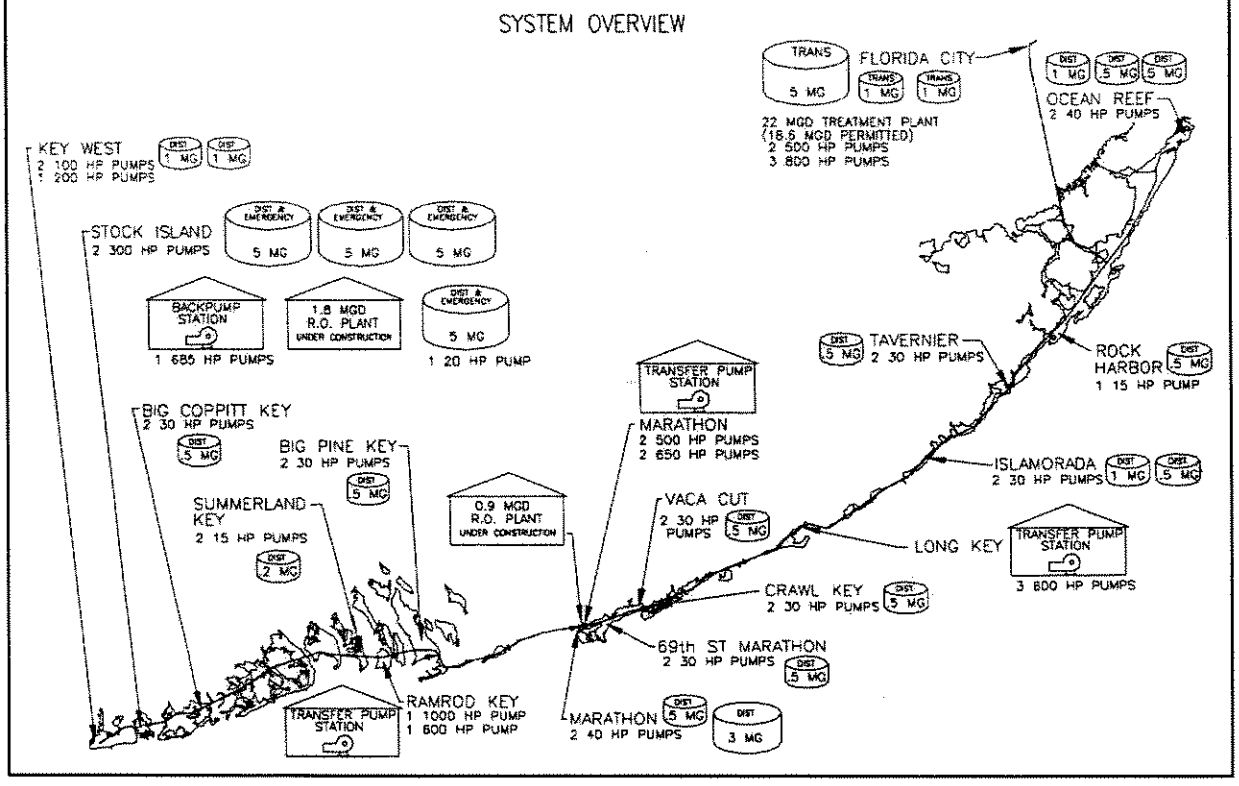
At present, Key West is the only area of the County served by a flow of potable water sufficient to fight fires. Outside of Key West, firefighters rely on a variety of water sources, including tankers, swimming pools, and salt water either from drafting sites on the open water or from specially constructed fire wells. Although sufficient flow to fight fires is not guaranteed in the County, new hydrants are being installed as water lines are replaced to make water available for fire fighting purposes and pump/tank stations are being upgraded to provide additional fire flow and pressure.

A map of the various FKAA facilities in the Keys is shown on the next page.

Demand for Potable Water

In October 2002, South Florida Water Management District approved the FKAA's increase in Water Use Permit (WUP). The WUP increases FKAA's potential withdraws to an average of 19.93 and a maximum of

Figure 3.1 - FKAA Facilities



23.79 Million Gallons per Day (MGD). In 2003, the FKAA distributed an average of 17.29 and a maximum of 22.2 MGD to the Florida Keys. As a condition of the WUP, the FKAA is constructing a Floridan Aquifer Storage and Recovery (ASR) system. This system is designed to recharge and store water from the Biscayne Aquifer during the wet season (May through November) in the Floridan Aquifer which is approximately 800-1,000 feet below the ground surface, and then recover fresh water to supplement the Biscayne Aquifer during the dry season (December through April). Unless the projected future water demands decrease, the FKAA must also consider an alternative source of water supply such as a brackish or salt water source which will require a new water treatment plant.

Demand for potable water is influenced by many factors, including the size of the permanent resident and seasonal populations, the demand for commercial water use, landscaping practices, conservation measures, and the weather. Figure 3.2 summarizes FKAA's historic withdrawals, in millions of gallons. The table also shows the percent change in withdrawal from one year to the next, the existing Water Use Permit (WUP) withdrawal limits, and the reserve capacity available for future development under the existing WUP.

Figure 3.2 - Annual Water Withdrawals 1980 to 2003

Year	Annual Withdrawal (MG)	% Change	WUP Limit (MG)	WUP +/- Annual Allocation (MG)
1980	2,854.90	-	N/A	N/A
1981	3,101.10	8.60%	N/A	N/A
1982	3,497.30	12.80%	N/A	N/A
1983	3,390.20	-3.10%	N/A	N/A
1984	3,467.50	2.30%	4,450	982.5
1985	4,139.20	19.40%	4,450	310.8
1986	4,641.50	12.10%	5,110	468.5
1987	4,794.60	3.30%	5,110	315.4
1988	4,819.80	0.50%	5,110	290.2
1989	4,935.90	2.40%	5,110	174.1
1990	4,404.10	-10.80%	5,560	1,155.90
1991	4,286.00	-2.70%	5,560	1,274.00
1992	4,461.10	4.10%	5,560	1,098.90
1993	5,023.90	12.60%	5,560	536.1
1994	5,080.00	1.10%	5,560	480
1995	5,140.40	1.20%	5,778	637.6
1996	5,272.00	2.60%	5,778	506
1997	5,356.00	1.60%	5,778	422
1998	5,630.00	5.10%	5,778	148
1999	5,935.30	5.40%	5,778	-157.3
2000	6,228.00	10.60%	5,778	-450
2001	5,626.70	-9.70%	5,778	151.3
2002	6,191.16	10.03%	7,274	1083.29
2003	6,288.29	1.57%	7,274	985.84

Source: Florida Keys Aqueduct Authority, 2004

Figure 3.3 - FKAA Annual Water Withdrawl

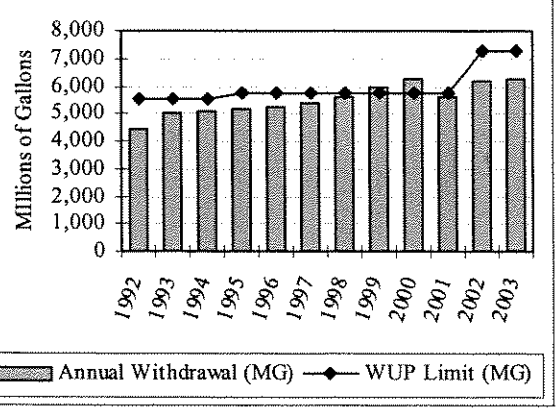
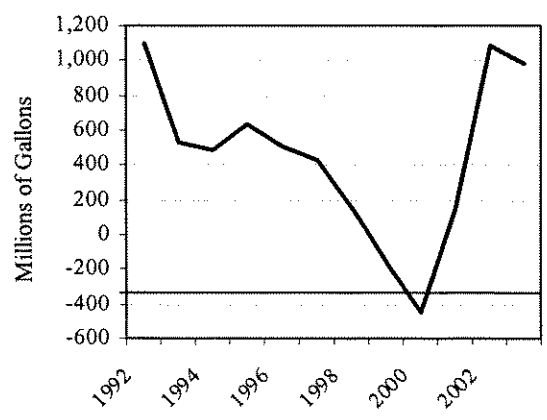


Figure 3.4 - WUP Remaining Allocation



The previous graphs show the relationship between the amount of water withdrawn on an annual basis and the limit of the Water Use Permit to the present. Figure 3.5 shows the projected water demand for 2004. Figure 3.6 indicates the amount of water available on a per capita basis. Based on Functional Population and permitted water withdrawal, the average water available is above 100 gallons per capita (person). The 100 gallons per person per day standard is commonly accepted as appropriate, and is reflected in Policy 701.1.1 of the Year 2010 Comprehensive Plan.

Figure 3.5 - Projected Water Demand in 2004

	FKAA Permit Thresholds	2003 Pumpage	2004 Water Demand Projected
Average Daily Withdrawal	19.93	17.29	17.57
Maximum Daily Withdrawal	23.79	22.2	22
Annual Withdrawal	7,274	6,288	6,414
All figures are in millions of gallons			

Source: Florida Keys Aqueduct Authority, 2004

FKAA's current Water Use Permit (Permit # 13-00005W) from the South Florida Water Management District was obtained in 2002, and is good for a period of five years. The current WUP allows an average daily water withdrawal of 19.93 million gallons per day (MGD), a maximum daily withdrawal of 23.79 MGD, and a yearly maximum of 7.274.45 billion gallons.

Preliminary figures for 2004 indicate an increase in average day water use of 2 percent through May compared to 2003 figures. Therefore, the average daily water demand withdrawal projections for 2004 reflect this increase.

The 1999 Public Facility Capacity Assessment Report indicated three recommended actions to be considered by the Board of County Commissioners with respect to potable water:

- Continue to monitor water consump tion and return to the Board for fur ther direction; and
- Prepare and adopt a series of ordi nances related to water conservation, including plumbing efficiency stan dards, a landscaping ordinance, and a permanent irrigation ordinance; and
- Enter into a memorandum of under standing with the FKAA to address the above items.

The Growth Management Division plans to work with the FKAA on water consumption and conservation. Revised plumbing efficiency standards have been implemented. Efforts on a permanent irrigation ordinance should be coordinated with Monroe County and other local governments. The Growth Management Division has offered to work with the FKAA on the development of an intergovernmental team to discuss water conservation options since conservation efforts must be undertaken by all jurisdictions

Figure 3.6- Per Capita Water Availability

Year	Functional Population	Average Daily Withdrawal (gallons)	Average Water Available Per Capita (gallons)	Maximum Daily Withdrawal (gallons)	Maximum Water Available Per Capita (gallons)
1998	156,120	15,830,000	101.4	19,190,000	122.9
1999	157,172	15,830,000	100.7	19,190,000	122.1
2000	159,113	15,830,000	99.5	19,190,000	120.6
2001	159,840	15,830,000	99	19,190,000	120.1
2002	160,568	19,930,000	124.1	23,790,000	148.2
2003	161,227	19,930,000	123.6	23,790,000	147.6
2004	161,235	19,930,000	123.6	23,790,000	147.5

Source: Florida Keys Aqueduct Authority, 2004

in the Keys to be successful.

Improvements to Potable Water Facilities

FKAA has a long-range capital improvement plan for both the distribution system and the transmission and supply system, as shown in the table below. The total cost of the scheduled improvements is approximately $67.5 million over the next 5 years. These projects are to be funded by the newly revised water rate structure, long-term bank loans, and grants.

The scheduled distribution system improvements include replacing and upgrading lines in various subdivisions throughout the Lower, Middle, and Upper Keys. These improvements began in 1989, when FKAA embarked on the Distribution System Upgrade Program to replace approximately 190 miles of galvanized lines.

In addition to improvements to the distribution system, FKAA also has significant improvements planned for the transmission and supply system. FKAA expects to expand the treatment capacity at the J. Robert Dean Water Treatment Plant to meet future water demands. Also, the FKAA is planning improvements to the pump stations to improve flow/pressure and construction of water storage tanks to provide additional emergency water supply.

Figure 3.7 on the following pages shows the projected capital improvements to the potable water system planned by the FKAA.

Figure 3.7 - FKAA Projected 5 Year Capital Imporovement Plan

Proj. No.	Project	2004	2005	2006	2007	2008	Total
	Water Treatment						
1077	Phase II - High Service Pump	100,000	1,574,000				1,674,000
1073	Aquifer Storage and Recovery (ASR)	750,000	628,000				1,378,000
1079	WTP Control System	126,000					126,000
	Security Cameras and Lighting		350,000				350,000
	Stock Island RO-Permeators & Carbonation	60,000	840,000				900,000
	Desalination Production Facility (Design Only)	75,000	250,000	250,000			575,000
	Distribution System						
	Replace Distribution Pipe	3,500,000	3,500,000	3,000,000	3,000,000	3,000,000	16,000,000
	North Roosevelt Blvd (JPA w/FDOT)				425,000	425,000	850,000
2186	Key West Plant Pump Station	400,000	3,470,000	1,530,000			5,400,000
2183	Cudjoe Tank & Pump Station	850,000	615,000	615,000			2,080,000
2191	Vaca Cut Tank & Pump Station	416,000	341,000				757,000
2187	Islamorada Tanks/Distribution Imp.	50,000		750,000			800,000
2189	Big Pine Pump Station	550,000	270,000				820,000
	Key Largo Storage Tank & Dist. Pump Station			1,000,000	1,000,000		2,000,000
	Transmission System						
	Water Tank Long Key Station				1,100,000		1,100,000
	Water Tank Ramrod Station			1,100,000			1,100,000
1075	Marathon Pump Station Imp. (Engine&Pumps)	100,000	900,000				1,000,000
1042	Jewfish Creek/Cross Key (DOT)	85,000	60,000	1,000,000	2,700,000	1,200,000	5,045,000
	North Roosevelt Blvd (JPA w/FDOT)				425,000	425,000	850,000
	Phase II-Cathodic Protection System		500,000	1,500,000			2,000,000
1064	Key Largo Trans Pump Sta. & Pipeline Inst.	3,500,000	2,000,000	50,000			5,550,000
	Whitehead/Southard Transmission Main		150,000				150,000
	Replace 500' 18" Trans. - Key Largo radio		100,000				100,000
	Replace 1,400' 18" Trans.- Key Largo swamp			300,000			300,000
	Replace 20,000' 36" Trans. Key Largo				1,500,000	2,000,000	3,500,000
	Facilities and Structures						
3080	Rockland Key - Area 2 & Const. Crew Yard	600,000					600,000
3073	Desal Seawall & Dolphins	50,000	50,000	464,000			564,000
	Admin Bldg. Renov. (Security/Roof/AC/Fire)	150,000	150,000	500,000			800,000
	New Admin Bldg/Garage	100,000	500,000	4,000,000			4,600,000
3077	Marathon Central Warehouse	250,000	1,000,000	500,000			1,750,000
	DESAL Customer Service/Records Bldg	100,000	900,000				1,000,000
	Marathon Customer Service Center	600,000	300,000	1,250,000	1,250,000		3,400,000
	DESAL/Stock Island/Lower Keys Garage Wastewater		40,000	200,000			240,000
3083	Stock Island Pump Station Wastewater			120,000			120,000
	TOTALS	***12,412,000***	***18,488,000***	***18,129,000***	***11,400,000***	***7,050,000***	***67,479,000***

Source: Florida Keys Aqueduct Authority, 2004

IV. EDUCATION FACILITIES

The Monroe County School Board oversees the operation of 13 public schools located throughout the Keys. Their data includes both unincorporated and incorporated Monroe County. The system consists of three high schools, one middle school, three middle/elementary schools, and six elementary schools. Each school offers athletic fields, computer labs, a cafetorium that serves as both a cafeteria and auditorium, and bus service. Approximately 54 busses transport about 4,316 students to and from school each day. In addition to these standard facilities, all high schools and some middle schools offer gymnasiums.

The school system is divided into three subdistricts that are similar, but not identical to the service areas outlined in Section 9.5-292 of the Land Development Regulations. One difference is that the School Board includes Fiesta Key and the islands that make up Islamorada in the Upper Keys (Subdistrict 1), while the Land Development Regulations place them in the Middle Keys (Subdistrict 2). Also, the School Board includes Key West in the Lower Keys (Subdistrict 3), while the Land Development Regulations do not consider Key West. The data presented in this section are based on the School Board's subdistricts.

Subdistrict 1 covers the Upper Keys from Key Largo to Lower Matecumbe Key and includes one high school and two elementary/middle schools, as shown in Figure 4.1. Subdistrict 2 covers the Middle Keys from Long Key to the Seven Mile Bridge and includes one high/middle school and one elementary school. Subdistrict 3 covers the Lower Keys, from Bahia Honda to Key West and includes one high school, one middle school, one elementary/middle school, and five elementary schools.

Demand for School Facilities

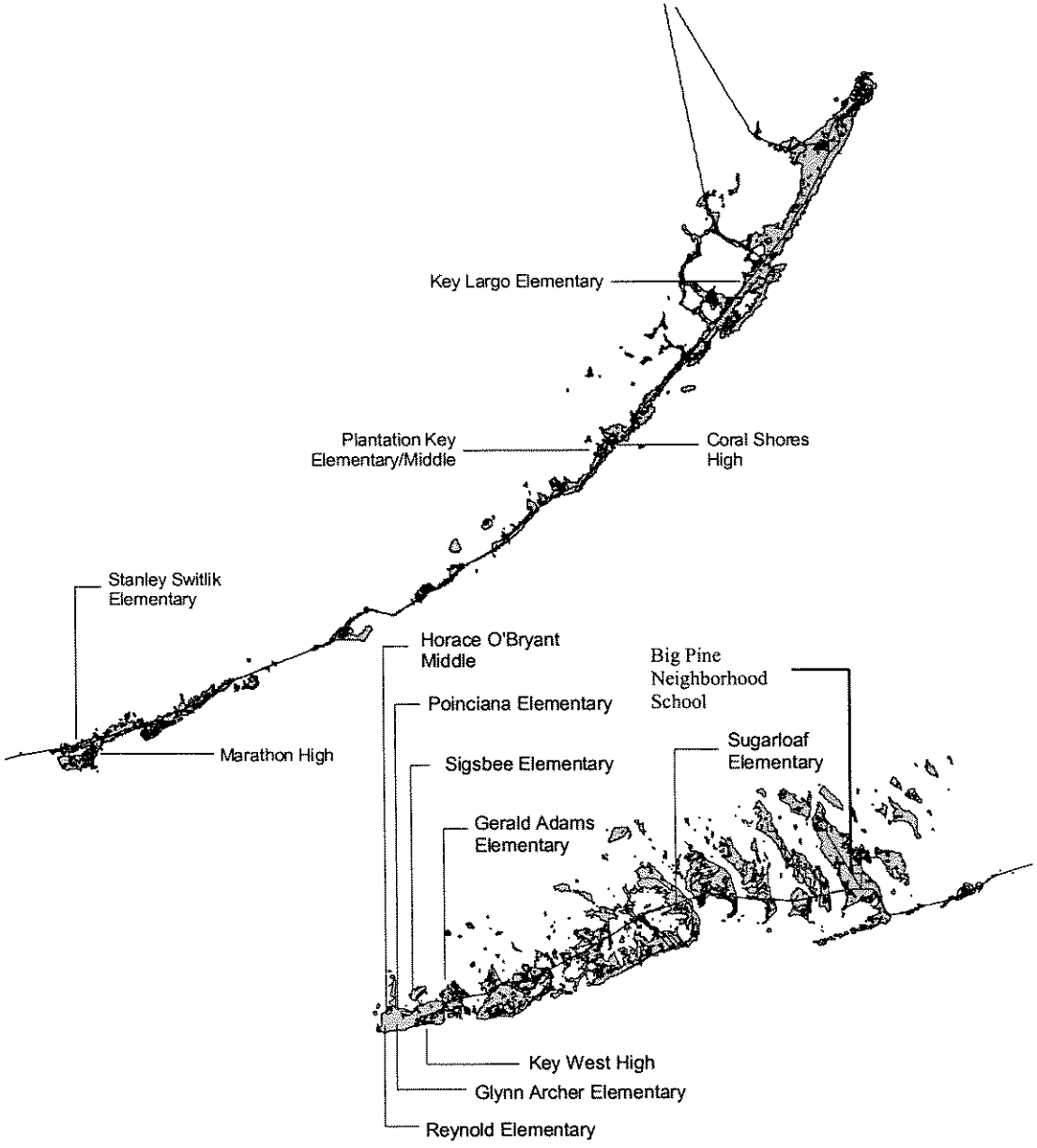
The population of school age children in Monroe County is influenced by many factors, including the size of the resident and seasonal populations, national demographic trends (such as the "baby boom" generation), that result in decreasing household size, economic factors such as military employment, the price and availability of housing, and the movements of seasonal residents.

The School Board collects enrollment data periodically throughout the year. Counts taken in the winter are typically the highest, due to the presence of seasonal residents.

Figure 4.1 - Schools by Subdistrict

Subdistrict 1	Subdistrict 2	Subdistrict 3
Coral Shores High School (9-12)	Marathon Middle/High School (7-12)	Key West High School (9-12)
Key Largo Elementary/Middle School (K-8)	Stanley Switlik Elementary (K-6)	Horace O'Bryant Middle School (6-8)
Plantation Key Elementary/Middle School (K-8)		Adams Elementary (K-5)
		Archer/Reynolds Elementary (K-5)
		Poinciana Elementary (K-5)
		Sigsbee Elementary (K-5)
		Big Pine Key Neighborhood School (Pre K-3)
		Sugarloaf Elementary/Middle School (K-8)

Source: Monroe County School Board, 2004



The following table (Figure 4.3) shows the fall school enrollments from 1992 to 2003 by subdistrict as taken from the School Board's Fall Student Survey.

Level of Service of School Facilities

The Monroe County Land Development Regulations do not identify a numeric level of service standard for schools (such as 10 square feet of classroom space per student). Instead, Section 9.5-292 of the regulations requires classroom capacity "adequate" to accommodate the school-age children generated by proposed land development.

The School Board uses recommended capacities provided by the Florida Department of Education (FDOE) to determine each school's capacity. All schools have adequate reserve capacity to accommodate the impacts of the additional land development activities projected for 2004-2005 school year. Figure 4.4 shows each school's capacity and the projected number of students.

Figure 4.3 - Fall School Enrollments 1992-2003

	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Subdistrict 1												
Coral Shores (H)	605	597	649	702	672	701	757	758	800	810	801	811
Key Largo (E/M)	1,310	1,213	1,235	1,198	1,223	1,273	1,253	1,183	1,173	1117	1112	1073
Plantation (E/M)	718	698	721	737	730	703	675	643	668	647	641	650
Subtotal	*2,633*	*2,508*	*2,605*	*2,637*	*2,625*	*2,677*	*2,685*	*2,584*	*2,641*	*2,574*	2,554	2,534
Subdistrict 2												
Marathon (H)	545	523	578	642	637	612	637	660	679	682	693	654
Switlik (E)	734	775	776	769	782	815	834	791	671	687	714	676
Subtotal	*1,279*	*1,298*	*1,354*	*1,411*	*1,419*	*1,427*	*1,471*	*1,451*	*1,350*	*1,369*	1,407	1,330
Subdistrict 3												
Key West (H)	1,114	1,120	1,155	1,255	1,237	1,327	1,372	1,344	1,305	1,327	1301	1382
O'Bryant (M)	852	902	876	909	897	863	899	814	838	854	874	873
Sugarloaf (E/M)	899	810	1,039	1,013	987	960	937	913	941	854	901	904
Adams (E)	541	529	516	486	500	499	574	566	513	544	598	591
Archer (E)	480	441	462	454	454	520	493	460	393	376	386	382
Poinciana (E)	521	566	613	626	637	608	620	632	599	586	583	547
Sigsbee (E)	471	400	431	431	398	404	423	393	358	363	326	295
Sands	81	81	85	52	52	58	1	0	0	0	0	0
Subtotal	*4,959*	*4,849*	*5,177*	*5,226*	*5,162*	*5,239*	*5,319*	*5,122*	*4,947*	*4,904*	4,969	4,974
Total	***8,871***	***8,655***	***9,136***	***9,274***	***9,206***	***9,343***	***9,475***	***9,157***	***8,938***	***8,847***	***8,930***	***8,838***

Source: Monroe County School Board, 2004

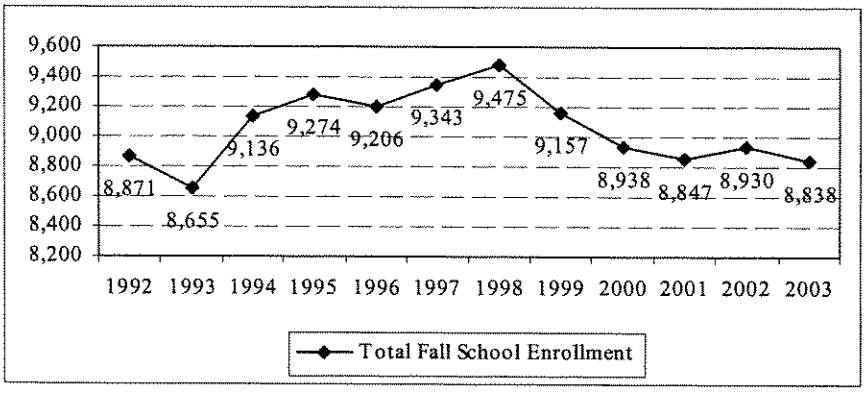


Figure 4.4 -School Capacity, & Projected Number of Students

	Recommended Capacity	Projected 2001-2002	Projected 2002-2003	Projected 2003-2004	Projected 2004-2005
Subdistrict 1					
Coral Shores	868	831	818	747	835
Key Largo	1,240	1,191	1,115	1,082	1,031
Plantation	971	645	653	665	649
Subtotal	*3,079*	*2,667*	*2,586*	*2,494*	*2,515*
Subdistrict 2					
Marathon	1,018	667	673	724	665
Switlik	925	668	674	684	651
Subtotal	*1,943*	*1,335*	*1,347*	*1,408*	*1,316*
Subdistrict 3					
Key West	1,349	1,312	1,267	1,313	1,408
O'Bryant	833	818	838	876	887
Sugarloaf	1,356	941	842	835	888
Adams	547	506	546	605	552
Archer	470	398	371	357	350
Poinciana	660	585	574	591	550
Sigsbee	534	357	373	327	284
Sands	0	0	0	0	0
Subtotal	*5,749*	*4,917*	*4,811*	*4,904*	*4,919*
Total	***10,771***	***8,919***	***8,744***	***8,806***	***8,750***

Source: Monroe County School Board, 2004

Improvements to School Facilities

Florida Statute 163.3177 requires counties to identify lands and zoning districts needed to accommodate future school expansions. In order to bring the Monroe County Year 2010 Comprehensive Plan into compliance with this statute, in 1998 the Monroe County Planning Department and School Board conducted research to determine the existing school capacity and the potential need for future educational facilities in Monroe County.

This study focused on land requirements for each of the schools expansion needs. Overall, the County has sufficient vacant and appropriately zoned land to meet the area's current and future school siting needs. The specific land requirements for the public schools in the County are discussed below.

Key Largo Elementary/Middle School (K-8)
Meeting the substantial land requirements of Key Largo School is a top priority of the School Board. The Department of Education (DOE) has instructed the Monroe County School Board to construct an additional 43,100 square feet of school space. However, current land use regulations prohibit the School Board from construction of any additional facilities on or adjacent to its current site due to the environmental sensitivity of the area. The School Board recently made an unsuccessful attempt to purchase a new site on which to build the required school facilities. Unless the Board is able to provide these facilities in Key Largo they will be non-compliant with the minimum DOE standards. Fully utilizing the current Key Largo site would enable the School Board to meet their DOE requirements and to minimize other secondary environmental impacts associated with the construction of a new school. It has been determined that the School Board may clear the required amount of land, but the location of the clearing is still under review by the Planning and Environmental Resources Department.

Plantation Key Elementary/Middle School (K-8)
The DOE has instructed the Monroe County School Board to construct an additional 16,600 square feet of school space for this school. The parcel of land for this school is not large enough to accommodate this development and regulations prohibit the School Board from constructing any additional facilities on, or adjacent to, its current site due to the environmentally sensitive nature of the area. The new Village of Islamorada will address plans for Plantation Key School and other educational facilities in its comprehensive plan.

Stanley Switlik Elementary
Expanding the existing school facilities into the two parcels of land flanking the current site will accommodate the land requirements for Stanley Switlik Elementary. The school has a new cafeteria/kitchen/multipurpose building as well as new parking and ballfields. Construction on the new facilities has been completed.

Marathon High and Middle School
The land requirements for Marathon High and Middle School are currently being met. The DOE has instructed the Monroe County School Board to construct a new 13,000 square foot auditorium for this school that could also serve as a community center.

Coral Shores High School
The School Board is currently finishing construction on the replacement school, which is scheduled for completion by the end of 2003.

Figure 4.5 is a table showing the results of the investigation completed by the Monroe County School Board and Planning Department in 1998 and updated in 2004.

Figure 4.5 - Preliminary Public School Land Needs

Schools	Developed Site (acres and zoning)	Land Needed		Potential Sites (acres and zoning)
		1998	2004 (estimate)	
Key Largo Elementary/Middle School (K-8)	27 acres (SC & SR)	2 acres (1)	0 acres	There are approximately 70 acres of vacant land zoned SR and 65 acres zoned NA surrounding the current site.
Plantation Key Elementary/Middle School (K-8)	8.29 acres (SR)	N/A (2)	N/A	N/A
Coral Shores High School	20.13 acres (SR)	N/A (2)	N/A	N/A
Stanley Switlik Elementary	9.43 acres (SC)	N/A	0 acres	N/A
Marathon High and Middle Schools	27 acres (SR)	0 acres (3)	0 acres	There are approximately 21 acres of vacant land zoned NA surrounding the current site.
Big Pine Neighborhood Elementary	4.5 acres (SC)	0 acres	0 acres	There are approximately 4.27 acres of vacant land zoned SC and 8.6 acres of vacant land zoned IS surrounding the current site.
Sugarloaf Middle and Elementary	42 acres (SC & NA)	0 acres	0 acres	There are approximately 27 acres of vacant land zoned NA and 34 acres zoned SR surrounding the current site.

(1) The School Board is working with Monroe County Planning Department to meet this need prior to the end of 2004.
(2) Islamorada will address plans for Plantation Key School, Coral Shores High School and other educational facilities in their comprehensive plan.
(3) The Marathon High School and Middle School Boards want to partner with the County to create an auditorium that will also serves as a community center.

Source: Monroe County School Board, 2004

V. SOLID WASTE FACILITIES

Monroe County's solid waste facilities are managed by the Solid Waste Management Department, which oversees a comprehensive system of collection, recycling, and disposal of solid waste. Prior to 1990, the County's disposal methods consisted of incineration and landfilling at sites on Key Largo, Long Key, and Cudjoe Key. Combustible materials were burned either in an incinerator or in an air curtain destructor. The resulting ash was used as cover on the landfills. Non-combustible materials were deposited directly in the landfills.

In August 1990, the County entered into a contract with Waste Management, Inc. (WMI) to transport the solid waste to the contractor's private landfill in Broward County. In accordance with County-approved franchise agreements, private contractors perform collection of solid waste. Residential collection takes place four times a week (2 garbage/trash, 1 recycling, 1 yard waste); nonresidential collection varies by contract. The four (4) contractors currently serving the Keys are identified in Figure 5.1.

The County's incinerators and landfills are no longer in operation. The landfill sites are now used as transfer stations for wet garbage, yard waste, and construction debris collected throughout the Keys by the four curbside contractors and prepared by WMI for shipment out of the Keys. However, it is important to note that a second, unused site on Cudjoe Key could be opened if necessary. Figure 5.2 below summarizes the status of the County's landfills and incinerators.

The County's recycling efforts began in October 1994, when curbside collection of recyclable materials was made available to all County residences and businesses. Recycling transfer centers have been established in the Lower, Middle, and Upper Keys. Waste Management, Inc. continues to process yard waste into mulch. The mulch product is then made available to the public. In addition to County efforts, other government agencies are mulching and reusing yard waste, and private enterprises are collecting aluminum and other recyclable materials.

White goods, waste oil, batteries and tires are handled separately, with collection sites operating at each landfill/transfer station site. The County collects household hazardous waste at the Long Key and Cudjoe Key Transfer Stations, in addition to the Key Largo Recycling Yard. Hazardous waste from conditionally exempt small quantity generators is collected once a year, as part of an Amnesty Days program.

Figure 5.1 - Solid Waste Contractors

Upper Keys	Middle Keys	Lower Keys
Keys Sanitary Service & Ocean Reef Club, Inc.	Mid-Keys Waste, Inc.	Waste Management of Florida, Inc.

Source: Monroe County Solid Waste Management Department, 2004

Figure 5.2 - Solid Waste Facilities

Site	Incinerators	Landfills	Reserve Capacity (cubic yards)
Key Largo	Closed 12/31/90	No Longer Active	0
Long Key	Closed 1/7/91	No Longer Active	0
Cudjoe			
Old Site	Closed 2/25/91	No Longer Active	0
Unused Site	None	Currently Inactive	180,000

Source: Monroe County Solid Waste Management Department, 2004

Demand for Solid Waste Facilities

For solid waste accounting purposes, the County is divided into three districts which are similar, but not identical to the service areas outlined in Section 9.5-292 of the Land Development Regulations (LDRs). One difference is that Windley Key, which is considered to be in the Upper Keys district in the LDRs, is included in the Middle Keys district for purposes of solid waste management. Another difference from the LDRs is that the cities of Layton and Key Colony Beach are included in the Middle Keys district for solid waste management.

Although Islamorada incorporated on December 31, 1997, the municipality continued to participate with Monroe County in the contract with Waste Management Inc. until September 30, 1998. Data for Monroe County solid waste generation is calculated by fiscal year which runs from October 1 to September 30. Therefore, the effects of Islamorada's incorporation on solid waste services appear in the 1999 data. Data for the City of Key West and the Village of Islamorada is not included in this report.

Marathon's incorporation was effective on October 1, 2000 and they continue to participate in the Waste Management Inc. contract. Effects of the incorporation, if any, will appear in the 2001 data.

Demand for solid waste facilities is influenced by many factors, including the size and income levels of resident and seasonal populations, the extent of recycling efforts, household consumptive practices, landscaping practices, land development activities, and natural events such as hurricanes and tropical storms. Analyses provided by a private research group indicate that the average single-family house generates 2.15 tons of solid waste per year. Mobile homes and multifamily units, having smaller yards and household sizes, typically generate less solid waste (1.96 and 1.28 tons per year, respectively).

The following table and graph summarize the solid waste generated by each district. The totals for each district are a combination of four categories of solid waste: gar-

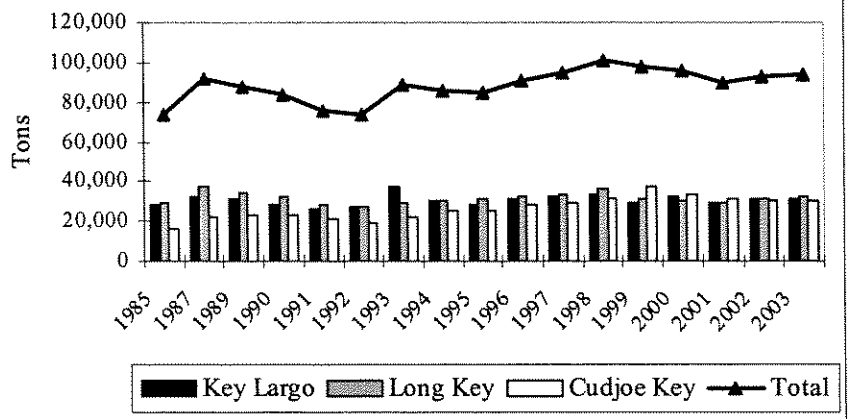
Figure 5.3 - Solid Waste Generation by District

Year	Key Largo	Long Key	Cudjoe Key	Total	% Change
1985	28,585	28,890	15,938	73,413	NA
1987	32,193	37,094	22,206	91,493	24.63%
1989	31,173	33,931	23,033	88,137	-3.67%
1990	28,430	31,924	22,988	83,342	-5.44%
1991	26,356	28,549	20,699	75,604	-9.28%
1992	27,544	26,727	18,872	73,143	-3.26%
1993	37,211	28,986	22,198	88,395	20.85%
1994	30,110	30,662	24,831	85,603	-3.16%
1995	28,604	30,775	25,113	84,492	-1.30%
1996	31,573	31,845	27,823	91,241	7.99%
1997	32,003	33,625	29,350	94,978	4.10%
1998	33,119	36,440	30,920	100,479	5.79%
1999	29,382	30,938	37,431	97,751	-2.71%
2000	32,635	30,079	33,420	96,134	-1.65%
2001	29,663	29,367	31,166	90,196	-6.18%
2002	31,018	31,217	30,700	92,935	3.04%
2003	31,529	31,889	30,385	93,803	0.93%

Note: The figures from 1984 to 1991 include white goods, tires, construction debris, and yard waste. They do not include source-separated recyclables.

Source: Monroe County Solid Waste Management Department, 2004

Figure 5.4 - Solid Waste Generation 1985 -2003 by District



bage, yard waste, bulk yard waste and other (includes construction and demolition debris).

After reaching a peak in 1988, the data shows a general decline in the total amount of solid waste generated throughout the County. However, in 1993 there was an increase of 21 percent in the amount of solid waste generated. This increase is attributed to the demolition and rebuilding associated with Hurricane Andrew, which made landfall in South Florida in late August 1992. For the next two years the amount of solid waste generated in the County was once again on the decline. However, from 1996 onward the amount of solid waste generated has been on the increase until 1998, when it reached its highest level yet. This increase is attributed to the debris associated with Hurricane Georges, which made landfall in the Keys in September of 1998. A portion of the decline seen from 1998 to 1999 may be attributable to the reduction in solid waste collected from Islamorada. The continuing decline shown in 2000 and 2001 is due to a reduction in construction and demolition debris being brought to the County transfer stations following the implementation of the Specialty Hauler ordinances. The increase in 2002 and 2003 may be attributable to fluctuations in waste streams from Islamorada.

Level of Service of Solid Waste Facilities

Section 9.5-292 of the Land Development Regulations requires that the County maintain sufficient capacity to accommodate all existing and approved development for at least three (3) years. The regulations specifically recognize the concept of using disposal sites outside Monroe County.

As of June 2004, Waste Management Inc., reports a reserve capacity of approximately 30.5 million cubic yards at their Central Sanitary Landfill in Broward County, a volume sufficient to serve their clients for another 14 years. Figure 5.5 below shows the remaining capacity at the Central Sanitary Landfill.

Monroe County has a contract with WMI authorizing use of in-state facilities through September 30, 2016, thereby providing the County with approximately twelve years of guaranteed capacity. Ongoing modifications at the Central Sanitary Landfill are creating additional air space and years of life. In addition to this contract, the 180,000 cubic yard reserve at the County

landfill on Cudjoe Key would be sufficient to handle the County's waste stream for an additional four to five years (at current tonnage levels), should the County choose to discontinue haul-out as the means of disposal.

The combination of the existing haul-out contract and the space available at the Cudjoe Key landfill provides the County with sufficient capacity to accommodate all existing and approved development for up to nineteen years.

Figure 5.5 - Remaining Capacity, Central Sanitary Landfill

	2000	2001	2002	2003	2004
Remaining Capacity (volume in millions of cubic yards)	28 yd^3	27 yd^3	34.2 yd^3	32.3 yd^3	30.5 yd^3
Remaining Capacity (time)	14 years	13 years	14 years	14 years	14 years

Source: Monroe County Solid Waste Management Department, 2004

VI. PARKS AND RECREATION

An annual assessment of parks and recreational facilities is not mandated by Section 9.5-292 of the Monroe County Land Development Regulations, though it is required for concurrency management systems by the Florida Statutes. The following section has been included in the 2004 Public Facilities Capacity Assessment Report for informational purposes only.

Level of Service standards for parks and recreational facilities are not mentioned in the Land Development Regulations, but are listed in Policy 1201.1.1 of the Monroe County Year 2010 Comprehensive Plan.

Parks and Recreational Facilities Level of Service Standard

The level of service (LOS) standard for neighborhood and community parks in unincorporated Monroe County is 1.64 acres per 1,000 functional population. To ensure a balance between the provisions of resource- and activity-based recreation areas the LOS standard has been divided equally between these two types of recreation areas. Therefore, the LOS standards are:

> 0.82 acres of *resource-based* recreation area per 1,000 functional population
> 0.82 acres of *activity-based* recreation area per 1,000 functional population

The LOS standards for each type of recreation area can be applied to unincorporated Monroe County as a whole or to each subarea (Upper, Middle, and Lower Keys) of unincorporated Monroe County. In determining how to apply the LOS standard for each type of recreation area, the most important aspect to consider is the difference between resource- and activity-based recreation areas. Resource-based recreation areas are established around existing natural or cultural resources of significance, such as beach areas or historic sites. Activity-based recreation areas can be established anywhere there is sufficient space for ball fields, tennis or basketball courts, or other athletic events.

Since the location of resource-based recreation areas depends upon the natural features or cultural resources of the area and cannot always be provided near the largest population centers, it is reasonable to apply the LOS standard for resource-based areas to all of unincorporated Monroe County. Since activity-based recreation areas do not rely on natural features or cultural resources for their location and because they can be provided in areas with concentrated populations, it is more appropriate to apply the LOS standard to each subarea of the Keys.

It is important to note that the subareas used for park and recreational facilities differ from those subareas used in the population projections. For the purpose of park and recreational facilities, the Upper Keys are considered to be the area north of Tavernier (PAEDs 15 through 22). The Middle Keys are considered to be the area between Pigeon Key and Long Key (PAEDs 6 through 11). The Lower Keys are the area south of the Seven Mile Bridge (PAEDs 1 through 6). Although the Middle and Lower Keys subareas both contain portions of PAED 6, the population of PAED 6 is located in the Lower Keys subarea.

An inventory of Monroe County's parks and recreational facilities is presented below. The facilities are grouped by subarea and are classified according to the principal use (resource or activity).

Figure 6.1 - Parks and Recreation Facilities Serving Unincorporated Monroe County

Site Name	Facilities	Classification and Size (acres)	
		Resource	Activity
	Upper Keys Subarea		
Garden Cove	Undeveloped.	1.5	
Hibiscus Park	Undeveloped.		0.46
Friendship Park	Basketball courts (2), playground, ball field, picnic shelters, parking and public restrooms.		1.92
Key Largo Community Park	A soccer field, two (2) ball fields, six (6) tennis courts, a jogging trail, three (3) basketball courts, roller hockey, volleyball, playground, picnic shelters, public restrooms, parking and aquatic center.		14
Sunset Point	Waterfront park with a boat ramp.	1.2	
Harry Harris	Two (2) ball fields, playground, restrooms, picnic shelters, beach, parking (89) and boat ramp.		16.4
Settler's Park	Playground, park benches, trails, and a historic platform.	3	
Sunny Haven	Undeveloped.	0.09	
Old S.R. 4-A	Undeveloped. NOT IN MASTER PLAN	0.3	
Key Largo Elementary	Monroe County School District; Playground, baseball field, running track, indoor gym.		3.4
Coral Shores High School	Monroe County School District; Baseball field, football field, softball field, 5 tennis courts, indoor gym.		10.1
Plantation Key Elementary	Monroe County School District; playground, 1 tennis court, 1 basketball court, 1 baseball field.		*1.7*
Subarea Total		***6.09***	***47.98***
	Middle Keys Subarea		
Pigeon Key	Historic structures, research/educational facilities, and a railroad museum.	5	
Marathon High School	Monroe County School District; Baseball and football field, softball field, 3 tennis courts, 3 basketball courts, indoor gym.		7.8
Switlik Elementary	Monroe County School District; Playground, 2 baseball fields, shared soccer/football field.		2.5
Subarea Total		***5***	***10.3***
	Lower Keys Subarea		
Little Duck Key	Picnic shelters, restrooms, boat ramp, and beach area.	25.5	
Missouri Key	Undeveloped.	3.5	
West Summerland	Boat Ramp.	31.8	
Heron Avenue	Undeveloped.	0.69	
Palm Villa	Playground and benches.		0.57
Big Pine Leisure Club	Undeveloped.		1.75
Blue Heron Park	Playground, basketball court, youth center, and picnic shelters.		5.5
Watson Field	Two (2) tennis courts, ball field, playground, and volleyball.		2.4
Ramrod Key Swim Hole	Swimming area with no facilities.	0.5	
Summerland Estates	Undeveloped.	0.13	
Little Torch Boat Ramp	Boat ramp.	0.1	
Sugarloaf Elementary	Monroe County School District;1 baseball field, playground.		3.1
Baypoint Park	Playground, volleyball, bocchi ball, two (2) tennis courts, and picnic area.		1.58
Palm Drive cul-de sac	Undeveloped.	0.1	
Rockland Hammock	Undeveloped.	2.5	
Boca Chica Beach	Beach area.	6	
Delmar Avenue	Boat ramp.	0.2	
Big Coppitt Fire Department Playground	Playground and benches.		0.75
Wilhelmina Harvey Children's Park	Two playground areas, a walking trail and green space.		0.65
Bernstein Park	Ball field, soccer, basketball court, track, tennis courts, playground, restrooms and volleyball.		11
East Martello	Historic structures, teen center, and picnic area.	14.58	
West Martello	Historic structure.	0.8	
Higgs Beach/Astro City	Five (5) tennis courts, playground, volleyball, picnic shelters, beach area, pier, and public restrooms.		15.5
Lighthouse Museum	Historic structure and museum.	0.77	
Subarea Total		***87.17***	***42.8***
UNINCORPORATED MONROE COUNTY TOTAL		***98.26***	***101.08***

Source: Monroe County Planning Department, 2004

There are currently 98.26 acres of resource-based recreation areas either owned or leased by Monroe County shown in Figure 6.1. Using the functional population projection for 2004 of 75,801 persons in unincorporated Monroe County, and the LOS standard of 0.82 acres per 1,000 functional population, the demand for resource based recreation areas is approximately 62.16 acres. The county currently has a resource-based land to meet the level of service with an extra 36.10 acres of reserve capacity.

Level of Service Analysis for Activity-Based Recreation Areas

The Year 2010 Comprehensive Plan allows activity-based recreational land found at educational facilities to be counted towards the park and recreational concurrency. There is currently a total of 101.08 acres of developed activity-based recreation areas either owned or leased by Monroe County and the Monroe County School Board. This total represents 47.98 acres in the Upper Keys (including Plantation Key in Islamorada), 10.3 acres in the Middle Keys (including Marathon), and 42.8 acres in the Lower Keys. Based on a LOS standard of 0.82 acres of activity-based recreation areas per 1,000 functional population in unincorporated Monroe County (37,314-Upper, 4,140-middle, and 34,347-Lower), the demand for these recreation areas are 30.60, 3.39 and 28.16 acres for the Upper, Middle, and Lower Keys, respectively.

There is currently a reserve of 17.38, 6.9, and 14.64 (Upper, Middle, and Lower) for a total of 38.92 acres of activity-based recreation areas for all of unincorporated Monroe County. Figure 6.2 shows the level of service analysis for activity-based recreation areas in each subarea.

Future Parks and Recreation Planning

Monroe County is currently undertaking a comprehensive analysis of it's parks and recreation system in order to more accurately plan for the recreational needs of the population. A parks and recreation master plan is being prepared and is anticipated to be complete within a year of this report. The master plan will assess the current level of service standard and how it is applied throughout the county, evaluate the current park system, recommend areas where new park sites should be acquired, and funding mechanisms which may be used for that acquisition. The master plan is mandated by the Year 2010 Comprehensive Plan and will allow the county to address the residents parks and recreation needs more accurately.

Identifying parks and recreation needs is also a part of the on going Livable CommuniKeys Program. This community based planning initiative looks at all aspects of an area and, among other planning concerns, identifies the parks and recreation desires of the local population. The Livable Commu-

Figure 6.2 - Level of Service Analysis for Activity-Based Recreation Areas

Subarea	2004 Functional Population	Total Activity-based Acreage Available	Demand (.82 AC/1,000 people)	Reserve Capacity (in acres)
Upper Keys Total	37,314	47.98	30.60	17.38
Middle Keys Total	4,140	10.3	3.39	6.91
Lower Keys Total	34,347	42.8	28.16	14.64
Total	***75,801***	***101.08***	***62.16***	***38.92***

Source: Monroe County Planning Department, 2004

niKeys Program has been completed on Big Pine Key and No Name Key, and Tavernier. The process has recently begun in Key Largo and will begin shortly in Stock Island.

Acquisition of Additional Recreation Areas

The Monroe County Year 2010 Comprehensive Plan states in Objective 1201.2 that "Monroe County shall secure additional acreage for use and/or development of resource-based and activity-based neighborhood and community parks consistent with the adopted level of service standards." The elimination of deficiencies in LOS standards for recreation areas can be accomplished in a number of ways. Policy 1201.2.1 of the Comprehensive Plan provides six (6) mechanisms that are acceptable for solving deficits in park level of service standards, as well as for providing adequate land to satisfy the demand for parks and recreation facilities that result from additional residential development. The six (6) mechanisms are:

- Development of park and recreational facilities on land that is already owned by the county but that is not being used for park and recreation purposes;
- Acquisition of new park sites;
- Interlocal agreements with the Monroe County School Board that would allow for the use of existing school-park facilities by county residents;
- Interlocal agreements with incorporated cities within Monroe County that would allow for the use of existing city-owned park facilities by county residents;
- Intergovernmental agreements with agencies of state and federal governments that would allow for the use of existing publicly-owned lands or facilities by county residents; and
- Long-term lease arrangements or joint use agreements with private entities that would allow for the use of private park facilities by county residents.

To date, the county has employed two of these six mechanisms – acquisition of new park sites (number 2 above) and interlocal agreements with the School Board (number 3 above). However, these agreements need to be examined more closely to determine the amount of available acreage for calculating concurrency. Furthermore, Monroe County cannot rely upon joint use facilities to eliminate existing deficiencies or meet future LOS requirements until interlocal, intergovernmental, or private use joint agreements are executed. For instance, the County is currently reviewing and revising the interlocal agreements with the Monroe County School Board to provide greater day time accessibility for students to public recreational facilities. Once executed, these agreements will ensure that the facilities will be available for general use to Monroe County residents to meet peak season, weekend, or time of day recreation demands.