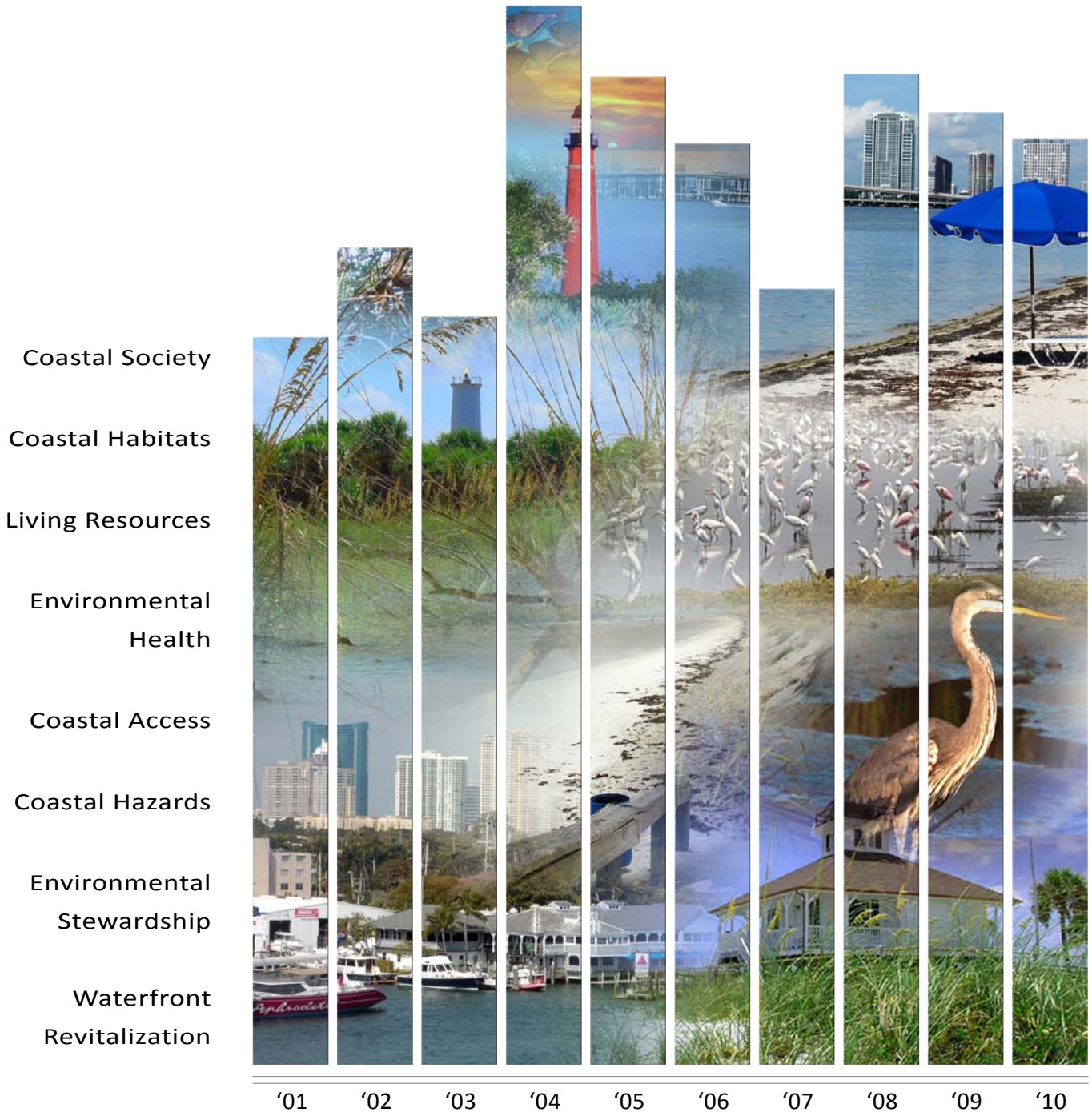


FACT 2010

Florida Assessment of Coastal Trends

Florida Coastal Management Program
Florida Department of Environmental Protection



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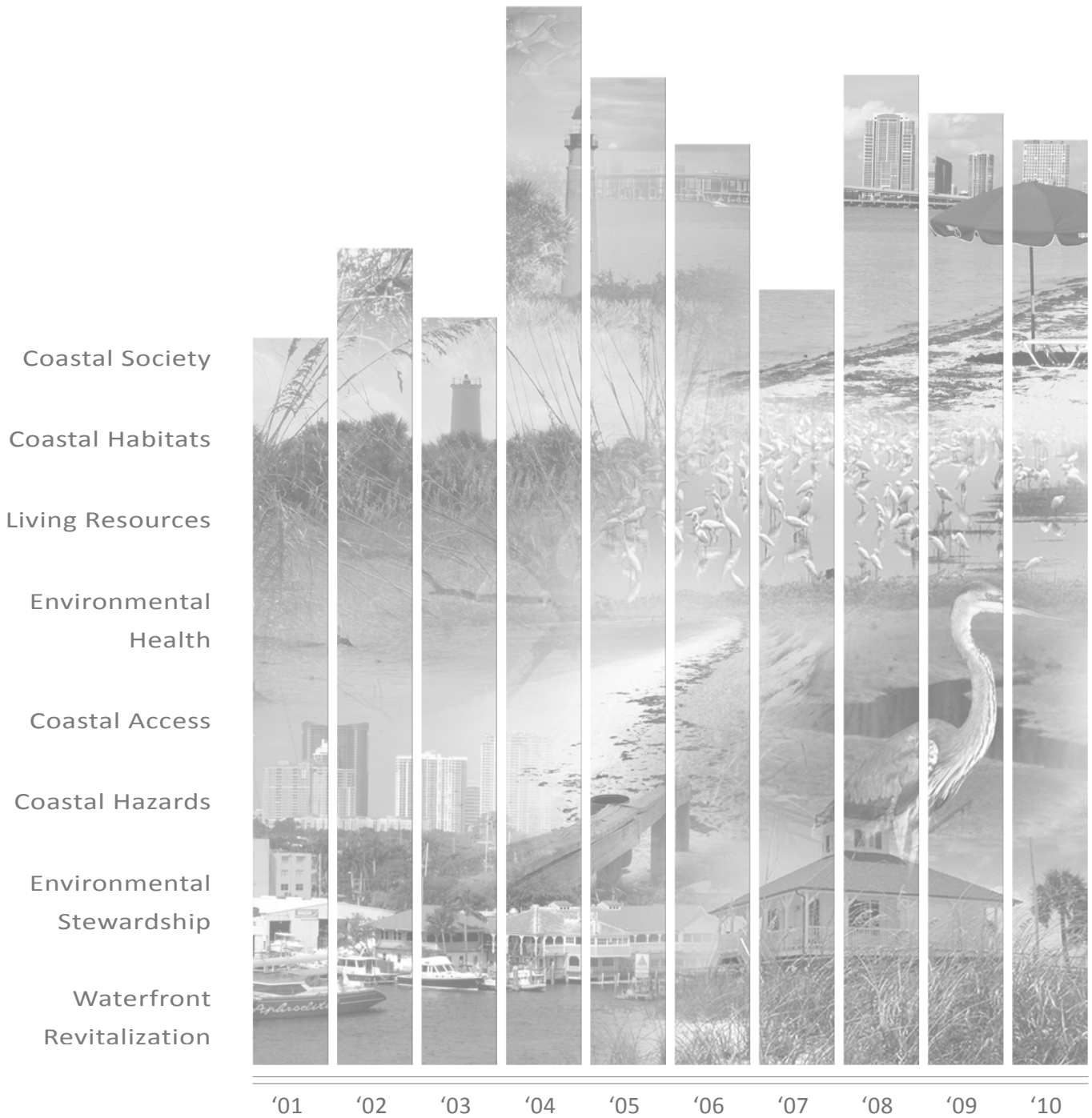


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List of Acronyms

BMAP	Basin Management Action Plan
BMP	Best Management Practice
BMR	Bureau of Mines and Reclamation
CAMA	Coastal and Aquatic Managed Areas
CARL	Conservation and Recreation Lands
CRS	Community Rating System
DACS	[Florida] Department of Agriculture and Consumer Services
DCA	Department of Community Affairs
DEO	Department of Economic Opportunity
DEP	[Florida] Department of Environmental Protection
DOD	Department of Defense
DOH	[Florida] Department of Health
DRP	Division of Recreation and Parks
DSL	Division of State Lands
FCMP	Florida Coastal Management Program
FDOT	Florida Department of Transportation
FKNMS	Florida Keys National Marine Sanctuary
FMNP	Florida Master Naturalist Program
FNRLI	Florida Natural Resources Leadership Institute
FSGEAC	Florida Sea Grant Extension Agent Advisory Committee
FWC	[Florida] Fish and Wildlife Conservation Commission
FWRI	Fish and Wildlife Research Institute
GP	General Public
HAPC	Habitat Area of Particular Concern
HMGF	Hazard Mitigation Grant Program
ICC	International Coastal Cleanup
NERR	National Estuarine Research Reserves
NOAA	National Oceanographic and Atmospheric Administration
NPS	National Parks Service
OFW	Outstanding Florida Waters
OSTDS	Onsite Sewage Treatment and Disposal System
PDRP	Post Disaster Redevelopment Plans
PSN	Persons with Special Needs
RPC	Regional Planning Council
SCORP	Statewide Comprehensive Outdoor Recreation Plan
SOC	Save our Coast
SOR	Save our Rivers
SpNS	Special Needs Shelters
STC	Sea Turtle Conservancy
STSSN	Sea Turtle Stranding and Salvage Network
SWIM	Surface Water Improvement and Management
TMDL	Total Maximum Daily Load
USDA	United States Department of Agriculture
USDOT	United States Department of Transportation
WBIDS	Waterbody Identifiers
WFP	Waterfronts Florida Program
WMD	[Florida] Water Management District

Introduction

The Florida Coastal Management Program (FCMP) is one of many entities, both public and private, involved in planning and implementing activities that affect the long-term health and vitality of Florida's rich coastal resources. An important part of planning for the future of these resources is maintaining a clear perspective on how they are changing. The Florida Assessment of Coastal Trends (FACT) 2010 tracks the most recent changes in 65 indicators in order to help illustrate how resources have responded to policies and activities implemented by coastal resource managers. One of the primary goals of the FACT is to provide decision makers across the state with another tool to help them effectively plan for the future of Florida's coastal zone.

Indicator Selection

Like its three predecessors, FACT 2010 is a collection of indicators in several different focus areas. FACT 2010 addresses a total of 65 indicators divided into eight focus areas and covers the period from 2000 to 2010. An indicator is a measured or observed parameter that provides information about a system.

The indicators included in previous versions of the FACT, particularly FACT 2000, heavily influenced the indicator selection process for FACT 2010. The FCMP attempted to preserve as many relevant indicators as possible in order to provide a near seamless stream of trend analysis. Of the 37 indicators that appeared in FACT 2000, 24 appear in the newest installment of the FACT in some form. Some indicators are exactly the same but most have changed slightly as a result of changes in data availability and reliability. Several indicators, such as the ones based on human population, were not present in FACT 2000 but did appear in FACT 1995 and FACT 1997.

Indicators can be utilized by coastal managers to illustrate broad trends and program changes that have occurred. Indicators can raise awareness, provide information concerning existing conditions, inform decision makers, and illustrate changes that have occurred to determine the effectiveness of actions. The indicators have been separated into eight focus areas of coastal zone management: Coastal Society, Coastal Habitats, Living resources, Environmental Health, Coastal Access, Coastal Hazards, Environmental Stewardship, and Waterfront Revitalization.

Data

Data compilation and trend analysis for FACT 2010 was conducted by Florida Coastal Management Program staff, except for the Waterfronts Revitalization chapter which was completed by the Waterfronts Florida Program staff at the Department of Economic Opportunity. Writers consulted with experts, knowledgeable and often currently conducting research, in the particular scope of an

Introduction

indicator. The FCMP relied heavily on data provided by state and federal agencies responsible for coastal management. Some indicators are based on datasets that do not cover the entire 11 year time period. In these cases, an effort was made to provide an analysis of the data that were available. Nine indicators are based on surveys conducted by Florida State University on behalf of the FCMP. Six of them are from the Coastal Issues Surveys and three of them are from the Local Government Coastal Trends Survey.

Coastal Issues Survey

The Florida Coastal Issues Surveys were conducted in 1999 and in 2009. Survey questions were related to coastal issues such as access, hazards, and stewardship. The 1999 survey was conducted during January and February 2000 and had 1,005 respondents. These results were used in FACT 2000. The majority of the 2009 survey was conducted between June 20, 2009 and December 1, 2009. A total of 1,331 respondents participated in this survey. Although the total number of respondents for each survey is mentioned here not all respondents answered each question. As a result, the sample size for some questions may vary.

Local Government Coastal Trends Survey

Three indicators are based on the Local Government Coastal Trends Survey of 41 local governments in the coastal zone. The survey was conducted in 2009 and included both 20 cities and 21 counties located along both coasts. Survey questions were related to hazards, access, and stewardship. All 41 local governments that were asked to participate complied.

Florida Coastal Management Program (FCMP) Contribution

Each year, the FCMP makes federal funds from the National Oceanic and Atmospheric Administration (NOAA) available as pass-through grants to local governments, state agencies and water management districts to promote the protection and effective management of Florida's coastal resources. Grant applications are solicited through two competitive programs – the Coastal Partnership Initiative for local projects, and a grant program specifically for state agencies and water management districts.



The goal of the Coastal Partnership Initiative (CPI) is to engage local governments in proactive conservation and restoration activities, and foster community stewardship of natural and cultural resources held in the public ownership. The CPI is an annual, competitive grant program open to local governments in Florida's 35 coastal counties and all municipalities within their boundaries that are required to include a coastal element in their local comprehensive plan. Florida's public colleges and universities, regional planning councils, national estuary programs and nonprofit groups may also apply for CPI funds if an eligible local government agrees to participate as a partner. Proposals selected for funding are included in the FCMP's annual cooperative Coastal Zone Management grant award from NOAA. Chapter 62S-4, Florida Administrative Code (FAC), specifies CPI grant submittal and review procedures and eligibility criteria.

The State Agency and Water Management District (WMD) grant program provides funds for projects that contribute to the protection, management and enhancement of Florida's ocean and coastal resources and achieve the policy issues identified in the Coastal Zone Management Act. Priority consideration is given to proposals that complement other state and federal ocean and coastal resource management programs and meet or reduce unmet needs. Chapter 62S-5, FAC, explains the grant submittal and review processes for state agencies and WMDs seeking FCMP funds.

Through the CPI and State Agency/WMD grant programs, funds are disbursed throughout Florida to support projects that may be broadly categorized into the following areas: Waterfront Revitalization, Coastal Hazards, Community Stewardship, Environmental Health, Coastal Habitats, and Coastal Access.

Number of Projects and Amount of Funds Awarded through FCMP Grants

Each year, the FCMP uses a considerable portion of its budget to fund projects that address priority coastal management issues. This section reviews grants awarded between 2000 and 2010, and examines funding levels and types of projects completed. Funded projects span all program focus areas that fundamentally address stewardship of Florida's natural resources: Waterfront Revitalization, Coastal Hazards, Community Stewardship, Environmental Health, Coastal Habitats and Coastal Access. These six focus areas are summarized below – each focus area includes a range of activities:

- Waterfront Revitalization grants are designed to assist communities with waterfront revitalization and projects that enhance/sustain traditional waterfronts while addressing public access, resource protection and hazard mitigation issues. Waterfront Revitalization grants are community- and stakeholder-driven, with an emphasis on development of vision plans to identify appropriate restoration and/or mitigation projects.
- Coastal Hazards projects target the numerous potential conditions that communities experience from natural and man-made hazard events and disasters, *e.g.*, hurricanes, flooding, sea-level rise, oil spills, and derelict vessels. Communities may also seek funding to prepare for such events, *i.e.*, to make the community more resilient to the effects of these hazards. Projects typically involve strategic planning, emergency response and post-event redevelopment.
- Community Stewardship projects promote the appreciation of fragile coastal resources and support community-based awareness and action efforts that involve citizens, volunteers, and the local government. Examples of community stewardship projects include dune and wetland restoration, invasive plant control, coastal cleanups, and environmental awareness initiatives and events.
- Environmental Health projects are directed at evaluating and mitigating water quality deterioration in natural systems (spring, stream, estuary, and ocean waters), and monitoring levels of biological and chemical contamination. Examples of environmental health projects include: conducting research and monitoring of harmful algal blooms, development of identification methodology and advisory reporting of bacterial and toxin contamination at beaches and in aquaculture species, and all aspects of coastal nonpoint pollution control, such as on-site treatment and disposal systems and Total Daily Maximum Loads monitoring.
- The Coastal Habitats focus area represents broad activities that include research, monitoring, protection, restoration, and mitigation of natural resources and ecosystems, and the protection and promotion of biodiversity throughout the state.
- Coastal access projects are essential to the public's enjoyment and understanding of coastal and marine resources. At the same time, these fragile coastal ecosystems should be protected from overuse and environmental damage. Towards this goal, grants in this focus area provide ease of access to coastal natural resources, educational outreach on the human impact of coastal resources, and maintenance of access sites to decrease degradation of natural areas as a whole. The Coastal Access focus area includes projects such as park plans, canoe and kayak paddle trails, land acquisition and small-scale construction, *e.g.*, boardwalks, observation towers, fishing piers, canoe launches and park improvements and restoration activities.

FCMP grants data were analyzed in two ways – by the number of projects within a focus area and by the amount of money funded in each focus area over time. Table A shows the number of projects in each of the six focus areas for years 2000 to 2010. The FCMP provided financial assistance to 22-32 projects each year for this period, or 302 over the time span. Coastal Habitats and Coastal Access projects were most frequently awarded funds, averaging six to seven projects per year, and totaling 87 and 72, respectively, over the 11 years. Coastal Hazards projects were

least frequently submitted and approved for funds; however, the Coastal Hazards focus area has become a high priority in the FCMP with the introduction of a new CPI category in 2010 called *Resilient Communities*. Grants awarded under this category will help communities respond to the effects of climate change, natural hazard events and disasters through funding for conducting risk assessments, vulnerability analyses, post-disaster redevelopment plans, wetland restoration, and new energy development.

Table A

Number of FCMP grants annually from 2000 to 2010 in six program focus areas, including: Waterfront Revitalization, Coastal Hazards, Community Stewardship, Environmental Health, Coastal Habitats, and Coastal Access.

Category	'00	'01	'02	'03	'04	'05	'06	'07	'08	'09	'10	Total
	FY 00-01	FY 01-02	FY 02-03	FY 03-04	FY 04-05	FY 05-06	FY 06-07	FY 07-08	FY 08-09	FY 09-10	FY 10-11	
Waterfront Revitalization	4	5	5	3	4	4	3	3	4	4	5	44
Coastal Hazards	1	0	0	0	1	0	1	1	1	3	3	11
Community Stewardship	4	6	5	5	3	2	3	4	3	3	3	41
Environmental Health	2	5	5	5	4	7	6	3	4	2	4	47
Coastal Habitats	9	4	6	6	11	10	11	5	9	10	6	87
Coastal Access	7	10	6	7	5	7	8	6	6	7	3	22
Total	27	30	27	26	28	30	32	22	27	29	24	302

The amount of funds distributed to coastal local governments, state agencies and water management districts from 2000 to 2010 exceeded \$19.8 million (Table B). Annual grant funding ranged from \$1.2 to \$2.1 million, and the amount fluctuated year to year. Over the past eleven years, Coastal Habitats and Environmental Health projects together received over half of all grant projects funded (\$6.76 and \$4.52 million, respectively). Coastal Access and Community Stewardship projects received \$3.9 and \$1.32 million, respectively, for the same period.

Table B

Amount of funding (in dollars) of FCMP grants annually from 2000 to 2010 in six program focus areas: Waterfront Revitalization, Coastal Hazards, Community Stewardship, Environmental Health, Coastal Habitats, and Coastal Access.

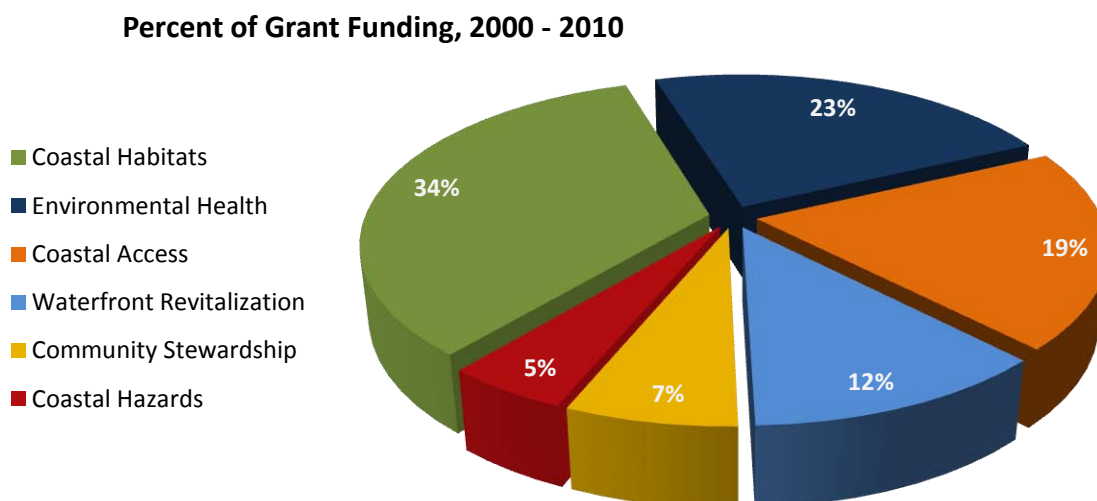
Fiscal Yr.	Grant Yr.	Waterfront Revitalization	Coastal Hazards	Community Stewardship	Environmental Health	Coastal Habitats	Coastal Access	Total
FY 00-01	'00	235,000	80,000	120,000	120,000	419,593	265,000	1,239,593
FY 01-02	'01	145,000	0	150,000	425,000	200,000	400,000	1,320,000
FY 02-03	'02	145,000	0	160,000	626,399	501,383	255,000	1,687,782
FY 03-04	'03	200,000	0	120,000	562,240	738,000	370,000	1,990,240
FY 04-05	'04	250,000	80,000	97,154	514,811	979,120	204,538	2,125,623
FY 05-06	'05	247,300	0	69,440	436,906	930,000	353,663	2,037,309
FY 06-07	'06	199,000	75,000	155,000	527,104	584,452	586,325	2,126,881
FY 07-08	'07	199,000	75,000	140,999	384,000	393,701	538,051	1,730,751
FY 08-09	'08	250,000	122,670	131,285	281,690	746,618	423,366	1,955,629
FY 09-10	'09	240,000	316,785	95,000	163,200	739,983	345,250	1,900,218
FY 10-11	'10	255,000	207,000	90,000	479,071	536,600	159,410	1,727,081
Total		\$2,365,300	\$956,455	\$1,328,878	\$4,520,421	\$6,769,450	\$3,900,603	\$19,841,107

The allocations of CPI and State Agency/WMD grants for any particular focus area are dependent upon the number and type of applications received from the local governments and state

agencies. Waterfront Revitalization has received consistent funding of between \$145,000 and \$255,000 each year for the past eleven years, for a total of \$2.3 million. Total expenditures on Coastal Hazards projects were approximately \$956,000 during this time, and showed an increasing trend with time. Funding for Environmental Health, Coastal Habitats and Coastal Access varied greatly in any given year. Allocations for Community Stewardship also varied during the 2000-2010 period. While the number of projects categorized as “stewardship” projects decreased in some years, multiple projects within the other categories include stewardship components (i.e. using volunteers to implement project tasks). This is not reflected in the data provided.

The percentage of total annual disbursements of grant funding in the six program focus areas are presented for 2000-2010 total spending (Figure A). The distribution of grant money over the last eleven years primarily funded projects for Coastal Habitats and Environmental Health (57%). Remaining funds show the percent distribution for Coastal Access (19%), Waterfront Revitalization (12%), Community Stewardship (7%) and Coastal Hazards (5%). Percentages in 2010 reflect the decadal trend of increasing awards of Coastal Hazards projects and decreasing awards for Community Stewardship projects.

Figure A
Percent of FCMP grant allocations in the six focus areas for the period 2000 to 2010.



Coastal Society



Executive Summary

Location plays a major part in defining how a society develops. In Florida, the entire population is less than 80 miles from the shore. Because of this proximity and the opportunities associated with it, the coast has heavily influenced and helped shape the state into a true coastal society.

This chapter focuses primarily on the coastal society within the coastal zone—the 35 coastal counties. These indicators scratch the surface of the coastal society and provide a broad overview of major trends that have taken place with regard to population, land use, water use, and employment in the coastal zone. It is comprised of six different indicators.

Table 1-1
Coastal Society Indicators

1.1	Population in Florida
1.2	Population by County, City
1.3	Population in the Coastal Zone
1.4	Land Cover Change
1.5	Coastal Dependent Use of the Coastline
1.6	Freshwater Withdrawals

These six indicators can be divided into two sections. The first section includes Indicators 1.1-1.3. The purpose of this section is to describe the trends in population growth in the state, its counties and cities, and in the coastal zone. Indicator 1.1 describes the change in population in Florida. Between 2000 and 2010, Florida's population increased 17.6 percent. Indicator 1.2 focuses on population changes at the county and city level. Indicator 1.3 focuses on population changes in the coastal zone and compares the coastal zone to the rest of the state. Most of the data that are presented in these indicators are from the US Census. Growth in the coastal zone accounted for 68 percent of the state's growth.

The second section includes Indicators 1.4-1.6. The purpose of this section is to describe the trends in the coastal society's use of their coastal environment. Indicator 1.4 uses land cover data which are derived from satellite imagery to describe the amount and type of change that has taken place with a focus on developed land. Overall, land cover change was minimal. Indicator 1.5 outlines employment trends in five different sectors of the coastal dependent ocean economy. Each of the Ocean Economy sectors has been deemed 'dependent' on the coastline. This indicator shows that the increase in employment in coastline dependent industries was driven mostly by tourism and hotels and drinking places. Indicator 1.6 explores freshwater withdrawals in six different categories. This indicator shows that agriculture was the largest withdrawer of freshwater at the beginning of the decade but public use category was the largest single withdrawer of freshwater by 2010.

Indicator 1.1 - Population in Florida

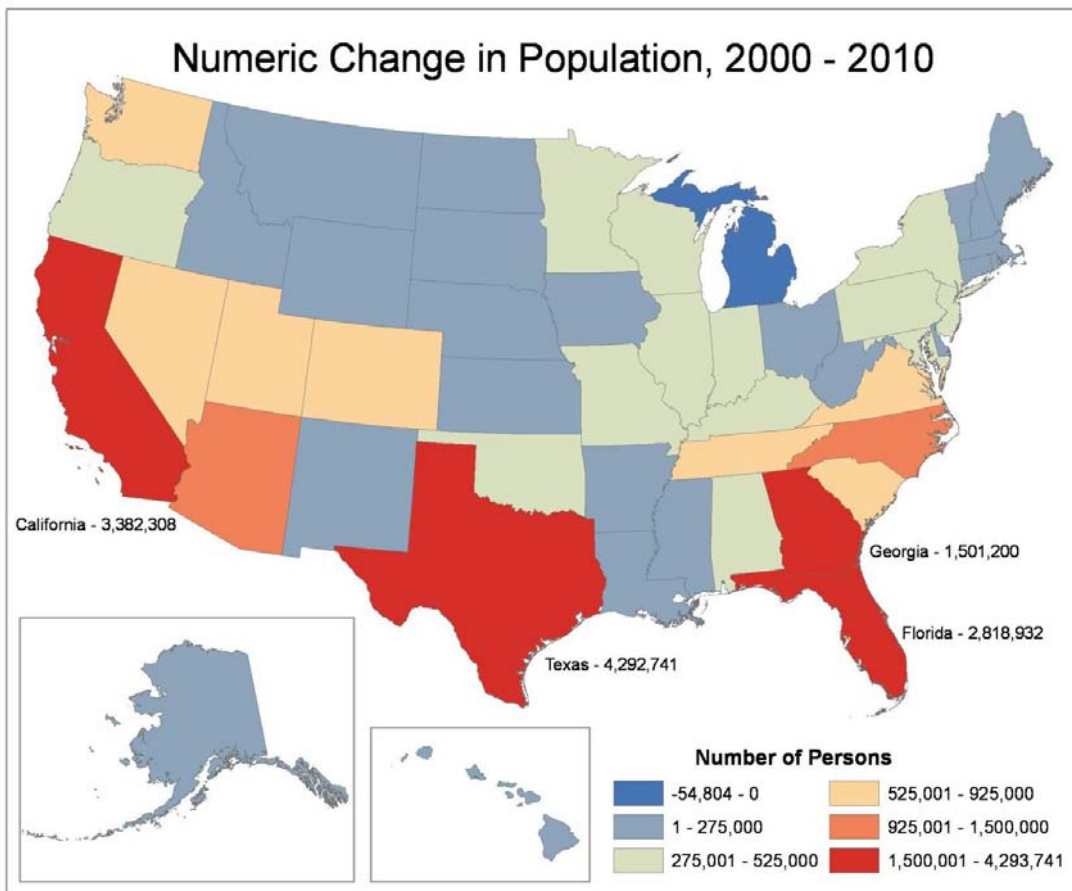
In 2010, the population in Florida accounted for 6 percent of the nation's population making the sunshine state the fourth most populated state in the country. This indicator tracks the overall population in the state of Florida between 2000 and 2010. Two components of population growth are covered—natural increase and net migration. During this time Florida experienced both a rapid increase in population and the most notable decrease in decades.

Population Growth in Florida

Between 2000 and 2010 Florida's population increased by 2.8 million people from 15,000,000 in 2000 to 18,801,310 in 2010 (Figure 1-1). During this period, Florida ranked notably among the fifty states in both numeric and percent growth. Only two other states—California and Texas—experienced a higher numeric increase in residents. In terms of percent growth, only seven other states—Nevada, Arizona, Utah, Idaho, Texas, North Carolina, and Georgia—exceeded Florida's 17.6 percent increase in population.

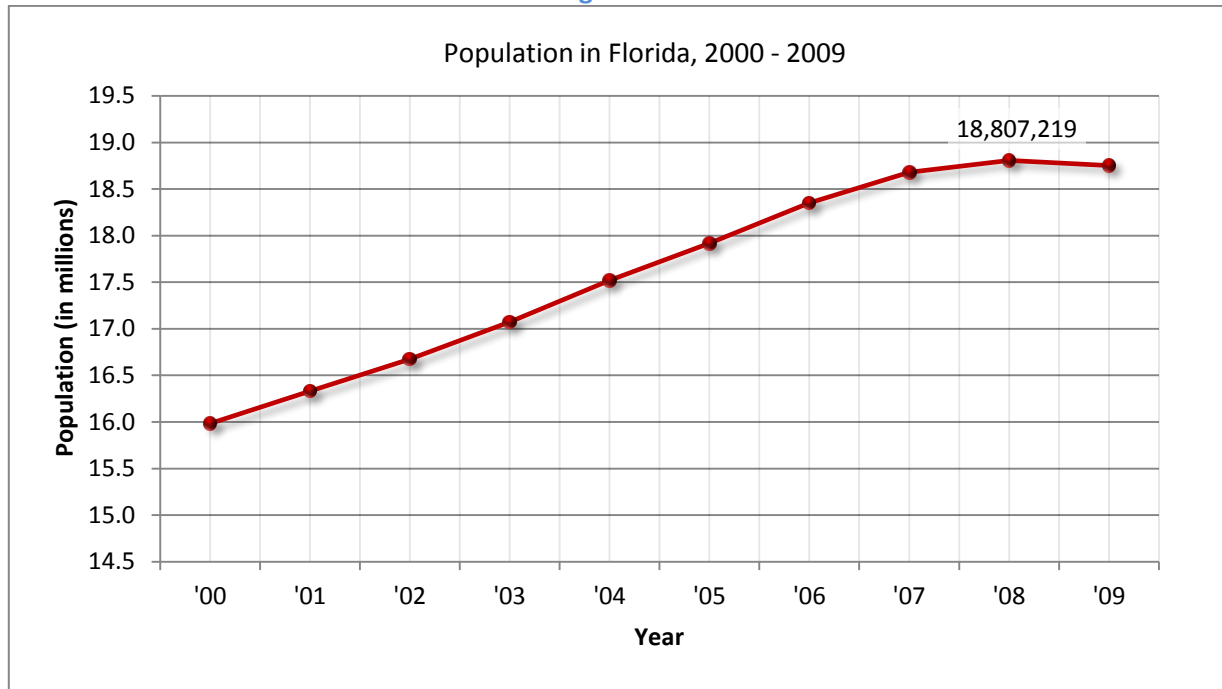
Figure 1-1

Figure 1-1 shows the numeric change in population for each state from 2000 - 2010. Florida ranked third in numeric change during this period.



Although steady population growth continued into the first decade of the new century, it did not last (Figure 1-2). Florida experienced its largest population increase during this period in 2004 growing by 445,224 people. The state continued to grow by more than 400,000 people for the next two years but then dropped to 330,000 in 2007. In 2008, growth fell to only 126,852 people and the population peaked at 18,807,219.

Figure 1-2



Components of Population Growth

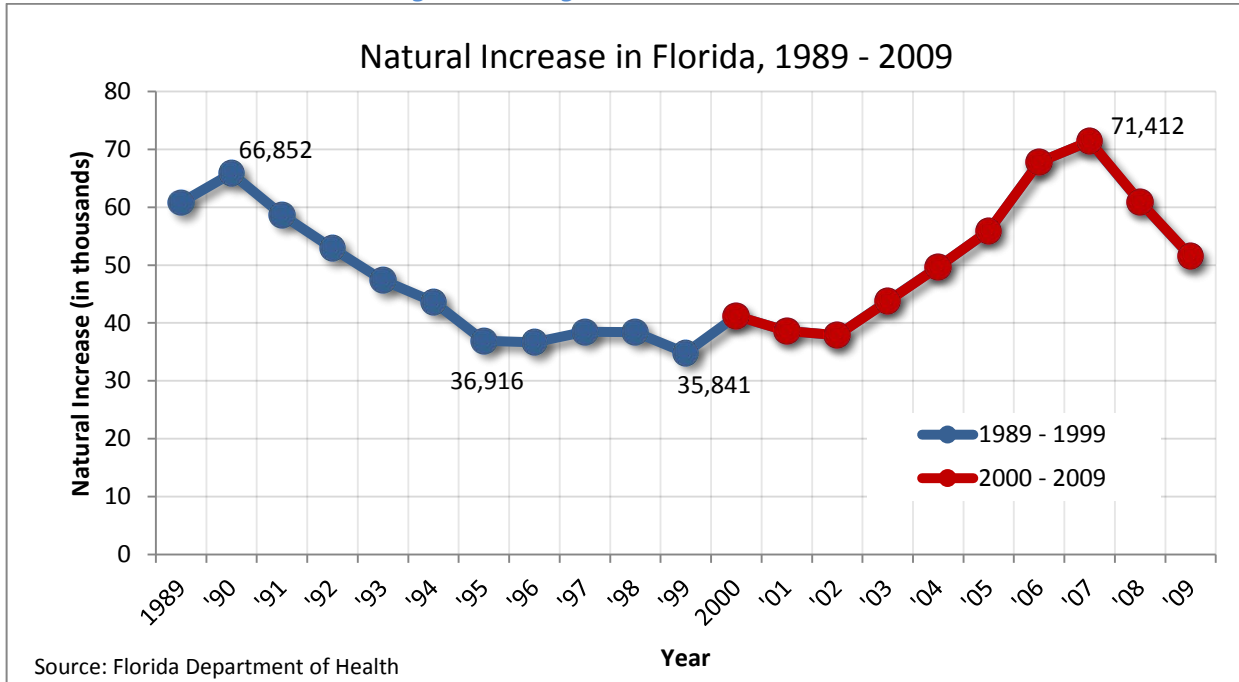
Population growth is the net result of four components—birth, death, immigration, and emigration. Birth and immigration add to the population while death and emigration subtract from it. Natural increase is the difference between the births and the deaths. A positive value indicates that there were more births than deaths while a negative value indicates the number of deaths exceeds the number of births. Net migration is the difference between the number of immigrants and the number of emigrants. Across the whole decade, natural increase represented approximately 20 percent of Florida's population growth while net migration accounted for 80 percent.

Natural Increase

Florida's natural increase between 2000 and 2009 totaled 518,766. During much of this period the natural increase was characterized by growth (Figure 1-3). Beginning in 1990, Florida's natural increase fell from nearly 66,000 down to 37,000 in five years and growth subsequently remained stagnant for the next four. The year 2002 marked the beginning of an uninterrupted steady increase in natural growth that lasted through 2007. That year, the natural increase reached 71,412. Natural increase fell in 2008 and again in 2009.

Figure 1-3

Figure 1-3 shows Florida's natural increase from 1989 - 2009. The blue line tracks the natural increase from 1989 to 1999 while the red line covers the period between 2000 and 2009. While there is clearly a rapid increase in natural increase that took place between 2000 and 2009, the 20 year period beginning in 1989 indicates much slower long-term change.



Domestic Migration

Domestic migration is the movement of individuals within the United States. Between 2000 and 2009, Florida both received and lost a large number of individuals internationally but according to the Census Bureau the majority (58.2 percent) of Florida's net migration during this period was domestic.

Total Domestic Migration

Nearly 4 million people moved to Florida from within the United States between FY2000 and FY2008. A large number of individuals came from highly populated states such as New York, Texas and California. The state also received a large number of individuals from its most populated neighbor, Georgia. New Floridians were least likely to move from Montana, South Dakota, Wyoming, and North Dakota. During this period, Florida lost approximately three million residents to domestic migration. More residents resettled in Georgia than it sent to any other state. Floridians also went in large numbers to North Carolina, Texas, New York, and California. Migrants were least likely to resettle in states such as Montana, Wyoming, South Dakota, and North Dakota.

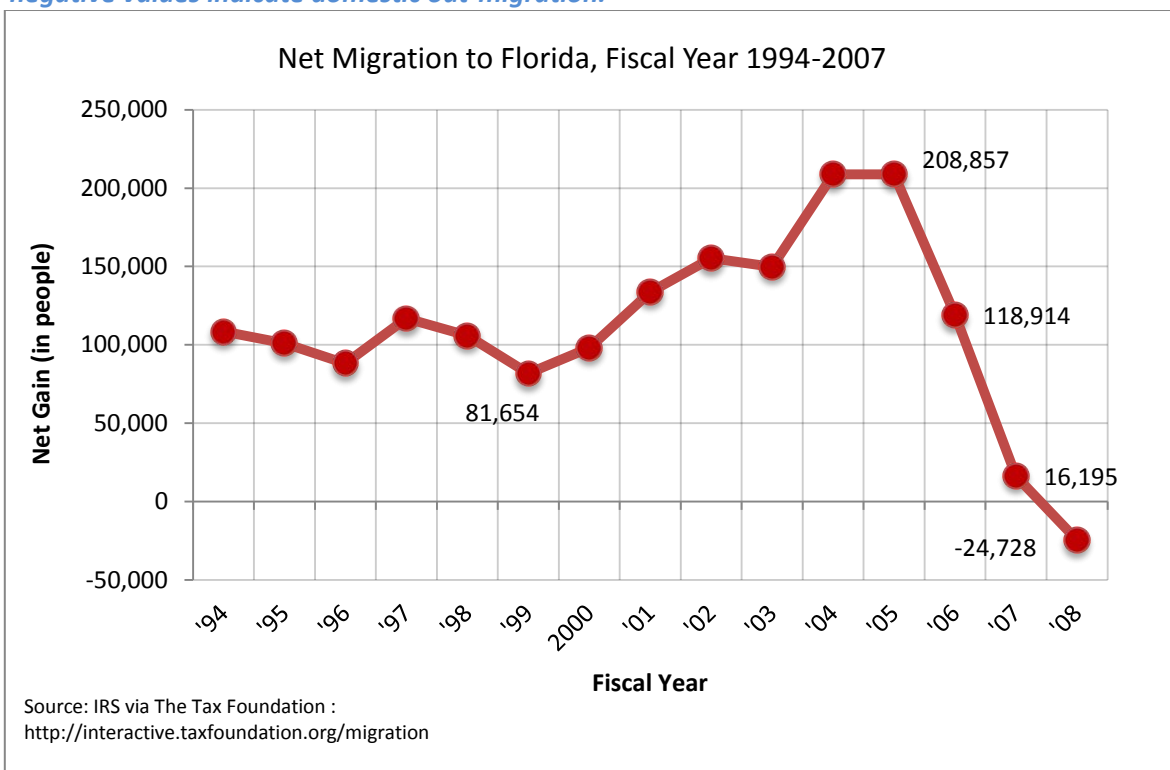
Net Domestic Migration

The net migration is the difference between the number of immigrants and the number of emigrants. Positive values indicate a greater number of immigrants while negative values indicate a greater number of emigrants. Between 2000 and 2009, Florida experienced an overall net gain of nearly one million individuals through domestic migration but not every year during this period was there a net gain.

The nine year period beginning in 2000 can be divided into two distinct phases. One phase is associated with overall steady increase while the other phase is associated with rapid decrease. A sharp transition between the two phases occurred in 2005 when net migration peaked at 208,857 after it had risen steadily during the first phase from 81,654 in 1999. The second phase began in 2006 when the number of residents who resettled in Florida from other states fell below its 2001 total to 118,914. The following year net migration fell again to 16,195. In 2008, domestic net migration dropped below zero to record low (-24,728) which means more Floridians were moving out of Florida to other states than individuals from other states were moving to Florida.

Figure 1-4

Figure 1-4 shows net domestic migration to Florida from Fiscal Year 1994 to 2008. The data are based on tax exemptions from the IRS. Positive values indicate domestic in-migration while negative values indicate domestic out-migration.



Indicator 1.2 - Population by County, City

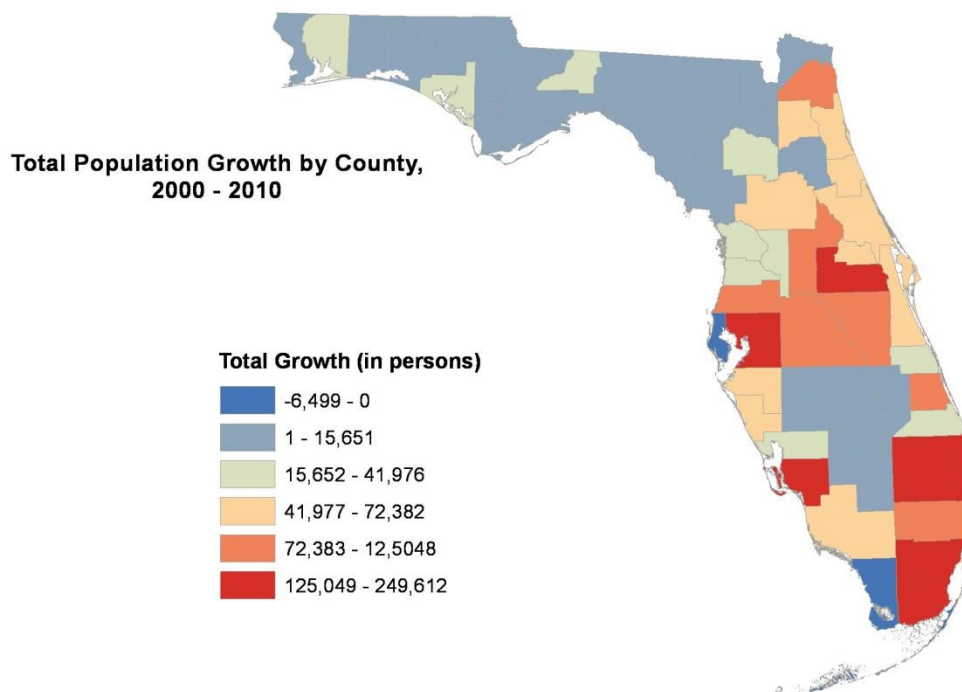
This indicator tracks the change in population in Florida counties and cities between 2000 and 2010. It is a more in depth look at the spatial distribution of the state's population. All 67 counties in the state are part of this indicator. Cities that had a population less than 5,000 people in 2000 are not included in this indicator. Overall the counties and cities that began the decade as the most populated counties and cities in the state remained as such in 2010. There were however notable changes that took place during this period regarding percent growth in several locations.

Florida Counties

Numeric Population Growth

Florida counties grew by an average of 42,000 people between 2000 and 2010. Although population growth took place across the state, such growth did not take place evenly. More growth took place in the central and southern regions of the state than in northern Florida. Thirty-eight of the state's 67 counties grew by more than 10,000 residents. Twenty-eight counties gained less than 10,000 residents and are primarily located in the panhandle. The remaining two counties, Pinellas and Monroe, were the only counties in the state that experienced population loss.

Figure 1-5



Orange County, located in central Florida, increased in population by almost 250,000 people—more than any other county in the state. Seven other counties, all of which are located on the peninsula, each increased in numeric population by more than 100,000 people (Table 1-1). The combined growth in these top eight counties represents more than half of the numeric growth in

the entire state. The ten counties listed in Table 1-2, along with six others (Duval, St. Lucie, Marion, Collier, Brevard, and St. Johns) were ranked among the nation's top 100 counties that experienced the largest amount of numeric growth.

Table 1-2

Table 1-1 shows the top ten counties that experienced the largest numeric population growth.

County	2000 Population	2010 Population	Growth
Orange	896,344	1,145,956	249,612
Miami-Dade	2,253,779	2,496,435	242,656
Hillsborough	998,948	1,229,226	230,278
Palm Beach	1,131,191	1,320,134	188,943
Lee	440,888	618,754	177,866
Broward	1,623,018	1,748,066	125,048
Pasco	344,768	464,697	119,929
Polk	483,924	602,095	118,171
Osceola	172,493	268,685	96,192
Lake	210,527	297,052	86,525

Other counties in the state experienced a much smaller increase in population. Table 1-3 shows the ten counties with the smallest increases. Madison County, which experienced the state's smallest increase, only grew by 491 people. Nine of the ten counties in Table 1-3 are located in the panhandle and north Florida. Hardee County, which experienced the state's second smallest increase, is located in central Florida.

Table 1-3

Table 1-2 shows the top ten counties that experienced the smallest numeric population growth.

County	2000 Population	2010 Population	Growth
Madison	18,733	19,224	491
Hardee	26,938	27,731	793
Gadsden	45,087	46,389	1,302
Gulf	14,560	15,863	1,303
Liberty	7,021	8,365	1,344
Holmes	18,564	19,927	1,363
Hamilton	13,327	14,799	1,472
Calhoun	13,017	14,625	1,608
Franklin	9,829	11,549	1,720
Lafayette	7,022	8,870	1,848

Percent Change

Percent change is found by calculating the number of new residents as percentage of the initial population. While numeric population growth is a simple raw count of new individuals, percent change is a measurement of the number of new individuals based on the initial population and can help determine how much a given location has grown.

Counties that experienced high percent growth (Flagler, Sumter, Osceola, and St. Johns), are located in central and northeast Florida while counties that experienced low to moderate percent

growth are distributed throughout the state (Figure 1-6). Counties in the Big Bend region experienced moderate percent growth. Two counties, Pinellas and Monroe, had a negative percent growth.

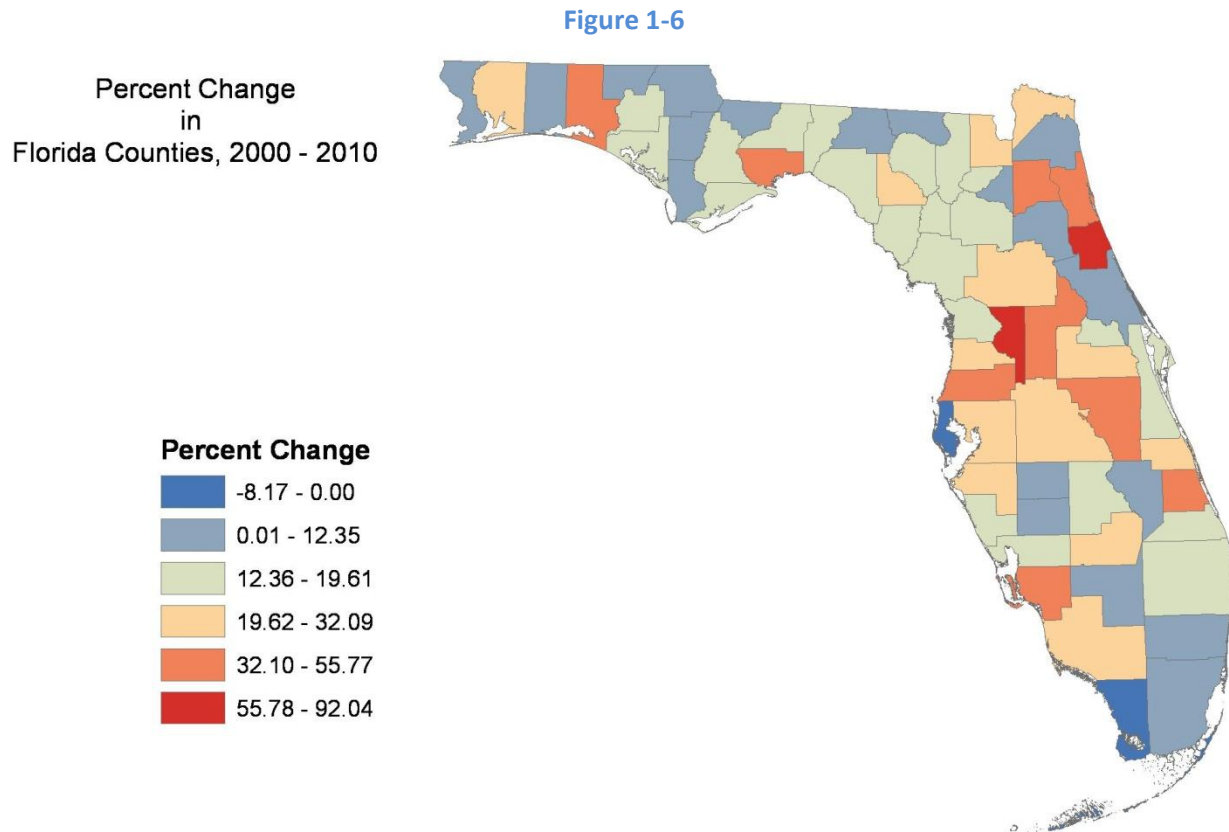


Table 1-4 shows the population in 2000 and 2010 as well as the percent change between the two years for the top ten counties based on percent change. Flagler and Sumter counties experienced a higher percent change than all other Florida counties (92% and 75% respectively). Osceola and St. Johns also experienced percent growth that exceeded 50 percent. Twenty four of the state's 67 counties grew by more than 20 percent. Some Florida counties were ranked high nationally. Flagler and Sumter were ranked in the nation's top ten counties with the highest percent growth and 52 counties had a higher percent growth than the national average of 9.7 percent.

Table 1-4

County	2000 Population	2010 Population	Percent Growth
<i>Flagler</i>	49,832	95,696	92.0
<i>Sumter</i>	53,345	93,420	75.1
<i>Osceola</i>	172,493	268,685	55.8
<i>St. Johns</i>	123,135	190,039	54.3
<i>St. Lucie</i>	192,695	277,789	44.2
<i>Lake</i>	210,527	297,052	41.1
<i>Lee</i>	440,888	618,754	40.3

<i>Walton</i>	40,601	55,043	35.6
<i>Clay</i>	140,814	190,865	35.5
<i>Pasco</i>	344,768	464,697	34.8

Table 1-5 shows the ten counties with the lowest positive percent growth. Seven are located in north Florida and the panhandle and the remaining three (Hardee, Hendry, and Broward) are in central and south Florida. Of the counties that increased, Escambia County, located in the western part of the panhandle, had the lowest percent growth—1.1 percent. Most of the counties in the table began the decade with a population less than 100,000 people but Broward County, which had a population of more than 1.5 million, is a notable exception. Only three other counties not included in the table (DeSoto, Gulf, and Bradford) had percent growth rates less than 10 percent.

Table 1-5

County	2000 Population	2010 Population	Percent Growth
<i>Escambia</i>	294,410	297,619	1.1
<i>Madison</i>	18,733	19,224	2.6
<i>Gadsden</i>	45,087	46,389	2.9
<i>Hardee</i>	26,938	27,731	2.9
<i>Putnam</i>	70,423	74,364	5.6
<i>Okaloosa</i>	170,498	180,822	6.1
<i>Jackson</i>	46,755	49,746	6.4
<i>Holmes</i>	18,564	19,927	7.3
<i>Broward</i>	1,623,018	1,748,066	7.7
<i>Hendry</i>	36,210	39,140	8.1

In both 2000 and 2010, the combined population of the top ten counties at the time comprised more than 60 percent of Florida's total population. Most counties that were ranked in the top ten in 2000 remained in the top ten in 2010 and changes in the ranked order of the top ten most populated counties were subtle (Table 1-6). No change occurred in the ranked order of the top four counties. Perhaps the most notable change involves Lee County which began the decade ranked 11th but jumped three spots to finish eighth at the end of 2010.

Table 1-6

Table 1-5 shows the top ten most populated counties in Florida 2010 and their rank in 2000. Volusia County, not listed here, was ranked tenth in 2000 and dropped to 11th in 2010.

County	2010 Population	2000 Rank
<i>Miami-Dade</i>	2,496,435	1
<i>Broward</i>	1,748,066	2
<i>Palm Beach</i>	1,320,134	3
<i>Hillsborough</i>	1,229,226	4
<i>Orange</i>	1,145,956	6
<i>Pinellas</i>	916,542	5

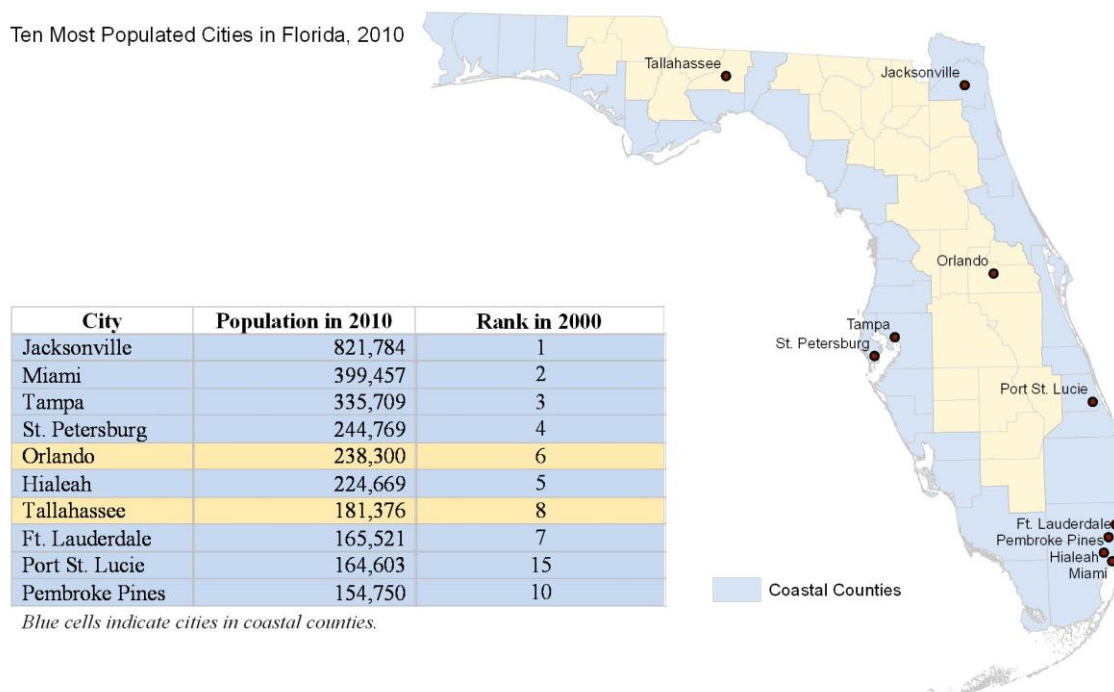
<i>Duval</i>	864,263	7
<i>Lee</i>	618,754	11
<i>Polk</i>	602,095	8
<i>Brevard</i>	543,376	9

Ten Most Populated Cities

Figure 1-7 shows the spatial location of the top ten most populated cities in 2010. In 2010, the city of Jacksonville, which comprises the vast majority of Duval County, had a population of 821,784 and was the most populated city in the state. Jacksonville was more populated than the state's second and third ranked cities, Miami and Tampa, combined. St. Petersburg, located near Tampa, was ranked fourth in the state followed by Orlando. Hialeah, located in Miami-Dade County placed higher than seventh ranked Tallahassee, the state's capital located in the panhandle. Figure 1-7 also includes a complete list of the state's top ten most populated cities in 2010.

Figure 1-7

Ten Most Populated Cities in Florida, 2010



Change in Urban Population in Ten Most Populated Cities

Between 2000 and 2010, the city of Jacksonville grew by 11.7 per cent to from 735,617 residents to 821,784 and remained Florida's most populated city. Miami, ranked second in both 2000 and 2010, grew by 10.2 percent to 399,457 residents while third ranked Tampa grew by 10.6 percent to 334,709 residents. Two cities in the 2010 top ten list, St. Petersburg and Hialeah, decreased in population during the decade.

Eight of Florida's top ten most populated cities are located on the peninsula. Eight of the top ten are also located in coastal counties. Port St. Lucie experienced the highest percent change among the top ten most populated cities. Ranked fifteenth in 2000, Port St. Lucie grew 85.4 percent to 164,603 residents and ended the decade ranked ninth in population.

Indicator 1.3 - Population in the Coastal Zone

This indicator describes population growth in the coastal zone between 2000 and 2010. This indicator was not present in FACT 2000. Although a similar indicator was present in FACT 1997, the coastal zone was restricted to areas within ten miles of the coast. For FACT 2010, the FCMP considers the coastal zone in Florida as coterminous with the 35 counties that border either the Gulf of Mexico or the Atlantic Ocean. This zone accounts for 55 percent of Florida's land area (30,000 square miles). The population in the coastal zone has typically been higher than that of the remaining 32 counties and that trend continues through 2010.

Numeric Change

Between 2000 and 2010, the population in the coastal zone increased by almost 1.2 million people to a total of 14,194,603. Of the top five counties that added the largest number of individuals, four of them (Miami-Dade, Palm Beach, Lee, and Broward) are located in the southern part of the state (Figure 1-8). The two counties that lost population, Pinellas and Monroe, are located in the coastal zone.

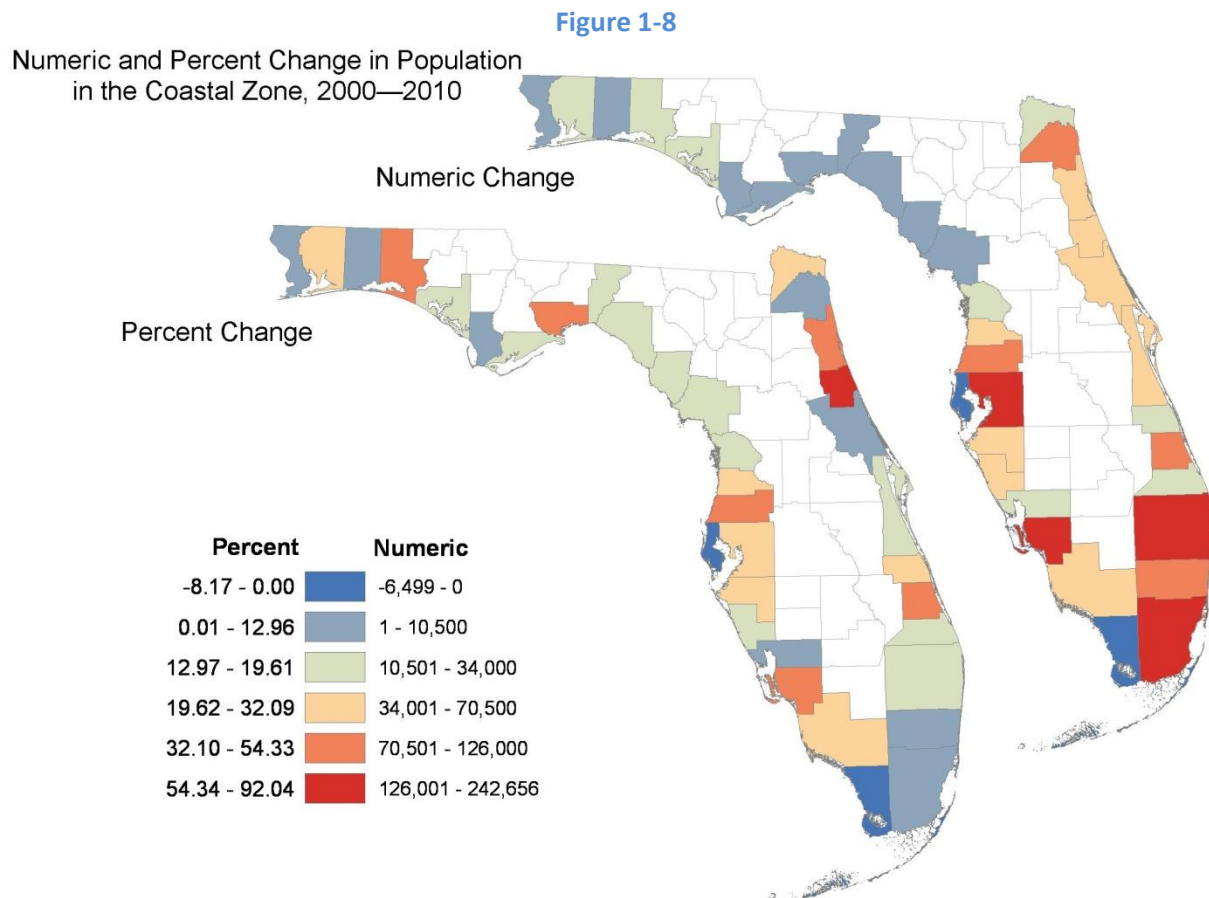


Table 1-7 shows the top ten counties in the coastal zone that grew by the largest number of individuals. The average population in 2000 for the top ten counties was 849,177 and half of them

began the decade with a population greater than 500,000. Miami-Dade and Hillsborough ranked first and second respectively and together accounted for nearly one quarter of the growth in the coastal zone. Six of the top ten counties grew by more than 100,000 people. One county, Hillsborough, breached 1 million residents during the decade. Six counties are located on the Atlantic Coast and four (Hillsborough, Lee, Pasco, and Collier) are located on the Gulf Coast of the peninsula. None are located in the panhandle or the big bend.

Table 1-7

County	Population		Numeric Change
	2000	2010	
<i>Miami-Dade</i>	2,253,779	2,496,435	242,656
<i>Hillsborough</i>	998,948	1,229,226	230,278
<i>Palm Beach</i>	1,131,191	1,320,134	188,943
<i>Lee</i>	440,888	618,754	177,866
<i>Broward</i>	1,623,018	1,748,066	125,048
<i>Pasco</i>	344,768	464,697	119,929
<i>Duval</i>	778,879	864,263	85,384
<i>St. Lucie</i>	192,695	277,789	85,094
<i>Collier</i>	251,377	321,520	70,143
<i>Brevard</i>	476,230	543,376	67,146

Table 1-8

County	Population		Numeric Change
	2000	2010	
Gulf	14,560	15,863	1,303
Franklin	9,829	11,549	1,720
Jefferson	12,902	14,761	1,859
Dixie	13,827	16,422	2,595
Escambia	294,410	297,619	3,209
Taylor	19,256	22,570	3,314
Levy	34,450	40,801	6,351
Wakulla	22,863	30,776	7,913
Okaloosa	170,498	180,822	10,324
Walton	40,601	55,043	14,442

The ten counties with the lowest positive numeric change appear in Table 1-7. Gulf County, increased by the smallest amount—1,303 people. Eight of the counties gained less than 10,000 people. The average population of these counties in 2000 was 3,320. The most populated county in 2000 was Escambia with almost 300,000 residents. Only one other county, Okaloosa began the decade with more than 100,000 people. The rest of the top ten began with less than 50,000.

Percent Change

From 2000 to 2010, the overall population in the coastal zone increased by 16 percent. Figure 1-8 also shows the percent growth for each county in the coastal zone. The big bend area experienced low to moderate growth while the counties in the central part of the peninsula in the west experienced moderately high to high percent growth. On the Atlantic side, south Florida counties experienced very low percent growth while counties with the highest percent growth (Flagler and St. Johns) are located in the northeast.

Table 1-8 shows the counties with the highest percent change. Of the ten counties, the average population in 2000 was 171,470. Flagler County experienced the highest percent growth rate—92 percent. The second highest percent growth belongs to St. Johns County, which is adjacent to Flagler County. These two counties are the only counties in the coastal zone that experienced a percent growth rate over 50%. The top ten counties are located in all areas of the state except in the big bend.

Table 1-9

County	Population		Percent Change
	2000	2010	
<i>Flagler</i>	49,832	95,696	92.04
<i>St. Johns</i>	123,135	190,039	54.33
<i>St. Lucie</i>	192,695	277,789	44.16
<i>Lee</i>	440,888	618,754	40.34
<i>Walton</i>	40,601	55,043	35.57
<i>Pasco</i>	344,768	464,697	34.79
<i>Wakulla</i>	22,863	30,776	34.61
<i>Hernando</i>	130,802	172,778	32.09
<i>Santa Rosa</i>	117,743	151,372	28.56
<i>Collier</i>	251,377	321,520	27.90

Table 1-10

County	Population		Percent Change
	2000	2010	
<i>Escambia</i>	294,410	294,410	1.09
<i>Okaloosa</i>	170,498	170,498	6.06
<i>Broward</i>	1,623,018	1,623,018	7.70
<i>Gulf</i>	14,560	14,560	8.95
<i>Miami-Dade</i>	2,253,779	2,253,779	10.77
<i>Duval</i>	778,879	778,879	10.96
<i>Volusia</i>	443,343	443,343	11.56
<i>Charlotte</i>	141,627	141,627	12.96
<i>Bay</i>	148,217	148,217	13.92
<i>Brevard</i>	476,230	476,230	14.10

Table 1-9 shows the counties that had the lowest positive percent change. Of the ten counties, the average population in 2000 was 634,456. Escambia had the lowest percent growth (1.1 percent). Only three other counties (Okaloosa, Broward, and Gulf) experienced a positive percent growth rate less than ten percent. Most counties had a population of less than one million in 2000 but Broward and Miami-Dade are two notable exceptions. The ten counties in Table 1-9 are located in all areas of the state except for the big bend area.

Coastal vs. Non-Coastal

Table 1-11 provides a comparison between the coastal and non-coastal counties. Together, the coastal counties grew by more than twice the number of individuals than the non-coastal counties and account for 68 percent of the state's numeric increase. Although the coastal zone had a higher numeric growth, the non-coastal counties had a higher percent growth. The average percent growth rate for a county located in the coastal zone (22 percent) was slightly higher than the average rate of a county in the non-coastal region (19 percent). Two counties in the coastal zone lost population whereas there were no non-coastal counties that lost population.

Table 1-11

	Coastal		Non-Coastal	
	County	Value	County	Value
Numeric Growth	--	1,908,462	--	910,024
Average	--	54,527	--	28,438
Max	<i>Miami-Dade</i>	242,656	<i>Orange</i>	249,612
Min	<i>Monroe</i>	-6,499	<i>Madison</i>	491
Percent Growth	--	15.53 %	--	24.62 %
Average	--	21.80 %	--	19.15 %
Max	<i>Flagler</i>	92.04 %	<i>Sumter</i>	75.12 %
Min	<i>Monroe</i>	-8.17 %	<i>Madison</i>	2.62 %

Percent of Total Population

Although the numeric increase in the coastal zone accounted for the overwhelming majority of new individuals in Florida, the percentage of Floridians that lived in the coastal zone in 2010 was one percent lower than in 2000 (Table 1-12). In 2000, the number of individuals living in the coastal zone accounted for 76 per cent of the statewide population whereas the population in the coastal zone in 2010 represented 75 per cent of the state's population.

Table 1-12

	2000		2010	
	Population	Percent	Population	Percent
Coastal	12,286,141	76.87	14,194,603	75.50
Non-coastal	3,696,383	23.12	4,606,707	24.50

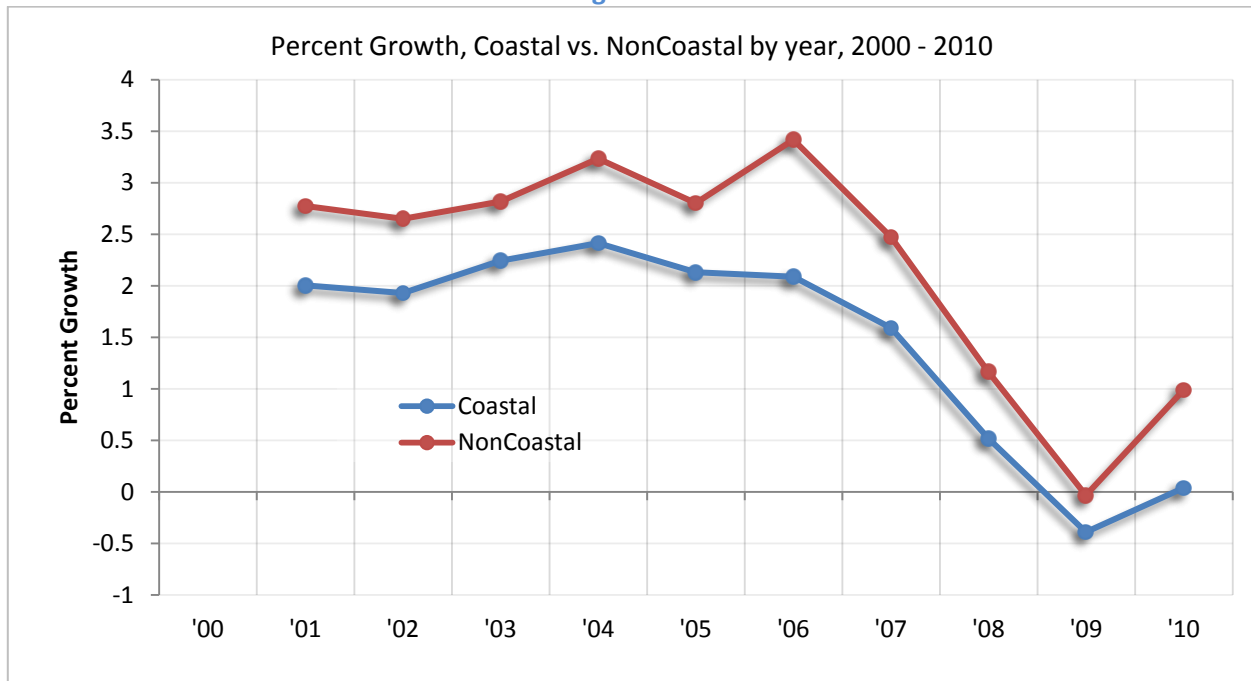
Annually, the population in the coastal zone typically increased more than the population in non-coastal counties (Table 1-13). Over the course of the decade, the average difference between the two regions each year was approximately 100,000 but the greatest difference occurred in between 2003 and 2004 when the coastal counties grew by 185,756 more individuals than the non-coastal counties. The smallest difference took place between 2007 and 2008 when the coastal zone grew by only 21,436 individuals more than the coastal counties. The greatest gain in a single year took place in 2003 for the coastal counties and in 2006 for the non-coastal counties. The greatest loss in a single year took place in 2009 when both regions lost residents. In 2010, the both zones gained residents again but coastal counties only recovered 10 percent of the 55,000 individuals who migrated away the previous year.

Table 1-13

Time Period	Coastal	Non-Coastal
'00 – '01	246,287	102,628
'01 – '02	242,065	100,804
'02 – '03	286,936	109,964
'03 – '04	315,490	129,734
'04 – '05	285,465	116,030
'05 – '06	285,479	145,426
'06 – '07	222,266	108,969
'07 – '08	74,144	52,708
'08 – '09	-55,317	-1,419
'09 – '10	5,647	45,180
Total	1,908,462	910,024

Figure 1-9 shows percent growth rates for each year from 2001 to 2010. From 2001 to 2004 percent growth in both regions grew steadily. In 2005, a decline in the percent growth occurred in both regions. The following year, in 2006, while the coastal zone's percent increase decreased slightly, the non-coastal zone experienced its most significant increase of the decade rising from 2.75% to almost 3.5%. Percent growth values for both regions declined until 2010.

Figure 1-9



Indicator 1.4 - Land Cover Change

Land cover is what occurs on the surface of the earth. This indicator reports on the change in land cover in the coastal zone between 2001 and 2006. An overview of the changes in land cover types as well as a closer look at changes in developed land is presented. There are 15 simplified land cover classes in the coastal zone. Overall, Scrub/Shrub, Grassland, and Barren Land gained large amounts of land while Evergreen Forest and Woody Wetland experienced heavy losses. Four of the 15 land cover classes are considered “developed land.” While all four of the developed land cover classes increased, none of them did so by more than 0.3 percent. During this time, the coastal zone maintained a higher percentage of developed land than the non-coastal counties.

Overview of Land Cover Change in the Coastal Zone

Between 2001 and 2006, a total of 1,280.72 square miles of land changed classes. This figure represents 4.11 percent of total land area in the coastal zone. Overall, Scrub/Shrub gained the largest amount of area (426 square miles) experienced the largest overall gain, or net gain, (279 square miles) in the coastal zone. This class also experienced a larger percent change than any other land cover class (.17 percent). Scrub/Shrub gained the most land from Evergreen Forest (210 square miles) and Grassland (176 square miles). Grassland gained the second largest amount of area (325 sq. mi.) and experienced the second largest net increase (123 sq. mi.). The Grassland class also gained a large amount of land from Evergreen Forest. Barren Land gained the third highest amount of land area (96.02 sq. mi.) and was ranked third based on overall gain (66.87 sq. mi.).

Open Water was ranked fourth in terms of net increase with 44.54 additional square miles of new area in 2006. This increase came primarily from Emergent Wetland, Barren Land, and Cultivated Land classes. Although Open Water was ranked fourth in net increase, it did not actually gain as many square miles other classes such as Emergent Wetland, Evergreen Forest, and Woody Wetland. The latter classes lost large areas of land (54.88, 484.40, and 143.02 square miles respectively) which resulted in a smaller net increase for Emergent Wetland and net decreases for Woody Wetland and Evergreen Forest.

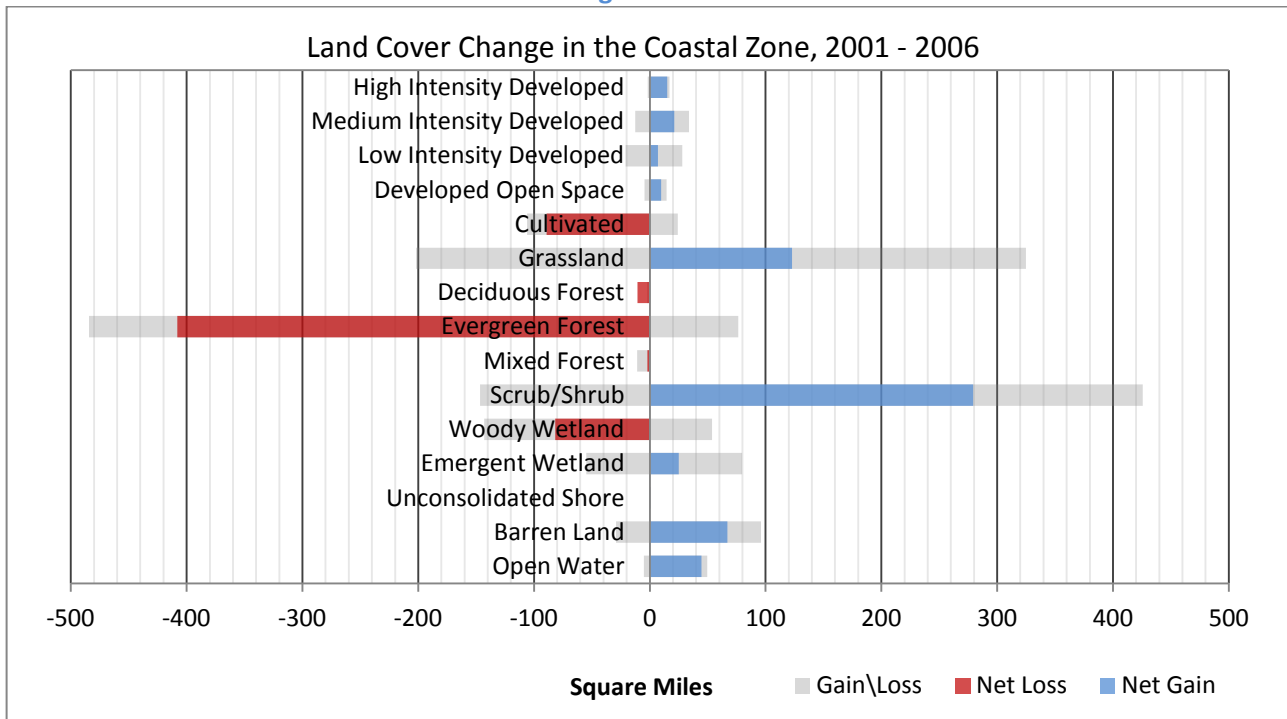
Evergreen Forest lost the most area and had the highest net loss. Most (451.18 square miles) of the Evergreen Forest class was converted to Scrub/Shrub or Grassland. Woody Wetland, the coastal zone’s largest land cover class in 2001, experienced the second highest net loss (89.21 sq. mi) and lost the fourth highest amount of area (143.02 sq. mi). Woody Wetland was primarily converted to Scrub/Shrub and Barren Land. Despite such losses, Woody Wetland remained the largest land cover class in the coastal zone in 2006 with a total of 9,262.10 square miles. Table 1-14 shows the numeric and percent change values for each land cover class in 2001 and 2006 while Figure 1-10 provides a visual representation of the gains and losses made by each land cover class during this period.

Table 1-14

Table 1-14 shows the net gain and net loss in square miles for all land classes. Classes are ranked based on net change. Change values for classes that experienced a net increase appear in green while change values for classes that experienced a net decrease appear in red.

C-CAP Class Scheme	Area in Square Miles					Percent Change
	2001	Gain	Loss	2006	Net Change	
Scrub/Shrub	1,644.36	425.74	-146.55	1,923.55	279.19	0.17
Grassland	892.93	324.82	-201.86	1,015.89	122.96	0.14
Barren Land	150.26	96.02	-29.15	217.13	66.87	0.45
Open Water	1,132.26	49.62	-5.08	1,176.79	44.54	0.04
Emergent Wetland	4,926.12	79.81	-54.88	4,951.05	24.93	0.01
Medium Intensity Developed	1,288.70	33.76	-12.65	1,309.81	21.11	0.02
High Intensity Developed	449.13	16.93	-1.76	464.30	15.18	0.03
Developed Open Space	735.78	14.43	-4.69	745.53	9.74	0.01
Low Intensity Developed	1,798.89	27.98	-21.01	1,805.87	6.97	0.00
Unconsolidated Shore	13.59	1.02	-0.77	13.83	0.24	0.02
Deciduous Forest	49.99	0.16	-2.36	47.79	-2.21	-0.04
Mixed Forest	224.98	0.27	-10.96	214.29	-10.69	-0.05
Cultivated	3,980.70	24.21	-105.90	3,899.01	-81.69	-0.02
Woody Wetland	9,351.32	53.81	-143.02	9,262.10	-89.21	-0.01
Evergreen Forest	4,505.18	76.47	-484.40	4,097.25	-407.93	-0.09

Figure 1-10



Developed Land in the Coastal Zone

In 2006, there were approximately 4,325 square miles (2,768,000 acres) of developed land in the coastal zone. This was an increase of 53 square miles (33,920 acres), or 1.2%, from 2001 to 2006 (Table 1-15). The net gain in developed land in the coastal zone accounts for 60 percent of the net gain in developed land across the entire state.

Table 1-15

	2001	2006	Numeric Increase	Percent Increase
Developed Land	4,272.5 sq. mi.	4,325.51 sq. mi.	53.01 sq. mi.	1.24%

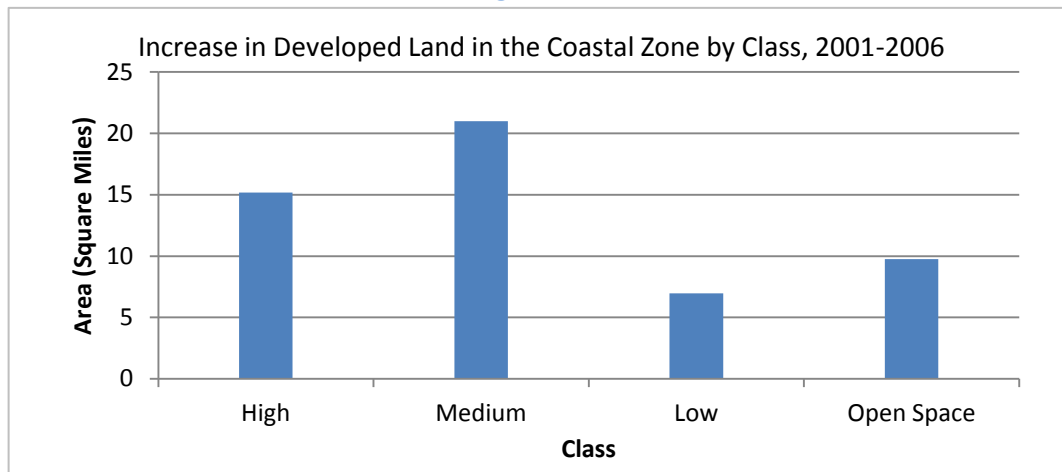
There are four classes of developed land cover. A description of each class can be found in Table 1-16.

Table 1-16

Developed Class Name	Description
High Intensity	<i>Contains significant land area is covered by concrete, asphalt, and other constructed materials. Vegetation, if present, occupies < 20 percent of the landscape. Constructed materials account for 80 to 100 percent of the total cover. This class includes heavily built-up urban centers and large constructed surfaces in suburban and rural areas with a variety of land uses.</i>
Medium Intensity	<i>Contains areas with a mixture of constructed materials and vegetation or other cover. Constructed materials account for 50 to 79 percent of total area. This class commonly includes multi- and single-family housing areas, especially in suburban neighborhoods, but may include all types of land use.</i>
Low Intensity	<i>Contains areas with a mixture of constructed materials and substantial amounts of vegetation or other cover. Constructed materials account for 21 to 49 percent of total area. This subclass commonly includes single-family housing areas, especially in rural neighborhoods, but may include all types of land use.</i>
Open Space	<i>Contains areas with a mixture of some constructed materials, but mostly managed grasses or low-lying vegetation planted in developed areas for recreation, erosion control, or aesthetic purposes. These areas are maintained by human activity such as fertilization and irrigation, are distinguished by enhanced biomass productivity, and can be recognized through vegetative indices based on spectral characteristics. Constructed surfaces account for less than 20 percent of total land cover.</i>

Within the coastal zone, the amount of growth varied between each developed class. Medium Intensity Developed experienced a net gain of roughly 21 square miles while High Intensity Developed class gained a net 15.18 square miles (Figure 1-11). Open Space Developed and Low Intensity Developed classes grew by 9.74 and 6.97 square miles, respectively.

Figure 1-11



Land Cover Conversions, To and From Developed Land

Developed land that changed classes typically remained in one of the other developed land classes (Table 1-17). Most of the land that was converted to High Density came from Medium Intensity (7.56 sq mi) while Medium Intensity gained large amounts from Cultivated and Low Intensity. Low Intensity and Open Space both gained large areas from Cultivated and Woody Wetland.

High Intensity held the highest retention rate only losing .39 percent of its 2001 total—roughly 1.76 square miles. Low Intensity lost 1.17 percent, the most of any developed class, which was equal to approximately 21.01 square miles. Open Water and Barren Land received the most amount of land from developed classes losses (7.84 square miles and 5.62 square miles respectively).

Table 1-17

Table 1-17 shows amount of land area that was converted to and from each developed land cover class.

Land Cover Class	Gains (square miles)				Losses (square miles)			
	High Intensity	Medium Intensity	Low Intensity	Open Space	High Intensity	Medium Intensity	Low Intensity	Open Space
High Intensity	447.37	0.02	0.43	0.16	447.37	7.56	6.53	0.02
Medium Intensity	7.56	1,276.05	0.62	0.40	0.02	1,276.05	8.68	0.42
Low Intensity	6.53	8.68	1,777.88	0.50	0.43	0.62	1,777.88	0.47
Open Space	0.02	0.42	0.47	731.10	0.16	0.40	0.50	731.10
Cultivated	0.71	11.11	10.78	5.75	--	--	0.05	0.03
Grassland	0.12	1.60	2.18	2.30	--	0.01	0.15	0.08
Deciduous Forest	--	0.02	0.02	0.01	--	--	--	--
Evergreen Forest	0.42	2.67	2.77	0.92	--	--	--	--
Mixed Forest	0.02	0.09	0.12	0.06	--	--	--	--
Scrub/Shrub	0.21	1.39	1.25	0.31	--	--	0.16	0.13
Woody Wetland	0.73	5.68	6.72	2.73	--	--	0.01	0.03
Emergent Wetland	0.10	0.78	0.82	0.29	--	0.02	0.02	0.13
Unc. Shore	--	0.02	0.02	--	--	--	--	--
Bare Land	0.51	1.28	1.75	0.99	0.19	2.34	2.58	0.52
Open Water	--	0.01	0.04	0.01	0.95	1.71	2.32	2.85
Totals	464.30	1,309.81	1,805.87	745.53	449.13	1,288.70	1,798.89	735.78
Percent Gain/Loss	3.65	2.58	1.55	1.94	0.39	0.98	1.17	0.64

Figure 1-12 shows that the amount of developed land in 2006 was not evenly balanced between coastal and non-coastal counties. In this year, 71.75 percent of the state's 6,072 square miles of developed land occurred in the coastal zone. This is roughly equivalent to 2001 when the coastal zone accounted for 71.91 percent of the state's developed land.

Within the coastal zone, there is notable variation. South Florida and Tampa Bay regions had the highest amounts of high intensity developed land. In both 2001 and 2006, the high intensity developed land in these two regions together equaled more than one and half times the amount in all the other regions combined. The North Central region had the lowest amount of high intensity developed land—less than one square mile in both 2001 and 2006. Tampa Bay had the highest percent as total developed land while Apalachee had the lowest.

Figure 1-12

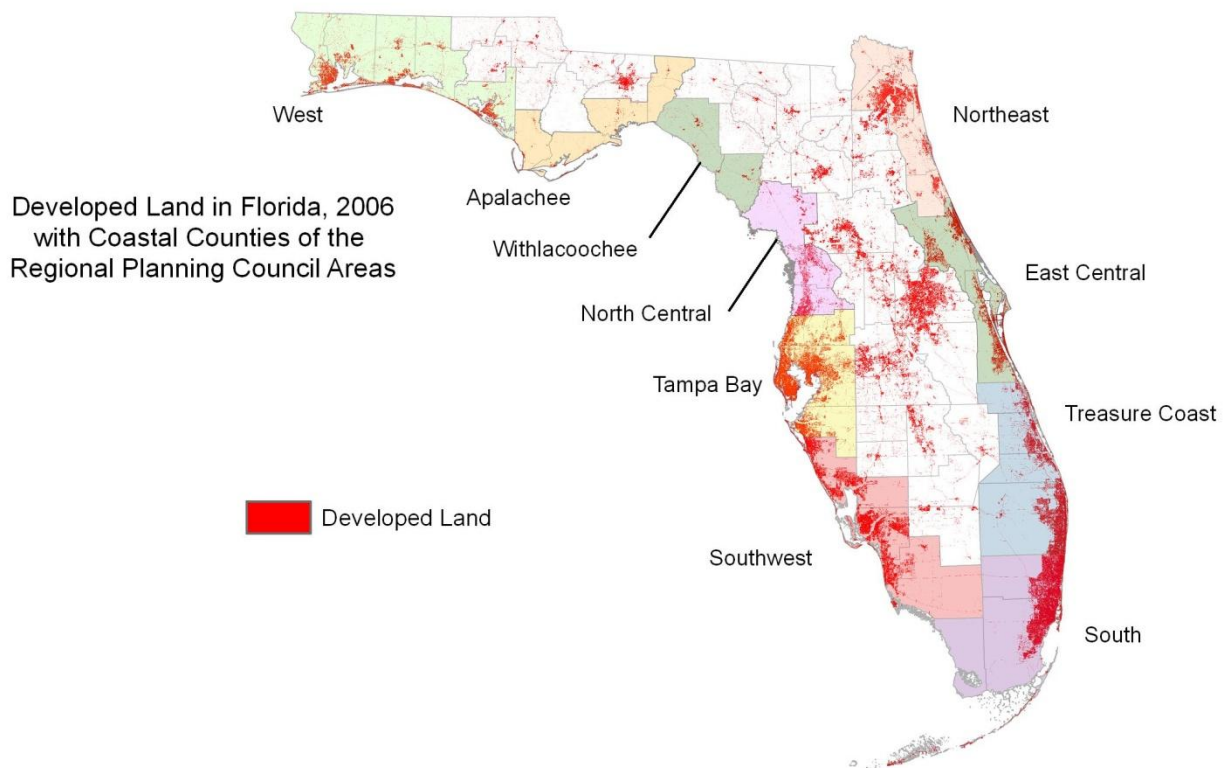


Table 1-18 shows the change that took place in ten of Florida's Regional Planning Council regions included in Figure 1-12. Most changes were subtle and no change was greater than 0.5 percent.

Table 1-18
Change in Developed Land, 2001 - 2006

Region	Developed Land				Change in Developed Land	Total Land in Region	Change in Percent of Developed Land
	High	Medium	Low	Open			
	Square Miles						
West	0.71	0.81	1.41	1.53	4.46	4,483	0.10
Apalachee	0.18	0.15	0.14	0	0.47	2,352	0.02
North Central	0.07	-0.02	-0.02	0	0.03	1,7656	< 0.00
Northeast	1.76	3.17	2.65	1.09	8.67	2,688	0.32
Withlacoochee	0.38	0.58	0.19	0.24	1.39	2,255	0.06
East Central	0.86	0.94	0.37	0	2.17	2,278	0.09
Tampa Bay	3.23	4.62	2.46	2.59	12.90	2,888	0.45
Southwest	2.2	4.54	0.91	1.6	9.25	4,187	0.22
Treasure Coast	2.41	3.6	-0.35	1.24	6.90	3,977	0.17
South	3.39	2.72	-0.77	1.45	6.79	4,268	0.16
Total	15.18	21.11	6.99	9.73	53.03	31,144	0.17

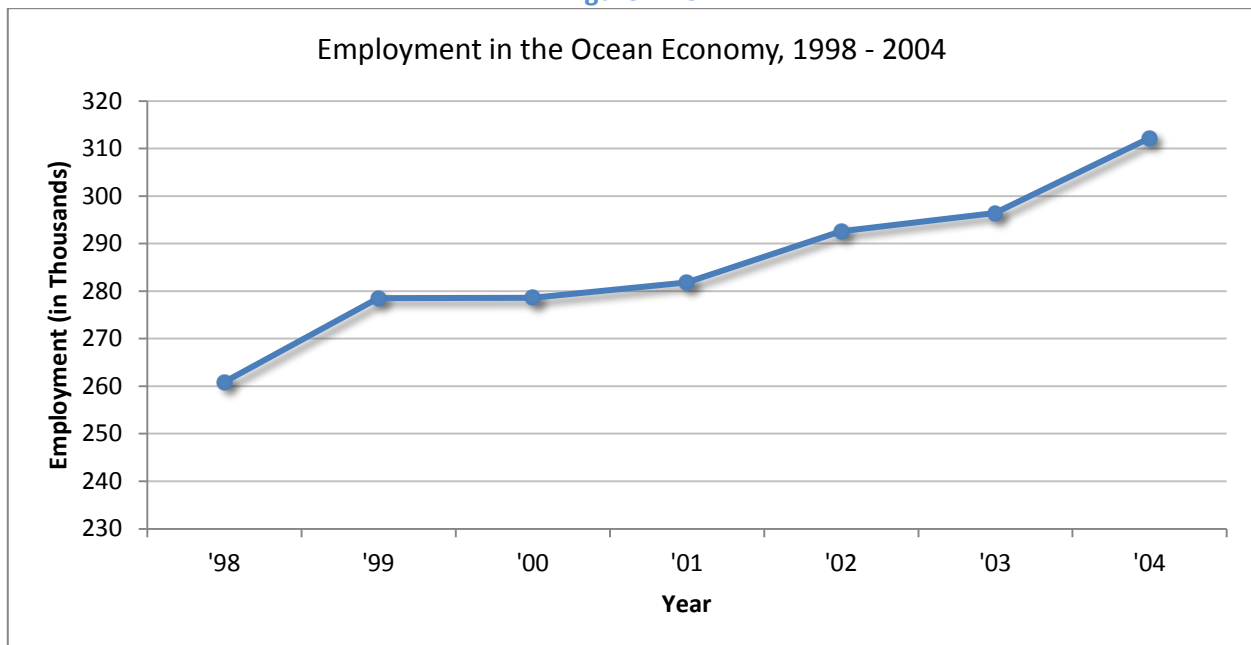
Indicator 1.5 - Coastal Dependent Use of the Coastline

Many of the activities that take place in Florida's coastal zone are heavily influenced by the proximity of the Atlantic Ocean and the Gulf of Mexico. Such activities include commercial fishing, ship and boat building and repair, boat dealers, sand and gravel production, and deep sea freight transportation. These activities, along with others, have been assigned to one of six categories according to the North American Industrial Classification System (NAICS). The six different sectors include Marine Construction, Living Resources, Minerals, Ship and Boat Building, Tourism and Recreation, and Transportation. The industries included in these sectors are dependent on the coastline and have directly employed an average of 292,000 workers each year between 2000 and 2004. This indicator describes the change in employment in these six sectors across the fourteen year period beginning in 1990 for the coastal counties. Currently, data are not available after 2004. This indicator presents the overall employment trends in Ocean Economy and provides an in depth analysis of each sector.

Overall Employment Trends in Ocean Economy

Between 1998 and 2004, employment in the Ocean Economy increased by 51,352 workers (Figure 1-13). This represented a 20 percent increase.

Figure 1-13

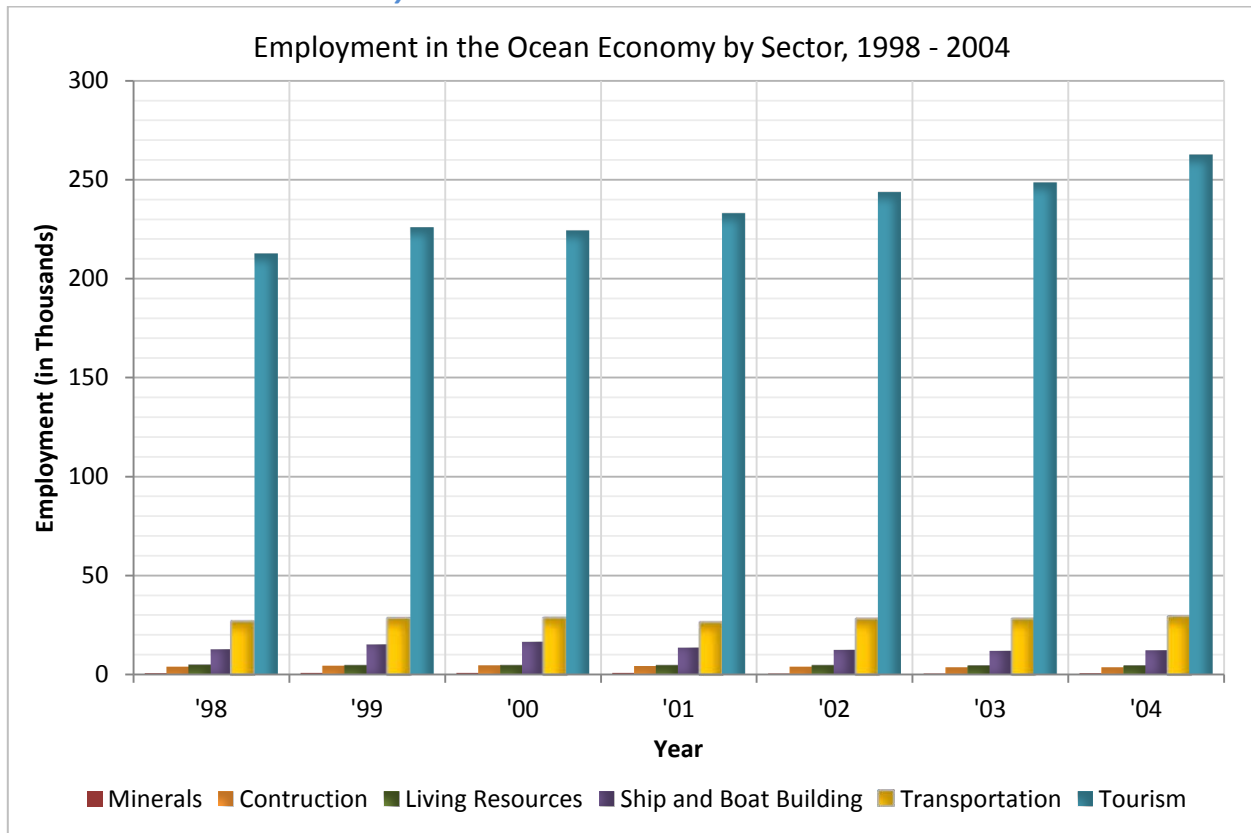


The rise in employment in the Ocean Economy was most heavily influenced by the rise in employment in the Tourism and Recreation sector. This sector maintained the overwhelming majority of workers the Ocean Economy during this period (Figure 1-14). Of the 51,352 additional employment positions in the Ocean Economy, nearly 50,000 of those positions were in the Tourism and Recreation sector. Employment in this industry remained higher than 200,000 for the entire period and climbed above 250,000 by 2004.

After Tourism and Recreation, Transportation accounted for the second largest workforce having between 25,000 to 30,000 workers each year. The only other sector to have greater than 15,000 workers was Ship and Boat Building; it did so during only one year (2000). Living Resources and Construction employed a similar number of workers while the Minerals sector had the smallest workforce with less 800 employees for the majority of the time.

Figure 1-14

Figure 1-14 shows employment for each sector of the ocean economy. Note the dominance of the Tourism and Recreation industry.



Ocean Economy Trends by Sector Tourism and Recreation

Tourism and Recreation accounted for the vast majority of employment in the Ocean Economy ranging from 80 to 84 percent of the entire workforce. This sector is comprised of nine different industries (Table 1-19). While some of these industries exist outside coastal areas, they are considered ocean related only when they are located in an area code that is determined to be near the shore.

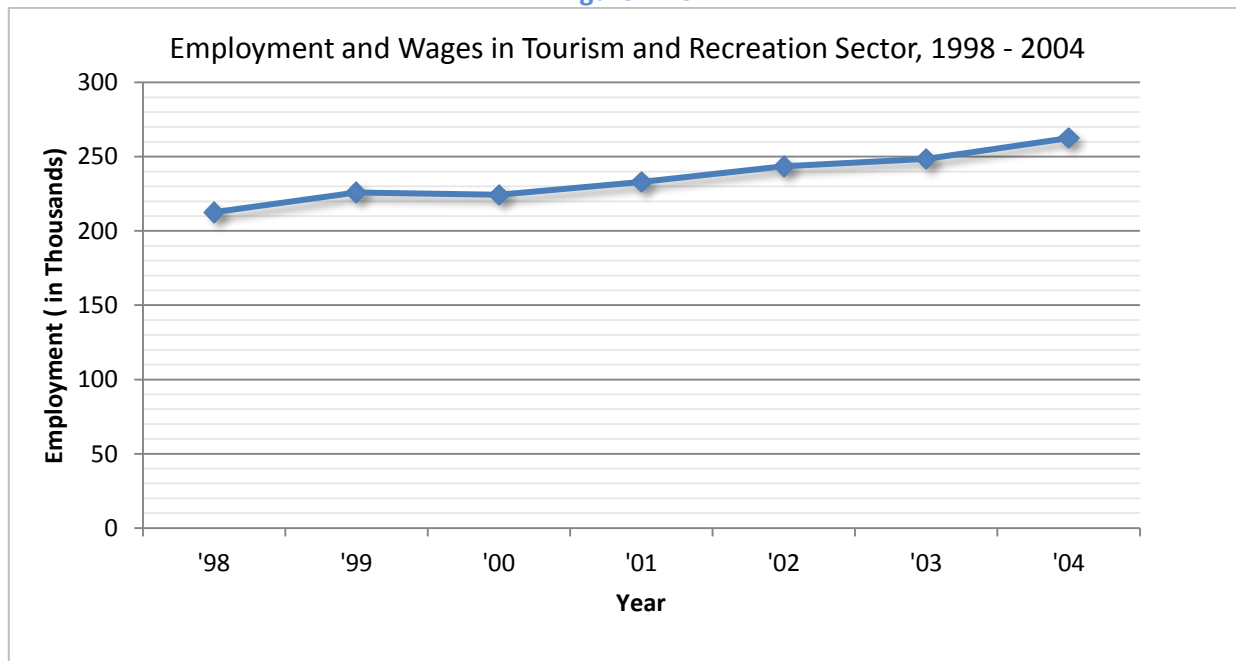
Table 1-19
Tourism and Recreation Industries

Hotels and Lodging Places	Zoos, Aquaria
Eating and Drinking Places	Scenic Water Tours
Amusement and Recreation Services, NEC*	Recreational Vehicle and Campsites
Marinas	Sporting Goods Retailers
Boat Dealers	

*(Not Elsewhere Classified)

Overall employment in the Tourism and Recreation sector increased steadily during this time (Figure 1-15). Employment increased by nearly 50,000 workers (24 percent) from 212,653 in 1998 to 262,642 workers in 2004.

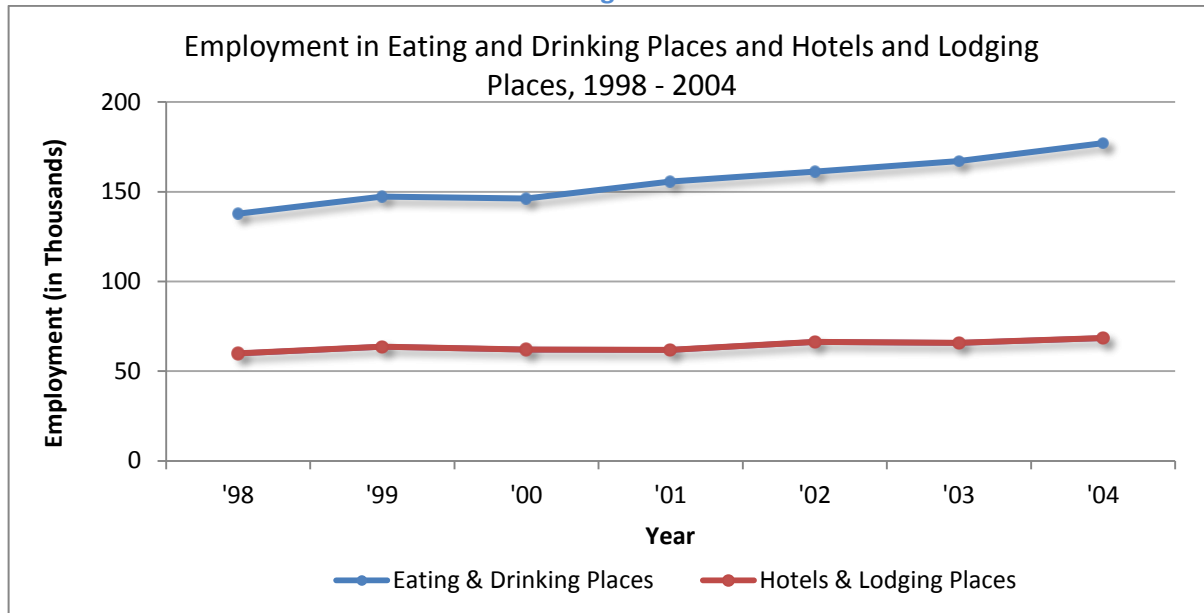
Figure 1-15



By far, the two industries that dominate the Tourism and Recreation industry are Eating and Drinking Places and Hotels and Lodging Places. Every year since 1998, the combined workforce in these two industries has accounted for more than 91 percent of workforce in this sector. Of the two, Eating and Drinking Places typically employs twice the number of employees as Hotels and

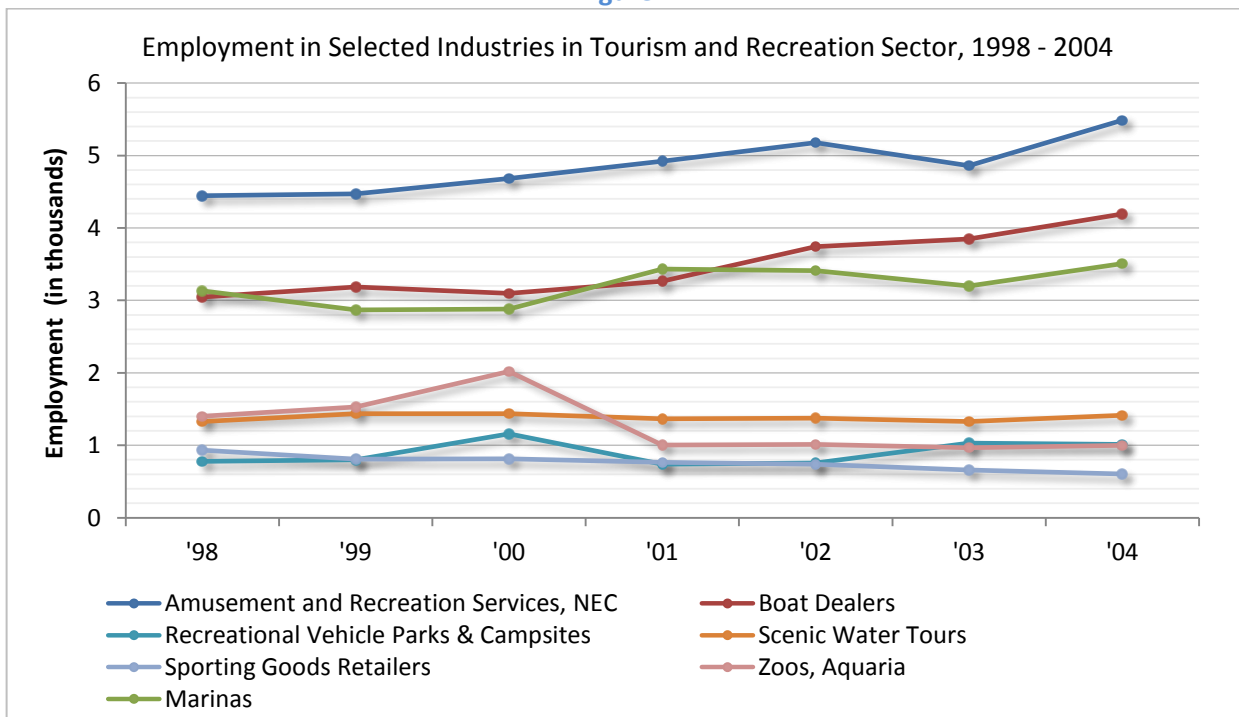
Lodging Places (Figure 1-16). Between 1998 and 2004, both industries have experienced overall steady growth.

Figure 1-16



The remaining seven industries in the Tourism and Recreation Sector accounted for six to eight percent of the workforce between 1998 and 2004. Amusement and Recreation Services, NEC and Boat Dealers have remained the top employers among these industries and both increased steadily overall (Figure 1-17). Of the nine industries in this sector, only two—Sporting Goods Dealers (SGD) and Recreational Vehicle Parks and Campsites (RVPC)—experienced a decline in employment in 2004. Employment in SGD decreased by eight percent while employment in RVP&C decreased by less than two percent.

Figure 1-17



Transportation

The Transportation Sector is comprised of five industries—Deep Sea Freight Transportation (DSF), Marine Passenger Transportation (MPT), Marine Transportation Services (MTS), Search and Navigation Equipment (SNE), and Warehousing (WH). Employment increased each year during this period except for 2001 when the workforce decreased by more than 2,000 employees or eight percent (Figure 1-18)

Figure 1-18

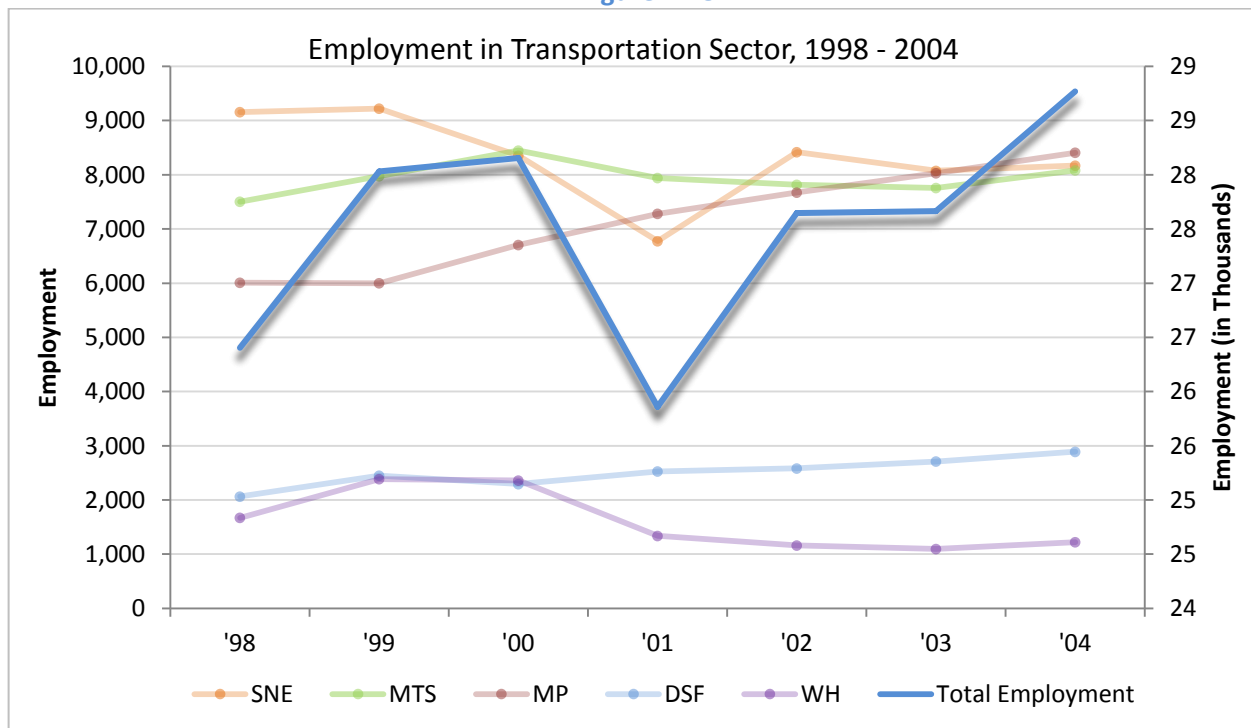


Figure 1-18 also shows employment trends in each industry of the Transportation sector. The Search and Navigation industry employed over 9,000 workers in 1998 but by 2001 the workforce shrank to less than 7,000 (26 percent loss). Marine Passenger Transportation (MPT) began the period employing less than both Marine Transportation Services and Search and Navigation but experienced an increase each year beginning 1999. By 2004 MPT had more employees than any other single industry in the sector. Employment in all six industries was on the rise in 2004.

In 1999 SNE employed 35 percent of workers in the Transportation sector, while MTS employed 28 percent (Table 1-20). In 2004, SNE dropped to 29 percent while employment in MTS and MPT increased to account for 28 percent and 29 percent respectively. Warehousing decreased by two percent while DSF increased two percent.

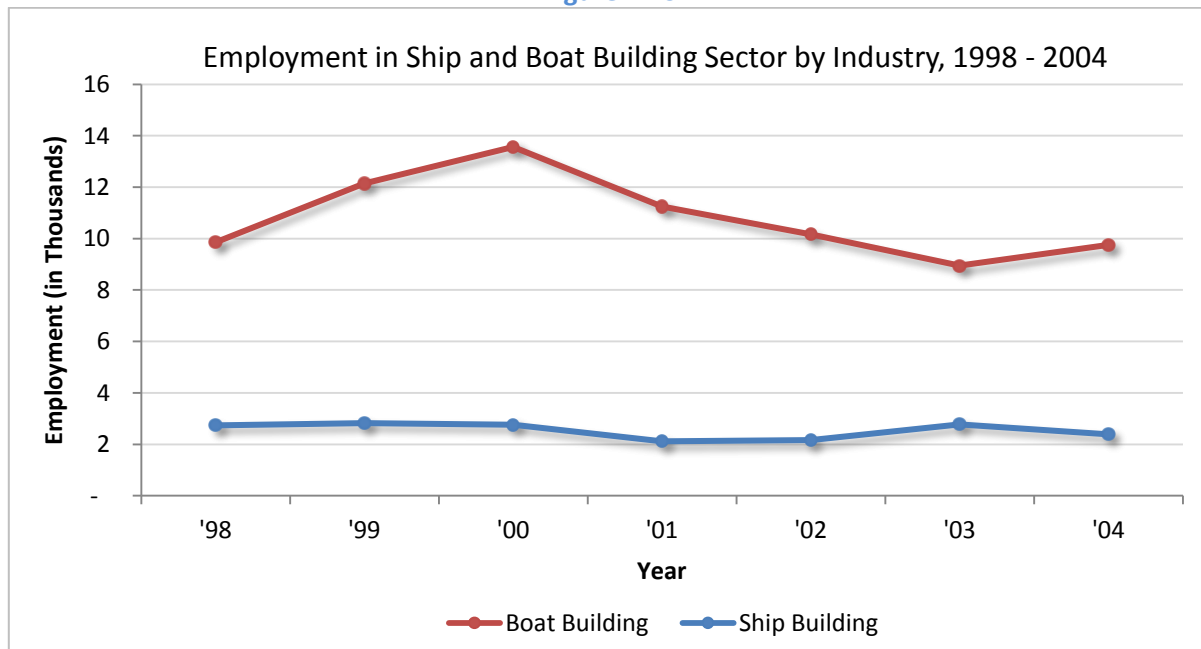
Table 1-20

Industry	Percent of Workforce		Change
	1998	2004	
Search and Navigation Equipment (SNE)	35	29	-6
Marine Transportation Services (MTS)	28	28	0
Marine Passenger Transportation (MPT)	23	29	6
Deep Sea Freight Transportation (DSF)	8	10	2
Warehousing (WH)	6	4	-2

Ship and Boat Building

The Ship and Boat Building Sector maintained the third largest number of workers in the Ocean Economy during this period. It is comprised of two different industries—Ship Building and Repair and Boat Building and Repair. For the two industries, *ship* refers to a watercraft typically suitable or intended for other than personal or recreational use while *boat* is defined as a watercraft typically suitable or intended for personal use. Employment trends in the Ship and Boat Building sector varied by industry. The ship building industry maintained a steady level of employment that never dropped below 1,300 employees and never grew to more than 3,000 employees (Figure 1-19). Employment in Boat Building increased in 1999 but peaked in 2000 and outnumbered employment in Ship Building by nearly five to one. The following three years employment dropped steadily. In 2004, employment in Boat Building was on the rise while employment in Ship Building experienced a slight decrease.

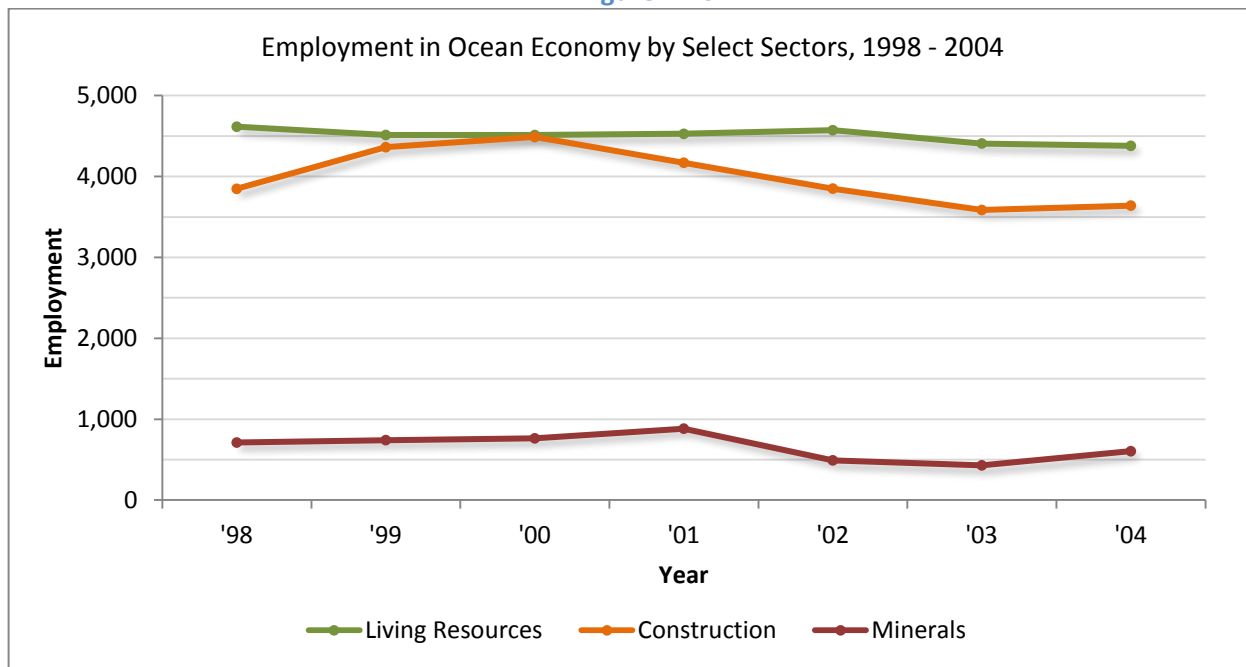
Figure 1-19



Living Resources, Marine Construction, and Minerals

Combined employment in the remaining sectors—Living Resources, Marine Construction, and Minerals—typically account for less than five percent of the workforce in the Ocean Economy. The Living Resources sector is comprised of four different industries—Fishing Hatcheries and Aquaculture, Fishing, Seafood Markets, and Seafood Processing. Overall, employment in this sector was lower in 2004 than in 1998. Employment experienced two notable drops during this period, one in 1999 (2 percent) and the other in 2003 (3 percent). In 1998, Seafood Processing employed 58 percent of workers in this sector. While the industry still maintained the majority of the workforce classified under Living Resources sector in 2004, the percentage had dropped slightly to 56 percent. Employment in Seafood Markets remained above 1,000 for the entire period. Figure 1-20 shows the employment trend in each sector from 1998 to 2004.

Figure 1-20



Overall employment the Marine Construction sector decreased by 207 employees (5 percent) beginning with 3,849 in 1998 to 3,642 in 2004. Employment increased between 1998 and 2000 and peaked at 4,490 employees. Employment decreased in 2001 and steadily over the next two years until 2004 when it increased slightly to 3,642 employees.

Ocean Minerals sector is comprised of industries associated with the production of sand, gravel, and limestone as well as industries involved with oil exploration. Overall employment in this sector decreased overall by 15 percent from 713 in 1998 to 606 in 2004. During the late 1990s, employment increased steadily and peaked in 2001 with 885 employees. The next year employment experienced its largest decline during this period dropping 44 percent to 493 employees. It fell slightly 2003 but the following year it increased by 269 recovering more than half of the losses incurred since 2000. In 1999, employment in LSG accounted for 58 percent of employment in the minerals sector. Two years later, employment in LSG accounted for only 42 percent. By 2001, employment in the Oil and Gas industry had surpassed employment in Limestone, Sand and Gravel (LSG). In 2003, employment in the two industries reached the largest margin of difference during this time period with OG accounting for 90 percent of workers.

Indicator 1.6 - Freshwater Withdrawals

In general, water withdrawals can be separated into two different types—freshwater and saline water. This indicator describes freshwater withdrawals made in the coastal zone in both 2000 and 2005 for six different withdrawal categories—Agriculture, Commercial Industrial, Domestic Supply, Public Supply, Recreation, and Power Generation. More detail is given to the Agriculture and Public Supply categories because of the significant change that took place in the percent each of these categories accounted for in the coastal zone. The data used in this indicator came from two reports—*Water Withdrawals, Use, Discharge, and Trends in Florida, 2000* and *Water Withdrawals, Use, and Trends in Florida, 2005*—that include statewide data from several sources including the USGS, the FDEP, water management districts, utilities, industries, and power companies. A similar report for 2010 has not yet been released. The first part of this indicator is an overall account of the change in freshwater withdrawals in the coastal zone while the second part is a more detailed description of each of the six withdrawal categories with extra attention to Agriculture and Public Supply. All primitive withdrawal values are expressed in million gallons per day (Mgal/day).

In 2005, the coastal counties in Florida withdrew 4,634 Mgal/day of freshwater (Table 1-21). This was 14 percent less (781 Mgal/day) than in 2000. Of the six different withdrawal category, five experienced decreases in withdrawals. The largest numeric decrease occurred in Agriculture (723Mgal/day) and the smallest numeric decrease occurred in Domestic Supply (9.92 Mgal/day). Public Supply increased by 5.74 percent or 106 Mgal/day and was the only category in which withdrawals did not decrease.

Table 1-21

Table 1-21 shows the amount of freshwater withdrawn for each category in 2000 and in 2005 and the numeric and percent change for each category.

Category	Withdrawals in 2000 (Mgal/day)	Withdrawals in 2005 (Mgal/day)	Numeric Change (Mgal/day)	Percent Change
Agriculture	2,406.09	1,682.97	-723.12	-30.05
Commercial Industrial	314.9	298.42	-16.48	-5.23
Domestic Supply	94.43	84.51	-9.92	-10.51
Power Generation	425.79	345	-80.79	-18.97
Public Supply	1,848.11	1,954.21	106.10	5.74
Recreational	326.18	268.9	-57.28	-17.56
Coastal Zone	5,415.50	4,634.01	-781.49	-14.43

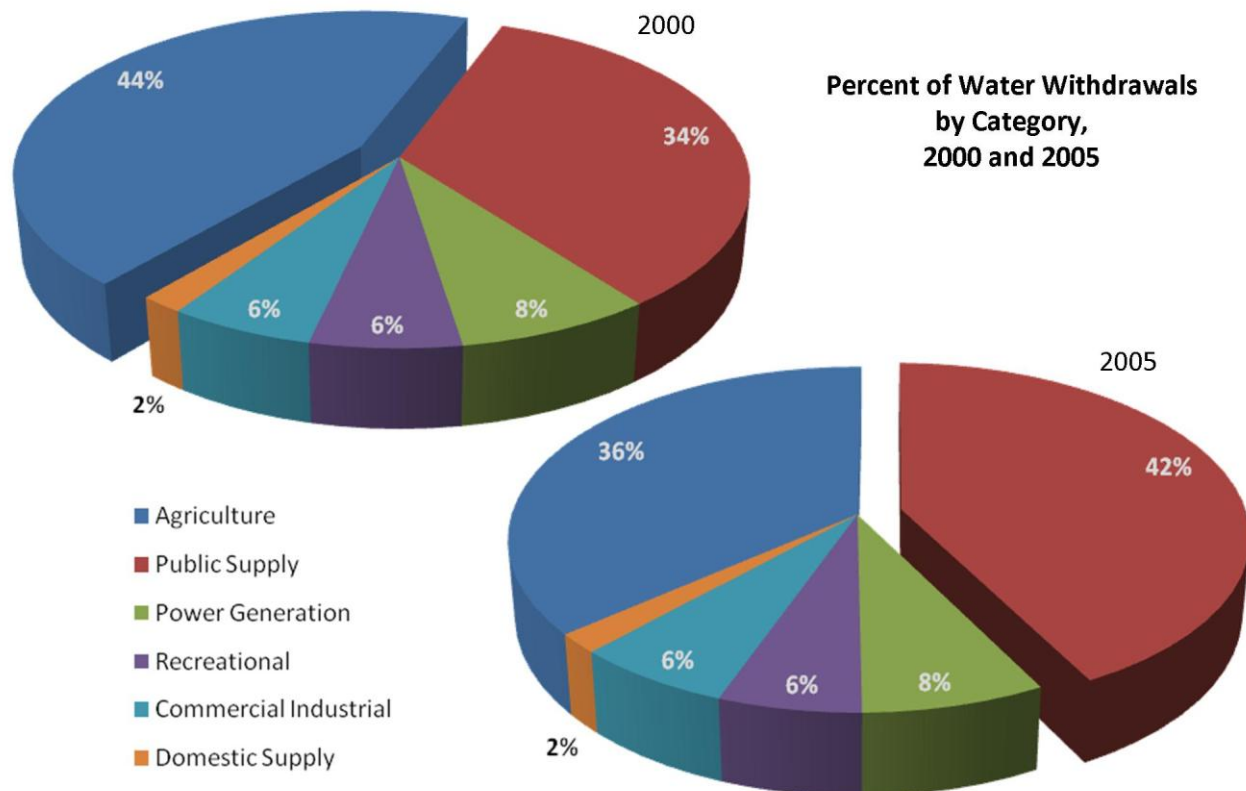
Withdrawals made in the coastal zone exceeded those made outside the coastal zone by 2,639 Mgal/day in 2000 and 2,400 Mgal/day in 2005. Coastal zone freshwater withdrawals account for approximately two-thirds of statewide withdrawals in 2000 and in 2005 (Table 1-22).

Table 1-22

	Withdrawals in Coastal Counties	Withdrawals in NonCoastal Counties	Difference	Percent of State Total
2000	5,415.50	2,776.07	2,639.43	66.11
2005	4,634.01	2,234.19	2,399.82	67.47

Figure 1-21 shows the percentage of withdrawals made in the coastal zone for each category in 2000 and 2005. Four of the six categories maintained the same percentage of withdrawals but two, agriculture and public supply, experienced notable changes. In 2000, Agriculture withdrawals accounted for 44 percent of freshwater withdrawals in the coastal zone—more than any other single category—while Public Supply withdrawals accounted for 34 percent (1-21). In 2005, Agriculture withdrawals dropped to 36 percent of the coastal zone’s freshwater withdrawals and no longer represented the zone’s largest single category. Instead, Public Supply accounted for 42 percent of the zone’s freshwater withdrawals. The shift from Agriculture being the largest category to Public Supply was more of a result of Agriculture withdrawals decreasing by 723 Mgal/day. Public Supply only increased by 106 Mgal/day.

Figure 1-21



Ground Water vs. Surface Water

Ground water withdrawals in the coastal zone decreased in five of the six categories (Table 1-23). The largest decreases occurred in power generation and agriculture (61 percent and 38 percent respectively). The only category to experience an increase in ground water withdrawals was public

supply. Public supply also experienced a percent increase in surface withdrawals—the largest percent increase of any single category. Agriculture and power generation not only experienced large decreases in ground water withdrawals, they also experienced notable decreases in surface withdrawals (25 percent and 17 percent respectively). Overall, the coastal zone experienced a decrease in the withdrawals from both the ground and the surface (142 and 2 percent respectively) but withdrawals from the ground decreased by a much higher value.

Table 1-23

Category	GW Withdrawals		Percent Change in GW	SW Withdrawals		Percent Change in SW
	2000	2005		2000	2005	
AG	927.41	576.26	-37.86	1,478.68	1,106.71	-25.16
PS	1,623.58	1,641.75	1.12	224.53	312.46	39.16
PG	17.16	6.67	-61.13	408.63	338.33	-17.20
CI	242.68	216.12	-10.94	72.22	82.3	13.96
RI	168.24	130.64	-6.12	157.94	138.26	5.83
DS	94.43	84.51	-10.51	0	0	0.00
Coastal Zone	3,073.5	2,655.95	-141.674	2,342	1,978.06	-1.70

Agriculture

Agriculture includes all water withdrawn for agricultural purposes. This includes irrigation, livestock watering, and aquaculture. In 2005, the coastal zone withdrew 723 Mgal/day less than it did in 2000 for agricultural purposes (Table 1-24). In 2000, the coastal zone withdrew 2,406 Mgal/day for agriculture which represented 61 of the state's total amount of agriculture withdrawals. In 2005, agriculture withdrawals dropped to 1,682 Mgal/day but still accounted for 61 percent of the agricultural withdrawals in Florida. Within the coastal zone, the decrease in agricultural withdrawals was part of a major shift in water withdrawals that took place between 2000 and 2005. During that time, agricultural withdrawals dropped from 44 percent of the coastal zone's withdrawals in 2000 to 36 percent in 2005.

Table 1-24

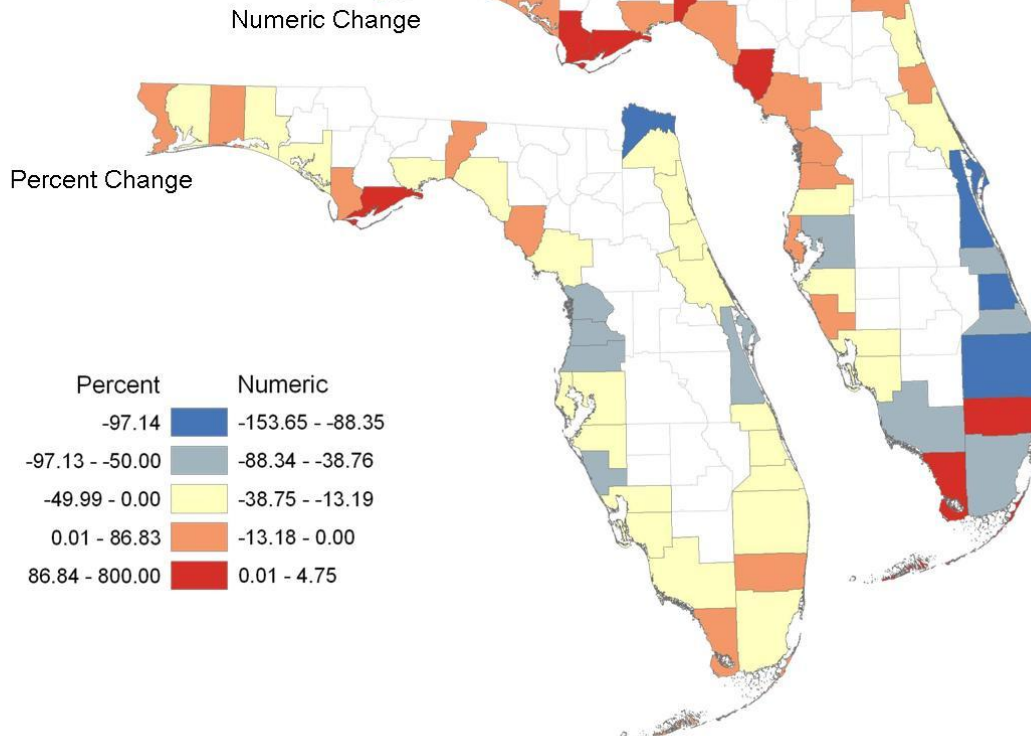
	2000	2005	Numeric Change	Percent Change
Coastal Counties	2,406	1,682	-723	-30.05
Noncoastal Counties	1,517	1,083	-434	-28.59
State	3,923	2,765	-1,158	-29.52
Coastal Percentage	61.33	60.83	-0.50	--

Figure 1-22 shows the numeric and percent change in agricultural withdrawals for each county in the coastal zone. Most counties experienced a decrease in agriculture withdrawals. Counties that experienced the greatest numeric decreases in agricultural withdrawals are located on the Atlantic coast in the central and southern part of the peninsula. Counties with small decreases are located in the northern part of the state in the panhandle and big bend regions. While most counties experienced a decrease in agriculture withdrawals, there were eight that experienced an increase. Six of those counties are located in the panhandle and big bend region and two are located in

south Florida. Of the 27 counties that experienced a decrease in agricultural withdrawals, 22 experienced decreases in agricultural withdrawals by more than 20 percent. These counties are primarily located in the peninsula.

Figure 1-22

Numeric and Percent Change
In Agricultural Withdrawals
In the Coastal Zone, 2000 - 2005



Overall, the average county withdrew 20.66 Mgal/day less freshwater in 2005 than in 2000. Palm Beach County experienced the largest numeric decrease in agricultural withdrawals (154 Mgal/day) while Jefferson County experienced the largest numeric increase (4.75 Mgal/day) (Table 1-25).

Table 1-25

County	2000	2005	Numeric Change	Percent Change
Bay	1.28	0.90	-0.38	-29.69
Brevard	136.82	48.47	-88.35	-64.57
Broward	4.10	7.66	3.56	86.83
Charlotte	47.19	26.19	-21.00	-44.50
Citrus	3.35	1.52	-1.83	-54.63
Collier	142.99	92.55	-50.44	-35.28
Dixie	1.62	1.86	0.24	14.81

Duval	4.07	2.12	-1.95	-47.91
Escambia	2.73	3.30	0.57	20.88
Flagler	15.70	9.30	-6.40	-40.76
Franklin	0.01	0.09	0.08	800.00
Gulf	0.21	0.30	0.09	42.86
Hernando	4.29	2.00	-2.29	-53.38
Hillsborough	87.15	48.39	-38.76	-44.48
Indian River	222.49	157.64	-64.85	-29.15
Jefferson	6.53	11.28	4.75	72.74
Lee	60.51	33.37	-27.14	-44.85
Levy	22.45	21.23	-1.22	-5.43
Manatee	105.72	73.55	-32.17	-30.43
Martin	140.02	90.12	-49.90	-35.64
Miami-Dade	110.35	58.06	-52.29	-47.39
Monroe	0.03	0.05	0.02	66.67
Nassau	0.70	0.02	-0.68	-97.14
Okaloosa	0.75	0.96	0.21	28.00
Palm Beach	946.16	792.51	-153.65	-16.24
Pasco	22.73	9.54	-13.19	-58.03
Pinellas	0.46	0.26	-0.20	-43.48
Santa Rosa	5.00	2.96	-2.04	-40.80
Sarasota	7.54	3.48	-4.06	-53.85
St. Johns	28.59	15.02	-13.57	-47.46
St. Lucie	237.34	147.21	-90.13	-37.98
Taylor	1.93	1.14	-0.79	-40.93
Volusia	32.91	17.72	-15.19	-46.16
Wakulla	0.28	0.27	-0.01	-3.57
Walton	2.09	1.93	-0.16	-7.66
Coastal Zone	2,406.09	1,682.97	-723.12	-30.05

Public Supply

Public Supply refers to water distributed to the public by a community water system, either publicly or privately owned. The coastal zone withdrew 106 Mgal/day more in 2005 than it did in 2000 for public supply (Table 1-26). This figure represents a 6 percent increase within the public supply category. In 2000, public supply withdrawals accounted for 34 percent of freshwater withdrawals in the coastal zone. In 2005, similar public withdrawals increased to account for 42 percent of the coastal zone's freshwater withdrawals.

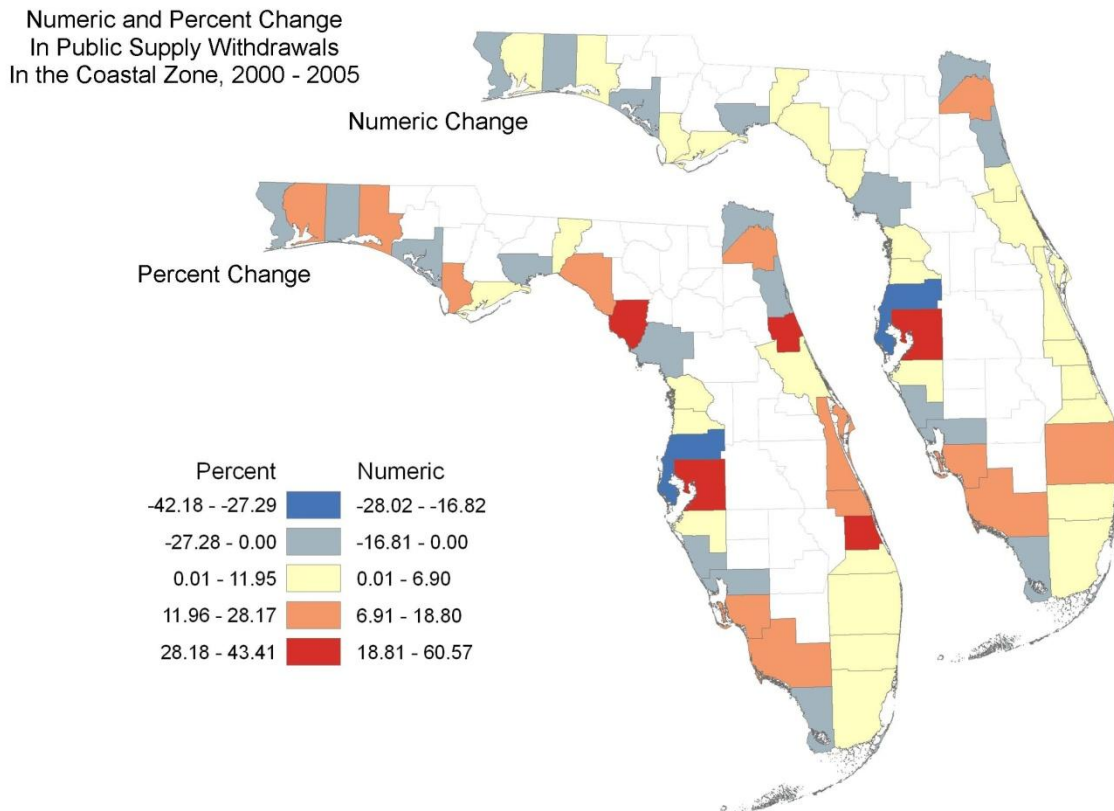
The coastal zone's public supply withdrawals in 2000 (1,848 Mgal/day) accounted for 76 percent of the state's total amount of similar withdrawals. In 2005, such withdrawals in the coastal zone increased slightly to 77 percent of the state's total.

Table 1-26

	2000	2005	Numeric Change	Percent Change
Coastal Counties	1,848.11	1,954.21	106.10	5.74
Noncoastal Counties	588.68	586.31	-2.37	-0.40
State	2,436.79	2,540.52	103.73	2,436.79
Coastal Percentage	75.84	76.92	1.08	--

Figure 1-23 shows the numeric and percent change in public supply withdrawals for each county in the coastal zone. Twenty-three counties experienced an increase in withdrawals. The twelve remaining that did not experience an increase are located primarily along the Gulf coast in either the panhandle or the peninsula. Two counties on the Atlantic coast that experienced a decrease in public supply withdrawals (Nassau and St. Johns) are located in the northeast.

Figure 1-23



The average coastal county withdrew 3.03 Mgal/day more in 2005 than in 2000. Nationwide, Florida ranked second in the nation in ground water withdrawals for public supply in 2005 and the coastal zone accounted for 77 percent of the state's total. In the coastal zone, Hillsborough County experienced the largest numeric increase (61 Mgal/day) while Pasco County experienced the largest numeric decrease (Table 1-27). One county, Monroe, did not make public supply withdrawals in either 2000 or 2005.

Table 1-27

County	2000	2005	Numeric Change	Percent Change
Bay	51.17	47.12	-4.05	-7.91
Brevard	27.74	32.90	5.16	18.60
Broward	258.06	263.57	5.51	2.14
Charlotte	7.28	6.37	-0.91	-12.50
Citrus	13.97	15.64	1.67	11.95
Collier	52.4	67.16	14.76	28.17
Dixie	0.67	0.88	0.21	31.34
Duval	119.12	137.92	18.80	15.78
Escambia	44.63	40.45	-4.18	-9.37
Flagler	6.22	8.92	2.70	43.41
Franklin	1.92	2.13	0.21	10.94
Gulf	1.47	1.82	0.35	23.81
Hernando	20.27	22.53	2.26	11.15
Hillsborough	166.39	226.96	60.57	36.40
Indian River	13.93	16.76	2.83	20.32
Jefferson	0.72	0.78	0.06	8.33
Lee	52.37	64.53	12.16	23.22
Levy	2.16	1.79	-0.37	-17.13
Manatee	49.92	50.98	1.06	2.12
Martin	18.45	19.30	0.85	4.61
Miami-Dade	394.29	400.01	5.72	1.45
Monroe	0	0	0	--
Nassau	6.81	6.50	-0.31	-4.55
Okaloosa	22.97	22.07	-0.90	-3.92
Palm Beach	229.84	246.67	16.83	7.32
Pasco	102.67	74.65	-28.02	-27.29
Pinellas	39.88	23.06	-16.82	-42.18
Santa Rosa	13.47	15.90	2.43	18.04
Sarasota	28.71	26.35	-2.36	-8.22
St. Johns	16.49	14.34	-2.15	-13.04
St. Lucie	17.95	24.85	6.90	38.44
Taylor	1.73	2.02	0.29	16.76
Volusia	54.9	58.55	3.65	6.65
Wakulla	2.19	1.81	-0.38	-17.35
Walton	7.35	8.92	1.57	21.36
Coastal Zone	1,848.11	1,954.21	106.10	5.74

Power Generation

Power generation includes water withdrawn by thermoelectric power generation facilities, both fossil fuel and nuclear, and water used at hydroelectric facilities. The vast majority of water withdrawn for power generation is saline. Freshwater accounted for 3% of the total amount of power generation withdrawals in the coastal zone in both 2000 and 2005. What follows is a deeper look into the 3% of freshwater withdrawals made for power generation.

In 2005, the coastal zone withdrew 80.79 Mgal/day less than it did in 2000 for power generation (Table 1-28). In 2000, withdrawals in the coastal zone equaled 426 Mgal/day which represented 65 percent of the state's total amount of power generation withdrawals. In 2005, such withdrawals decreased to 345 Mgal/day and accounted for 62 percent of the state's total.

Table 1-28

	2000	2005	Numeric Change	Percent Change
Coastal	425.79	345	-80.79	-18.97
NonCoastal	232.47	213.08	-19.39	-8.34
State Total	658.26	558.08	-100.18	-15.22
Coastal Percentage	64.68	61.82	-2.87	--

Commercial Industrial

Commercial Industrial withdrawals include withdrawals made by commercial users and can include government and military facilities, schools, prisons, hospitals, recreational (non-irrigation), and nonmanufacturing facilities. In 2005, the counties in the coastal zone withdrew 16.48 Mgal/day less than it did in 2000 for commercial industrial purposes. In both 2000 and 2005, commercial withdrawals accounted for 6 percent of freshwater withdrawals in the coastal zone.

The coastal zone's commercial industrial withdrawals in 2000 (314.9 Mgal/day) accounted for 56 percent of the state's total amount of similar withdrawals (Table 1-29). In 2005, such withdrawals in the coastal zone increased to 61 percent of the state's total.

Table 1-29

	2000	2005	Numeric Change	Percent Change
Coastal Counties	314.9	298.42	-16.48	-5.23
Noncoastal Counties	248.4	189.91	-58.49	-23.55
State	563.3	488.33	-74.97	-13.31
Coastal Percentage	55.90	61.11	5.20	--

Recreational Irrigation

Recreational Irrigation refers to withdrawals made for landscaping and recreational purposes. It includes withdrawals made for watering golf courses as well as athletic fields, cemeteries, public highway areas, parks, playgrounds, and nonresidential lawns (although some residential lawns are included). In 2005, the coastal zone withdrew 57 Mgal/day less than it did in 2000 for recreational irrigation purposes. Recreational Irrigation withdrawals accounted for 6 percent of the coastal zone's freshwater withdrawals. In 2000, the coastal zone withdrew 326 Mgal/day for agriculture

which represented 79 of the state's total amount of agriculture withdrawals. In 2005, agriculture withdrawals decreased to 269 Mgal/day and accounted for 82 percent of the state's total (Table 1-30).

Table 1-30

	2000	2005	Numeric Change	Percent Change
Coastal Counties	326.18	268.9	-57.28	-17.56
Noncoastal Counties	85.55	60.74	-24.81	-29
State	411.73	329.64	-82.09	-19.94
Coastal Percentage	79.22	81.57	2.35	--

Domestic Supply

Domestic Supply refers to withdrawals of potable water without the need of a permit from water management districts. In 2005, the coastal counties withdrew 9.92 Mgal/day less than it did in 2000 for domestic supply purposes. In both 2000 and 2005, domestic withdrawals accounted for 2 percent of freshwater withdrawals in the coastal zone. The coastal zone's domestic withdrawals in 2000 (94.43 Mgal/day) accounted for 48 percent of the state's total amount of similar withdrawals. In 2005, such withdrawals in the coastal zone decreased to 46 percent of the state's total (Table 1-31).

Table 1-31

	2000	2005	Numeric Change	Percent Change
Coastal Counties	94.43	84.51	-9.92	-10.51
Noncoastal Counties	104.25	100.94	-3.31	-3.18
State	198.68	185.45	-13.23	-6.66
Coastal Percentage	47.53	45.57	-1.96	--

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Coastal Habitats



Executive Summary

Florida spans the transition zone from temperate to sub-tropical climate, and the natural resources of the state reflect the ecological diversity found in areas of changing physical and chemical characteristics. Northern Florida is strongly influenced by rivers of the southern Appalachians and Piedmont. Freshwater springs are abundant throughout northern and central Florida's karstic limestone region. Coastal areas of the Panhandle are rich in riparian, alluvial wetlands and coastal bays. Estuaries and coastal areas of the Florida Gulf of Mexico support salt marsh, seagrass, and oyster reef communities, and are characterized by barrier islands of sandy beach or thickly vegetated marshlands. The Big Bend region is characterized by extensive seagrass meadows in the shallow coastal waters. In the southern peninsula of Florida, salt marsh grasses give way to mangrove forest coastlines and islands. The vast area of the Everglades wetland (1.5 million acres) was called Pahayokee – "Grassy Water" (Douglas, 1947) by the native Seminole Indians, and has been made a National Park and Wilderness Area. The Everglades contain southerly sheet flowing surface and ground water that serve as the sole source of drinking water for 6 million South Floridians. The Everglades were designated as a World Heritage Site in 1979, and contain the largest stand of protected mangrove forest in the western hemisphere. The Atlantic coast of Florida is composed of the coastal wetlands of the 5.6 million acres St Johns River basin, Lake Okeechobee (the seventh largest freshwater lake in the United States), sandy beaches, barrier islands and coastal lagoons. Salt marsh grasses, submerged shallow water seagrasses, estuarine mangroves, and offshore reef systems (from Martin County south) characterize the Florida Atlantic coast. Beyond the southern peninsula extend the Florida Keys, consisting of more than 1,500 islands of remnant coral reef and expansive shallow water habitat for seagrass meadows in the Gulf of Mexico and coral reef formations along the Atlantic. The coral reefs of the Florida Keys were designated a National Marine Sanctuary in 1990, and represent the one of the largest reef systems in the world. The sanctuary includes 1.8 million acres stretching from Key Largo to the Dry Tortugas. Abbreviated descriptions of eight regional geomorphic and biotic descriptive characterizations presented in the Florida Wildlife Legacy Initiative Marine and Estuarine Site Assessment (TNC, 2005) are tabulated below (Table 2-1).

In 2010, conserved lands in Florida represented 28.5% of the land area of the state, more than 9.85 million acres. State and federal managed lands represent 93% of Florida's conserved lands, with the proportion of state lands increasing to 53% of all conserved lands in 2010. The total number of acres of managed conserved lands increased by nearly 1.2 million acres (13.8%) between 2001 and 2010. Most of the increase occurred in state lands, primarily by the Water Management Districts (WMD) and the Department of Agriculture and Consumer Services (63.4% combined). The South Florida WMD saw the greatest increase in acres of managed land among the districts between 2003 and 2010, which was mainly associated with the Everglades. Within the Department of Environmental Protection, the Division of Recreation and Parks manages most of the lands for the state; over 590,000 acres in 2010.

The coastal habitat of shallow water seagrass has been a priority area of research and monitoring in Florida over the last 20 years. An alarming decrease in areal cover of near-shore seagrass beds due to deteriorating water quality led to implementation of active seagrass management

statewide since the 1990s. Continual monitoring efforts and recurrent aerial imagery are used to determine the condition and extent of seagrass meadows. Florida seagrass cover was estimated as greater than 2.25 million acres in 2003 in territorial coastal waters. Most seagrass in Florida (90%) is located in two areas of the state; South Florida and the Big Bend regions (1.4 and 0.6 million acres, respectively). The majority of the seagrass around the coastline showed positive changes in extent of areal cover between data collection periods in the 1990s and in the 2000s. Areas of concern due to seagrass losses include Perdido Bay, Pensacola Bay, Choctawhatchee Bay, St. Josephs Bay, and the Southern Big Bend. Motorboat propeller damage to seagrass beds has emerged as a threat to varying degrees around the state. The slow recovery of seagrass from propeller scars and the increase in recreational boats statewide contribute to an accumulation of scarring in shallow waters. In areas where studies have been conducted, the increase in seagrass scarring damage has been significant, e.g. Charlotte Harbor and Florida Bay.

During the last 200 years, Florida has experienced a steady loss of wetlands due to expansion of agriculture and development of the built environment. Wetland conversion to other land uses resulted in an estimated reduction of more than 9.3 million acres (Dahl, 1990) to the current total estimate of 10.275 million acres of all 15 wetland types by the Florida Fish and Wildlife Conservation Commission. This represents a loss of nearly 50% of original wetlands in Florida between 1790 and 1990. Six counties in South Florida (Collier, Monroe, Miami-Dade, Broward, Palm Beach, and Polk) contain 34% of Florida wetlands. Two thirds of wetlands (6.75 million acres) are located in the 35 coastal counties, and saltwater marsh, tidal flats, and mangroves amount to one million acres or nearly 15% of Florida coastal wetlands. National policy toward wetland conversion changed to conservation with the passage of the 1990 Water Resources Development Act, and Florida adheres to a “no net loss of wetland function” policy. There are two primary types of coastal estuarine and marine wetlands in Florida; mangroves and saltwater marsh. Florida mangroves, over 550,000 acres, represent approximately 1.5% of the world mangrove acreage, and account for nearly all mangroves found in North America. Saltwater marsh amounts to 6.4% of the coastal wetland total and 43% of estuarine wetlands in Florida. Most saltwater marsh in Florida (66%) is found on the Gulf Coast in the Big Bend and South Florida regions.

Table 2-1
Description of eight coastal regions based on geomorphic-biotic characterizations. Abbreviated descriptions taken from (TNC, 2005)

Region	General Description
Northeast	Georgia to Cape Canaveral. Coastal geomorphology shaped by mixed wave and tidal energy. North of Matanzas Inlet; tidal inlets are wide and deep, tidal flats and marshes extensive, barrier islands relatively short. South of Matanzas Inlet; barrier islands are relatively long and wave dominated with a longshore bar and trough system, dunes are high, beaches range from narrow and steep to wide and gently sloping. The majority of coastline is quartz-sand barrier islands with some beach and shallow nearshore limerock.
East-central	Cape Canaveral to Jupiter. Narrow barrier island morphology with sandy beaches and broader continental shelf near Cape Canaveral. Back barrier Indian River Lagoon estuary stretches 240 kilometers characterized as the most biologically diverse estuary in North America. Offshore benthic habitat types include patch coral reef, shallow Sabellaniid worm reef, hard bottom and deep oculina banks. Major source of freshwater discharge from Lake Okeechobee through the St. Lucie Canal.

Southeast	Jupiter Inlet to north end of the Florida Keys. Characterized by sandy beaches, narrow barrier islands, a narrow continental shelf and reef terraces parallel to the beach. Reef terraces dominated by octocorals and sponges transition to patch reefs north of West Palm Beach. Includes the northern portion of Biscayne Bay.
Florida Keys/ Florida Bay	Southern tip of Florida characterized by low-lying string of limestone islands from Key Biscayne off Miami to the Dry Tortugas (330 kilometers). The southern side of the Florida Keys is bounded by the world's third largest fringing barrier reef, (10 kilometers offshore). The continental shelf is relatively shallow and makes way for the Florida Straits between the United States and Cuba. Florida Bay forms a large shallow water body between the Florida mainland and Florida Keys. Florida Bay is a patchwork of deeper "lakes" separated by shallow mud banks supporting mangrove islands (Lodge, 1998). Southern Biscayne Bay (Biscayne National Park) is included in the northern portion of this region.
Southwest/ Ten Thousand Islands	The Ten Thousand Islands area extends from Cape Sable to Cape Romano. One of the world's largest contiguous mangrove areas (more than 205,000 acres), and still growing seaward. The area is characterized by vast mangrove forests, mangrove islets, tidal channels, small embayments, oyster reef and sabellarid worm reef (Davis, 1997). Southbound longshore currents carry sand and shells to the region. Oyster bars provide substrate for mangroves to take hold (Lodge, 1998). In the Cape Sable area, relic vermetid gastropod reefs may provide the substrate for mangrove islands to become established (Davis, 1997).
West-central	Cape Romano to Anclote Key. Characterized by the most morphologically diverse barrier island system in the world, with 29 barrier islands and 30 inlets (Davis, 1997). The wide continental shelf extends more than 160 kilometers into the Gulf of Mexico. The largest estuaries in this area, Tampa Bay and Charlotte Harbor, have large tidal prisms. Subsurface flow, sheet flow, and the Caloosahatchee River, which was artificially connected to Lake Okeechobee decades ago, are freshwater sources into this portion of the coast.
Big Bend	The Big Bend coastline extends from Anclote Key at the south to Cape San Blas at the North. Continental shelf is extremely wide (150 kilometers); the seaward gradient is extremely shallow resulting in a low wave energy environment (Davis, 1997). The area is characterized by extensive seagrass and salt marsh communities that extend for 350 kilometers along the coast. Other prominent features include; actively discharging freshwater springs, large oyster reefs, and a delta formed by the Suwannee River. Quartz sand is absent from this portion of Florida coastline.
Northwest	The Panhandle coast has a wave-dominated energy regime with barrier islands, well-developed beaches, foredunes, and widely spaced inlets (Davis, 1997). The Apalachicola River, which drains much of Georgia and Alabama, ends in a large fluvial delta. The gradient from the Apalachicola delta into deep waters is shallow (1:1,800). Further to the west, the offshore gradient is relatively steep (1:60 to a depth of 20 m). Littoral drift from the Apalachicola delta is westward, and has been estimated at 200, 000 cubic meters annually.

The focus area of coastal habitats is composed of nine indicators (Table 2-2) to assess the trends in acreage and condition of select natural coastal environments to sustain native species and ecosystems to maintain Florida's unique biodiversity of plants and animals.

Table 2-2
Coastal Habitat Indicators

2.1	Number of Acres Managed for Habitat Conservation
2.2	Number of Acres of Seagrass Cover and Degree of Propeller Scarring
2.3	Number of Acres of Wetland Habitat
2.4	Number of Acres of Shellfish Growing Habitat
2.5	Number of Miles of Sandy Beach and Acres of Dune Habitat
2.6	Number of Acres of Coral Protected Habitat and Artificial Reefs
2.7	Number of Acres of Aquatic Preserves

2.8	Number of Freshwater Springs, Springshed Land Use, and Nutrient Levels
2.9	FCMP Grants for Coastal Habitats

Coastal Habitats

Management of habitats in Florida has been a high priority for the vision of the state for many years. Programs for the conservation of Florida’s unique combination of habitats have long standing support of the majority of the people of Florida, as seen in the passage of the Preservation 2000 and Florida Forever programs. Billions of dollars have been invested to preserve and maintain the natural aspects of Florida that people have been drawn to for recreation and enjoyment as residents and visitors since before statehood. Some of those natural habitats found along the coast include; coral reefs, sandy beaches, seagrass meadows, freshwater springs, and the estuaries and wetlands of Florida.

Preservation of Florida habitats is linked to the desire to maintain the original biodiversity at an appropriate level that supports healthy ecosystems and the species that have become endangered with the development of the human built environment. This biodiversity is accepted, by global consensus, as necessary for the healthy survival of human populations. The U.S. Congress established the State Wildlife Grants (SWG) Program to support development of comprehensive plans by states to conserve biodiversity and prevent species from becoming imperiled. The Florida Fish and Wildlife Conservation Commission (FWC) created the Florida Wildlife Legacy Initiative to develop a strategic vision for conserving all of Florida’s wildlife to meet the requirements of the State Wildlife Grants Program. The result of the Initiative was the development of the Statewide Wildlife Action Plan (SWAP), which produced a comprehensive inventory of the natural habitats and threatened species in Florida in 2005 and outlined a strategic plan for conserving Florida’s habitats.

In the development of the SWAP, the approach toward species conservation shifted from previous strategies of protecting species one at a time as they became endangered to a holistic view of conservation of the natural environment on a landscape scale. Managing Florida’s natural resources from a landscape perspective produces protected ecosystems consisting of numerous native species before legal protection is needed, as well as, those already listed as threatened and endangered. Landscape conservation encompasses whole habitats and attempts to maintain the natural connectivity between habitats. The SWAP also identifies the major stressors within habitats and their level of priority to assess the threat to natural conserved lands and species through a process developed by The Nature Conservancy (2000). The FWC prioritization process produced 45 habitat categories for Florida, of which 14 were coastal environments. The SWAP (2005) provided a baseline of the status of the coastal habitats in this report. Eight indicator habitats were chosen for the assessment of coastal trends in 2010 (Table 2-3). Some habitats have more extensive coverage than others, *e.g.*, seagrasses, springs, and corals.

One of the required elements of State Wildlife Grants is the identification of conservation threats to wildlife habitats throughout the state. Table 2-3 is a modified version of the threat ratings for the 14 marine, estuarine, and coastal habitats for Florida. Qualitative ratings (*i.e.*, low, medium,

high, very high) were converted to numeric equivalents (1 through 4), so that average stress or habitat values for multiple categories could be calculated. Stressor ratings were then able to be quantitatively ordered to identify priority threat areas. Habitats were assigned cumulative values representing the status considering all stressors. It should be noted that this is a modification of the original evaluation (SWAP 2005, Table 4, page 42), and should be viewed only as a *post hoc* analysis of the process employed by FWC in developing the Statewide Comprehensive Wildlife Conservation Strategy for all habitats. Where the FWC identified the categories as threats, this analysis has renamed the categories as stressors. Assigning a critical threat level to the sources of stress in Table 2-3 was determined by the combination of stress level, number of habitats affected, and the frequency of high/very high ratings. Pair-wise correlations were performed for the three factors to identify extreme stressors in the distribution. In performing this analysis some of the categories were combined (*e.g.*, vessel and boating impacts) or added (*e.g.*, Coastal Strand) for application to this coastal assessment; therefore, a direct comparison between the FWC conclusions and the statements made here should not be made.

According to this method, six sources of stress were determined to be threats of very high priority to coastal and marine habitats; coastal development, incompatible resource extraction (*e.g.*, mining and drilling), dams and release of fresh water, dredging of channels for canals and shipping, light pollution, and parasites and pathogens. The percentage of habitats with stressors rated as level 3 or 4 ranged from 71% to 100%. Resource extraction, light pollution, and parasites/pathogens are very specific to habitat type. Coastal development, fresh water control, and channeling and dredging were broad threats, affecting 12 to 14 of 14 habitats at stress levels 3 or 4. Eleven sources of coastal habitat stress were determined to be threats of high priority. High priority stressor ratings ranged from 2.54 to 3.00, and all had between 56% and 67% of habitats at stress level of 3 or 4. The number of affected habitats ranged from 8 to 13. Thirteen sources of stress were determined to be medium level threats, and five were low level threats. Medium threats ranged between 1.82 and 2.45 average stressor levels, and had frequencies of ratings of 3 or 4 for 0% to 55% of the habitats. Four to 13 habitats were affected among stressor sources that were medium threats. The five stressor sources of low threat had few or no ratings of 3 or 4, and occurred in 4 to 8 habitats. The overall average threat rating for the 35 sources of stress was 2.42, with a standard deviation of 0.50, and an average of 8 affected habitats each (range = 3 to 14). Seventeen sources of stress were frequently (56% of the time or more) at a stress level of 3 or 4 in the habitats affected.

No coastal habitat had an overall rating of 3.00 or higher; therefore, none of the coastal habitats in this analysis were rated at threat level “very high” for the data considered in the 2005 SWAP. Seven habitats were rated as stressed to a high level of threat; coral reefs, coastal tidal streams, submerged aquatic vegetation (seagrass and algae), beaches, mangrove swamp, salt marsh, and tidal flats, descending order of stressor rating. Six habitats were determined to be at medium threat levels and one marine habitat, pelagic, was rated as having a low threat. The overall average threat rating for Florida coastal marine habitats was 2.40, with a standard deviation of 0.38, and an average of 21 stressors each (range = 14 to 30).

This analysis was based on data collected and evaluated in the 2004 to 2005 period. More recent data is presented for the indicators included in this report. Based on the changes monitored since the SWAP was published, ratings of habitats and average stress levels may have changed, *e.g.* submerged aquatic vegetation and boating and coral reefs and pathogens. The FWC revises the SWAP on a ten year cycle, as outlined in the federal directives of the SWG program.

Table 2-3
FWC Habitat Threat Rating

Sources of Stress		Habitat Category Stress Levels by Source													Overall Stressor Rating			
		Annelid Reef	Beach/Surf Zone*	Coastal Strand*	Bivalve Reef	Coastal Tidal Stream	Coral Reef	Inlet	Mangrove Swamp	Hard bottom	Pelagic	Salt Marsh	Submerged Aquatic Vegetation	Subtidal Unconsolidated Sediment	Tidal Flat	Number of Habitats Affected	Percentage of Habitats Rated 3/4	Average Stressor Rating (all Habitats)
1	Coastal development	3	4	4	3	4	4	3	4	0	0	4	4	3	4	12	100%	3.67
2	Mining and drilling	0	4	0	0	3	3	0	0	0	0	0	0	0	0	3	100%	3.33
6	Dams/Release of water	2	3	0	3	4	3	3	3	2	0	3	3	3	3	12	83%	2.92
8	Dredging channels/shipping	3	3	2	3	4	3	3	3	3	1	3	4	2	2	14	71%	2.79
5	Light pollution	0	3	3	0	0	0	3	0	0	0	0	0	0	0	3	100%	3.00
4	Parasites/pathogens	0	0	0	0	0	4	0	3	3	0	0	2	0	0	4	75%	3.00
3	Climate change	3	4	3	0	3	4	0	3	2	0	3	3	0	2	10	60%	3.00
7	Stormwater management	1	2	0	4	4	4	2	2	2	3	3	4	3	3	13	62%	2.85
9	Harmful algal blooms	0	3	0	3	0	3	2	3	2	3	0	4	0	2	9	67%	2.78
10	Shoreline hardening	1	3	4	0	4	3	3	3	2	0	2	3	0	2	11	64%	2.73
11	Roads, bridges, causeways	0	4	3	3	2	3	2	3	1	0	3	3	2	3	12	67%	2.67
12	Disrupting sediment	2	3	0	0	0	2	3	0	3	0	3	3	0	2	8	63%	2.63
13	Beach nourishment	3	3	2	3	3	3	3	2	2	0	3	2	2	3	13	62%	2.62
14	Invasive plants	0	3	2	0	3	3	2	3	2	0	2	3	0	0	9	56%	2.56
15	Nutrient loads (all sources)	0	3	1	3	3	4	0	3	0	2	0	3	1	0	9	67%	2.56
16	Chemicals & toxins	0	2	0	0	3	3	0	3	2	0	2	2	3	3	9	56%	2.56
17	Industrial operations	3	3	0	1	3	2	2	3	2	1	3	3	3	4	13	62%	2.54
18	Invasive animals	0	3	2	3	3	0	2	3	2	2	0	3	1	3	11	55%	2.45
19	Recreational activities	1	4	3	1	2	2	3	2	0	0	0	4	2	3	11	45%	2.45
20	Surface water withdrawal	0	0	0	3	3	0	2	2	0	0	3	3	1	2	8	50%	2.38
21	Losses of keystone species	0	3	1	0	0	3	0	0	2	3	0	2	0	0	6	50%	2.33
22	Large industrial spills	0	2	0	0	3	2	2	2	0	0	2	2	0	3	8	25%	2.25
23	Groundwater withdrawal	0	0	0	0	2	0	0	2	0	0	0	3	0	2	4	25%	2.25
24	Fishing pressure	0	2	0	1	2	4	2	2	2	2	0	3	0	0	9	11%	2.22
25	Vessel/Boating impacts	1	2	0	1	2	3	3	2	2	1	2	4	1	2	13	23%	2.00
26	Aquaculture operations	0	2	0	0	0	0	0	3	0	1	0	2	0	0	4	25%	2.00
27	Noise pollution	0	2	0	0	2	0	2	3	0	1	0	0	0	0	5	20%	2.00
28	Utility corridors	2	2	0	0	2	2	2	2	1	0	2	2	0	0	9	0%	1.89
29	Fish & Wildlife mgmt.	0	2	1	1	0	0	0	3	2	1	3	0	0	0	7	29%	1.86
30	Fishing gear impacts	1	2	0	0	2	3	2	2	2	1	0	2	2	1	11	9%	1.82
31	Solid waste	0	2	0	0	2	2	0	2	2	0	0	1	1	2	8	0%	1.75
32	Aquarium trade	0	1	0	0	0	3	0	0	1	0	0	2	0	0	4	25%	1.75
33	Thermal pollution	0	0	0	0	2	0	0	2	0	0	0	2	1	0	4	0%	1.75
34	Military activities	0	0	2	0	0	2	2	0	0	0	1	0	0	0	4	0%	1.75
35	Placement of artificial reefs	1	0	0	0	0	2	0	2	2	1	1	2	0	0	7	0%	1.57
Number of Stressors		14	29	14	15	25	27	22	29	23	14	19	30	16	20	AVERAGE & SD		2.42
Overall Habitat Rating		1.93	2.72	2.36	2.40	2.80	2.93	2.41	2.59	2.00	1.64	2.53	2.77	1.94	2.55	2.40	0.38	0.50

Indicator 2.1 - Number of Acres Managed for Habitat Conservation

Land acquisition has been an important part of habitat conservation in Florida. The conserved lands are managed by government agencies at different levels and private entities. Federal, state, and local governments contribute to conserved land management in different ways. Federally managed lands in Florida consist of national parks, wildlife refuges, wilderness areas, national forest land, and military reserves. State conserved lands are managed primarily by four agencies with different divisions responsible for lands for various purposes. The statewide trend for the period 2001 to 2010 was a steady increase in the acres of land conserved as natural habitat through active acquisition programs, such as Save Our Rivers and Florida Forever. Changes in land managed by the Water Management Districts have produced the largest increase in South Florida district-managed lands (41% between 2001 and 2010). Acquisition of conserved land was strongly curtailed in 2010 by economic conditions, and only 20,000 acres were added; the lowest annual increase (0.2%) between 2001 and 2010.

All Florida Conserved Lands

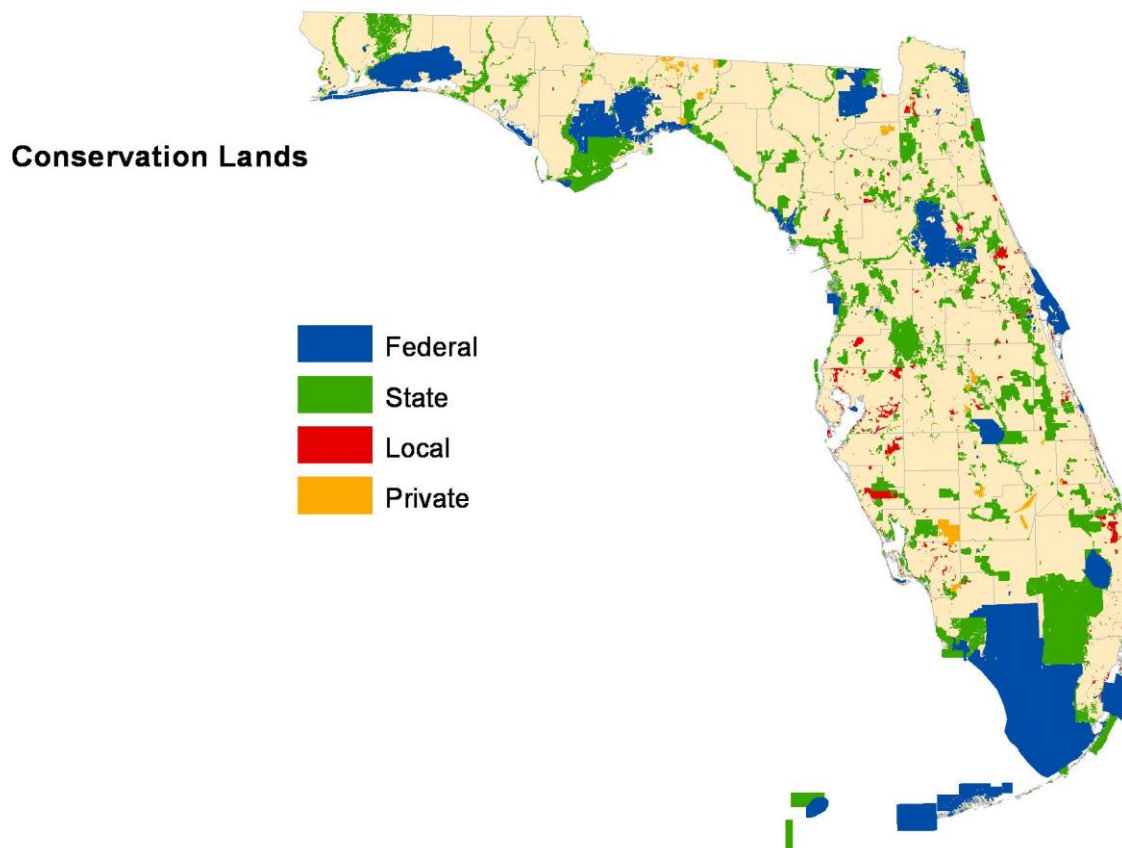
The total number of acres managed for conservation in Florida, according to the FNAI report in March 2010, was 9,858,963. This was an increase of 1.19 million acres, or 13.8%, from 2001 to 2010 (Table 2-4). The ten year trend shows annual increases in conserved land varying between 4.22% in 2002 and 0.20% in 2010. The average annual increase in land managed for conservation was 132,513 acres. Conservation lands are managed by local, state, and federal agencies, as well as, private entities, and the majority of the increase between 2001 and 2010 was for state managed lands (Figure 2-1). State and federal management comprises most (93% in 2010) of the conservation land in Florida. State managed conservation lands increased by 990,130 acres (22.6%) from 4.37 to 5.36 million acres between 2001 and 2010, representing 53% of Florida conservation lands in 2010 (Figure 2-2). Federal land acreage in Florida increased by 32,290 acres (less than 1% change) to 4.04 million acres, but decreased as a percentage of all Florida conserved lands from 45% to 40% between 2001 and 2010, due to relatively large increases in state and local managed lands (Figure 2-2). Locally managed lands increased by 170,198 acres from 280,460 to 450,658 (5% of Florida conserved land) between 2001 and 2010; a change of over 60%. Privately managed conservation lands remained at 2% of Florida conserved land proportionally, although the total private conserved acres increased steadily between 2002 and 2009 for an increase of 48,716 acres (35.3%) over the last ten years.

Table 2-4
Number of Acres of Land Managed for Conservation by Managing Agency from 2001 to 2010

Agency	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	Change in Acres (2001 to 2010)	Percent Change (2001 to 2010)
Federal	4,011,171	4,013,539	4,008,953	3,983,563	4,023,669	4,035,752	4,035,858	4,026,748	4,043,143	4,043,461	32,290	0.8%
State	4,374,714	4,700,578	4,741,585	4,919,771	5,058,905	5,083,984	5,210,821	5,281,440	5,357,346	5,364,844	990,130	22.6%
Local	280,460	317,644	326,647	344,312	371,424	369,677	386,161	408,197	438,471	450,658	170,198	60.7%
Private	137,945	128,531	135,435	141,694	147,001	148,901	156,843	175,661	185,465	186,661	48,716	35.3%
Total Public Conserved Non-submerged Acres	8,666,345	9,031,761	9,077,185	9,247,646	9,453,998	9,489,413	9,632,840	9,716,385	9,838,960	9,858,963	1,192,618	13.8%
Year to Year Change in acres	NA	365,416	45,424	170,461	206,352	35,415	143,427	83,545	122,575	20,003		
Year to Year % Change in acres	NA	4.22%	0.50%	1.88%	2.23%	0.37%	1.51%	0.87%	1.26%	0.20%		

Source: FNAI reports, posted March 1st of each year except 2002 (which was November 1st).

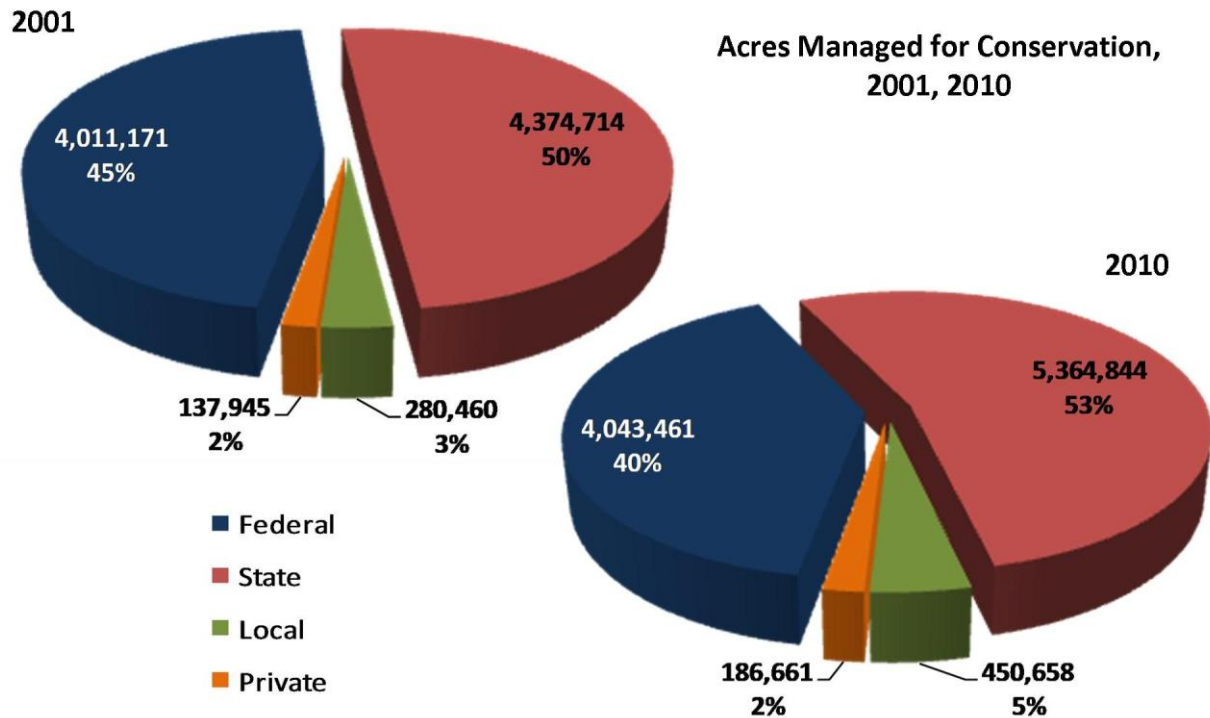
Figure 2-1
Conservation lands managed by Federal, State, Local, and Private agencies



Source: FNAI, 2010

Figure 2-2

Comparison of the number of acres of land managed for conservation (by managing organization), and as a percentage of managed lands for March 1, 2001 and March 1, 2010.



Federal Conserved Lands

Federal conservation lands in Florida are managed by several agencies, including the National Park Service (NPS), the National Forest Service (USDA), the Fish and Wildlife Service (FWS), the Department of Defense (DOD), and other miscellaneous offices. The percent change of managed conserved lands for the four named federal agencies ranged from -0.9% to 2.8% between 2001 and 2010 (Table 2-5). The overall agency proportions of federally managed lands in Florida did not change between 2001 and 2010, and remained as follows: NPS, 42%; USDA, 29%; FWS, 13%; DOD, 16%; and other, 0.01% (Figure 2-3). Other federal lands in Florida increased by 237 acres or 5.2%. The National Park Service is part of the U.S. Department of the Interior, and manages the largest amount of land of the federal agencies in Florida; nearly 1.7 million acres. National Park land in Florida consists of eleven sites which include three parks, two monuments, two memorials, two preserves, and two national seashores. The National Forest Service of the U.S. Department of Agriculture (USDA) manages over 1.1 million acres. The Fish and Wildlife Service and Department of Defense each manage over one half million acres (0.5 and 0.65 million, respectively). Trends for all Florida lands managed federally between 2001 and 2010 were flat and stable, with annual changes fluctuating by less than one percent of the ten-year mean. Figure 2-3 reveals the main characteristic of the federal lands in Florida between 2001 and 2010, little change over time. The other federal managed lands are barely discernible on the scale of millions (Figure 2-4).

Table 2-5
Acres Managed for Conservation Annually by Federal Agency, 2001 - 2010

Level of Govt	Agency	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	Change in Acres (2001 to 2010)	Percent Change (2001 to 2010)
Fed	NPS	1,701,229	1,698,899	1,696,214	1,691,433	1,688,370	1,688,455	1,686,285	1,685,032	1,685,291	1,685,522	-15,707	-0.9%
Fed	USDA	1,153,013	1,153,646	1,154,115	1,158,076	1,173,413	1,181,061	1,183,214	1,184,040	1,184,829	1,184,756	31,743	2.8%
Fed	FWS	505,506	506,330	506,535	481,715	509,547	509,796	509,919	501,236	503,973	504,133	-1,373	-0.3%
Fed	DOD	646,849	649,903	647,328	647,578	647,578	651,669	651,669	651,669	664,239	664,239	17,390	2.7%
Fed	Other	4,574	4,761	4,761	4,761	4,761	4,771	4,771	4,771	4,811	4,811	237	5.2%
Conserved Acres in Florida Managed Federally		4,011,171	4,013,539	4,008,953	3,983,563	4,023,669	4,035,752	4,035,858	4,026,748	4,043,143	4,043,461	32,290	0.8%
Annual Change in acres		NA	2,368	-4,586	-25,390	40,106	12,083	106	-9,110	16,395	318		
Annual % Change (acres)		NA	0.06%	-0.11%	-0.63%	1.01%	0.30%	0.00%	-0.23%	0.41%	0.01%		

Figure 2-3

Comparison of the number of federally managed conservation lands in Florida between 2001 and 2010:
NPS-National Park Service, USDA-National Forest Service, FWS-Fish and Wildlife Service, DOD-Department of Defense, and other federal lands.

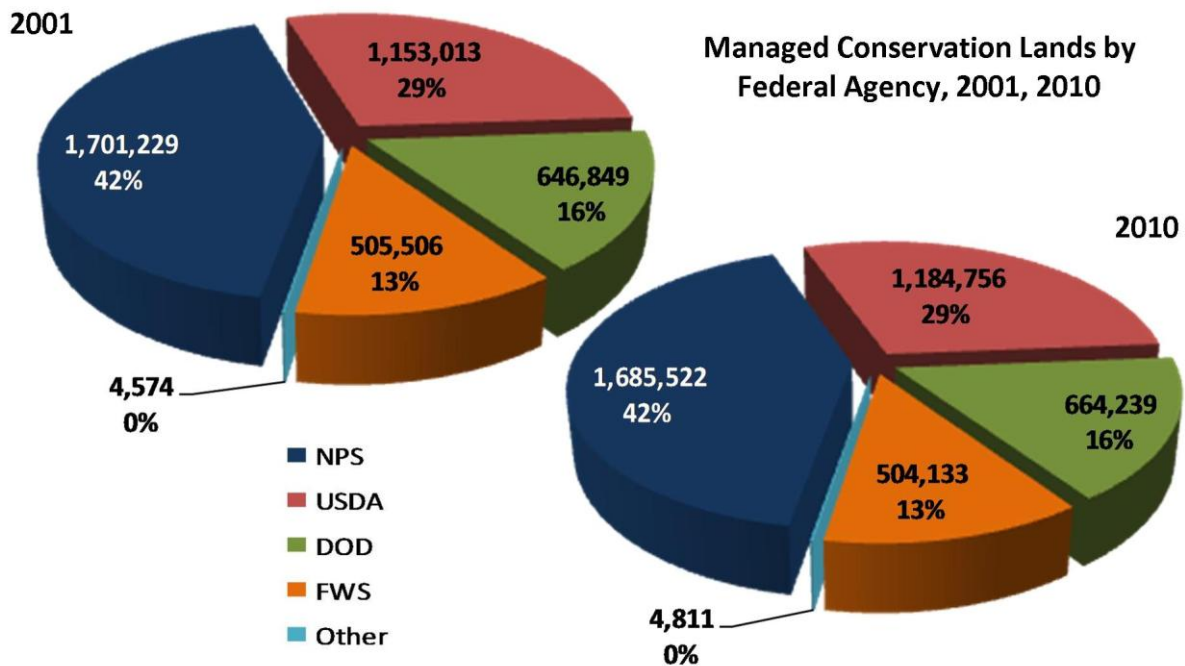
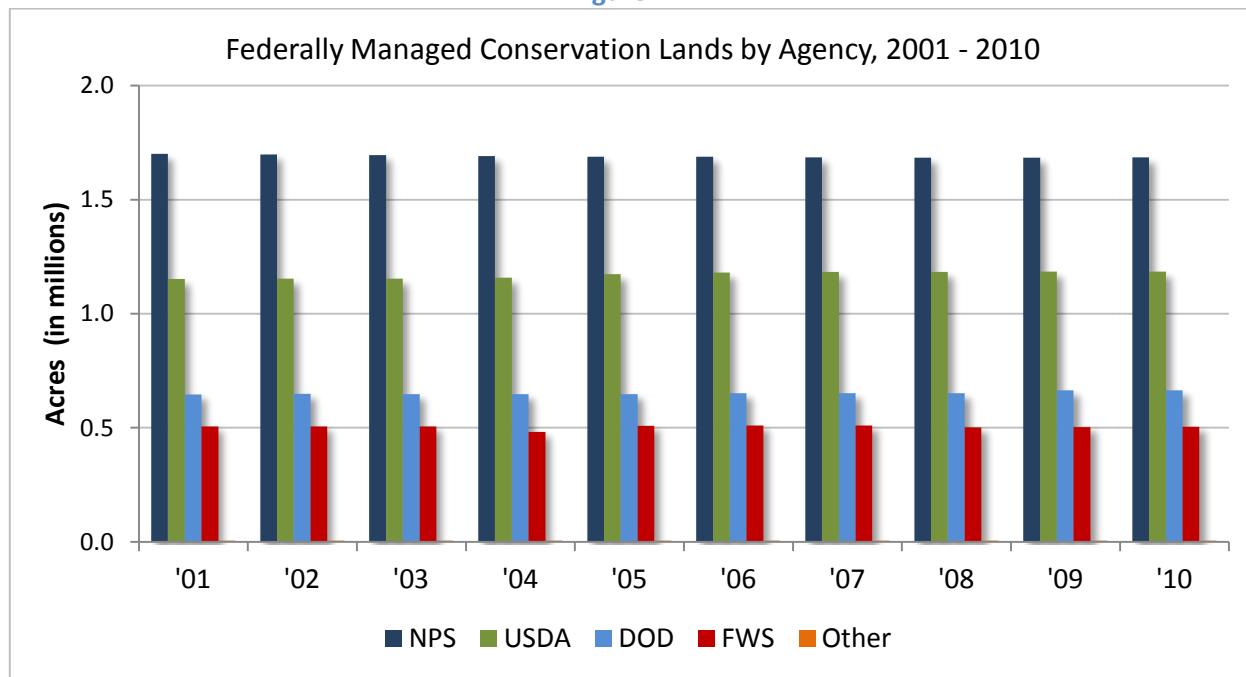


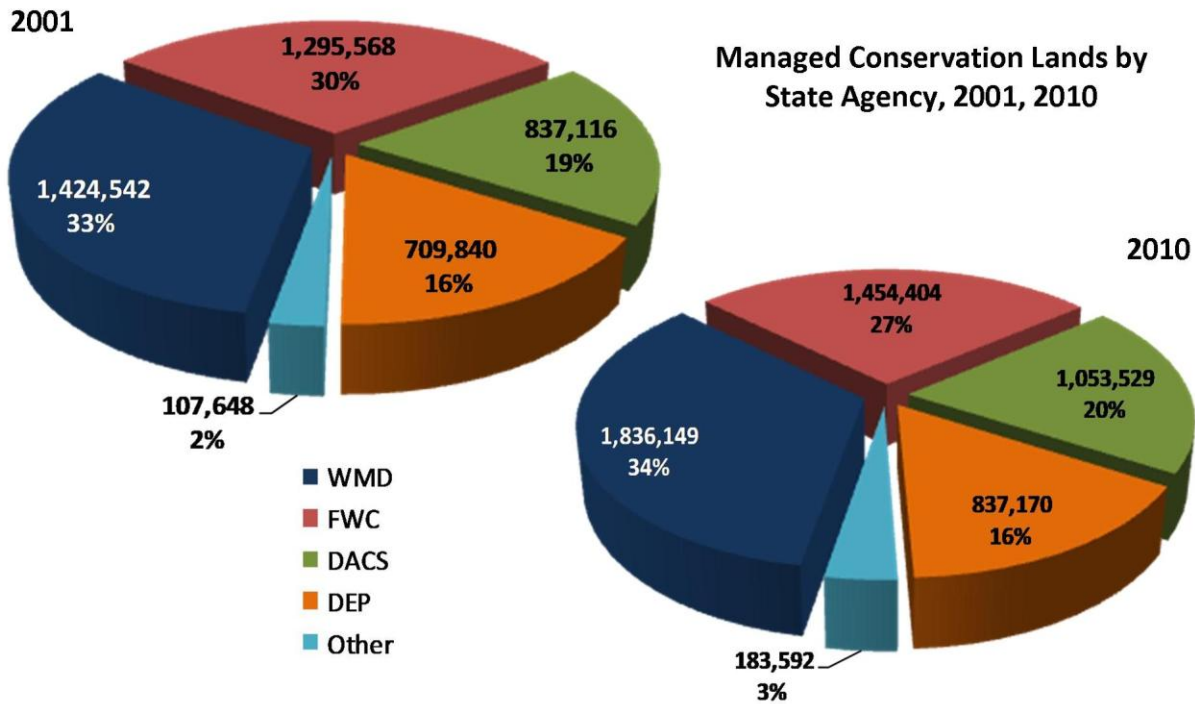
Figure 2-4



State Conserved Lands

State conserved lands are primarily managed by four agencies composed of the Department of Environmental Protection (DEP), the Department of Agriculture and Consumer Services (DACS), the Fish and Wildlife Conservation Commission (FWC), and the Water Management Districts (WMD). The five Water Management Districts manage the largest portion (34%) of state conservation lands along with FWC (27%) and the Florida Forest Service within DACS (20%) for a combined total of 4.3 million acres, or 81% state conserved lands (Figure 2-5). DEP and other state agencies manage the remaining 19%; an additional 1.2 million acres for a statewide total of 5.36 million acres of managed conservation lands in 2010. The other state land management organizations are not specifically identified in this report (and are referred to collectively as other).

Figure 2-5



All state management agencies increased in total lands managed between 2001 and 2010 amounting to a cumulative increase of 990,130 acres (23%) in state managed Florida conservation lands (Table 2-6). The percent change for each agency between 2001 and 2010 ranged from 12% to 71%, and the increases were distributed as follows: DEP, 18%; DACS Forest Service, 26%; FWC, 12%; WMD, 29%; and other agencies, 71%. These increases resulted in shifts in the proportions of conserved lands managed by the state agencies, with DEP remaining unchanged at 16%, and DACS, WMD, and other agencies increasing by 1% each. FWC decreased from 30% to 27% in its proportion of state-managed lands (Figure 2-5).

Table 2-6
Acres Managed for Conservation Annually by State Agency, 2001 - 2010

Level of Govt	Agency	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	Change in Acres (2001 to 2010)	Percent Change (2001 to 2010)
State	DEP	709,840	773,369	791,555	790,998	831,084	849,774	830,254	833,789	835,414	837,170	127,330	18%
State	DACS	837,116	907,228	911,679	978,112	993,885	1,001,624	1,013,775	1,032,525	1,046,474	1,053,529	216,413	26%
State	FWC	1,295,568	1,340,361	1,366,066	1,416,201	1,434,493	1,411,379	1,438,303	1,447,410	1,455,593	1,454,404	158,836	12%
State	WMD	1,424,542	1,543,959	1,563,787	1,625,896	1,690,255	1,711,530	1,740,093	1,777,634	1,836,761	1,836,149	411,607	29%
State	Other	107,648	135,661	108,498	108,564	109,188	109,677	188,396	190,082	183,104	183,592	75,944	71%
Conserved Acres in Florida Managed by State Agencies		4,374,714	4,700,578	4,741,585	4,919,771	5,058,905	5,083,984	5,210,821	5,281,440	5,357,346	5,364,844	990,130	23%
Annual Change in acres		NA	325,864	41,007	178,186	139,134	25,079	126,837	70,619	75,906	7,498		
Annual % Change (acres)		NA	7.45%	0.87%	3.76%	2.83%	0.50%	2.49%	1.36%	1.44%	0.14%		

Coastal Habitats

The annual percent change in amount of land managed by state agencies (Table 2-7) was variable over time, with a large increase in all agencies in 2002 (totaling over 325,000 acres), and occasional decreases within agencies (*e.g.*, other agencies in 2003). Annual percent increases within state agencies ranged from 0.1% to 6.8% from 2003 to 2009, with the exception of other agencies in 2007, due to the transfer of land (over 73,000 acres) from DEP to Babcock Ranch, LLC. Little activity in land acquisition was seen in 2010, with percent change ranging from -0.1% to 0.7%.

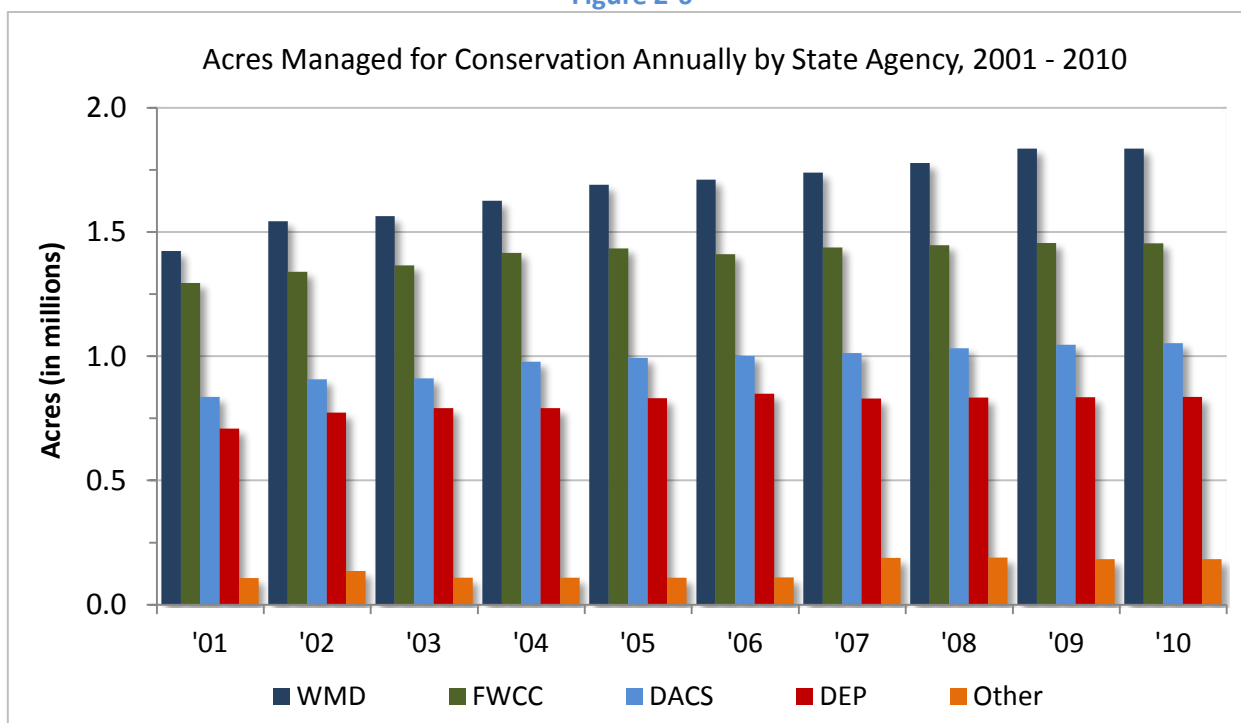
Table 2-7
Percent Change of Acres of Land Managed for Conservation by State Agency from 2001 to 2010

Agency	2001	'02	'03	'04	'05	'06	'07	'08	'09	'10
DEP	n/a	8.2	2.3	-0.01	4.8	2.2	-2.4	0.4	0.2	0.2
DACS	n/a	7.7	0.5	6.8	1.6	0.8	1.2	1.8	1.3	0.7
FWCC	n/a	3.3	1.9	3.5	1.3	-1.6	1.9	0.6	0.6	-0.1
WMD	n/a	7.7	1.3	3.8	3.8	1.2	1.6	2.1	3.2	0
Other	n/a	20.6	-25	0.1	0.6	0.4	41.8	0.9	-3.8	0.3

Source: FNAI reports, posted March 1 of each year except in 2002 (posted November 1)

Trends in state managed conservation lands by agency can be seen in Figure 2-6. Steady increases in acres of land were seen in lands managed by the WMD, DACS, and to a lesser extent, FWC. Florida DEP managed lands were relatively stable from 2001 to 2010. Lands managed by other agencies were mostly unchanging, with the land transfers in 2002 and 2007 being the exceptions.

Figure 2-6



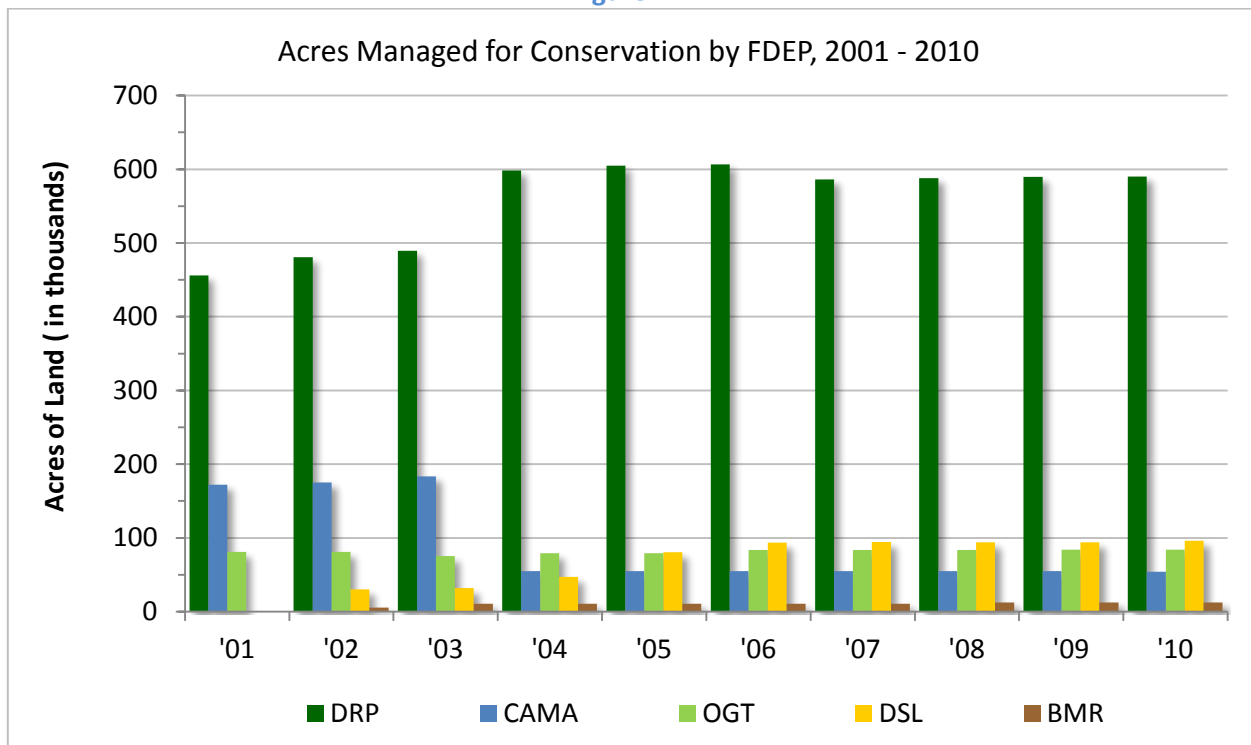
Department of Environmental Protection Managed Conservation Lands

Lands managed by DEP increased from 709,840 to 837,170 between 2001 and 2010 (Table 2-8 and Figure 2-7); a total of 127,330 acres (or 18%). Five agencies manage lands within DEP; the Division of Recreation and Parks (DRP), Coastal Aquatic Management Areas (CAMA), the Office of Greenways and Trails, the Division of State Lands (DSL), and the Bureau of Mines and Reclamation (BMR). The Division of Recreation and Parks is responsible for the majority (over 70%) of DEP managed lands (590,184 acres in 2010). The greatest change in DEP managed lands occurred in 2003 with the reduction of 128,000 acres of CAMA managed lands, most of which is now managed by DRP. CAMA now primarily manages approximately 2 million acres of submerged lands, which are not included in the data presented here and are discussed later in this chapter (*see section on Aquatic Preserves*). DSL and BMR were the agencies which increased most in percentage of acres managed within DEP (217% and 117%, respectively) between 2001 and 2010, although BMR manages the least total acreage (12,507 acres in 2010).

Table 2-8
Acres Managed for Conservation Annually by FDEP, 2001 - 2010

Level of Govt	Agency	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	Change in Acres (2001 to 2010)	Percent Change (2001 to 2010)
FDEP	DRP	456,347	480,813	489,647	598,415	604,976	606,901	586,521	588,246	589,685	590,184	109,371	23%
FDEP	CAMA	172,203	175,169	183,573	54,935	54,936	54,936	54,936	54,936	54,936	54,117	-121,052	-69%
FDEP	OGT	81,290	81,290	75,536	79,537	79,537	83,544	83,531	83,875	84,061	84,212	2,922	4%
FDEP	DSL		30,340	31,988	47,300	80,824	93,582	94,455	94,225	94,225	96,150	65,810	217%
FDEP	BMR		5,757	10,811	10,811	10,811	10,811	10,811	12,507	12,507	12,507	6,750	117%
Conserved Acres in Florida Managed by FDEP Offices		709,840	773,369	791,555	790,998	831,084	849,774	830,254	833,789	835,414	837,170	127,330	18%
Annual Change in acres		NA	63,529	18,186	-557	40,086	18,690	-19,520	3,535	1,625	1,756		
Annual % Change (acres)		NA	8.95%	2.35%	-0.07%	5.07%	2.25%	-2.30%	0.43%	0.19%	0.21%		

Figure 2-7



Water Management District Managed Conservation Lands

The Water Management Districts (WMD) manage more state land than any other agency in Florida, 1.836 million acres in 2010. The WMD consist of five regional areas encompassing the entire state of Florida. The five districts are: the Northwest, NFWWMD; Suwannee River, SRWMD; St Johns River, SJRWMD; South Florida, SFWMD; and Southwest, SWFWMD (Figure 2-8). The WMD management area of conserved lands increased from 1.56 million acres to 1.836 million acres between 2003 and 2010 (Figure 2-9). Annual increases ranging from 21,000 to 64,000 acres produced a 17% increase of 272,361 acres of WMD managed conservation lands between 2003 and 2010 (Table 2-9). All five districts increased in conserved lands, with SJRWMD increasing the most conserved land, 138,029 acres, of all the districts. This equated to a 41% increase between 2003 and 2010. The other districts increased by 7% to 13% in conservation area (representing increases of 17,000 to 33,600).

Figure 2-8

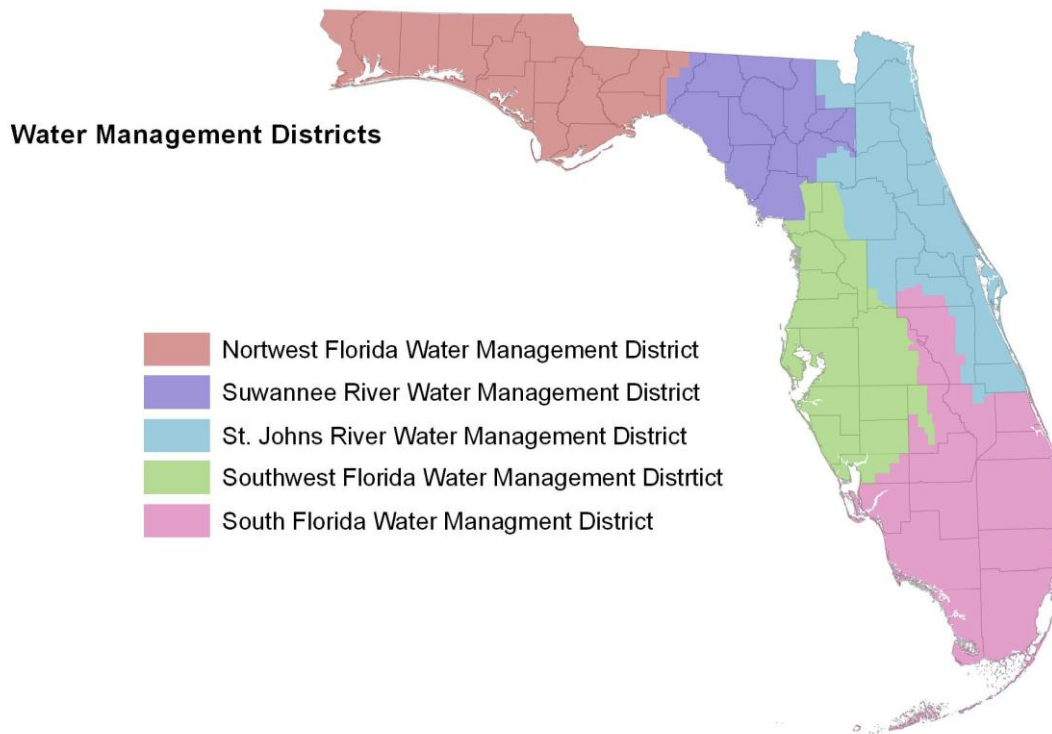
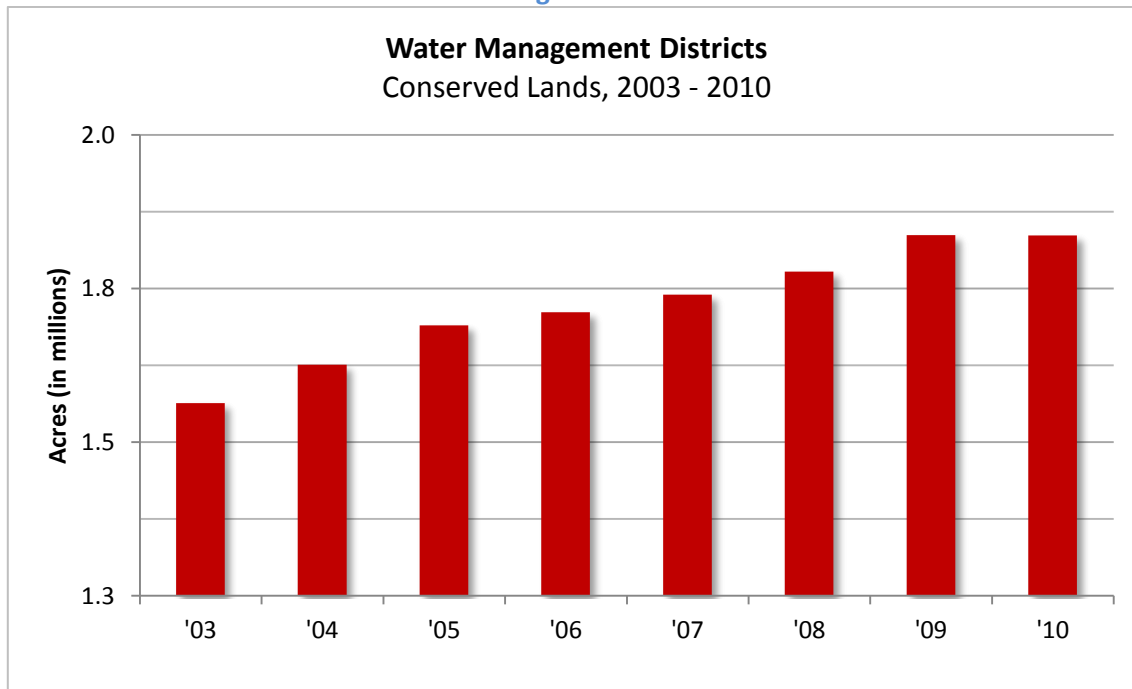


Figure 2-9



Coastal Habitats

The order of districts in amount of conserved lands remained the same from 2003 to 2010, although the magnitude of the differences between some of the districts changed with time (Table 2-9, Figure 2-10). For example, the ratio of conserved WMD area managed for SJR:SWF remained nearly the same, while the ratio of SJR:SF shifted from 1.4 to 1.1 from 2003 to 2010. As of March 2010, SJR managed the most conserved land of the WMD (532,307 acres), followed by SFWMD (474,576 acres). SWFWMD maintained an intermediate amount of conserved acreage (342,148) and Suwannee River and Northwest Florida WMD managed 267,593 and 219,524 acres, respectively. Figure 2-11 shows the district proportions of WMD conserved land from 2003 and 2010. The shifts in district proportions can be seen in an increase from 22% to 26% for SFWMD and decreases of 1% for SJRWMD and SWFWMD conservation land. Northwest Florida percentage of WMD conserved lands remained the same, while Suwannee River percentage of WMD conserved lands decreased by 2%

Table 2-9
Conservation Lands Managed by Water Management Districts

District	2003	2004	2005	2006	2007	2008	2009	2010	Change '03 - '10	
									Numeric	Percent
NWF	195,479	201,241	204,510	205,287	212,543	216,385	218,137	219,524	24,045	12
SR	250,532	253,394	259,582	258,741	254,570	256,414	259,329	267,593	17,061	7
SJR	472,685	486,418	518,379	525,339	525,630	546,171	530,934	532,307	59,622	13
SF	336,547	360,557	369,329	382,803	407,186	414,810	482,665	474,576	138,029	41
SWF	308,544	324,286	338,455	339,360	340,165	343,853	345,696	342,148	33,604	11
Conserved Acres	1,563,787	1,625,896	1,690,255	1,711,530	1,740,094	1,777,633	1,836,761	1,836,148	272,361	17
Change in acres	NA	62,109	64,359	21,275	28,564	37,539	59,128	-613		
Percent Change (acres)	NA	3.97%	3.96%	1.26%	1.67%	2.16%	3.33%	-0.03%		

Figure 2-10

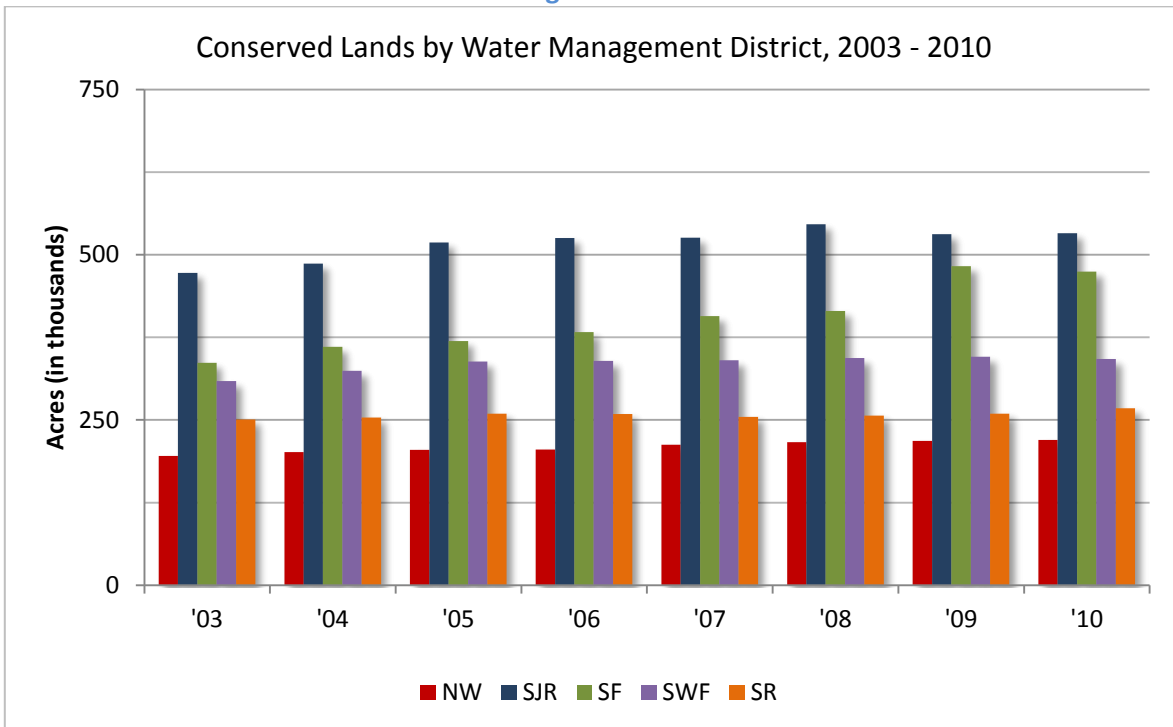
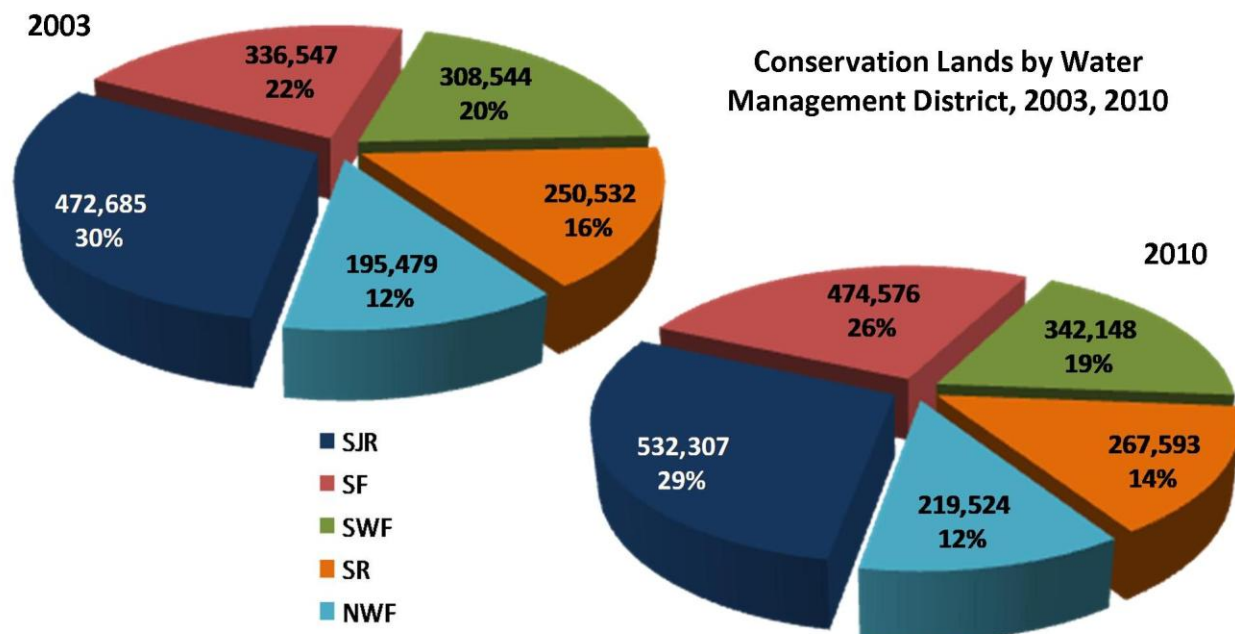


Figure 2-11



Indicator 2.2 - Number of Acres of Seagrass Cover and Degree of Propeller Scarring

The total amount of seagrass cover in Florida coastal waters can only be estimated, but is thought to have exceeded 2.25 million acres in 2003 (Carlson and Madley, 2007). This area does not include the deeper water ($> 2\text{ m depth}$) beds of *Halophila decipiens* (paddle grass) in the Gulf of Mexico, which have not been mapped. Figure 2-12 highlights the distribution of seagrass around the state based on the most recent data entered into the statewide database (time span of data 1987 to 2007, dependent upon estuary). The most obvious aspects of Florida seagrass distribution are the abundances found in Florida Bay/Florida Keys and Big Bend area. The lack of submerged aquatic vegetation on the Atlantic coast of Florida north of Mosquito Lagoon in Volusia County is due to the high energy surf along the beaches and the fresh and blackwater nature of the rivers in this area. The seagrass area shown in Figure 2-12 represents the extent mapped by aerial photography, but not the density nor continuity of the grassbeds. For example, the 258,000 acres of Biscayne Bay seagrass area consists of approximately one third patchy and mixed hardbottom/seagrass cover (Yarbro and Carlson, 2010).

Seagrass meadows can be described as continuous or patchy. Patchy areas of seagrass may be so naturally or by impact from environmental stressors (man-made or natural). Patchy seagrass may be more vulnerable to accumulated environmental stressors, but should not be considered ecologically less valuable. The functional attributes of continuous seagrass beds and patchy seagrass areas differ, and each provides habitat to the estuarine or marine community. Also, the deep-water edge of Figure 2-12 may change with the application of alternative forms of data collection and remote sensing technology. Large areas of the Florida coastal Gulf of Mexico may contain the diminutive *Halophila decipiens*, which has been found to be abundant to 30 meters depth in the Gulf of Mexico (Southwest Florida Nearshore Benthic Habitat Study, CSA, 1989).

As aerial shoreline data has been collected and analyzed more frequently, the percent cover of seagrass has been found to be variable spatially and temporally on time scales of a decade or less. Statewide estimated seagrass cover was 15% lower (2.25 million acres) in 2003 than in 1993 (Carlson and Madley, 2007). On a regional basis, with the state divided into five coastal regions, most of the seagrass in the state is located in South Florida (1,420,517 acres, 63%) and the Big Bend (612,815 acres, 27%)(Figure 2-13). The remaining 10% of mapped seagrass in Florida coastal water (223,416 acres) is divided among the Gulf Peninsula (5%), Atlantic Peninsula (3%), and the Panhandle (2%). The counties composing the regions can be found in the Figure 2-14.

Figure 2-12



Figure 2-13

Percent of Seagrass by Region
1993 Estimates

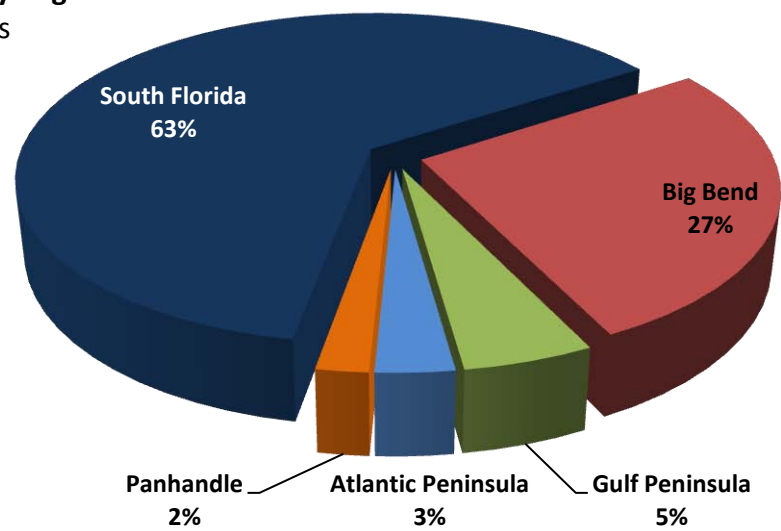
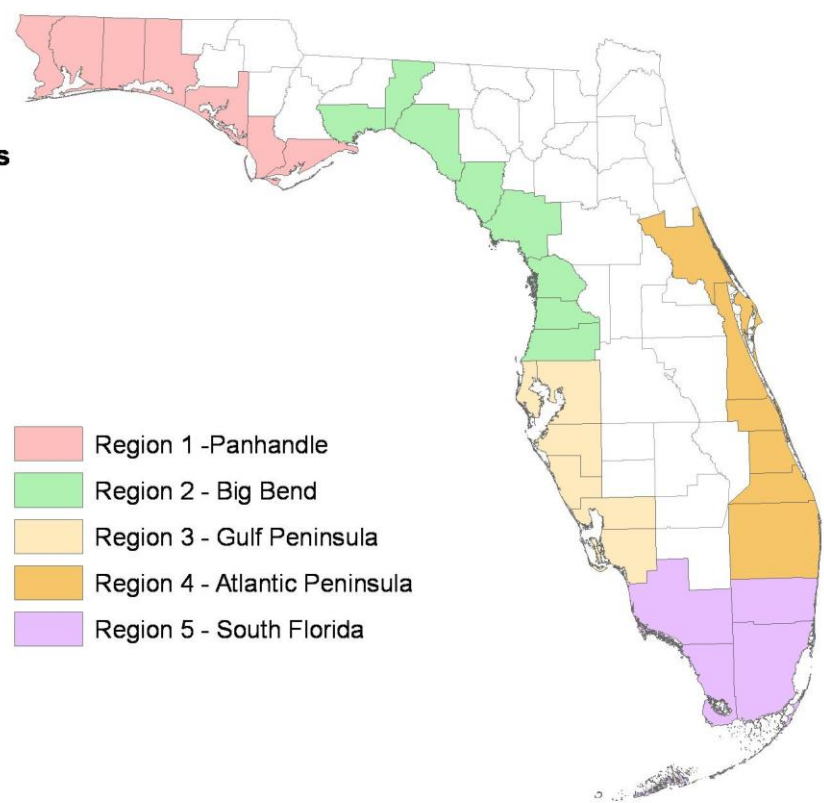


Figure 2-14

Seagrass Regions



Source: Sargent et al (FWRI, 1995)

However, at a sub-regional level, some estuaries have seen increasing seagrass cover while others have seen declines, and differences in trends can be seen on the sub-estuary level (Yarbro and Carlson, 2010).

The seagrass acreage data presented in this section will consist of a mosaic of available data generated by collection efforts from different regions of the state by various agencies at differing times. Two periods were chosen to represent times for trend analysis, approximating a seven to ten year differential. Seagrass mapping data collection dates clustered around 1992 and 2001 for the older set and 2003 and 2008 for the recent set. The data source (Yarbro and Carlson, 2010) compiled input on current and past seagrass information from agencies around the state responsible for the estuaries and coastal areas of interest. These data were synthesized and summarized, and are presented here to provide the most recent assessment of seagrass coverage extent trends from reported mapping and monitoring efforts by region and estuary (Table 2-10).

Table 2-10 provides comparative data for seagrass cover from 26 estuaries and coastal areas around the state. Data from two dates were chosen in an attempt to show the change in seagrass area from the periods 1987-1999 to 2000-2010. Data were not available in every region for both time periods, so the best available data was presented. The Panhandle, Big Bend, and South Florida regions have data gaps in seagrass extent. The average time span between reporting dates was 8 years. Estuaries of the Atlantic Peninsula region showed increasing trends over the period 1999 to 2007. Seagrass in the Indian River Lagoon increased in acreage by more than 13% from 1999 to 2007. Estuaries of the Gulf Peninsula showed increasing seagrass cover from 1999 to 2008 ranging from 5.5% to 36.7%, with Sarasota Bay having the largest increase. Estero Bay showed a negative change in seagrass cover, but reporting dates were 2004 to 2006. The Panhandle showed significant loss of seagrasses in St Joseph Bay (-18.3%), Choctawatchee Bay (-38.4%), the Pensacola Bay system (-42.7%), and Perdido Bay (-80.5%), during the period 1987 and 2006. Other estuaries of the Panhandle region showed increases in seagrass beds: St Andrews Bay (14.2%), Santa Rosa Sound (9.9%), and Big Lagoon (1.1%) between 1992 and 2003. Most of the estuaries that were impacted by the Deepwater Horizon oil spill in 2010 were in the Panhandle. Seagrass meadows in the northern Big Bend remained stable (less than 1% change between 2001 and 2006). Florida Bay showed stable seagrass cover of over 145,008 acres (less than 1% change between 1992 and 2004). This represents a recovery from the widespread die-off of seagrass in Florida Bay beginning in 1987. The total extent of seagrass from all estuaries indicates stable statewide percent cover for the time period 1987 to 2008. The totals were calculated by holding missing data constant at “no change” values.

Coastal Habitats

Table 2-10

Acreage of seagrass by estuary and the change in area (in acres) for successive aerial mapping data (on average, 8 years apart). Data from Yarbro and Carlson (2010).

Region	Areal Cover Status	Estuary or Coastal Area	Data Collected	Seagrass cover (Acres)	Data Collected	Seagrass cover (Acres)	Change	Seagrass Present (recent monitoring)
P		Perdido Bay	1987	642	2002	125	-80.5	Hw
P		Pensacola Bay System	1992	892	2003	511	-42.7	
P		Big Lagoon	1992	538	2003	544	1.1	Tt, Hw & Rm
P		Santa Rosa Sound	1992	2,760	2003	3,032	9.9	Tt, Hw
P		Choctawhatchee Bay	1992	4,261	2003	2,623	-38.4	~Tt, Hw
P		St. Andrews Bay	1992	9,832	2003	11,233	14.2	Tt, Sf, Hw
P		St. Josephs Bay	1993	8,170	2006	6,672	-18.3	Tt, Sf
P		Franklin County	1992	14,452	x	x	NA	Tt, Sf, Hw
BB		Northern Big Bend	2001	149,840	2006	149,140	-0.5	Tt, Sf, Hw, He
BB		Southern Big Bend	2001	59,670	2006	56,150	-5.9	Tt, Sf, Hw, He
BB		Suwannee, Cedar Key, Waccasassa	2001	33,625	x	x	NA	Tt, Sf, Hw, He
BB		Springs Coast	x	x	2007	379010	NA	Tt, Sf, Hw, He, Rm
BB		Western Pinellas County	2006	23,943	2008	25,880	8.1	Tt, Sf, Hw
GP		Tampa Bay	1999	24,841	2008	29,647	19.3	Tt, Sf, Hw, Rm, He
GP		Sarasota Bay	1999	9,247	2008	12,641	36.7	Tt, Hw
GP		Lemon Bay	2006	2,714	2008	2,863	5.5	Tt, Hw
GP		Charlotte Harbor	1999	51,936	2006	58,849	13.3	Tt, Sf, Hw, Rm, He
GP		Estero Bay	2004	3,625	2006	3,529	-2.6	Tt, Sf, Hw, Rm, He
SF		Rookery Bay Aquatic Preserve	x	x	2005	1028	NA	Tt, Sf, Hw, He, Hd
SF		Ten Thousand Islands	x	x	x	x	NA	Tt, Sf, Hw, He
SF		Florida Keys National Marine Sanctuary	1992	856,355	x	x	NA	Tt, Sf, Hw, He, Hd
SF		Florida Bay	1992	146,600	2004	145,300	-0.9	Tt, Sf, Hw, Rm, He
SF		Biscayne Bay	1992	258,258	x	x	NA	Tt, Sf, Hw, Rm, He
AP		Lake Worth Lagoon	2001	1,647	2007	1,688	2.5	Tt, Sf, Hw, Hd, Hj
AP		Southern Indian River Lagoon	1999	7,808	2007	8,848	13.3	Sf, Hw, He, Hj
AP		Northern Indian River Lagoon	1999	63,084	2007	71,646	13.6	Tt, Sf, Hw, Rm, He, Hd, Hj
State		Total	Previous	2,114,778	Most Recent	2,133,649	0.88	Tt, Sf, Hw, Rm, He, Hd, Hj

Tt=Thalassia testudinum; Sf= Syringodium filiforme; Hw=Halodule wrightii; Rm=Ruppia maritime; He=Halophila engelmannii; Hd=Halophila decipiens; Hj=Halophila johnsonii

Regional Status of Seagrass

Panhandle

Panhandle estuaries have incurred considerable losses to seagrass due to water quality issues associated with coastal development over the last 50 years, with Perdido Bay, Pensacola Bay, and Choctawatchee Bay especially affected. Loss of water clarity due to harbor dredging, upland development, and increases in stormwater runoff has been one cause of seagrass declines for most Panhandle estuaries. Increased epiphytes from elevated nutrients and propeller scarring from motorboats are of concern for St Andrews Bay, St Joseph Bay and Franklin County. Impacts from oil spills and impacts from the oil response to the Deepwater Horizon oil spill will vary, and will not be known for some time.

Big Bend

Except for the Northern Big Bend, poor water clarity and elevated nutrients are the primary stressors regionally. In the Southern Big Bend seagrass coverage continued to decline between 2000 and 2006 losing 3,500 acres or 6% of the seagrass beds (Yarbo and Carlson, 2010). Additionally, continuous seagrass cover declined by 22% in this area. Localized propeller scarring was cited as a problem for all areas of the region. The Northern Big Bend, Springs Coast, and Western Pinellas County showed stable seagrass cover and species composition (2006-2008 data).

Gulf Peninsula

The Gulf Peninsula region has seen strong positive effects of improving water quality on the growth and health of seagrasses. Increasing or stable seagrass percent cover and density was reported for all estuaries except Estero Bay (2006-2009 data). Tampa Bay has shown a 37% increase in seagrass coverage from 1982 to 2008. In Sarasota Bay seagrass cover increased 45% from 1988 to 2008. In 2008 a Sarasota Bay assessment indicated stable seagrass composition and increased extent (28%) from 2006, with an approximate 15% decrease in Roberts Bay and Blackburn Bay from 1999 to 2008. While in Charlotte Harbor the 2006 assessment indicated seagrass increased by 1,636 acres (2.9%) from 2004, but also showed extensive propeller scarring (21,507 acres impacted) at Pine Island & Matlacha Pass. In Estero Bay seagrass extent and density is declining with a 2.6% decrease in acreage from 2004 to 2006.

Propeller scarring is a growing problem in all estuaries of the Gulf Peninsula region, and is especially high in the Pine Island and Matlacha Pass areas of Lee County in Charlotte Harbor (see the following Propeller Scarring discussion in this section). In Estero Bay the County has taken regulatory steps to manage the impact of propeller scarring on seagrass beds by designating certain areas as "No Internal Combustion Motor Zones. The growing coastal population of this region and increasing shallow water boater use has presented an emerging challenge to estuarine managers to find ways to reduce propeller scarring impacts on seagrass meadows.

South Florida

The South Florida region extends from Rookery Bay on the Gulf coast to Biscayne Bay on the Atlantic coast, and includes the Florida Keys and Dry Tortugas and contains the greatest extent of seagrass in the state. Starting at the western edge of the region, Rookery Bay and the Ten

Thousand Islands experience high runoff and low water clarity so seagrasses are sparse and declining in this sub-region. In Florida Bay monitoring in 1992 and 2004 indicated the seagrass meadows as stable in extent (145,308 acres) and species composition, with turtle grass still the most abundant type of seagrass (~75%). The Florida Bay seagrass beds have recovered from the 1980-1990 die-off event. Although, in the eastern basin of Florida Bay, extensive and persistent phytoplankton blooms, associated with high nutrient levels, occurred in 2005 to 2008 (Yarbro and Carlson, 2010). Localized propeller scarring has been noted in areas within the boundaries of Everglades National Park, and in areas of high use throughout the Florida Keys.

The Florida Keys National Marine Sanctuary (FKNMS) contains 568,900 acres of seagrass in Gulf waters, 276,500 acres of seagrass in Atlantic waters, and 11,000 acres of seagrass in the Dry Tortugas (1992 data). In the FKNMS the seagrass cover is thought to be stable, with some species composition and seagrass density change, due to altered water quality and macroalgal growth. Biscayne Bay and the nearshore Atlantic contain 208,200 acres of seagrass (1992 data). The Biscayne Bay Assessment in 2007 indicated stable seagrass cover and species composition.

Atlantic Peninsula Seagrass Status

The lagoons of the Atlantic Peninsula region vary in seagrass status dependent upon location. The southern Lake Worth Lagoon has seen losses (23%) in seagrass cover since 1990, and low but stable seagrass abundance between 2001 and 2007. The Indian River Lagoon (IRL) seagrass abundance has been stable (southern segments) or increased (northern IRL) from 1992 to 2007. In the northern IRL mapping and monitoring assessment from 2005 to 2007 indicated the Northern IRL region seagrass cover increased 9% to 71,646 acres due to expansion of seagrasses into deeper water. The Atlantic Peninsula region seagrass beds are sensitive to stormwater runoff, light limitation due to high turbidity, and salinity fluctuations from sudden freshwater inflow from hurricanes or the release of freshwater from man-made canals. Localized impacts from propeller scarring have been noted in the Atlantic Peninsula region.

Propeller Scarring of Seagrass Habitat

Propeller scarring of seagrass in Florida waters is a problem of increasing concern for managers of coastal submerged habitats. Propeller scars occur primarily in water less than 1 meter (3.3 feet) depth when motor boat propellers contact, scour, or dredge areas of seagrass and sediment during navigation along the coast. Propeller scarring is a vessel operator issue arising from several factors (Sargent et al., 1995), including;

1. Inexperience in navigation, attempts to dislodge from accidental grounding with propeller power (“blow holes”), and lack of understanding of boat draft and the effects of propeller damage
2. Poorly marked navigation channels or failure to remain within marked channels
3. Use of short cuts or attempts to plane the vessel in areas of insufficient water depth
4. Intentional propeller dredging of channels for recreational access “wheel ditches”

The result of propeller scarring is the destruction of habitat area and the change in functional characteristics of seagrass beds through physical impact damage and loss of seagrass cover and biomass. Immediate damage from propeller scarring comes from seagrass burial by sediment,

increased sediment movement and re-suspension, and fragmentation and discontinuity of seagrass beds.

Scars can range from meters to kilometers long. In Florida Bay, 11,751 propeller scars, representing 527,498 meters (326.2 miles), which ranged from 2.1 to 1,680 meters, were mapped from 1:24,000 aerial photographs in 2004 (NPS, 2008). Conservative estimation of scarring density can be expected due to indiscernible scars in heavily used areas; photo quality issues of resolution, light glare, wind disturbance, and sun angle; water turbidity; and masking of scars (*e.g.*, by drift algae). Based on a subset of comparative, high resolution images taken in 2006, the researchers found these numbers underestimated actual scarring, and stated that the true number of scars was 11.7 times higher and length of scars 6.6 times higher than reported.

Recovery times of seagrass into propeller scars are highly variable and dependent upon the extent of damage, the health status and species of the seagrass, environmental conditions, and the presence and extent of other stressors. Estimates of recovery times range from 2 to 10 years, with faster rates for shoal grass and manatee grass and slower rates for turtle grass (Zieman, 1976; Dawes *et al.*, 1997; Kenworthy *et al.*, 2002, 2006; NOAA 2010). Longer recovery times have been reported and modeled, with projections as high as 60 years for 100% recovery of a 1200 m² scar for the slow growing sub-tropical turtle grass, *Thalassia testudinum* (Fonseca *et al.*, 2004).

Seagrass restoration efforts are carried out around state, but recovery of damaged seagrass habitat is both expensive and time consuming. An estimate in year-2001 dollars for preparing and planting a seagrass restoration project was \$45,000/acre. Adding the required monitoring increased the total cost of seagrass restoration in excess of \$245,000/acre (Fonseca *et al.*, 2001). General guidelines for conservation and restoration of seagrasses have been developed and published (Fonseca *et al.*, 1998; McKenzie, 2003). Techniques have been tested and improved over the last decade, and restoration factors to optimize seagrass planting survival and recovery rates are being identified. Transplant, plant propagation, and seeding techniques have all been used in seagrass restoration projects. Techniques such as the use of bird stakes to enhance seagrass growth through localized nutrient enrichment, degradable sediment tubes to stabilize and level the propeller scar area, and mechanical transplanting have been used to try to accelerate the recovery of affected seagrass beds. The numerous projects are constrained by cost to limited areas, and only small portions of the total scarred area has been restored. The 1993 statewide conservative estimate of scarred seagrass was 173,931 acres (Sargent *et al.*, 1995). More recent studies of specific areas (Florida Bay and Charlotte Harbor in 2004), indicate the degree of scarring has increased and become more severe with time.

1993 Regional Propeller Scarring Analysis

Sargent *et al.* estimated Florida seagrass scarring by county in 1993 using aerial photographs from a variety of sources ranging in resolution from 1:13,200 to 1:40,000. The areas covered by the smallest scale (1:40,000) included: Southeast Florida, Biscayne Bay, and Southwest Florida from Florida Bay to Charlotte Harbor. Seagrass scarring reported from these areas should be considered conservative values of only the most obvious scarring. This 1993 study (Sargent *et al.*, 1995) is still

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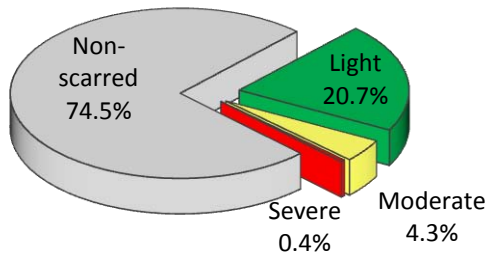
the only comprehensive state-wide perspective regarding seagrass scarring. Therefore, the information from the study is provided as background for more recent regional studies.

In 1993, an estimated 6.54% of the 2,657,901 acres of Florida seagrass was scarred, and five counties comprised 54% of the scarring in the state, with ten counties making up 77% of scarring statewide. The 1993 photographic data of propeller scarring by county from Sargent *et al.*, 1995 were combined into regional totals, with regions corresponding to the map from Figure 2-14. Seagrass scars from each county were assigned an intensity level of light, moderate, or severe. The scarred acreages of counties were summed by intensity level, and the regional percentage of each category presented in Figure 2-15.

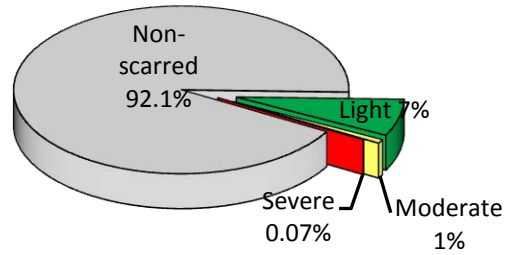
Figure 2-15

Seagrass areal extent with percentage of scarring within Region for coastal waters (1993 estimate)

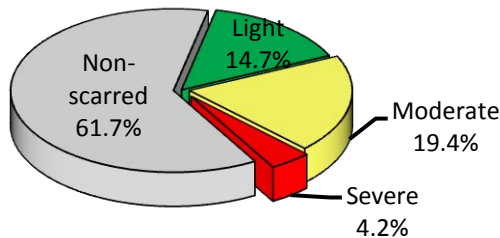
Panhandle
(48,170 Acres, 1993 Estimate)



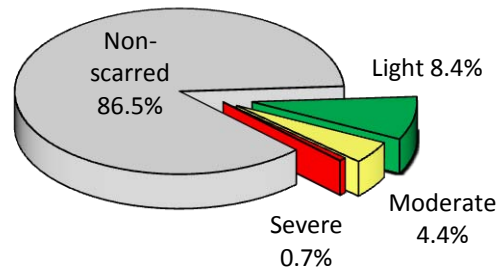
Big Bend
(826,770 Acres, 1993 Estimate)

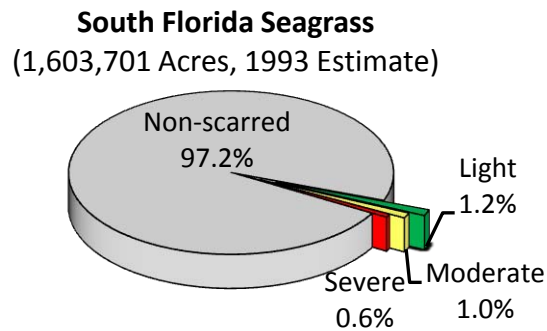


Gulf Peninsula
(109,900 Acres, 1993 Estimate)



Atlantic Peninsula
(69,360 Acres, 1993 Estimate)





Data from a more recent study of Florida Bay (NPS, 2008) suggested that seagrass scarring has increased in number and total distance within the submerged lands of Everglades National Park. Mapped seagrass scarring was substantially greater in 2004 when compared to areas reported by Sargent *et al.* in 1995. Three sites (Cross Bank, Shell Key, and Twisty Mile) in Florida Bay were compared between 1999 and 2004, and the number of scars increased by 333% to 392% and the length of scarring increased by 187% to 321% (Table 2-11). Spatial correlation analyses found that seagrass scarring significantly increased with proximity to channels (marked and unmarked); shorelines; and fishing, recreational, and transit boating activity. The seagrass scarring trends described in Florida Bay, and other areas of the state (see Charlotte Harbor case study below) require active management measures to prevent further losses to Florida coastal seagrasses.

Table 2-11
Seagrass areal extent for coastal waters in the South Florida

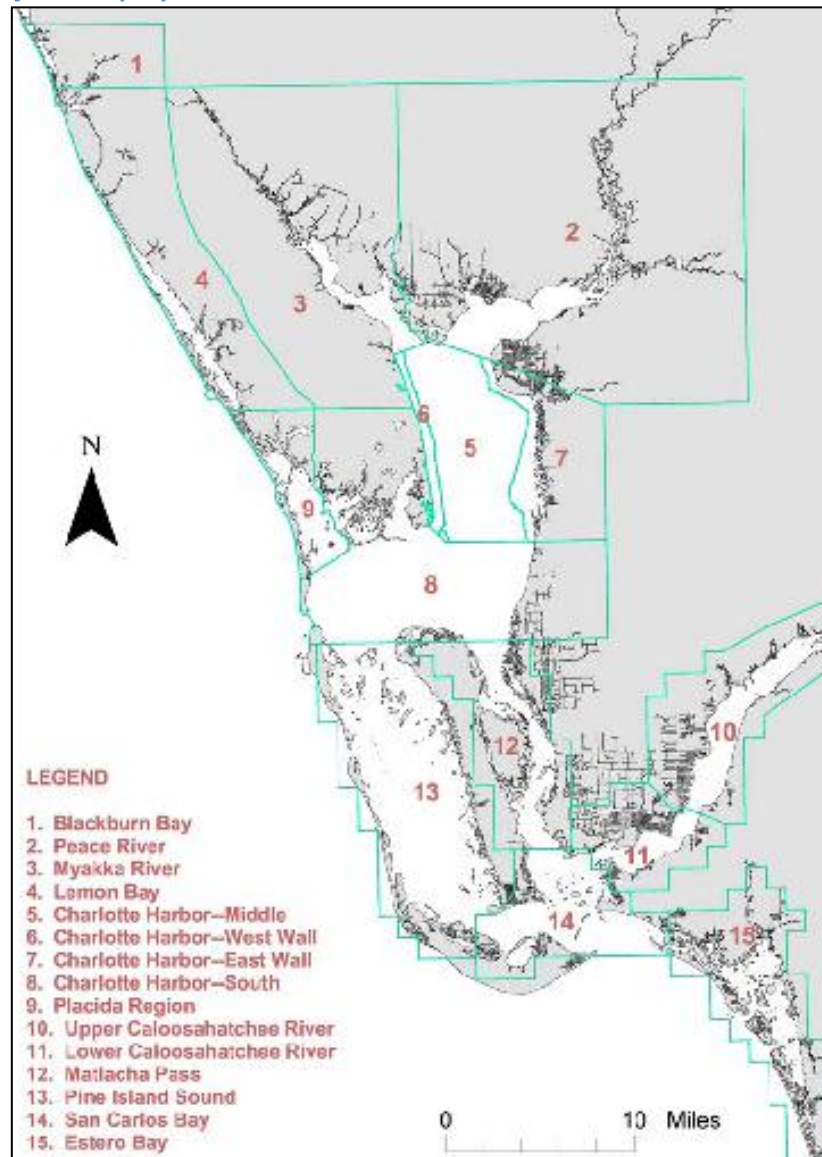
Location	Year	Number of Scars	Percent Increase	Length of Scars (m)	Percent Increase
Cross Bank	'99	83	-	4,342	-
Cross Bank	'04	387	366	14,395	232
Shell Key Bank	'99	52	-	3,475	-
Shell Key Bank	'04	225	333	9,986	187
Twisty Mile	'99	61	-	2,936	-
Twisty Mile	'04	300	392	12,360	321

Greater Charlotte Harbor Propeller Scarring Analysis

An update to the Sargent *et al.* 1995 report on seagrass scarring was performed in Charlotte Harbor (Madley et al., 2004) by the Fish and Wildlife Conservation Commission (FWC) and the Charlotte Harbor National Estuary Program (CHNEP). Figure 2-16 depicts the Charlotte Harbor Estuary and the 15 sub-estuary areas of the CHNEP. Charlotte Harbor is located on the Gulf of Mexico in Southwest Florida, with a small northern portion of the estuary in Sarasota County (map area 1, Figure 2-16), and the northern tributaries and most of Charlotte Harbor in Charlotte County (sections 2-8), and the southern areas of the estuary from Charlotte Harbor-South to Estero Bay (sections 8-15). The data presented below have been adapted from the reports by Sargent et al. (1995), Madley et al. (2004), and Yarbrow and Carlson (2010).

Figure 2-16

Locations for FWC propeller scar assessment in the Greater Charlotte Harbor Region



Source: Madley et al (2004)

The number of acres of scarred seagrass of the three levels of intensity in 2003 were combined from the 15 areas of Charlotte Harbor Estuary and compared to the scarring reported in 1993 (Table 2-12). The total scarred habitat increased from 21,817 to 30,064 acres, a 38% increase. Light scarring decreased by 50% or 3,760 acres (a negative change in the table). This can be explained by natural recovery of some light scarring and progression of some light scarring to a worse condition reclassified as moderate or severe scarring. Decreases in light scarring occurred in 11 of 13 areas of the Bay (excluding the Caloosahatchee River, which has lost all seagrass). Moderate and severe scarring increased by 18% and 614%, respectively, in Charlotte Harbor Estuary from 1993 to 2003.

(Table 2-12). The overall increase of combined moderate and severely scarred seagrass habitat over 10 years was 84%, a change from 14,322 to 26,335 acres (Table 2-12, Figure 2-17).

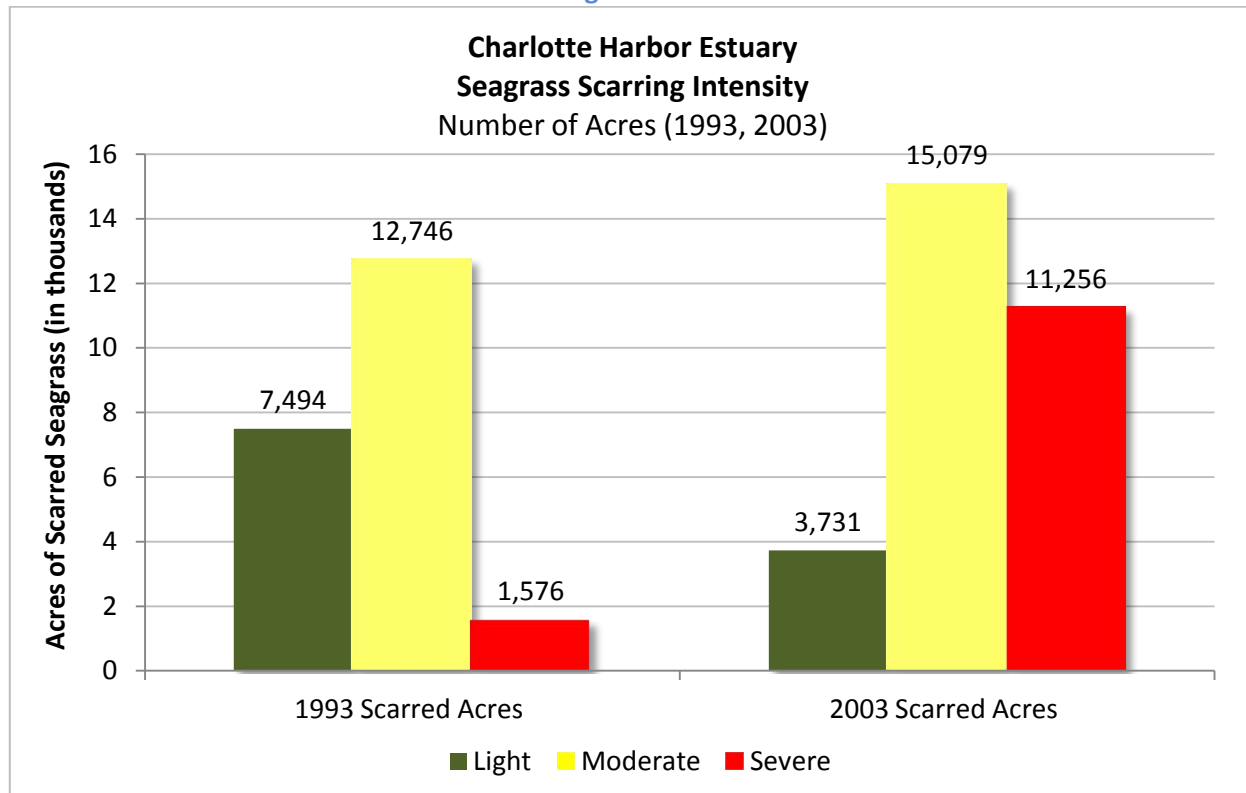
Table 2-12

Numeric and Percent Change of Boat Propeller Scar Damage in the Greater Charlotte Harbor Region

Greater Charlotte Harbor Estuary	Scarred Acres		Change (Acres)	Percent Change
	1993	2003		
Light	7,494	3,731	-3,760	-50
Moderate	12,746	15,079	2,328	18
Severe	1,576	11,256	9,678	614
Total Scarred Seagrass Habitat	21,817	30,064	8,247	38
Increase of Moderate + Severe Scarred Seagrass Habitat	14,322	26,335	12,006	84

Source: Madley et al (2004)

Figure 2-17



Source: Madley et al (2004)

The proportion of scarred seagrass in Greater Charlotte Harbor Region varied from 10% to 81% of the total amount of the seagrass in each sub-estuary in 2003. The percentage of scarring of all seagrass in Charlotte Harbor Estuary in 2004 was 47%, or 30,067 of 64,020 total acres (Table 2-13). The East Wall of Charlotte Harbor has the greatest proportion of seagrass damage, but total scarring has changed little in this area since 1993. South Harbor, Matlacha Pass, Pine Island Sound,

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and San Carlos Bay are the areas of the estuary with greatest amount of seagrass, and are also the areas with the greatest seagrass scarring. Pine Island has the greatest acreage of seagrass of any area in the Charlotte Harbor Estuary, exceeding 28,000 acres, and over 41% (11,610 acres) has been scarred (Figure 2-18). Pine Island seagrass scarring represents over 18% of the scarring for the whole estuary. South Charlotte Harbor and Matlacha Pass, both with 58% scarring of large seagrass meadows (10,823 and 7,479 total acres of seagrass, respectively), and San Carlos Bay and Estero Bay are all areas of concern due to seagrass scarring within the Charlotte Harbor Estuary. These five areas represent 85% of all scarring found within Charlotte Harbor. Severe and moderate scarring amounting to thousands of acres for each of the five areas can be seen in Figure 2-18.

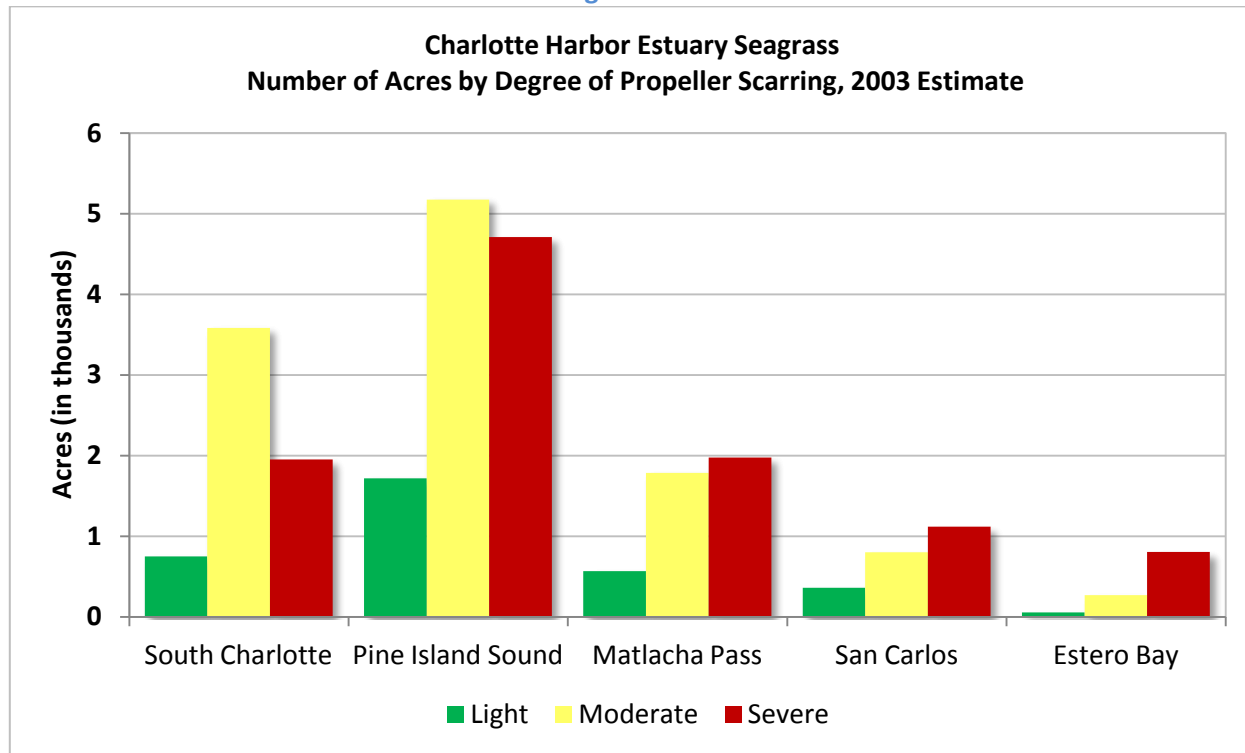
Table 2-13

FWC Assessment of Boat Propeller Scar Damage in the Greater Charlotte Harbor Region, 2004.

ID	Greater Charlotte Harbor Estuary Areas	Total Acres of Seagrass (Yarbro and Carlson)	Acres of Scarred Seagrass (Medley <i>et al.</i>)	Percent of Area Acres of Seagrass Scarred	Percent of Total Estuary Acres of Seagrass Scarred
1	Blackburn Bay	468	47	10.0	0.1
2	Peace River	295	67	22.7	0.1
3	Myakka River	331	130	39.3	0.2
4	Lemon Bay*	2,714	851	31.4	1.3
5	Middle Charlotte Harbor		**		
6	West Wall Charlotte Harbor	1,784	668	37.4	1.0
7	East Wall Charlotte Harbor	3,275	2,650	80.9	4.1
8	South Charlotte Harbor (Cape Haze + Bokeelia)	10,823	6,288	58.1	9.8
9	Placida Region		***		
10	Upper Caloosahatchee River	0	0	0.0	0.0
11	Lower Caloosahatchee River	0	0	0.0	0.0
12	Matlacha Pass	7,479	4,335	58.0	6.8
13	Pine Island Sound	28,034	11,610	41.4	18.1
14	San Carlos Bay	5,192	2,286	44.0	3.6
15	Estero Bay	3,625	1,135	31.3	1.8
	Total	64,020	30,067		46.9

Source: Madley *et al* (2004)

Figure 2-18



Source: Madley et al (2004)

The majority of Charlotte Harbor seagrass are located in Lee County waters and when the scarring data were analyzed by county, the majority of scarring also occurs in Lee County. The shift from light and moderate scarring in 1993 to moderate and severe scarring in 2003 can be seen in Table 2-14. Both counties had greater than 90% seagrass scarring as light and moderate in 1993, and greater than 87% moderate to severe scarring in 2003. The total increase in seagrass scarring in Charlotte County and Lee County from 1993 to 2003 was 10.7% (793 acres) and 50.3% (7,196 acres), respectively.

Table 2-14

Numeric and Percent Change of Boat Propeller Scar Damage in the Greater Charlotte Harbor Region by County

Year	Scarring Intensity	Charlotte	Percent of County Scarring	Lee	Percent of County Scarring
'93	Light	1,529	20.5	5,925	41.4
'93	Moderate	5,628	75.6	7,098	49.6
'93	Severe	286	3.8	1,288	9.0
1993	TOTAL	7,443	100	14,311	100
'03	Light	869	10.6	2,768	12.9
'03	Moderate	5,527	67.1	9,374	43.6
'03	Severe	1,840	22.3	9,365	43.5
2003	TOTAL	8,236	100	21,507	100
1993 to 2003 Increase in Scarring (Acres)		793		7,196	
1993 to 2003 Percent Increase in Scarring (Acres)		10.7		50.3	

Source: Madley et al (2004)

Management of Seagrass Scarring

Four preventative management options to protect areas of threatened seagrass have been proposed and implemented to varying degrees around the state. These options are education, channel marking, enforcement, and restricted zones. Increased public awareness of the importance of seagrasses and safe boat handling courses that promote best practices may help reduce the occurrence of seagrass scarring, if broadly implemented. Restricted zones have been implemented in highly impacted seagrass areas. No motor zones, allowing only push poles or trolling motors, and area closures prevent further seagrass damage and provide for natural recovery from propeller scarring. Restoration efforts attempt to correct for damage already done, and to accelerate the recovery of seagrass function.

Indicator 2.3 - Number of Acres of Wetland Habitat

Wetlands are characterized by a combination of traits, consisting of hydrophytic vegetation and hydric soil, which may include the presence of surface water, that produce unique habitat for a wide variety of plant and animal life. The amount, persistence, and source of water determine differing qualities of wetlands resulting in swamp, marsh, bog, or fen. Ecologically, wetlands produce abundant food for wildlife, including shellfish, fish, birds, and land animals. Wetland net primary production averages $\sim 9,000 \text{ kcal/m}^2/\text{year}$

(<http://www.globalchange.umich.edu/globalchange1/current/lectures/king/energyflow/energyflow.html>), with average estimates for the various types of wetland ranging from 600 to 2,000 $\text{g/m}^2/\text{year}$ of carbon, but able to exceed 5,400 (mangroves) and 8,000 (salt marsh) $\text{g/m}^2/\text{year}$ of carbon (<http://kingfish.coastal.edu/biology/sgilman/778PrimProd.htm>). The conversion for grams carbon to kilocalories is approximately one to four. Wetlands, along with estuaries and tropical rainforests, are among the most productive ecosystems on a per unit basis. Florida Statutes, Chapter 373, define wetlands as:

“Wetlands” means those areas that are inundated or saturated by surface water or ground water at a frequency and a duration sufficient to support, and under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soils. Soils present in wetlands generally are classified as hydric or alluvial, or possess characteristics that are associated with reducing soil conditions. The prevalent vegetation in wetlands generally consists of facultative or obligate hydrophytic macrophytes that are typically adapted to areas having soil conditions described above. These species, due to morphological, physiological, or reproductive adaptations, have the ability to grow, reproduce or persist in aquatic environments or anaerobic soil conditions. Florida wetlands generally include swamps, marshes, bayheads, bogs, cypress domes and strands, sloughs, wet prairies, riverine swamps and marshes, mangrove swamps and other similar areas. Florida wetlands generally do not include longleaf or slash pine flatwoods with an understory dominated by saw palmetto.

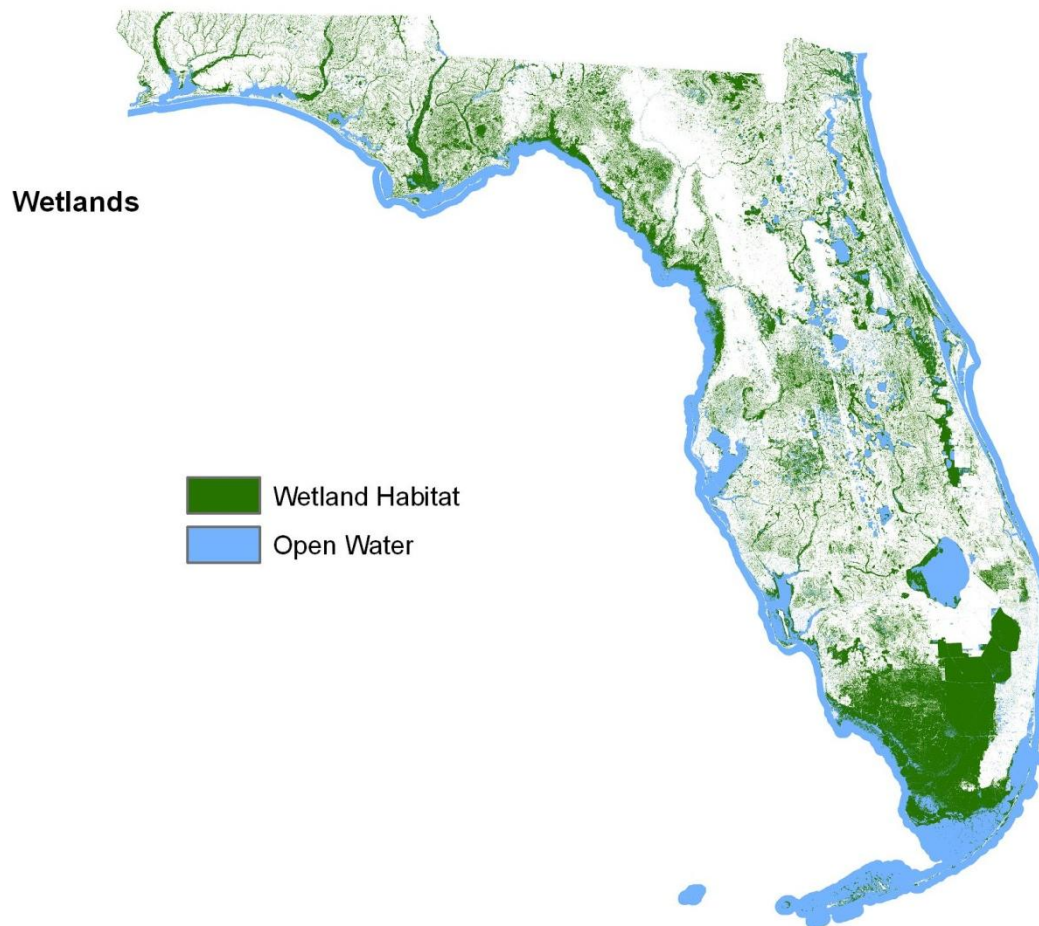
In relation to human activities, wetland ecosystems provide numerous functions that cannot be reproduced artificially in any form approaching the scale, efficiency, and balance found naturally. Some important services of naturally functioning wetlands include:

1. Providing food for numerous species such as oysters, crabs, fish, and wildlife
2. Providing protective habitat for migratory fish and juveniles of many commercial fishery species
3. Providing feeding, breeding, spawning, and nesting habitat for water fowl and migratory birds, endangered species, and many commercial and recreational fish and shellfish
4. Maintaining the biodiversity of native species with sufficient space and community health
5. Improving water quality by absorbing sediment loads and filtering pollutants
6. Influencing climate through evaporation and transpiration
7. Protecting human life and property by reducing floodwater flow and volume

8. Enhancing human community resilience by buffering environmental conditions (*e.g.*, hurricanes, floods, climate, and sea level rise), reducing erosion, and providing groundwater recharge areas

Figure 2-19 is map of wetlands in Florida is based on Landsat Enhanced Thematic Mapper imagery from 2003 and the FWC habitat classifications revised in 2004. Due to the change in designation methodology, comparison to earlier years and a statement of trends cannot be made. If newer imagery data is analyzed with the same classification scheme, the data from this image may be used to determine changes in extent of wetlands across for Florida.

Figure 2-19



Prior to becoming part of the United States of America, the land of Florida consisted of an estimated 20.3 million acres of wetland, nearly 59% of Florida's current land area (~ 34.5 million acres). National policy and local practice of draining and converting wetlands (mainly for agriculture), caused the loss of an estimated 9.3 million acres of Florida's wetlands during two centuries of development from the 1780s to 1980s. Conversion to agricultural and other uses reduced the total wetland acreage by 46% to 11.0 million (Dahl, 1990); approximately 31% of Florida's land area. This equates to an average loss rate of 46,500 acres/year, or 127 acres every

day for 200 years. During the 1950s to 1970s period, Florida wetland loss rate was estimated at 72,000 acres/year (Hefner, 1986). The conversion of wetland to other uses occurred statewide; from conversion of the Everglades to sugar cane and vegetable cropland, to channelization of the Kissimmee River basin, to drainage of St Johns River and Apalachicola floodplains, and mangrove removal from the Tampa Bay and Indian River estuaries (Frayer and Hefner, 1991). Other states had higher loss rates and more extensive loss of wetlands (e.g., California, Indiana, Illinois, Iowa, Kentucky, Missouri, and Ohio), ranging from 81% to 91% of each state's total wetland (Dahl, 1990).

Historically, wetlands have been the purview of federal agencies. Five U.S. federal agencies share responsibility for protecting wetlands: Army Corps of Engineers (USACE), Environmental Protection Agency (EPA), Fish and Wildlife Service (FWS), National Oceanic and Atmospheric Administration (NOAA), and the Department of Agriculture Natural Resources Conservation Service (NRCS). Each agency's authority for wetland protection is generated from the mission of agency for different national interests: USACE—navigation and water supply, EPA—water quality, FWS—fish and wildlife and endangered species, NOAA—coastal resources, and NRCS—agricultural activities (USGS, WSP 2425). The delineation of wetlands has caused controversy over time. Guidance for the identification of wetland boundaries come under section 404 of the Clean Water Act (1975) and the Water Resources Development Act of 1990 (Title 33, U.S. Code, 2201). The USACE, which uses the 1987 Wetlands Delineation Manual (TR Y-87-1) standards, jointly with the Environmental Protection Agency are the federal authorities that administer section 404, which regulates dredge and fill discharge into waters of the United States. The "Swampbuster" provision of the Food Security Act of 1985 and the Wetland Reserve Program (1990) administered by the U.S. Department of Agriculture reinforce protection of designated wetlands through incentives to discourage conversion for agricultural purposes and encourage restoration of altered lands.

The national policy toward wetlands changed officially with the 1990 Water Resources Development Act, which set a "no net loss" goal, making conversion of wetland to other uses restricted under permit, and when permitted to be mitigated by the creation of wetland elsewhere. The no net loss policy has generated wetland conservation and restoration efforts that have caused the stabilization of wetland loss. The Economic Research Service of the U.S. Department of Agriculture reported data that showed a net increase nationally in wetlands (13,800 acres per year) for the period 1997 to 2002 (AREI, 2006). The 1997-2002 period documented the first positive net change in wetland acreage reported since the country's inception, and represented a reversal from the pre-1954 national wetland loss rate of 814,000 to 887,000 acres per year (averaged since 1885). National wetland loss rates were declining from 1954 to 1992: 1954-1974, 458,000 acres/year; 1974-1982, 446,000 acres/year; 1982-1992, 79,000 acres/year. During this time, the source of losses changed from predominantly agriculture conversions to other uses (mostly urban development, 57% of the losses in 1982-1992). Restoration efforts have also showed increases of the agricultural contribution toward wetland conservation. In the 1982-1992 period, agricultural lands supplied 10% of restored wetland acreage (8,000 acres), and during the 1992-2002 the amount more than tripled (28,000 acres) amounting to 40% of all restored wetlands. The cessation of wetland loss was primarily the result

of large decreases in wetland conversions to other purposes, although restoration and mitigation efforts contributed to wetland gains (AREI, 2006).

More recently (since the 1970s), responsibility for protection and management of wetland has shifted to the states. Florida is one of the few states with a comprehensive wetland regulatory program. Florida requires an environmental resource permit (ERP) approval for most alterations to state tidal and freshwater wetlands *in addition to* the federal, USACE permit approval. Issuance of the ERP indicates water quality certification (or waiver) under section 401 of the Clean Water Act, and constitutes concurrence of consistency with section 307 of the Coastal Zone Management Act (CZMA). Exemptions to the ERP requirement are stated in Florida Statutes 373.406 and 403.927 for lands used for agricultural activities, which include silviculture and aquaculture. The Florida Department of Agriculture and Consumer Services (DACS) assists the agricultural community to minimize adverse impacts on wetlands and other surface waters. The ERP process is administered jointly by the Florida Department of Environmental Protection and the Water Management Districts, and extends to activities located on sovereign submerged lands from the tidal high water line to the territorial limit – 3 miles into the Atlantic and 10 miles into the Gulf of Mexico. The Florida wetland delineation methodology differs from federal methodology and is designated in Florida Statute 373.421, adopted July 1, 1994. The intent of the ERP program is a “no net loss of wetland function.”

A large proportion of Florida wetland has already been lost, disturbed, or impaired due to the increase in human population, changes in land use, and the expansion of the built environment. Restoration and mitigation efforts in Florida have increased substantially since the 1970s to correct the deterioration of wetland habitat. The reported wetland loss rate for Florida during the 1985 to 1996 period was 5,000 acres/year (FCMP Section 309 Assessment FY 2006 – FY2010). Data for the period 2004 to 2010 from the FDEP Office of Submerged Lands and Environmental Resources shows a continued decrease in wetlands loss in Florida. The ERP process tracked, on average, less than 4,000 acres of wetland lost per year from 2004 through 2010 (Table 2-15). During the same time, 1,771 acres/year of wetland were created, and another 15,164 acres/year of wetland were improved, in keeping with Florida policy of no net loss in wetland function. Another 16,744 acres/year of wetlands were preserved between 2004 and 2010 for a total of more than 100,000 acres of preserved wetlands during the six years.

Table 2-15
2010 Environmental Resource Permitting Wetland Loss and Gain Summary

AGENCY & YEARS	Individual Permits issued	Applications Denied	Applications Withdrawn	Exemptions Verified	General Permits Verified	Acreage Permanently Lost	Acreage Temporarily Disturbed	Acreage Preserved	Acreage Created	Acreage Improved	Mitigation Bank Credits Used
NWFWMD											
10/04 to 09/05	196	0	17	Not Applicable	36	25.70	0.00	572.89	27.25	2.28	Not Applicable
10/05 to 09/06	266	0	16		51	32.70	0.00	298.90	34.80	15.70	
10/06 to 09/07	304	0	18		37	32.00	0.00	296.60	33.90	15.70	
10/07 to 09/08	233	0	26		27	3.84	2.88	436.43	5.91	6.01	
10/08 to 09/09	203	0	12		27	6.70	3.52	242.72	3.48	27.24	
10/09 to 09/10	214	0	10		31	7.41	3.49	1,138.78	5.68	13.63	
Total	1,416	0	99	0	209	108.35	9.89	2,986.32	111.02	80.56	#
SWFWMD											
10/04 to 09/05	3,451	25	230	402	274	390.60	85.99	1,807.27	416.56	758.89	DATA FROM DEP RECORDS
10/05 to 09/06	3,374	36	290	310	266	481.65	47.76	1,533.04	755.15	701.87	
10/06 to 09/07	3,553	35	139	236	243	740.67	137.84	2,029.35	902.58	1,099.74	
10/07 to 09/08	2,774	64	357	385	272	675.81	91.96	4,425.72	644.52	823.41	
10/08 to 09/09	2,086	34	247	279	307	682.77	170.78	4,266.07	1,119.38	764.81	
10/09 to 09/10	1,173	33	138	198	223	354.77	93.13	3,379.11	910.78	1,019.27	
Total	16,411	227	1,401	1,810	1,585	3,326.27	627.46	17,440.56	4,748.97	5,167.99	#
SJWMD											
10/04 to 09/05	1,293	25	21	30	183	1,328.65	33.63	11,251.81	400.77	1,639.03	-
10/05 to 09/06	1,304	29	135	39	159	2,098.87	50.68	12,932.11	190.90	1,185.30	354.52
10/06 to 09/07	1,242	22	55	14	142	2,013.66	59.78	7,321.14	73.11	1,504.58	487.41
10/07 to 09/08	1,122	140	222	45	112	1,752.08	33.94	11,511.59	33.64	1,278.97	593.45
10/08 to 09/09	759	186	267	48	95	1,109.43	13.17	5,577.01	63.59	709.89	291.77
10/09 to 09/10	581	150	174	65	83	479.38	15.47	2,531.81	9.20	176.90	107.74
Total	6,301	552	874	241	774	8,782.07	206.67	51,125.47	771.21	6,494.67	1,834.89
SFWMD											
10/04 to 09/05	2,421	44	Data not available	30	986	2,616.79	Did not track this information	6,168.31	2,662.78	4,050.24	DATA FROM DEP RECORDS
10/05 to 09/06	4,994	43		39	704	3,434.21		6,222.60	544.66	3,731.25	
10/06 to 09/07	1,525	29		14	1,012	2,209.10		3,207.63	1,288.60	3,088.20	
10/07 to 09/08	1,193	27		45	64	1,252.92		6,221.39	194.31	2,337.09	
10/08 to 09/09	912	33		48	57	263.03		584.62	44.91	310.88	
10/09 to 09/10	1,008	57		66	84	543.12		3,525.64	80.82	62,693.89	
Total	12,053	233	578	242	2,907	10,319.17	0.00	25,930.19	4,816.08	76,211.55	#
SRWMD											
10/04 to 09/05	281	7	15	77	276	15.27	* Did not track this information	203.98	1.25	200.80	This information is not tracked by SRWMD
10/05 to 09/06	50	12	13	90	332	6.35		13.24	3.42	11.40	
10/06 to 09/07	47	31	11	110	333	15.09		*	15.09	*	
10/07 to 09/08	39	18	8	16	211	0.00		57.92	5.50	22.88	
10/08 to 09/09	14	10	10	43	152	0.00		5.44	1.20	0.00	
10/09 to 09/10	19	4	14	76	142	0.71		0.00	0.30	0.00	0.87
Total	450	82	71	336	1,446	37.42	75.50	276.34	25.56	235.08	0.87
WMD Subtotal	36,631	1,094	3,023	2,629	6,921	22,573.28	919.52	97,758.88	10,472.84	88,189.85	#
DEP											
10/04 to 09/05	5,897	750	598	5,106	1,834	168.91	10.49	106.27	37.47	398.56	DATA FROM DEP RECORDS
10/05 to 09/06	6,414	685	555	4,923	1,877	415.62	17.22	1,055.57	18.99	1,154.54	
10/06 to 09/07	4,886	652	639	4,194	1,745	288.19	27.62	708.17	50.71	593.13	
10/07 to 09/08	2,427	427	519	3,407	671	82.85	25.50	292.66	38.69	123.67	
10/08 to 09/09	1,968	329	459	3,057	449	41.20	429.58	246.92	0.66	293.20	
10/09 to 09/10	1,658	170	383	3,487	457	30.32	7.48	297.71	4.81	230.43	
DEP Total	23,250	3,013	3,153	24,174	7,033	1,027.09	517.89	2,707.31	151.33	2,793.52	#
Grand Total	59,881	4,107	6,176	26,803	13,954	23,600.37	1,437.41	100,466.18	10,624.18	90,983.38	1,836
AVERAGE Number/year	9,980	685	1,029	4,467	2,326	3,933	240	16,744	1,771	15,164	307

The protection of wetlands is preferred to mitigation; however, when permitted impacts do occur, the Uniform Mitigation Assessment Method (Florida Administrative Code, Chapter 62-345) is used to determine the amount of compensatory mitigation required (effective February 2, 2004).

Mitigation is the compensation for destroyed wetland function by enhancement, restoration, or creation of replacement wetland. Mitigation banking is a practice in which an environmental enhancement and preservation project is conducted by a public agency or private entity (“banker”) to provide mitigation within a defined region. The bank is the project site, and the currency is a credit, which represents the wetland ecological value equivalent to the complete restoration of one acre. The number of potential credits permitted for the bank and the credit debits required for impact permits are determined by the permitting agencies. Differing mitigation ratios for creation, enhancement, and preservation of wetlands have been established. Mitigation banks were authorized by the Environmental Reorganization Act, 1993 (Florida Statute, Chapter 373-4135). See the FDEP website for more information on mitigation banking (<http://www.dep.state.fl.us/water/wetlands/mitigation/synopsis.htm>).

The Everglades restoration project is one example of Florida’s commitment to preserving wetlands and reviving wetland function. The \$10.9 billion Comprehensive Everglades Restoration Plan (CERP) is a joint state and federal wetland restoration project of unparalleled scale in south Florida. Florida invests extensively in the protection of wetlands through acquisition and conservation of state lands to preserve natural resources. CARL, Preservation 2000, and Florida Forever are examples of acquisition programs for conservation and protection of wetlands and other sensitive habitats.

The current total wetland area for Florida is 10.275 million acres, as determined from GIS metadata associated with the map presented in Figure 2-19 (FWC, 2010). The Florida Wildlife Conservation Commission identifies 15 types of wetland habitats. Freshwater marsh (21.5%), hardwood swamp (17.8%), and cypress swamp (15.2%), mixed wetland forest (14.2%), and shrub swamp (10.5%) comprise the majority of Florida wetland (Table 2-16 and Figure 2-20). These five wetland types combine for a total of over 8.1 million acres. Marine and estuarine wetlands (salt marsh, tidal flats, mangrove swamp, and scrub mangrove), which are found only in the coastal counties, totaled over 1 million acres or 9.9% of the Florida wetlands. The 35 coastal counties account for 65.7% of Florida wetlands, and 32 non-coastal counties comprise 34.3% of wetlands in the state (Table 2-17, Table 2-18, and Figure 2-21).

Table 2-16
Wetland Type Summary

Wetland	Acres	Percent	Wetland	Acres	Percent
Freshwater Marsh Acres	2,208,354	21.5%	Hardwood Swamp Acres	1,826,431	17.8%
Sawgrass Marsh Acres	698,674	6.8%	Hydric Hammock Acres	35,517	0.3%
Cattail Marsh Acres	65,066	0.6%	Bottomland Hardwood Acres	85,048	0.8%
Shrub Swamp Acres	1,081,119	10.5%	*Salt Marsh Acres	433,216	4.22%
Bay Swamp Acres	203,918	2.0%	**Mangrove Swamp Acres	554,757	5.40%
Cypress Swamp Acres	1,557,630	15.2%	**Scrub Mangrove Acres	5,099	0.05%
Cypress Pine Acres	46,396	0.45%	*Tidal Flat Acres	15,010	0.15%
Mixed Wetland Forest Acres	1,458,992	14.2%	Total Wetlands	10,275,227	100.0%

Figure 2-20

Wetland Habitat Types

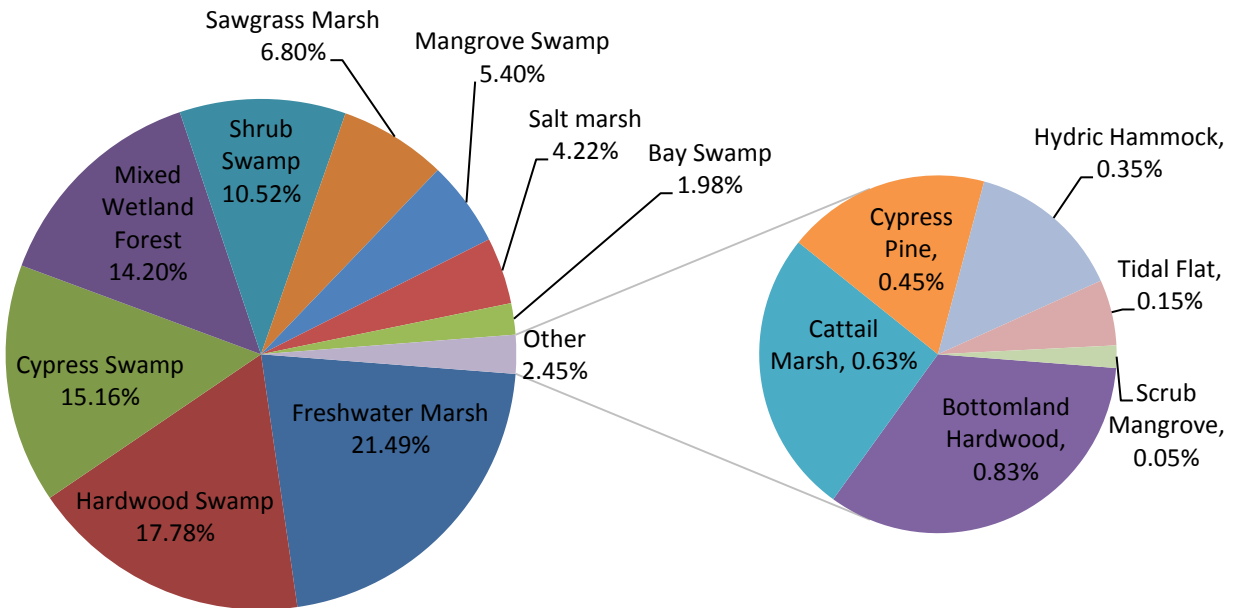


Figure 2-21

Acres of and Percent of Wetlands by Region

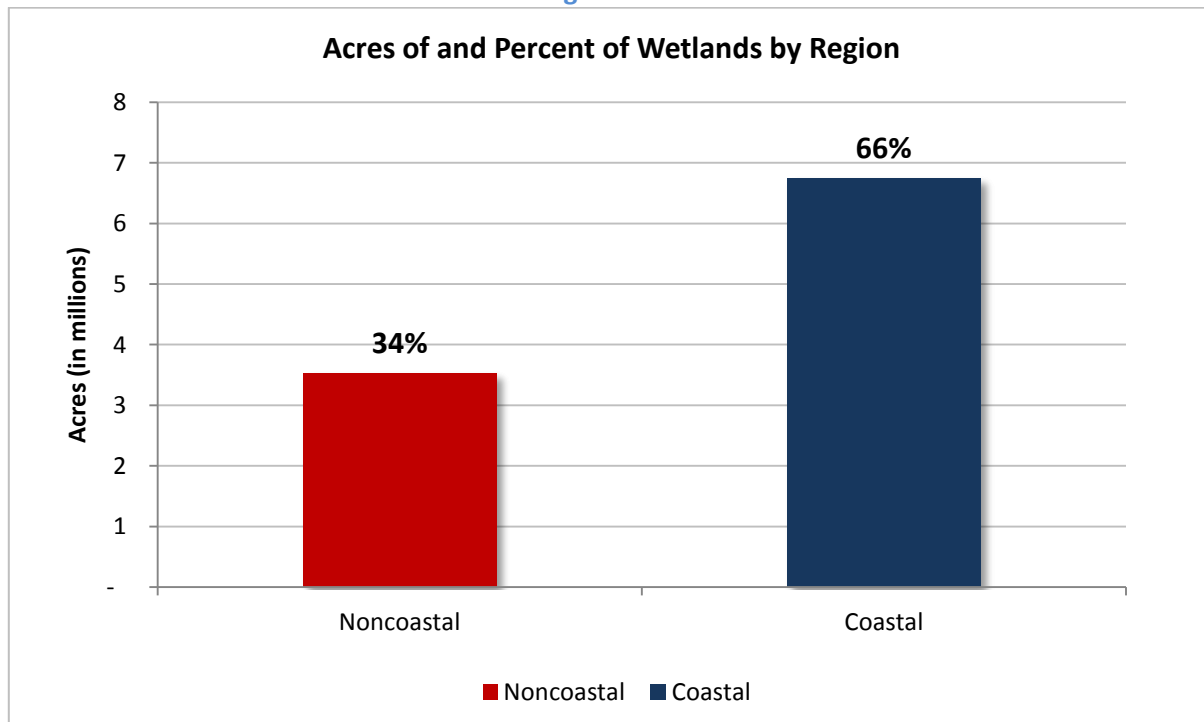


Table 2-17
Wetland Acreage for Coastal County by Wetland Type

REGION	COASTAL COUNTY NAME	Freshwater Marsh Acres	Sawgrass Marsh Acres	Cattail Marsh Acres	Shrub Swamp Acres	Bay Swamp Acres	Cypress Swamp Acres	Cypress Pine Acres	Mixed Wetland Forest Acres	Hardwood Swamp Acres	Hydric Hammock Acres	Bottomland Hardwood Acres	Salt Marsh Acres	Mangrove Swamp Acres	Scrub Mangrove Acres	Tidal Flat Acres	Open Water Acres-not wetland	2010 TOTAL COUNTY WETLAND	% Wetland of County Land Acres
P	BAY	1,979	0	0	29,570	35,393	5,640	0	39,887	7,947	0	258	8,976	0	0	169	9,104	129,819	26.6%
AP	BREVARD	92,108	0	0	54,728	941	10,558	14	16,019	14,607	1,243	0	17,150	4,659	0	0	48,364	212,027	32.5%
SF	BROWARD	156,046	282,357	17,225	37,355	0	7,936	624	2,146	4,914	0	0	147	1,216	0	0	24,412	509,966	65.9%
GP	CHARLOTTE	40,228	0	0	6,260	0	10,902	2,533	3,907	3,841	0	0	9,041	16,451	0	413	35,935	93,576	21.1%
BB	CITRUS	8,952	0	0	3,257	0	4,070	0	9,666	36,770	9,243	0	25,555	0	0	405	25,472	97,918	26.2%
SF	COLLER	220,325	881	0	29,820	0	315,815	25,178	130,091	56,212	0	0	22,843	85,685	0	0	28,118	886,850	68.4%
SF	DADE	385,692	271,770	400	30,607	0	10,044	750	1,205	10,820	3,259	0	38,599	64,517	122	8,654	58,938	823,180	66.1%
BB	DIXIE	4,207	0	0	5,042	112	31,445	0	47,361	76,210	0	0	20,662	0	0	1,084	9,645	185,382	41.1%
AP	DUVAL	1,989	0	0	5,720	1,491	17,588	0	27,244	26,854	0	0	31,697	0	0	0	60,552	112,583	22.7%
P	ESCAMBIA	1,466	0	0	155	7,484	2,206	0	23,813	30,052	0	5,724	461	0	0	0	8,257	71,361	16.8%
AP	FLAGLER	14,479	0	0	11,752	536	26,918	0	30,395	20,620	0	738	7,596	0	0	0	16,860	107,766	34.7%
P	FRANKLIN	13,547	0	0	57,579	4,342	9,215	0	28,518	20,881	0	738	7,596	0	0	8	11,153	142,424	41.7%
P	GULF	4,858	0	0	16,511	3,426	10,245	0	45,168	44,154	0	7,565	1,578	0	0	0	12,899	133,505	36.9%
BB	HERNANDO	5,246	0	0	1,708	4	4,459	0	7,289	27,226	1,089	0	7,839	0	0	128	9,888	54,988	18.0%
GP	HILLSBOROUGH	23,524	0	0	19,861	1	19,146	0	17,392	49,050	0	0	3,331	6,176	0	234	29,971	138,715	20.6%
AP	INDIAN RIVER	24,893	0	0	28,601	95	5,546	111	3,713	9,229	0	0	426	3,398	0	0	23,943	76,012	23.6%
BB	JEFFERSON	8,039	0	0	2,509	964	40,032	0	24,300	41,870	784	0	3,902	0	0	4	4,413	122,404	32.0%
GP	LEE	16,655	0	0	7,839	0	21,722	9,299	12,965	7,792	0	0	4,856	36,550	0	0	42,369	117,678	22.9%
BB	LEVY	17,953	0	0	616	0	24,389	0	32,499	80,878	12,111	0	37,049	0	0	285	13,610	205,780	28.7%
GP	MANATEE	19,131	0	0	10,686	2	4,412	84	7,706	23,543	0	0	2,262	4,883	0	62	21,486	72,771	15.3%
AP	MARTIN	31,977	0	0	3,625	413	3,671	636	1,324	7,373	0	0	144	2,713	0	0	79,800	51,876	14.6%
SF	MONROE	109,674	15,242	0	4,252	0	37,766	1,880	3,064	3,335	0	0	80,925	310,760	4,977	2,152	70,092	574,027	89.9%
AP	NASSAU	1,747	282	26	6,792	3,365	21,454	0	30,070	30,966	0	0	24,622	0	0	0	18,523	119,324	28.6%
P	OKALOOSA	142	0	0	594	20,448	1,081	0	29,051	30,805	0	0	3,998	151	0	0	8,429	86,270	14.4%
AP	PALMBEACH	131,325	122,082	20,845	48,318	16	22,645	1,520	951	8,201	0	0	251	577	0	0	185,327	356,731	28.2%
BB	PASCO	23,643	0	0	6,830	5	21,280	1	18,578	36,456	0	0	3,911	747	0	154	17,535	111,605	23.4%
GP	PINELLAS	492	0	0	1,866	0	5,442	205	3,527	2,203	0	0	1,245	4,912	0	0	11,506	19,892	14.9%
P	SANTAROSA	8,789	0	0	0	25,554	1,269	0	35,734	40,707	0	6,228	29	0	0	36	7,546	118,346	18.2%
GP	SARASOTA	28,614	0	0	12,628	21	3,654	1	4,354	16,877	0	0	1,423	830	0	0	14,258	68,402	18.7%
AP	ST JOHNS	4,263	0	0	3,150	178	21,373	0	27,236	44,063	0	0	17,408	0	0	0	37,902	117,671	30.2%
AP	ST LUCIE	13,588	0	0	3,241	819	2,815	307	1,605	7,429	0	0	283	5,021	0	0	10,501	35,108	9.6%
BB	TAYLOR	4,901	0	0	9,539	2,767	77,645	0	50,775	88,596	6,312	0	23,133	0	0	730	8,406	264,398	39.6%
AP	VOLUSIA	44,619	0	0	26,997	4,428	68,961	0	51,443	52,395	1,194	0	9,677	5,641	0	0	98,963	265,355	37.5%
BB	WAKULLA	3,143	0	0	48,380	1,487	26,610	0	29,252	23,473	282	0	20,791	0	0	492	8,529	153,910	39.6%
P	WALTON	645	0	0	2,904	19,298	3,308	0	32,491	46,793	0	5,073	2,142	0	0	0	10,114	112,744	16.7%
	COASTAL TOTAL	1,468,879	692,614	38,496	539,292	133,590	901,352	43,143	826,739	1,033,431	35,517	29,584	433,171	554,757	5,099	15,010	1,082,820	6,750,364	
	STATE TOTAL	2,208,354	698,674	65,066	1,081,119	203,918	1,357,630	46,396	1,488,992	1,826,431	35,517	85,048	433,216	554,757	5,099	15,010	1,976,911	10,275,227	
	COASTAL % OF WETLAND CATEGORY	66.5%	99.1%	59.2%	49.9%	65.5%	57.9%	93.0%	56.7%	56.6%	100.0%	34.8%	100.0%	100.0%	100.0%	100.0%	54.8%	65.7%	
	PERCENTAGE OF TOTAL COASTAL WETLAND	21.8%	10.3%	0.6%	8.0%	2.0%	13.4%	0.6%	12.2%	15.3%	0.5%	0.4%	6.4%	8.2%	0.1%	0.2%	-	100.0%	
	PERCENTAGE OF TOTAL STATE WETLAND	14.3%	6.7%	0.4%	5.2%	1.3%	8.8%	0.4%	8.0%	10.1%	0.3%	0.3%	4.2%	5.4%	0.0%	0.1%	-	65.7%	

Table 2-18
Wetland Acreage for Non-Coastal County by Wetland Type

NON-COASTAL COUNTY NAME	Freshwater Marsh Acres	Sawgrass Marsh Acres	Cattail Marsh Acres	Shrub Swamp Acres	Bay Swamp Acres	Cypress Swamp Acres	Cypress Pine Acres	Mixed Wet- land Forest Acres	Hardwood Swamp Acres	Hydric Hammock Acres	Bottomland Hardwood Acres	Salt Marsh Acres	Mangrove Swamp Acres	Scrub Man- grove Acres	Tidal Flat Acres	Open Water Acres- not wetland	2010 TO- TAL COUNTY WETLAND	% Wetland of County Land Acres
ALACHUA	15,740	5,347	6,261	13,182	935	13,304	0	16,712	17,444	0	0	0	0	0	0	27,546	88,925	15.9%
BAKER	675	0	0	13,333	5,166	77,474	0	24,389	4,725	0	0	0	0	0	0	2,828	125,762	33.6%
BRADFORD	639	0	0	932	3,980	11,347	1	10,018	17,609	0	0	0	0	0	0	4,779	39,433	21.0%
CALHOUN	544	0	0	11,670	5,701	4,946	0	35,546	17,609	0	15,485	0	0	0	0	3,964	91,501	25.2%
CLAY	4,558	81	66	2,599	1,080	16,014	0	25,102	16,924	0	0	0	0	0	0	26,616	66,424	17.3%
COLUMBIA	1,656	0	0	7,429	8,404	50,424	0	26,131	8,424	0	0	0	0	0	0	3,908	102,468	20.1%
DESOTO	31,005	0	0	11,806	2	2,900	0	5,438	19,708	0	45	0	21	0	0	3,655	70,925	17.4%
GADSDEN	282	0	0	2,551	104	9,868	84	21,688	34,225	0	1,368	0	0	0	0	7,871	70,170	21.2%
GILCHRIST	2,103	0	0	1,168	149	8,327	0	8,238	8,628	0	0	0	0	0	0	2,671	28,613	12.8%
GLADES	73,249	49	18,677	43,597	0	7,282	40	5,689	7,202	0	0	0	0	0	0	69,389	155,785	31.5%
HAMILTON	8,987	75	5	6,996	1,764	15,454	0	16,818	7,422	0	0	0	0	0	0	11,681	57,521	17.5%
HARDEE	20,323	0	0	14,200	759	5,833	0	9,326	32,003	0	0	0	0	0	0	6,570	82,444	20.2%
HENDRY	77,426	43	460	20,266	0	24,237	2,991	21,324	16,862	0	0	0	0	0	0	23,986	163,609	22.2%
HIGHLANDS	50,909	0	0	18,062	3,868	9,052	44	8,481	14,424	0	0	0	0	0	0	50,896	104,840	15.9%
HOLMES	3	0	0	179	427	11,306	0	14,260	30,664	0	8,461	0	0	0	0	4,241	65,300	21.1%
JACKSON	1,830	0	0	838	1,096	20,323	0	15,873	44,064	0	1,419	0	0	0	0	12,982	85,443	14.6%
LAFAYETTE	1,829	0	0	29,389	1,120	37,105	0	28,135	33,672	0	0	0	0	0	0	4,431	131,250	37.8%
LAKE	53,028	0	0	18,760	4,047	27,130	0	32,810	62,082	0	0	0	0	0	0	103,962	197,857	32.4%
LEON	9,699	0	0	19,629	2,090	15,577	52	14,549	17,925	0	0	0	0	0	0	11,473	77,694	18.2%
LIBERTY	118	0	0	116,920	2,090	17,266	0	48,654	41,138	0	21,045	0	0	0	0	4,452	247,231	46.2%
MADISON	8,857	0	0	6,056	3,601	59,849	0	22,009	14,036	0	0	0	0	0	0	4,007	114,408	25.8%
MARION	26,468	45	61	11,238	1,619	11,800	0	21,690	33,954	0	0	0	0	0	0	30,870	106,875	10.6%
OKEECHOBEE	54,017	0	933	17,154	829	4,779	28	4,766	11,867	0	0	0	0	0	0	74,394	94,373	19.0%
ORANGE	34,126	0	0	16,236	2,930	27,762	1	31,784	32,573	0	0	0	0	0	0	70,457	145,412	25.0%
OSCEOLA	91,949	0	0	29,569	4,141	53,532	10	28,623	37,211	0	0	0	0	0	0	98,597	245,035	29.0%
POLK	117,831	0	0	79,596	8,538	44,282	1	31,771	69,412	0	0	0	0	0	0	110,164	351,431	29.3%
PUTNAM	11,946	420	107	7,709	2,473	15,254	0	37,578	43,425	0	0	0	0	0	0	61,894	118,912	25.7%
SEMINOLE	12,670	0	0	7,063	434	3,062	0	12,329	25,989	0	0	0	0	0	0	26,802	61,547	31.2%
SUMTER	21,908	0	0	9,916	670	19,951	0	14,242	42,335	0	0	0	0	0	0	11,673	109,022	31.2%
SUWANNEE	750	0	0	453	133	1,748	1	2,780	2,422	0	0	0	0	0	0	4,029	8,287	1.9%
UNION	126	0	0	1,019	1,304	13,731	0	11,058	6,397	0	0	0	0	0	0	2,266	33,635	21.9%
WASHINGTON	4,224	0	0	2,312	2,701	14,190	0	23,113	28,505	0	7,686	0	0	0	0	11,037	82,731	22.3%
NON-COASTAL TO- TAL	739,475	6,060	26,570	541,827	70,328	656,278	3,253	632,253	793,289	0	55,464	45	21	5,099	0	894,091	3,524,863	
STATE TOTAL	2,208,354	698,674	65,066	1,081,119	203,918	1,557,630	46,396	1,458,992	1,836,431	35,517	85,048	433,216	554,757	5,009	15,010	1,976,911	10,275,227	
NON-COASTAL % OF WETLAND CATE- GORY	33.5%	0.9%	40.8%	50.1%	34.5%	42.1%	7.0%	43.3%	43.4%	0.0%	65.2%	0.01%	0.004%	0.0%	0.0%	45.2%	34.3%	
PERCENTAGE OF TO- TAL NON-COASTAL WETLAND	21.0%	0.2%	0.8%	15.4%	2.0%	18.6%	0.1%	17.9%	22.5%	0.0%	1.6%	0.0%	0.0%	0.0%	0.0%	-	100.0%	
PERCENTAGE OF TO- TAL STATE WET- LAND	7.2%	0.1%	0.3%	5.3%	0.7%	6.4%	0.0%	6.2%	7.7%	0.0%	0.5%	0.0%	0.0%	0.0%	0.0%	-	34.3%	

Coastal Habitats

Nationally, coastal wetlands represent 38% of all wetlands of the conterminous 48 states, and NOAA data from the period 1998 to 2004 showed losses to coastal wetlands of the eastern United States estimated at an average of 59,000 acres/year (Stedman and Dahl, 2008). That study found loss to *freshwater vegetated* wetlands in the U.S. Gulf of Mexico coastal watersheds was six times higher than in U.S. Atlantic coastal watersheds. The loss estimates for *all* wetland types along the entire U.S. Gulf of Mexico coast (68 million acre study area) were 25 times higher than the Atlantic coast of the U.S. (89 million acre study area) from 1998 to 2004.

Wetlands in coastal counties (6.75 million acres) equal 19.6% of the land area of Florida. Among the five geographical regions of Florida, South Florida (4 counties: Broward, Dade, Monroe, and Collier) has the greatest number of acres (nearly 2.8 million) of coastal county wetlands, representing 41% of Florida coastal wetlands (Figure 2-22 and Table 2-19). The Atlantic Peninsula (10 counties) and the Big Bend (8 counties) encompass 1.45 million (21%) and 1.2 million (18%) acres of coastal wetland, respectively. The Panhandle, with 7 counties, (12%) and the Gulf Peninsula, with 7 counties, (8%) are the areas of the state with the least amount of coastal wetlands remaining (1.3 million acres combined).

Figure 2-22

Coastal Wetlands by Region, Acres and Percent of Coastal County Wetlands

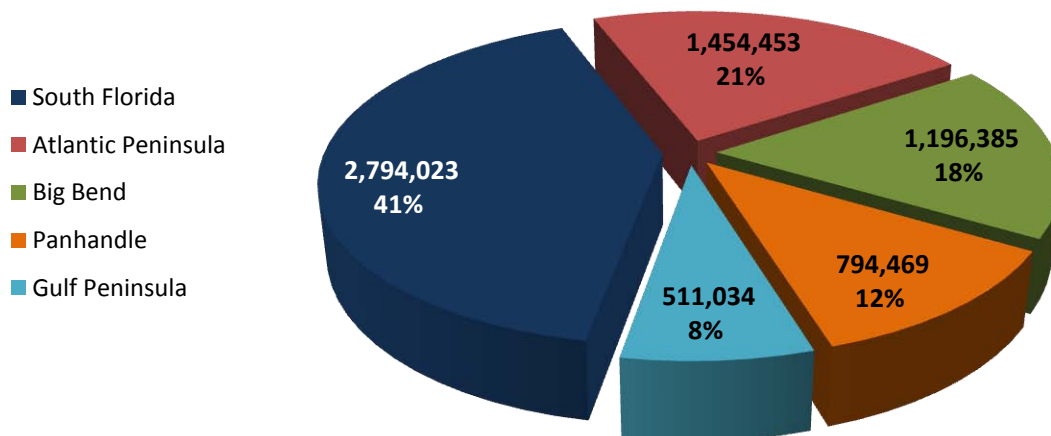


Table 2-19
Regional Wetland Acreage

Region	Coastal Counties	Salt Marsh (acres)	Mangrove Swamp (acres)	Scrub Mangrove (acres)	Tidal Flat (acres)	Total E/M* Wetland (acres)	E/M* Regional (percent)	E/M* as Percent of Total Coastal Wetland	Total Regional Wetland (acres)	Regional Percent of Total Coastal Wetland
Panhandle	7	20,933	-	-	213	21,153	2.10	0.31	794,469	11.8
Big Bend	8	142,842	747	-	3,282	146,879	14.57	2.18	1,196,385	17.7
Gulf Peninsula	6	22,158	69,802	-	709	92,675	9.19	1.37	511,034	7.6
Atlantic Peninsula	10	104,724	22,009	-		126,743	12.57	1.88	1,454,453	21.5
South Florida	4	142,514	462,178	5,099	10,806	620,601	61.57	9.19	2,794,023	41.4
Total	36	433,171	554,736	5,099	15,010	1,008,051	100	14.9	6,750,364	100

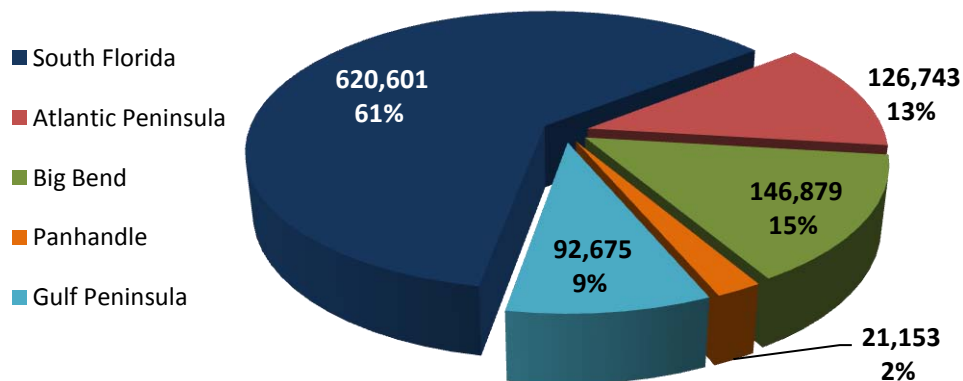
* E/M (Esuarine/Marine)

The amount of Florida coastal wetland designated as marine or estuarine totals 1,008,016 acres (14.9% of Florida coastal county wetlands (Table 2-19). South Florida coastline contains most of the estuarine and marine wetlands of the state (61.5%). The Panhandle region maintains the least estuarine and marine wetlands (2.1%). The other three regions represent about a third of Florida's marine and estuarine wetlands (~336,000 acres), and are nearly equally distributed at 9.2%, 12.6%, and 14.6% for the Gulf Peninsula, Atlantic Peninsula, and Big Bend, respectively (Figure 2-23).

Collier and Miami-Dade counties have the most wetlands of all counties in terms of absolute acreage, each exceeding 800,000 acres (see Table 2-17 and Table 2-18 for county wetland data). Monroe and Broward follow in ranking, each exceeding 500,000 acres. Palm Beach and Polk counties each exceed 350,000 acres of wetland. These six counties represent 3.3 million acres or 32% of Florida's wetlands statewide. As a percentage of county land area, Monroe has the greatest amount of wetland (89.9%), followed by Collier, Miami-Dade, and Broward which each have more than 65% of county land area as wetland. Liberty is the non-coastal county with the greatest percentage of wetland (46%), and the coastal counties of Franklin, Dixie, Taylor, and Wakulla have between 40% and 42% wetland.

Figure 2-23

Marine/Estuarine Wetlands, Acres and Percent by Region



Mangroves

Fifty-five species of mangroves occur around the world, and four are found in the United States: *Rhizophora mangle* (red mangrove), *Avicennia germinans* (black mangrove), *Laguncularia racemosa* (white mangrove), and *Conocarpus erectus* (buttonwood). Mangroves in Florida extend from the peninsula to the Keys, with the northern limits of Cedar Key on the Gulf and Ponce de Leon Inlet on the Atlantic (Figure 2-24). Ninety percent of Florida mangroves are found in four counties: Lee, Collier, Monroe, and Miami-Dade (USFWS, 1999). The total number of acres of mangrove, as reported by FWC in 2010, was estimated at 559,767 acres. Florida mangrove area was reported to be 488,400 acres as a “most recent reliable estimate” from 2001 by the FAO (FAO, 2007 report). The mangroves of Florida represent only 1.5% of the world mangrove acreage, estimated to be over 34 million acres (based on data from the year 2000, Giri *et al.*, 2010), but account for nearly all of the mangroves found in North America, except for isolated pockets of *Avicennia* located in Louisiana and southern Texas.

Figure 2-24



Saltwater Marshes

Another component of Florida estuarine/marine wetlands are the saltwater marshes (Figure 2-25). Saltwater marsh amounts to 43% of estuarine wetlands, and 6.4% of the Florida coastal wetland total. One third of saltwater marshes are found in the Big Bend region along the Gulf coast (142,842 acres), and one third are located in South Florida (142,514 acres). More than 24% of saltwater marshes are found in the counties of the Atlantic Peninsula coast (104,724 acres), and the remaining 10% are distributed approximately evenly between the Gulf Peninsula (22,203 acres) and Panhandle (20,933 acres) regions (Figure 2-26). Ten coastal counties encompass more than 75% of all Florida saltwater marsh land, and Monroe County has the most acreage (80,925 acres), with over twice that of any other county and more than ten times the amount found in 21 of the counties with saltwater marsh (Table 2-17). Miami-Dade is the next most abundant county in terms of saltwater marshes with 38,599 acres. Eight other counties exceed 20,000 acres of saltwater marsh each including: Duval and Nassau on the Atlantic, and Levy, Citrus, Taylor, Collier, Wakulla, and Dixie along the Gulf. Brevard County and St Johns County each have over 17,000 acres of saltwater marsh, and all other coastal counties (24) have less than 10,000 acres each, ranging from 29 to 9,677 acres.

Figure 2-25

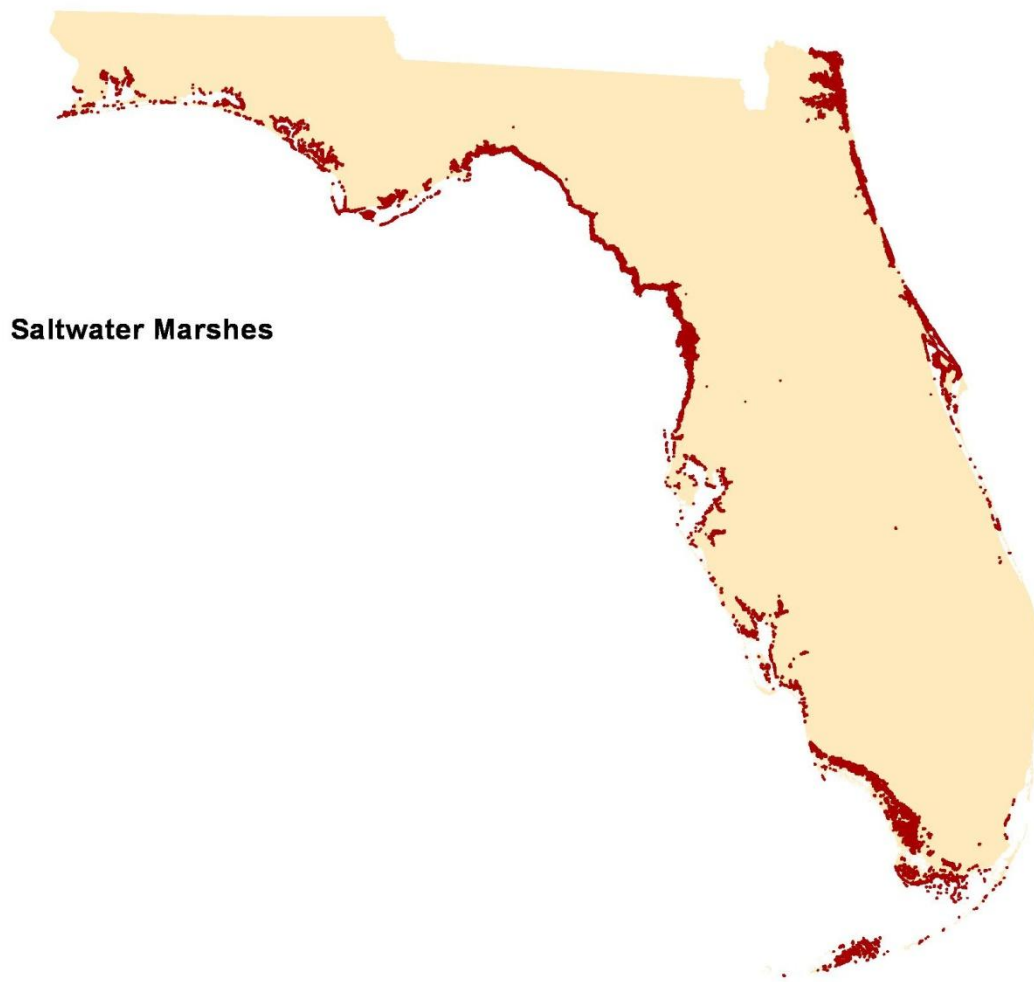
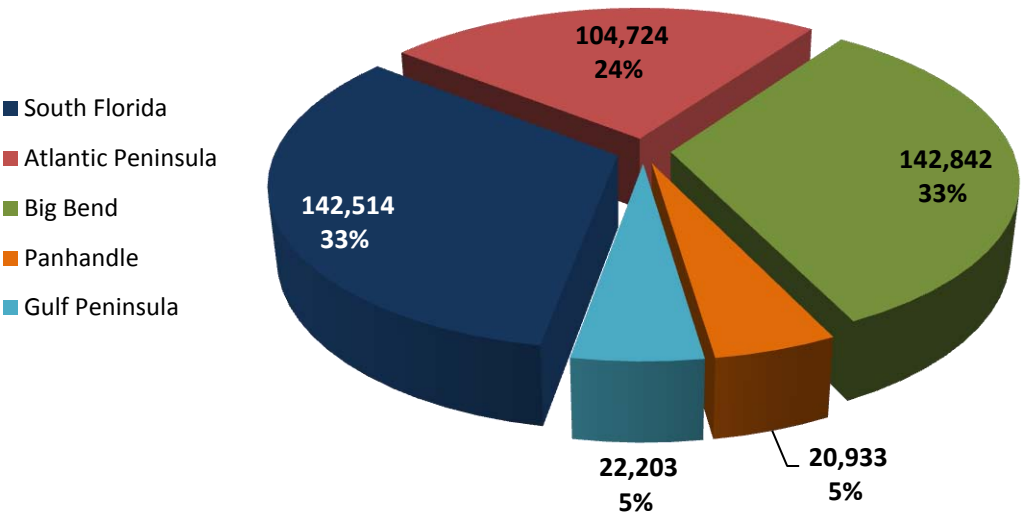


Figure 2-26

Saltwater Marsh Wetlands, Acres and Percent by Region

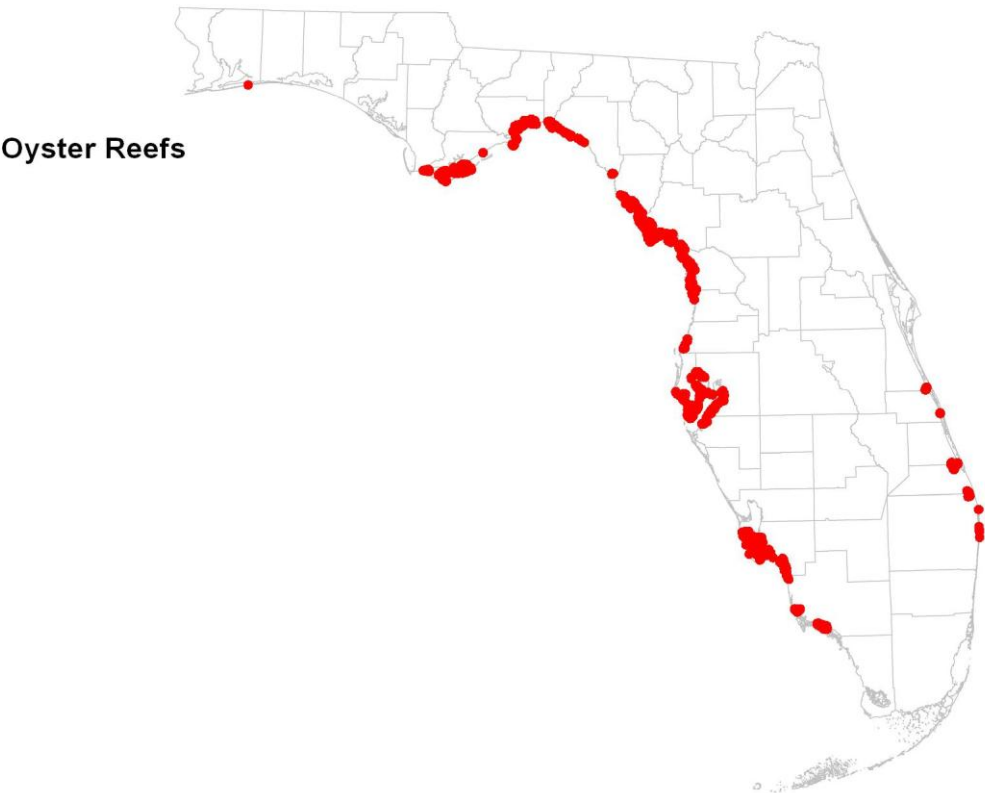


Indicator 2.4 - Number of Acres of Shellfish Growing Habitat

Shellfish in the context of Florida aquaculture refers to mussels, oysters, and clams, which are found in estuarine and marine coastal waters around the state. The Department of Agriculture and Consumer Services (DACS) is responsible for the control of shellfish harvesting from Florida submerged lands. Sanitary control of the shellfish industry is necessary due to the possibility of waterborne diseases concentrating in the edible tissue of harvested species. Health hazards from polluted waters include: typhus, hepatitis, and salmonellosis. DACS Division of Aquaculture follows the National Shellfish Sanitation Program standards, and the program is reviewed annually by the Food and Drug Administration. The Florida Shellfish Environmental Assessment Section (SEAS) classifies and manages the 39 shellfish harvesting areas, which cover a total of 1,430,854 acres of Florida coastal waters. SEAS uses 1,200 monitoring stations to sample water quality around harvesting areas to determine if conditions are safe to produce edible shellfish. Coliform bacteria counts are used as indicators of clean or polluted waters. When standard thresholds of bacterial counts are exceeded, shellfish areas are closed to harvesting. Area closures also occur automatically under certain environmental conditions that may increase the probability of waters becoming a health risk, for example, rainfall, river stage, or river discharge reaching specified levels are defined as adverse pollution conditions. Temporary closure of a harvest area are for the protection of human health. A comprehensive shellfish harvesting area survey is composed for each of the 39 areas based on findings from sanitary, hydrographic, meteorological, and bacteriologic surveys, and produces a classification for the area. Waters are classified for shellfish harvesting as: approved, conditionally approved, restricted, conditionally restricted, prohibited, and unclassified (unapproved). Surveys are maintained annually, reevaluated every three years, and resurveyed every 12 years. Full details of the pathogen standards, water conditions, shellfish classifications, and other aspects of the management of shellfish in Florida can be found at (http://www.floridaaquaculture.com/SEAS/SEAS_intro.htm). More than 500 acres of state owned submerged lands are leased for oyster culturing in Apalachicola Bay (Florida Aquaculture Plan, 2011-2012).

Figure 2-27 shows the location of oyster reefs around Florida. This figure shows an estimated 7,842 acres of oyster reefs statewide which are mainly located in the Big Bend region from Franklin County to Pasco County. Other isolated reef tracts are distributed in the estuaries along the southern Gulf coast (Pinellas, Hillsborough, Sarasota, Lee, and Collier counties) and along the Atlantic coast in Brevard, Indian River, St Lucie, Martin, and Palm Beach counties.

Figure 2-27



Indicator 2.5 - Number of Miles of Sandy Beach and Acres of Beach Dune Habitat

The number of miles of sandy beach in Florida has been determined to be 825 by a thorough survey of coastal shoreline. This number is modified by the amount of erosion and beach re-nourishment occurring over time. Beach erosion is discussed under the topic of coastal hazards. Accepting 825 miles as the baseline of Florida sandy beach, the amount of coastal sandy shoreline reported by county is described in Table 2-20. The counties were grouped into eight regions, with the Florida Keys split evenly for Atlantic and Gulf sides. Florida sandy beaches are distributed primarily along three shorelines: the northwest Panhandle, the southwest Gulf coast, and the Atlantic coast from Duval County to Miami-Dade (Figure 2-28). Very little sandy beach is found in the Big Bend area, the Ten Thousand Islands area on the Gulf in Monroe County, and the Florida Keys.

The Northeast and East Central regions combine for 272.6 miles of sandy shoreline, or 33% of the state total (Figure 2-29). The Panhandle (221 miles) represents 27%, and Southwest Florida (179.9 miles) another 22% of all sandy shoreline. These four regions amount to 82% of the state's sandy beaches. Southeast Florida totals 11%, and the Keys total 6%, while the Big Bend region has only 1%, or 8.9 miles, of the sandy shoreline in the state. The Gulf Coast totals 435.9 miles, and the Atlantic Coast totals 389.1 miles, of Florida's sandy beaches (Table 2-20 and Table 2-21).

Figure 2-28

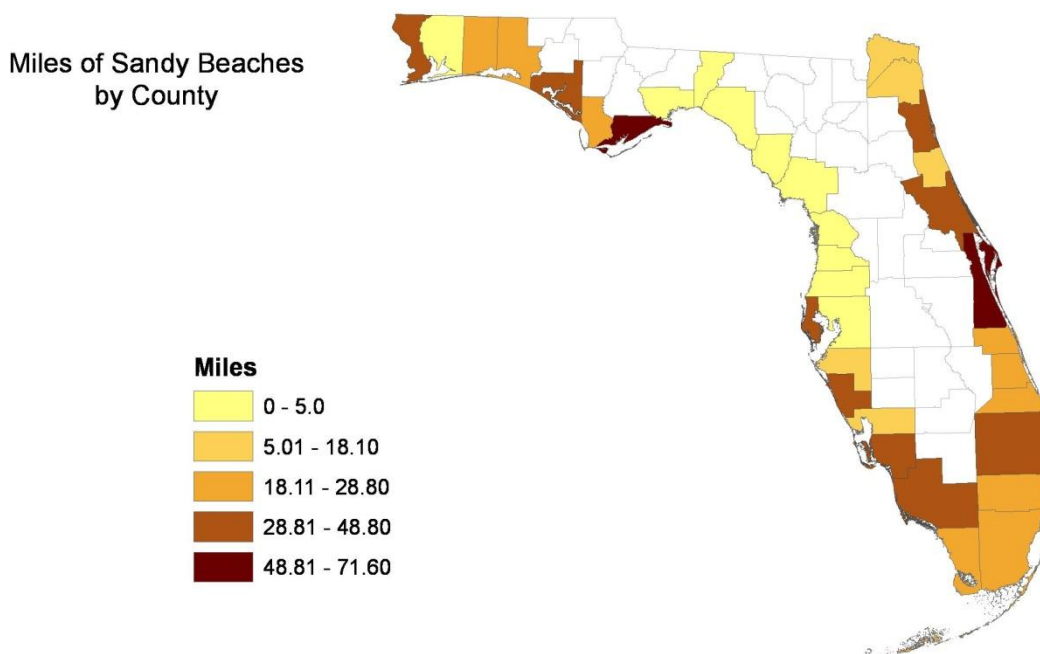


Table 2-20

Gulf Coastal Counties	Region	Miles
Escambia	Panhandle	38.9
Santa Rosa	Panhandle	5.0
Okaloosa	Panhandle	23.9
Walton	Panhandle	25.6
Bay	Panhandle	41.2
Gulf	Panhandle	28.8
Franklin	Panhandle	54.6
Wakulla	Panhandle	3.0
Jefferson	Big Bend	0.0
Taylor	Big Bend	0.3
Dixie	Big Bend	0.0
Levy	Big Bend	3.2
Citrus	Big Bend	0.2
Hernando	Big Bend	0.8
Pasco	Big Bend	4.4
Pinellas	Southwest	37.2
Hillsborough	Southwest	2.1
Manatee	Southwest	12.3
Sarasota	Southwest	34.7
Charlotte	Southwest	12.2
Lee	Southwest	47.3
Collier	Southwest	34.1
Monroe	Keys	26.1
Total Gulf	-	435.9
Atlantic Coastal Counties	Region	Miles
Monroe	Keys	26.4
Palm Beach	Southeast	45.3
Broward	Southeast	24.0
Miami-Dade	Southeast	20.8
Brevard	Central	71.6
Indian River	Central	22.4
St. Lucie	Central	21.5
Martin	Central	21.4
Nassau	Northeast	12.7
Duval	Northeast	15.0
Flagler	Northeast	18.1
St. Johns	Northeast	41.1
Volusia	Northeast	48.8
Total Atlantic	-	389.1
Total		825.0

Source: Beaches and Shores Technical and Design Memorandum, 89-1, 1993

Figure 2-29

**Percentage of State Sand Beach
Regional Shoreline in Florida**

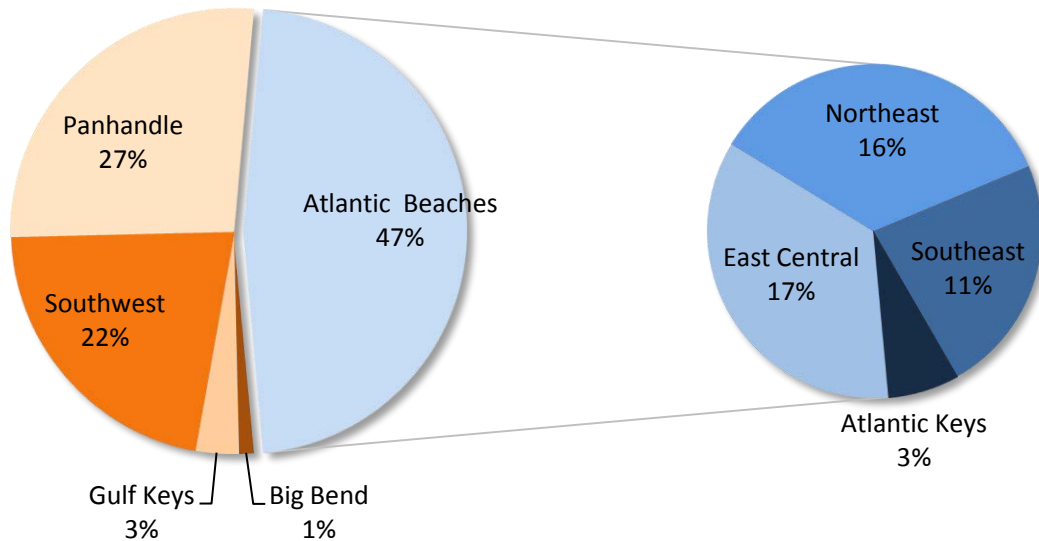


Table 2-21

Region	Miles
Panhandle	221.0
Big Bend	8.9
Southwest	179.9
Gulf Keys	26.1
Gulf Total	435.9
Atlantic Keys	26.4
Southeast	90.1
East Central	136.9
Northeast	135.7
Atlantic Total	389.1
State Total	825.0

Beach dune habitat is found on the barrier island system that exists along most of Florida's coastline. Dune habitat overlaps with most of the area identified as sandy shoreline, except in areas of Volusia, Collier, and Sarasota counties. The FWC estimated 32,295 acres of dune habitat in 2005. Over half of this habitat is protected as conserved lands; 46% existing as conserved and managed lands (under the Coastal Barrier Resources Act), 1% Florida Forever lands, and 5% Strategic Habitat Conservation Area lands. Florida beaches and beach dunes are important nesting areas for sea turtles and many species of shorebirds.

Indicator 2.6 - Number of Acres of Coral Protected Habitat and Artificial Reefs

Coral reefs are found along the south Florida coast from Monroe County up to Martin County. Recently completed mapping efforts have delineated 139,931.70 acres of coral reef tract along Florida's coast (Figure 2-30). The majority of the reef tract, or 66 percent, is present in Monroe County (Figure 2-31), followed by Palm Beach County with 16 percent and Martin County with the lowest of 2 percent of the total reef tract.

Figure 2-30

Coral Reefs in South Florida

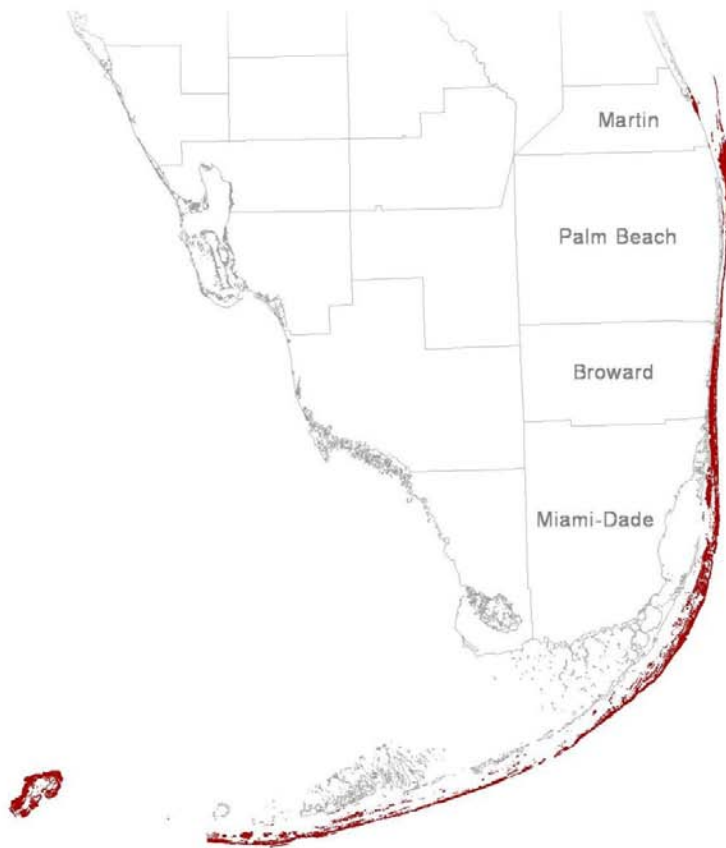
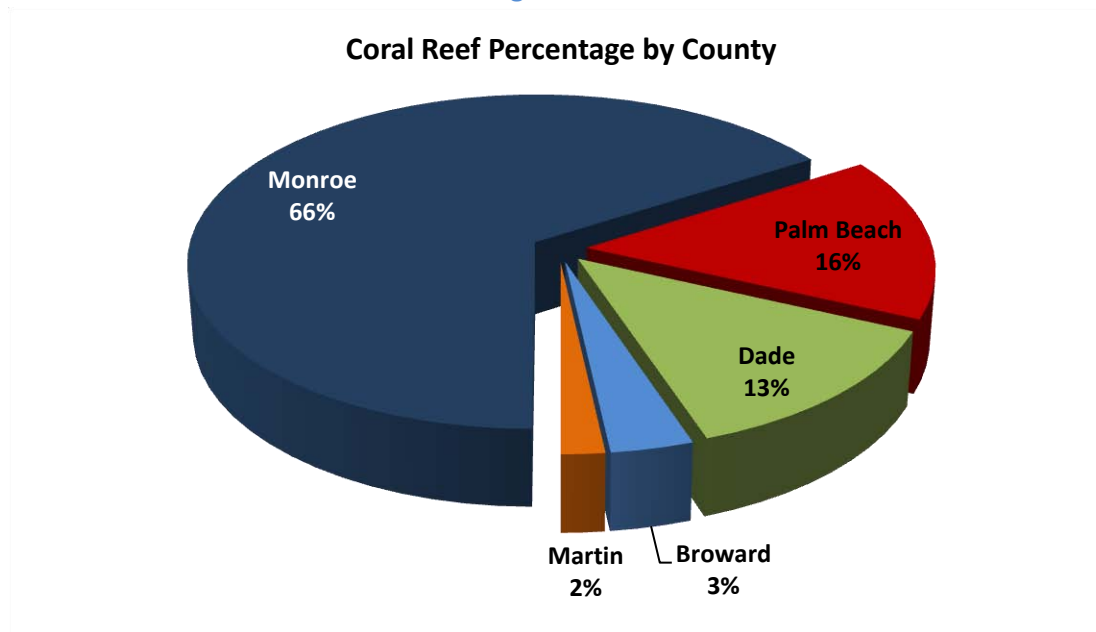


Figure 2-31



The coral reef tract in Monroe County is protected within the Florida Keys National Marine Sanctuary. Other reef protected areas outside Monroe County include Biscayne Bay National Park and St Lucie Inlet State Park. Management areas, or zones within protected areas, that expanded between 2000 and 2010 in the reef area were the Tortugas Ecological Reserve North in 2001 and the Dry Tortugas No Take Zone established in 2006. These two areas encompass 116,114 acres a portion of which is outside state territorial waters.

In 2003, the Southeast Florida Coral Reef Initiative team first met to develop local action strategies for the reef tract outside Monroe County. Four main focus areas of concern were determined: 1. Awareness and appreciation; 2. Fishing, diving, and other uses; 3. Land-based sources of pollution and water quality; and 4. Maritime industry and coastal construction impacts. Focus teams and objectives have been determined for each area of concern to help manage the reef tract. Also, in 2009 the Florida legislature passed the Coral Reef Protection Act clearly defining the fines and penalties for damage to the coral reefs and allowing higher penalties for repeat offenders.

Although outside state waters, the South Atlantic Fishery Management Council expanded the experimental Oculina Research Reserve off Ft. Pierce in 2000 and established the Poutales Terrace Coral Habitat of Particular Concern Area in 2010 off the lower Keys in Monroe County to protect coral communities. The Gulf of Mexico Fishery Management Council in 2004 established the 2,300 acre Habitat Area of Particular Concern (HAPC) west of the Dry Tortugas at Pully Ridge and the Middle Ground HAPC located west of Tampa Bay was expanded by 1,193 acres in 2001.

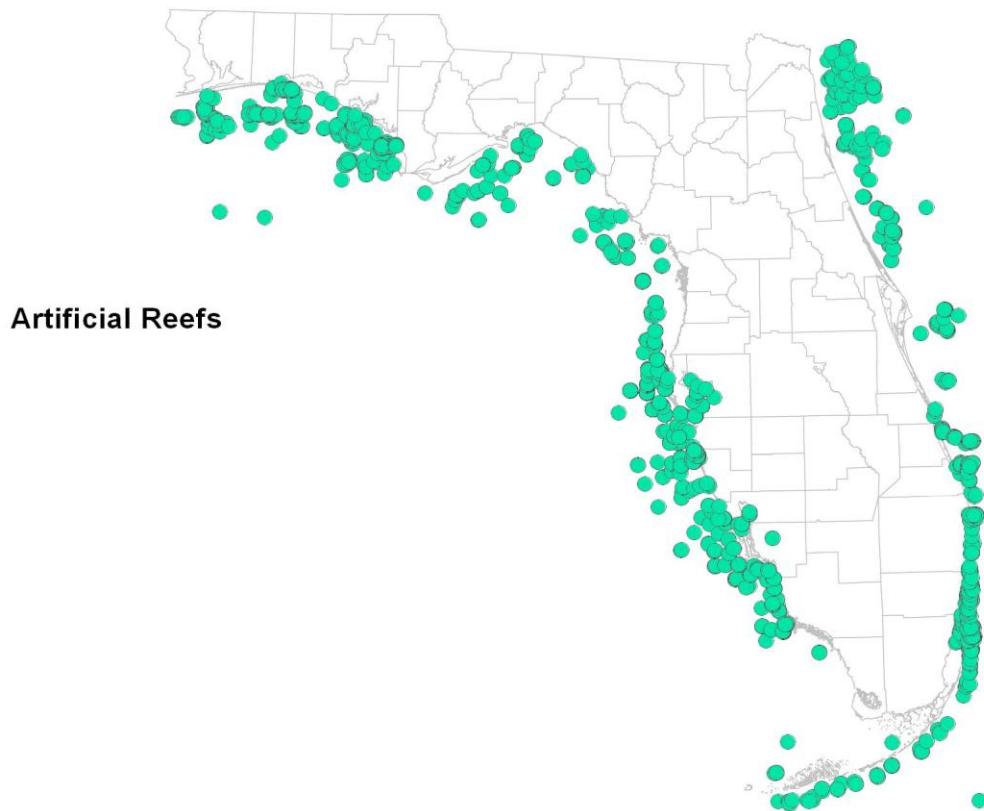
Artificial reefs

Artificial reefs are designed to provide the same functions as natural reefs: to provide shelter for marine fishes and to provide attachment sites for invertebrate, plant, and animal communities. An artificial reef community is not only the plants and animals at the structure itself, but also the community around the structure and above the reef. Artificial reefs can be designed and located to provide similar complexity and structural characteristics to an area and serve as an additional habitat enhancement tool for fishery managers to help augment Florida's natural reef system. Florida has had an artificial reef program since 1982. The FWC administers the program which manages grants for artificial reef creation and monitors the reefs. Reefs funded through this grant program are created for the following six objectives:

1. Enhance private recreational and charter fishing and diving opportunities;
2. Provide a socio-economic benefit to local coastal communities;
3. Increase reef fish habitat;
4. Reduce user conflicts; and
5. Facilitate related reef research
6. While accomplishing objectives 1-5, do no harm to fishery resources, Essential Fish Habitat, or human health.

Thirty-four of the 35 coastal counties are or have been involved in artificial reef development. Figure 2-32 shows the location of the artificial reefs in Florida.

Figure 2-32



The FWC tracks artificial reefs through deployment, or each time material is placed in the water for a reef, and by tonnage. Figure 2-33a and Figure 2-33b show the different information illustrated. Pinellas County has the most deployments but several Counties have higher tonnage. For example Escambia has the most tonnage but fewer deployments since some of their reefs are tanks and battleships. Escambia was also able to recycle the concrete bridge rubble created when Hurricane Katrina in 2005 damaged Interstate 10 as offshore reefs.

There are more than 2,400 artificial reefs constructed in Florida and the adjacent federal waters. Between 2000-2010 there were 1,086 artificial reef deployments in Florida (Figure 2-34). There was an increase in reef deployments in 2007 and a sharp decrease in 2010.

Figure 2-33a

Artificial Reef Deployments, 2000 - 2010

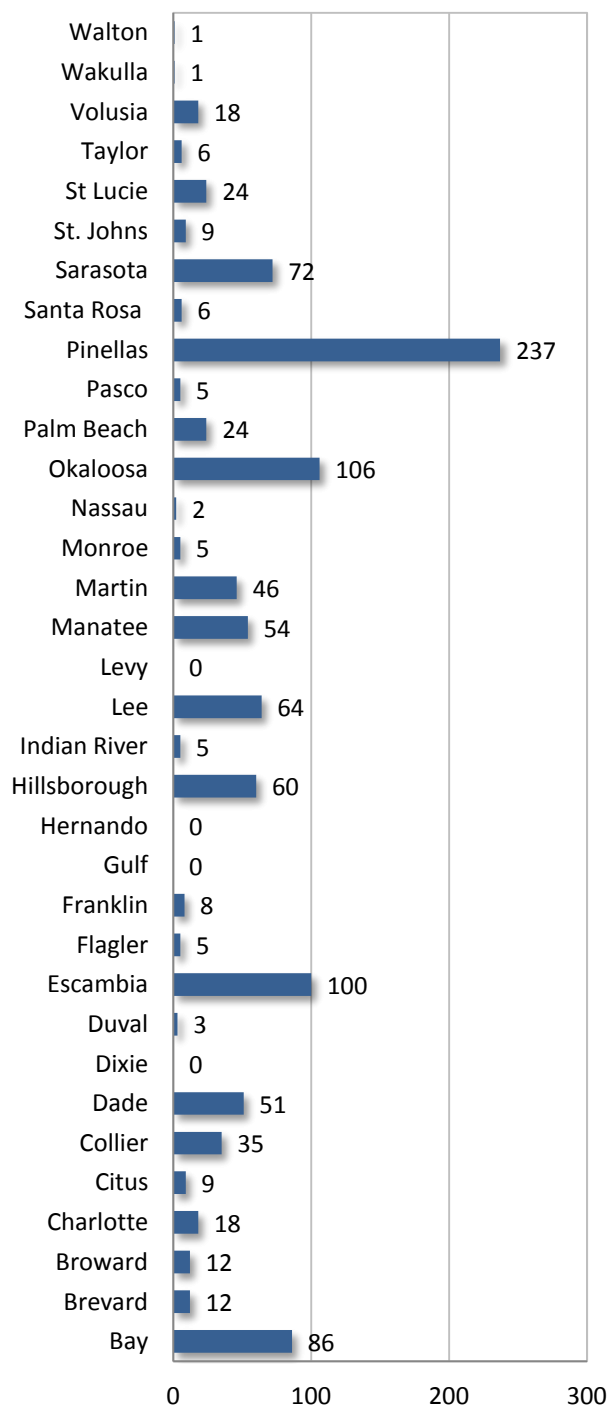


Figure 2-33b

Material (in tons) Used for Artificial Reefs, 2000-2010

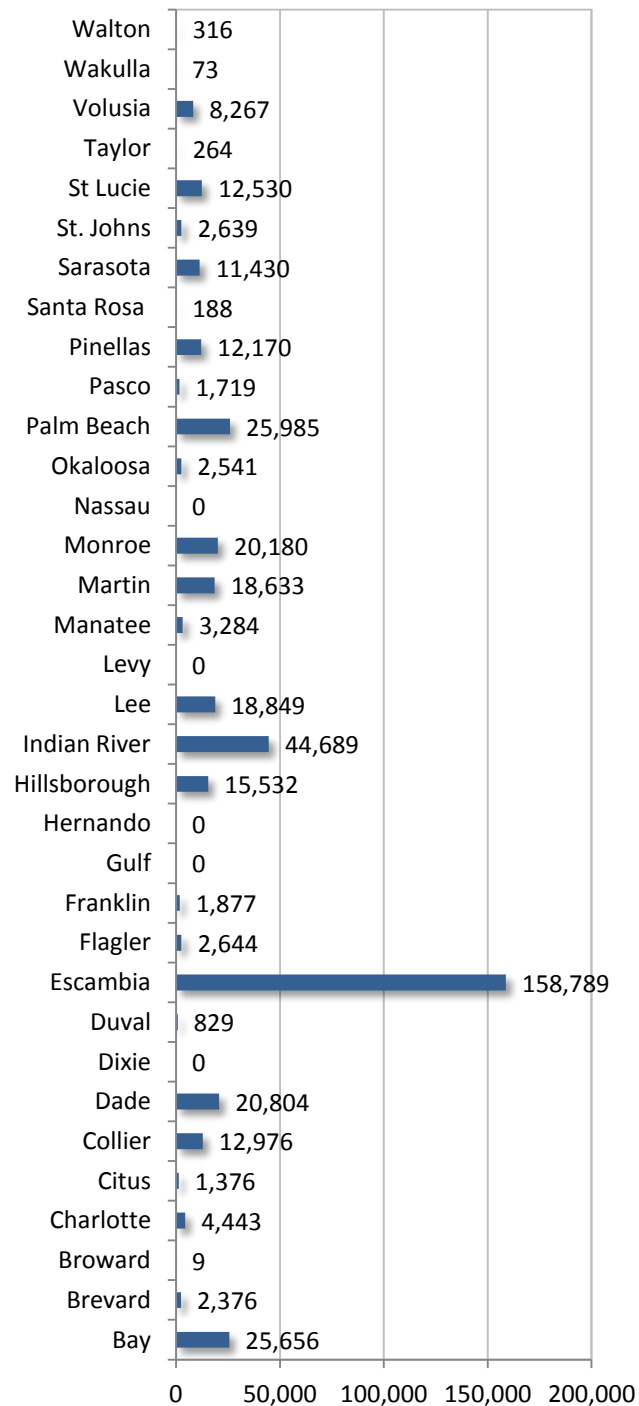
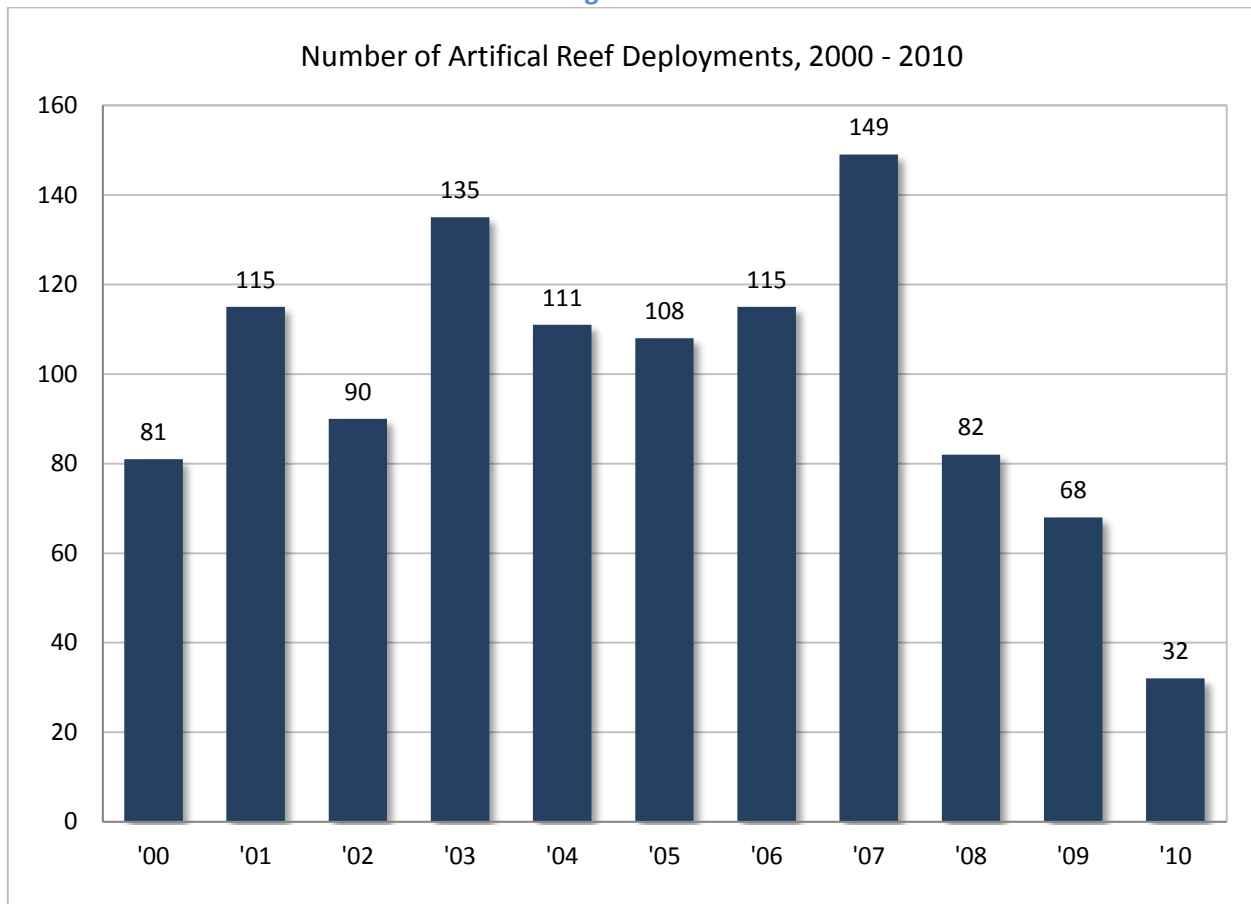


Figure 2-34



Many artificial reefs are constructed through the FWC grant program but additional artificial reefs are constructed as mitigation or restoration as part of environmental permits or repair of damaged reef areas from vessel groundings.

Indicator 2.7 - Number of Acres of Aquatic Preserves

The Aquatic Preserve Act of 1975 was enacted to set aside forever state-owned submerged lands in areas which have exceptional biological, aesthetic, and scientific value as aquatic preserves or sanctuaries for the benefit of future generations (Florida Statutes, Chapter 258). The Coastal Aquatic Managed Areas (CAMA) office of FDEP manages the 41 Aquatic Preserves located around the state, which in 2010 represented nearly 1.98 million acres of protected coastal submerged habitat. Dredging, drilling, mineral excavation, and structural development are restricted within the Preserves (exceptions are made for navigational purposes). Twenty-one of the Preserves are located on the west coast, 16 on the east coast including the Keys, and 4 are inland in the northern part of the state (Figure 2-35). The Big Bend Seagrasses Aquatic Preserve is the largest preserve area with 682,828 acres, followed by Pinellas County Aquatic Preserve with 327,772 acres, and Apalachicola Bay Preserve with 103,119 acres (Table 2-22).

Figure 2-35

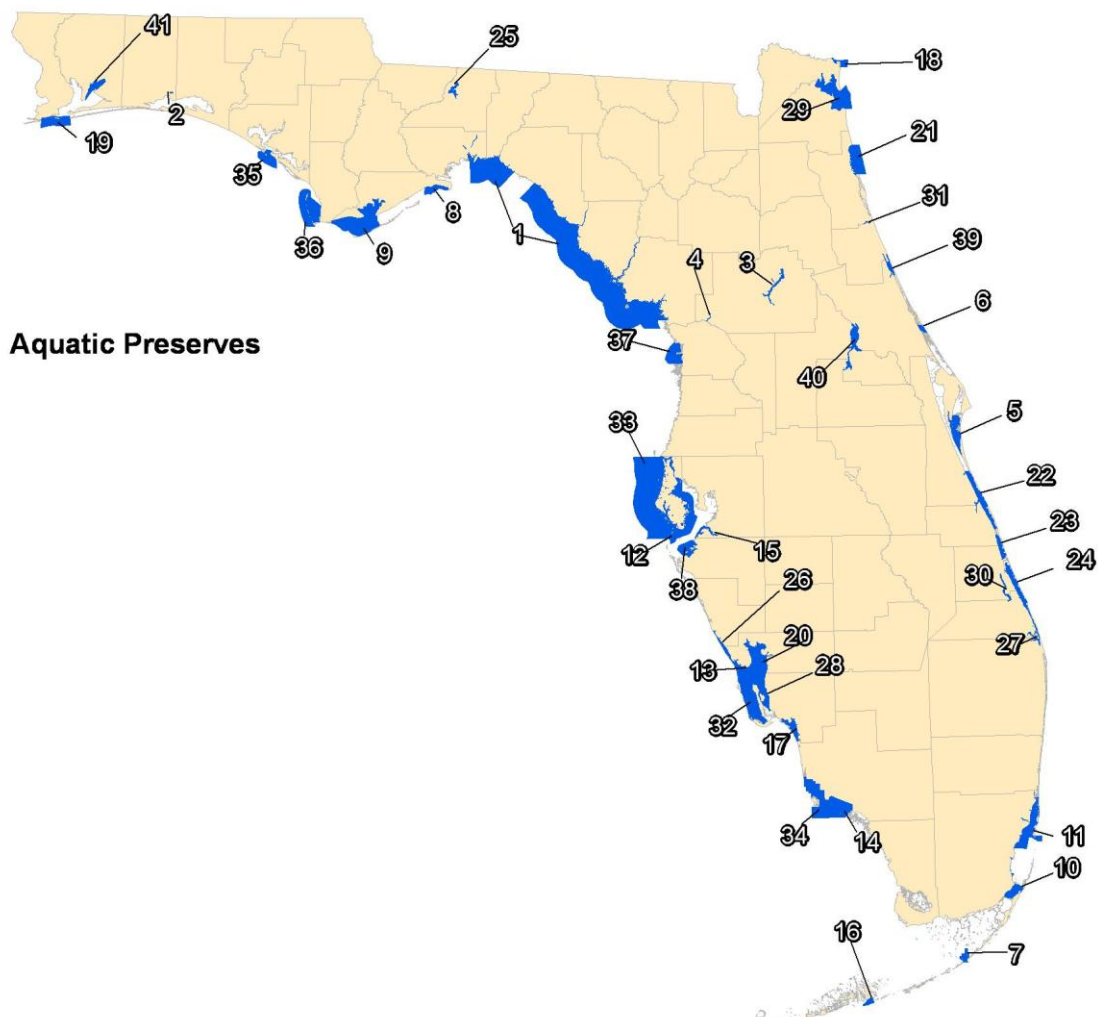


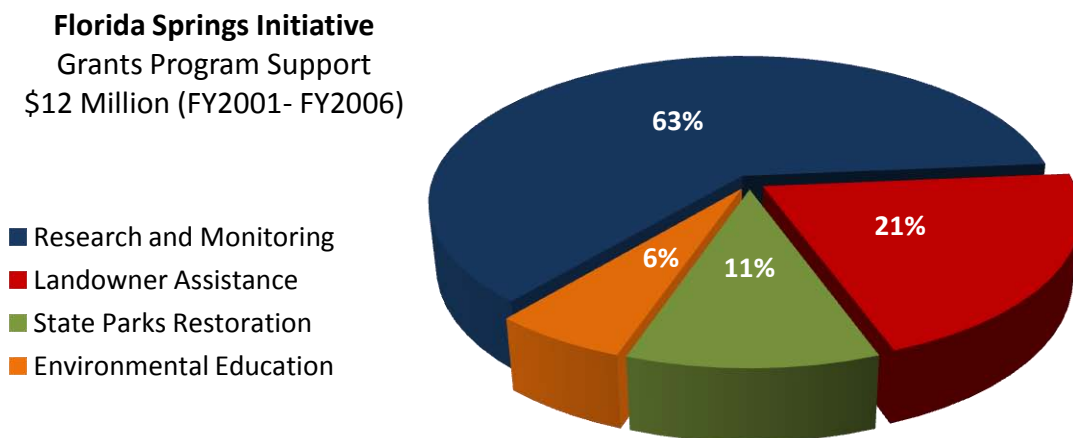
Table 2-22

Object #	Aquatic Preserve Name	Acres
1	Big Bend Seagrasses Aquatic Preserve	682,828
2	Rocky Bayou State Park Aquatic Preserve	368
3	Oklawaha River Aquatic Preserve	7,248
4	Rainbow Springs Aquatic Preserve	262
5	Banana River Aquatic Preserve	26,048
6	Mosquito Lagoon Aquatic Preserve	3,824
7	Lignumvitae Key Aquatic Preserve	8,274
8	Alligator Harbor Aquatic Preserve	14,380
9	Apalachicola Bay Aquatic Preserve	103,119
10	Biscayne Bay - Cape Florida to Monroe County Line Aquatic Preserve	4,149
11	Biscayne Bay Aquatic Preserve	62,538
12	Boca Ciega Bay Aquatic Preserve	18,352
13	Cape Haze Aquatic Preserve	15,173
14	Cape Romano - Ten Thousand Islands Aquatic Preserve	51,470
15	Cockroach Bay Aquatic Preserve	4,535
16	Coupon Bight Aquatic Preserve	4,622
17	Estero Bay Aquatic Preserve	10,730
18	Fort Clinch State Park Aquatic Preserve	7,531
19	Fort Pickens State Park Aquatic Preserve	31,034
20	Gasparilla Sound - Charlotte Harbor Aquatic Preserve	84,033
21	Guana River Marsh Aquatic Preserve	40,928
22	Indian River - Malabar to Vero Beach Aquatic Preserve	27,482
23	Indian River - Vero Beach to Ft. Pierce Aquatic Preserve	9,604
24	Jensen Beach to Jupiter Inlet Aquatic Preserve	23,085
25	Lake Jackson Aquatic Preserve	4,825
26	Lemon Bay Aquatic Preserve	6,660
27	Loxahatchee River - Lake Worth Creek Aquatic Preserve	2,031
28	Matlacha Pass Aquatic Preserve	19,794
29	Nassau River - St. Johns River Marshes Aquatic Preserve	70,481
30	North Fork, St. Lucie Aquatic Preserve	5,037
31	Pellicer Creek Aquatic Preserve	650
32	Pine Island Sound Aquatic Preserve	56,483
33	Pinellas County Aquatic Preserve	327,772
34	Rookery Bay Aquatic Preserve	58,076
35	St. Andrews State Park Aquatic Preserve	23,874
36	St. Joseph Bay Aquatic Preserve	65,770
37	St. Martins Marsh Aquatic Preserve	31,520
38	Terra Ceia Aquatic Preserve	21,141
39	Tomoka Marsh Aquatic Preserve	4,954
40	Wekiva River Aquatic Preserve	23,290
41	Yellow River Marsh Aquatic Preserve	14,889
Total Aquatic Preserve Acreage		1,978,862

Indicator 2.8 - Number of Freshwater Springs, Springshed Land Use, and Nutrient Levels

The Florida Springs Initiative was established in 2001 within the Florida Department of Environmental Protection to further Florida's ability to conserve and protect the valuable freshwater spring resources of the state. Over the past two decades, increased anthropogenic pressure has caused a decline in overall spring health due to reductions of groundwater supply and water quality degradation (The Florida Senate 2009-317, October 2008). Consumptive withdrawals and land-use changes have been identified, respectively, as the causal agents of spring flow reductions in some locations and increases in nutrients broadly (Brown *et al.*, 2008). Between 2001 and 2010, the Florida legislature provided approximately \$24.5 million in funding for the Florida Springs Initiative (www.floridasprings.org/protecting/initiative). Figure 2-36 shows the proportion of funds spent between 2001 and 2006 to support spring protection through research and monitoring, landowner assistance, restoration and protection in state parks, and environmental education and outreach.

Figure 2-36



Source: Florida Springs Initiative Program Summary and Recommendations, 2007

Between 2001 and 2006 the Springs Initiative carried out 44 research and monitoring projects. A total of 58 sampling locations were established at first magnitude springs and at state parks to comprise the Florida Springs Water Quality Monitoring Network (FDEP Springs Program Summary, 2007). The Florida Geological Survey performs the monitoring, and the U.S. Geological Survey provides flow measurements. FDEP Bureau of Laboratories performs chemical and biological assessments of springs. The Water Management Districts also carry out monitoring of springs and watersheds.

Thirty nine of the 67 Florida counties contain freshwater springs. Figure 2-37 shows the distribution of the major springs statewide located in northwest, north, and central Florida (see Harrington *et al.*, 2010 for exact locations of all springs on the FDEP Master List). A total of 1,012 named freshwater spring vents or vent groups were identified and verified in Florida, as of March, 2011. Twenty-five of the 35 coastal counties contain freshwater springs. Sixteen submarine, freshwater spring discharges (Figure 2-38) have been found offshore and in estuaries on both coasts of the state (FGS, Blln #66). The group of submarine springs along the Wakulla County coast may represent the spring group with the greatest discharge rate in the state (estimated at 2,000 cfs). Nutrients in submarine groundwater discharge have been hypothesized to be a factor instigating harmful algal bloom events in the Gulf of Mexico along the west coast of Florida (Hu *et al.*, 2006).

Figure 2-37

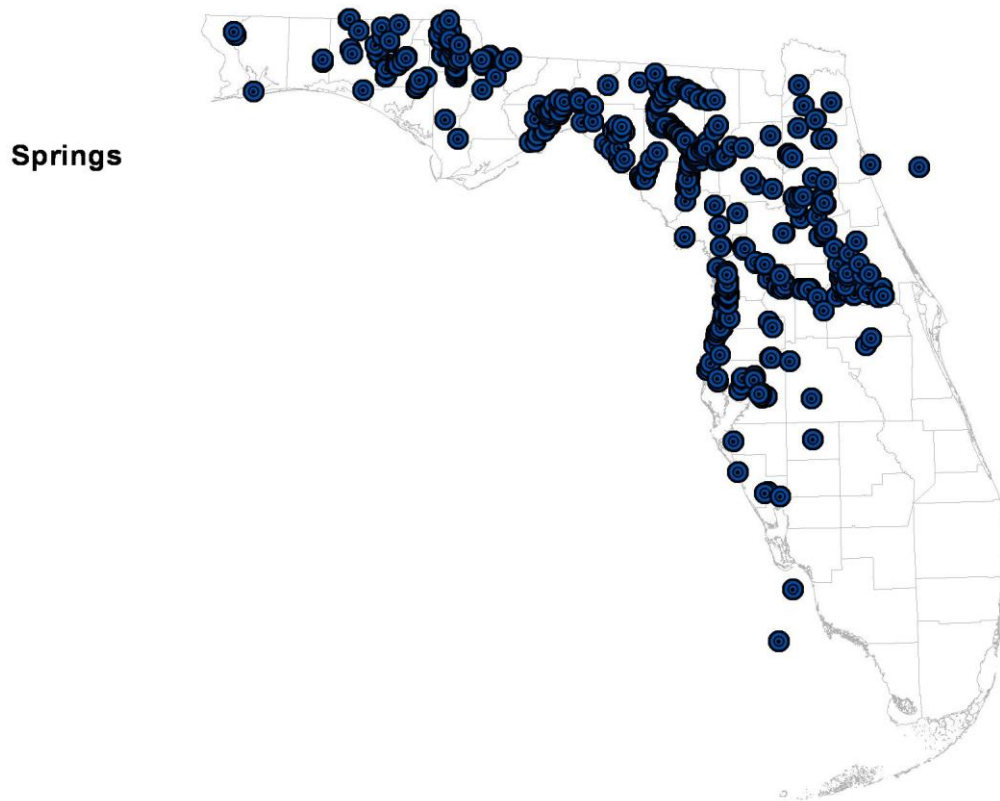
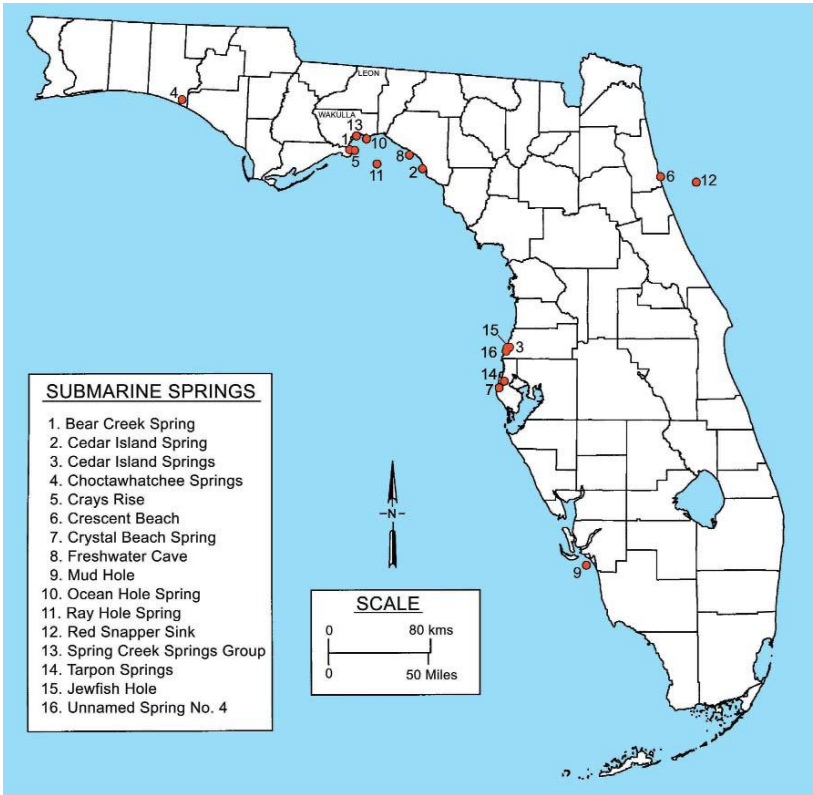


Figure 2-38



Source: FGS Bulletin 66

Three hundred seventy four named springs are found in coastal counties in Florida, with 221 verified as magnitude 1 through 4 (Figure 2-39). Most coastal county springs are found in the Big Bend region along the Gulf of Mexico from Wakulla County to Pasco County (285 total). The Panhandle and Southwest Florida regions have similar numbers of springs, 39 and 35 respectively. Citrus County and Wakulla County, with 89 and 57 springs respectively, are the two coastal counties with the most springs. Thirteen of the 34 First Magnitude Springs are found in coastal counties. Table 2-23 provides a listing of coastal counties with springs, and the distribution of spring flow magnitudes within counties.

Figure 2-39

Florida Coastal County Springs
Percent of Named Springs Magnitude 1 - 4

Magnitude

1 2 3 4

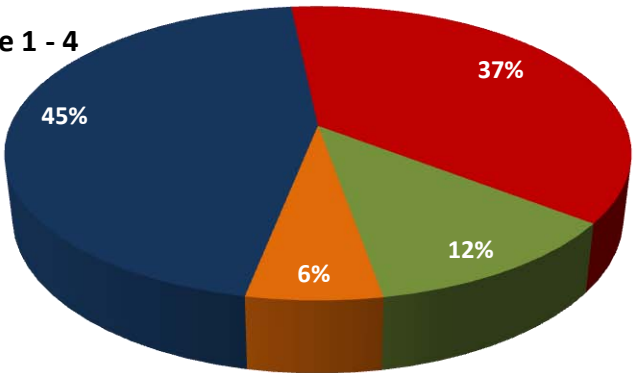


Table 2-23

Region	Coastal County	Number of Springs	Spring Magnitude						
			1	2	3	4	5	6	7
1	Bay	22	2	7	3				
1	Escambia	1					1		
1	Franklin	1							
1	Gulf	2			1				
1	Okaloosa	2							
1	Santa Rosa	2					1		
1	Walton	9	1	1	1	1			
2	Citrus	89	1	20	26	8			
2	Dixie	17	1	7	6	1			
2	Hernando	25	1	5	4	3			
2	Jefferson	23		16	4				
2	Levy	11	1	4	5				
2	Pasco	27		10	1				
2	Taylor	36	1	15	11	3			
2	Wakulla	57	4	2	13	9			
3	Charlotte	0							
3	Hillsborough	28		10	1				
3	Lee	0							
3	Manatee	1							
3	Pinellas	1		1	1	1			
3	Sarasota	4			2				
3	Collier	1							
4	Brevard	0							
4	Indian River	0							
4	Martin	0							
4	Palm Beach	0							
4	St. Lucie	0							
4	Volusia	9	1	1	1		1		2
4	Broward	0							
4	Miami-Dade	0							
4	Monroe	0							
4	Duval	2			1				
4	Flagler	1							
4	Nassau	1						1	
4	St. Johns	2		1	1				
TOTAL		374	13	100	82	26	3	1	2

A high priority of the Springs Initiative has been the delineation of the spring recharge basins (springsheds) for the 34 first magnitude springs in the state and the springs found in state parks. Springsheds are the areas within groundwater and surface water basins that contribute to the discharge of the spring (FGS, 2003). First magnitude springs have a flow rate of greater than 100 cfs, cubic feet per second (64.6 million gallons per day). The source of most Florida springs is groundwater from the Floridan aquifer. More than 700 springs have been identified and categorized in eight levels based on flow rate (Table 2-24). Classification of the volume of flow is based on Meinzer (1927), and can be found in the Florida Geological Survey special publication #52 (FGS, 2003).

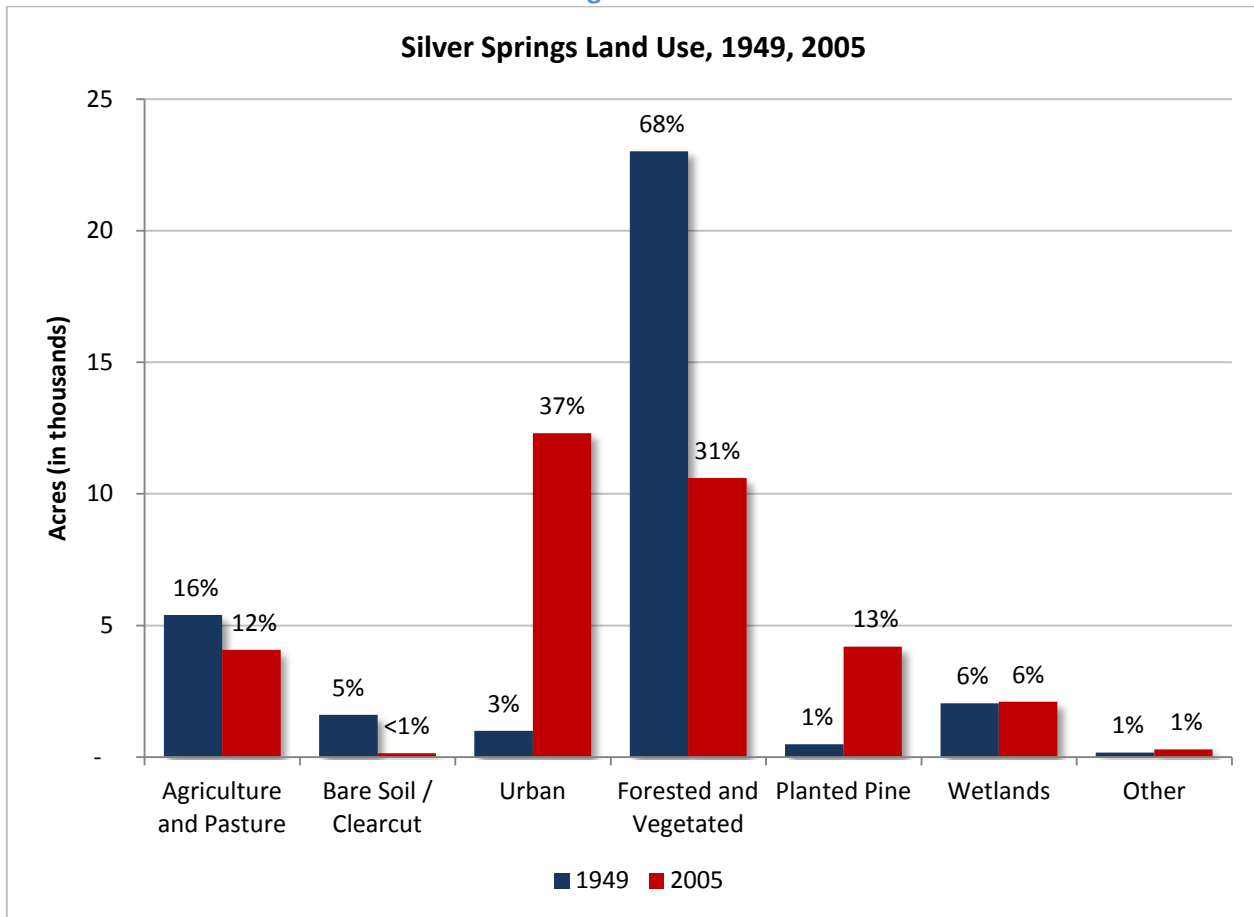
The groundwater of the Floridan aquifer may be modified by conditions within the springshed that affect the ambient pressure or water quality. Aquifer pressure and direction of water flow can be changed by alteration of the permeability of the land and introduction of new breaches into the confined aquifer space. The aquifer is connected with surface conditions through caves, swallow holes, sinks, seepage, and other conduits that allow surface water and precipitation to enter the groundwater. Therefore water quality of the springs can thus be altered by activities within the springshed.

Table 2-24

Spring Magnitudes	Lower Limit Flow Rate (cfs)	Lower Limit Conversion (gallons/min)	Lower Limit Conversion (gallons/day)
1st	>100	44,883	64,631,693
2nd	>10	4,488	6,463,169
3rd	>1	449	646,317
4th	>0.2	100	144,000
5th	>0.02	10	14,400
6th	>0.002	1	1,440
7th	>0.0003	0.126	181
8th	<0.0003	<0.126	<181

Long-term data on the Silver Springs springshed near Ocala has been analyzed (SJRWMD, 2007), and shows the type of change Florida springsheds are experiencing due to human population increase and land development. The increase in urban land with a reciprocal loss of forested and vegetated land is the most obvious change to the springshed. Urban land use increased from 3% to 37%, and primary forest and vegetation decreased from 68% to 31% of the land in the 1,200 square miles of the springshed (approximately a 20 mile radius from the spring) from 1949 to 2005 (Figure 2-40). Some of the lost vegetation has been replaced by planted pine forest, which increased from 1% to 13%. Bare soil decreased from 5% to less than 0.5% over the 55 year period.

Figure 2-40

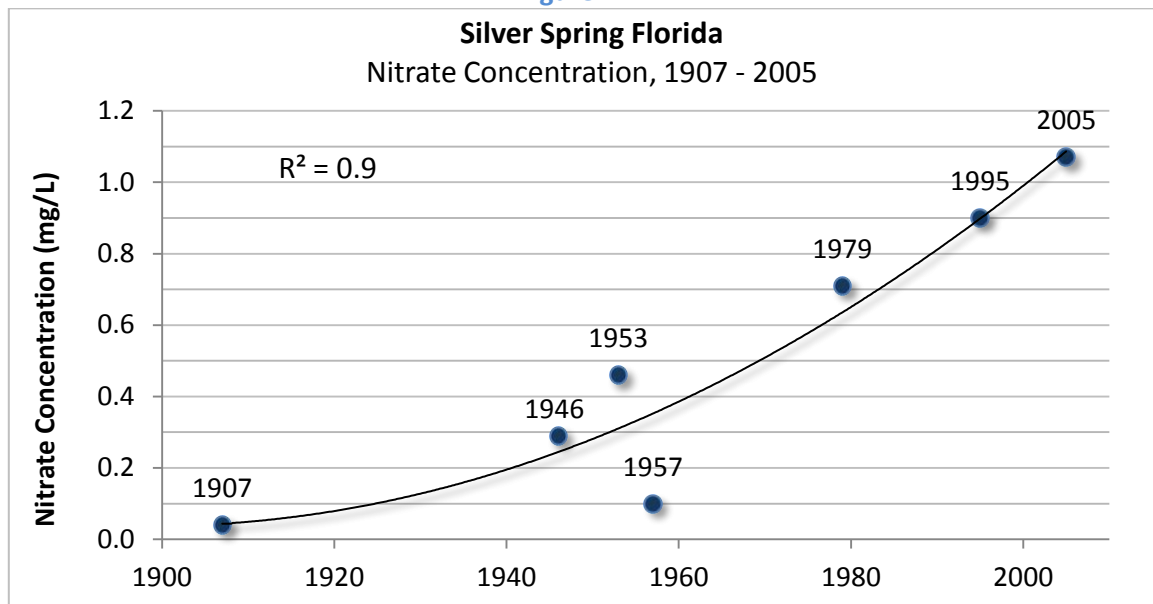


Changes in water chemistry from natural conditions have been measured in most monitored springs in Florida. Changes in levels of nitrate, phosphate, sulfate, potassium, calcium, alkalinity, dissolved oxygen, turbidity, and other parameters have occurred to varying degrees. Direct correlation of chemical parameters indicative of eutrophication and the change in plant and animal communities has not been demonstrated (Stevenson et al., 2007; Heffernan et al., 2010); however, complex interconnections are likely to obscure simple direct effect models of the observed spring ecosystem changes. The combined factors of light, nutrient, mineral, pH, and salinity levels will have a compound effect favoring opportunistic species (*e.g.*, *Lyngbya*, *Vaucheria*, *Hydrilla*, and *Eichhornia*) and deteriorating natural community species. The levels of nitrate and phosphate often naturally limit primary productivity in aquatic ecosystems. Threshold levels of nutrients and the numeric ratio N : P (nitrogen to phosphorous) are used as indicators of ecosystem balance. When concentrations of one or the other, or both, are elevated to excess, differential productivity and changes to community composition often follow. Background levels of nitrate and phosphate vary but can be considered as 0.05 mg/L N and 0.03 mg/L P (Harrington et al., 2010). Based on experimental results, Stevenson et al. (2007) stated that levels of nitrogen and phosphorous much lower than N = 0.59 and P = 0.026 mg/L for *Vaucheria*, and N = 0.25 and P = 0.033 mg/L for *Lyngbya*, are necessary for substantial reductions in algal growth.

Shifts in aquatic vegetation have been noted in many Florida springs (Brown *et al.*, 2008), especially the appearance of invasive, nuisance vascular species (*e.g.*, *Hydrilla* and water hyacinth) and algal overgrowth (*Lyngbya*, *Vaucheria*, and other algal species) associated with eutrophic waters. Macroscopic algae are capable of growing in dense, thick mats and epiphytically on other submerged vegetation. Surveys of Florida springs have found 50% of spring bottoms covered by macroalgae (Stevenson *et al.*, 2007). Images of springs with algal mat overgrowth have little resemblance to the springs of Florida pictured in historic photographs, and referred to by Marjory Stoneman Douglas as “Bowls of liquid light.” Reports have been made from several springs (Itchetucknee Springs State Park, Alexander Spring, and Crystal River) of recreational swimmers and park employees having severe skin reactions and respiratory distress after contact with *Lyngbya* mats occurred (PBSJ, 2007).

Nitrate levels should be viewed as an indicator of ecosystem stress of a spring basin, not as an isolated factor explaining the observed effects. As of 2008, elevated nitrate concentrations (higher than the FDEP proposed standard of 0.35 mg/L) were reported for 36 of 49 springs (73.5%) monitored in the Spring Network (Harrington *et al.*, 2010). Network Springs with the lowest nitrate concentrations include Alexander, Silver Glen and Juniper Springs. Many other chemical parameters measured do not meet threshold values expected for maintenance of healthy biological communities in the spring pools and runs. Nitrate levels should be viewed as an indicator of ecosystem stress of a spring basin, not as an isolated factor explaining the observed effects. Forty percent of Network Spring outflows, such as Fanning Springs (5.2 mg/L), Apopka Spring (4.55 mg/L), and Jackson Blue Spring (3.3 mg/L), have reached median levels higher than 1.0 mg/L (Harrington *et al.*, 2010, sampling values for 2001 to 2006). Twenty two springs were measured at median nitrate values greater than 3 mg/L, and 117 springs had median nitrate values between 1 and 3 mg/L for data collected from all sources available between 1998 and 2008 (Harrington *et al.*, 2010). Figure 2-41 shows the increase of nitrates in Silver Springs from 1909 to 2005 (data from SJRWMD, 2007).

Figure 2-41



Because the Floridan Aquifer is the source of drinking water for much of Florida, nutrient inputs based on spring nitrogen levels are being actively managed to ensure water quality standards for surface and groundwater. In 2005, 4.25 billion gallons per day of fresh groundwater was withdrawn, of which 60% was from the Floridan Aquifer. The fresh groundwater withdrawals were used primarily for agricultural irrigation and public water supply. Ninety percent of Floridians (16.19 million people) received their drinking water from groundwater in Florida in 2005.

In order to assess the source of stressors for a unique spring or group of springs supplied with water of similar history, a springshed must be delineated and levels of a nutrient or other indicator measured in waters in the aquifer from all parts of land contributing to the spring. Surface waters affecting the aquifer water quality will impose characteristic changes on the discharge of the spring. Proximate sources of the stressors entering spring habitats can be mapped. A number of springshed nitrate maps have been generated by the Springs Initiative, and can be used to determine the severity of stress for a given springshed area. The sampling of the aquifer is done through wells dispersed throughout the springshed. The map can give an indication of the level of severity of nutrient stress and the spatial distribution of high and low measurements. Ten maps have been published for nitrate concentrations from wells in the vicinity of springs (Harrington *et al.*, 2010), and help visualize the level of pressure from nutrient loading.

Table 2-25 lists the springsheds and the number of dispersed, representative well samples with four incremental levels of nitrate concentration that contribute to the discharge of the named spring vents. Area of the springsheds varied from 76,000 acres (Volusia and Jackson Blue Springs) to more than 1 million acres (Wakulla Springs). The number of samples also varied among springsheds from 33 in Volusia Blue springshed to 1,179 in Wekiva springshed. Volusia Blue Spring and Wakulla Spring had lower levels of springshed nitrate concentrations, while Jackson Blue Spring and Wekiwa Spring revealed extremely high levels of springshed nitrate input (Figure 2-42).

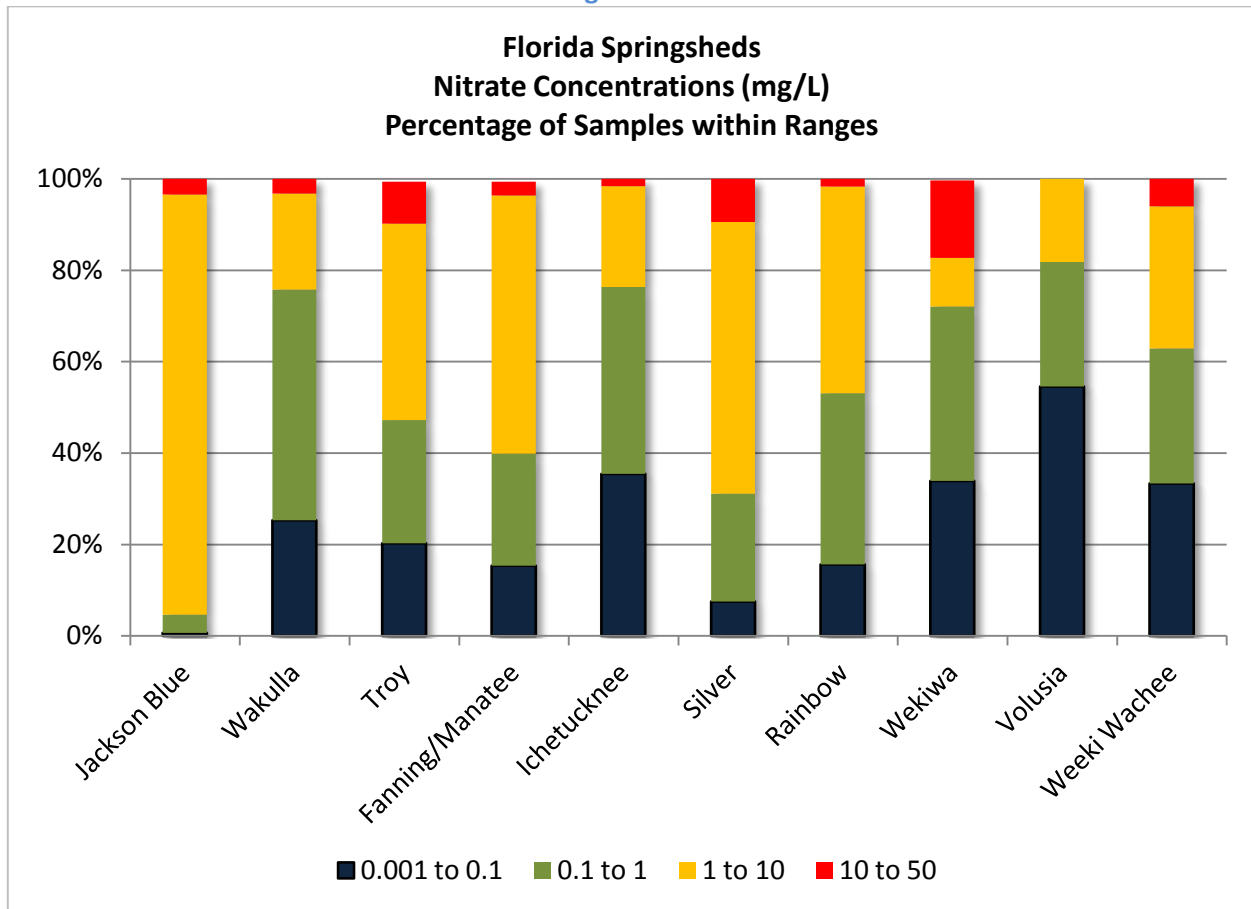
Coastal Habitats

Jackson Blue Spring had less than 5% of 577 measurements at 1 mg/L nitrate or less. Ninety-two percent of Jackson Blue Springshed samples were between 1 and 10 mg/L, and 3% exceeded drinking water standards (> 10 mg/L). Wekiwa Spring had the greatest number of excessively high nitrate measurements of the ten springsheds described (>10 to 50 mg/L) with 200 of 1179 total samples distributed primarily in 4 concentrated areas (see the Harrington 2010 report). Exceedingly high measurements were reported (concentrations in the range >50 to 1,400 mg/L) for six samples; four in the Wekiwa Springshed and one each in Troy and Manning Springs. Volusia Blue Spring had no measurements above 10 mg/L nitrate. Volusia Blue, Wakulla, and Ichetucknee Springs had more than 75% of samples at nitrate levels less than 1 mg/L.

Table 2-25

Springshed	Estimated Area		Counted Samples	Nitrate Concentration (mg/L)			
	miles ²	acres		0.001 - 0.1	0.1 - 1	1 - 10	10 - 50
Jackson Blue	120	76,800	577	4	23	530	20
Wakulla	1,600	1,024,000	186	47	94	39	6
Troy	190	121,600	163	33	44	70	15
Fanning/Manatee	250	160,000	163	25	40	92	5
Ichetucknee	620	396,800	186	66	76	41	3
Silver	500	320,000	212	16	50	126	20
Rainbow	780	499,200	179	28	67	81	3
Wekiwa	725	464,000	1,179	400	450	125	200
Volusia	120	76,800	33	18	9	6	0
Weeki Wachee	240	153,600	132	44	39	41	8
Total	5,145	3,292,800	3,010	681	892	1,151	280

Figure 2-42



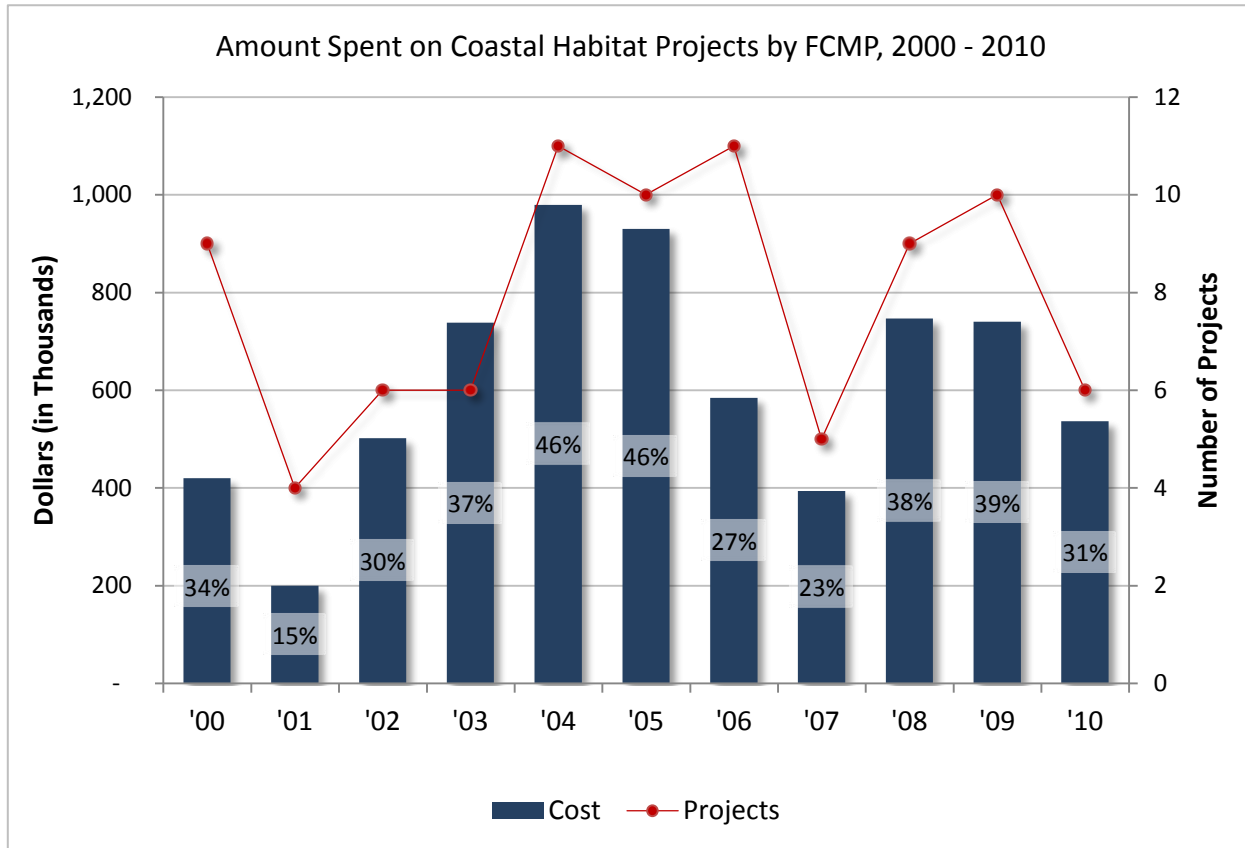
Indicator 2.9 - FCMP Grants for Coastal Habitats.

The FCMP administers the Coastal Partnership Initiative and the State Agency (<http://www.dep.state.fl.us/cmp/grants/index.htm>) competitive grant programs to support the protection, management and enhancement of Florida's ocean and coastal resources. The annual allocation of funds for coastal habitat projects statewide was variable over time during the period FY 2000 through FY 2010, for a total of \$6.8 million (Table 2-26). The annual allocation has ranged between \$200,000 to \$979,120. Between 2000 and 2010 eighty-seven coastal habitat projects have been funded for an average of 7.9 per year. Figure 2-43 illustrates the number of projects funded by year plus the amount of funding and percent of the total funding that was granted to Coastal Habitat projects each year. Coastal Habitat projects received the highest number of projects funded and the highest amount of the total funding for this time period between the six categories.

Table 2-26

Fiscal Year	Year	Funding	Total Funding	Percent of Funding	Projects	Total All Projects	Percent of All Projects
FY 00-01	'00	419,593	\$1,239,593	34	9	27	33
FY 01-02	'01	200,000	\$1,320,000	15	4	30	13
FY 02-03	'02	501,383	\$1,687,782	30	6	27	22
FY 03-04	'03	738,000	\$1,990,240	37	6	26	23
FY 04-05	'04	979,120	\$2,125,623	46	11	28	39
FY 05-06	'05	930,000	\$2,037,309	46	10	30	33
FY 06-07	'06	584,452	\$2,126,881	27	11	32	34
FY 07-08	'07	393,701	\$1,730,751	23	5	22	23
FY 08-09	'08	746,618	\$1,955,629	38	9	27	33
FY 09-10	'09	739,983	\$1,900,218	39	10	29	34
FY 10-11	'10	536,600	\$1,727,081	31	6	24	25
Total		6,769,450	\$19,841,107		87	302	

Figure 2-43



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Living Resources



Executive Summary

The focus area of Living Resources is composed of seven indicators to provide an overview of the trends from 2000 – 2010. The indicators (Table 3-1) examine specific living creatures as indicators of the coastal system rather than entire ecosystems.

Table 3-1
Living Resources Indicators

3.1	Fisheries Commercial Landings
3.2	Coral Reef Percent Cover, Coral Species Richness, Disease Incidence
3.3	Number of Vulnerable, Endangered, and Threatened Species
3.4	Number of Sea Turtle Nests and Number of Strandings
3.5	Manatee Population and Mortality
3.6	Right Whale Population and Mortality
3.7	Non-Native Species and Invasive Species

Species can be used as an indicator of coastal health either directly like coral which is sensitive to water quality or sea turtles and manatees which are sensitive to loss of habitat. All three species are sensitive to direct impacts from humans utilizing the same environment. Between 2000 and 2010 the number of threatened or endangered species did not increase very much but the amount of areas delineated as critical habitat increased. If a species population numbers are not improving, then protecting the habitat the species' need to live and reproduce is essential.

This chapter also reviews human impacts to species and gives some examples of non-native species impacts on native species. (Most human impacts described in this chapter relate to examples such as boats and propellers striking a species or the release of non-native species into the Florida landscape.) The release of non-native species impacts the coastal environment when the introduced animals out-compete the native species for food or habitat, or simply consume a large number of the native species.

Indicator 3.1 - Fisheries Commercial Landings

The term *landings* refers to the amount of fish or shellfish brought ashore. This indicator describes the change in commercial landings from 2000 - 2010. Data are from NOAA Fisheries Office of Science and Technology. Dollar values are current at the time they were reported.

Commercial fisheries landed 15.4 million pounds less in 2010 than in 2000 (Figure 3-1). In 2004 commercial landing reached their highest level during this period (112.6 million pounds) but dropped 24 percent to their lowest level in 2007 (85 million pounds). In terms of revenue, landings began the period at its highest point (219.2 million) and dropped each year except for 2004, 2006, and 2010. Revenue reached its lowest value of 156 million in 2009. The largest increase took place in 2010 when revenue increased by 33.2 million dollars.

Figure 3-1

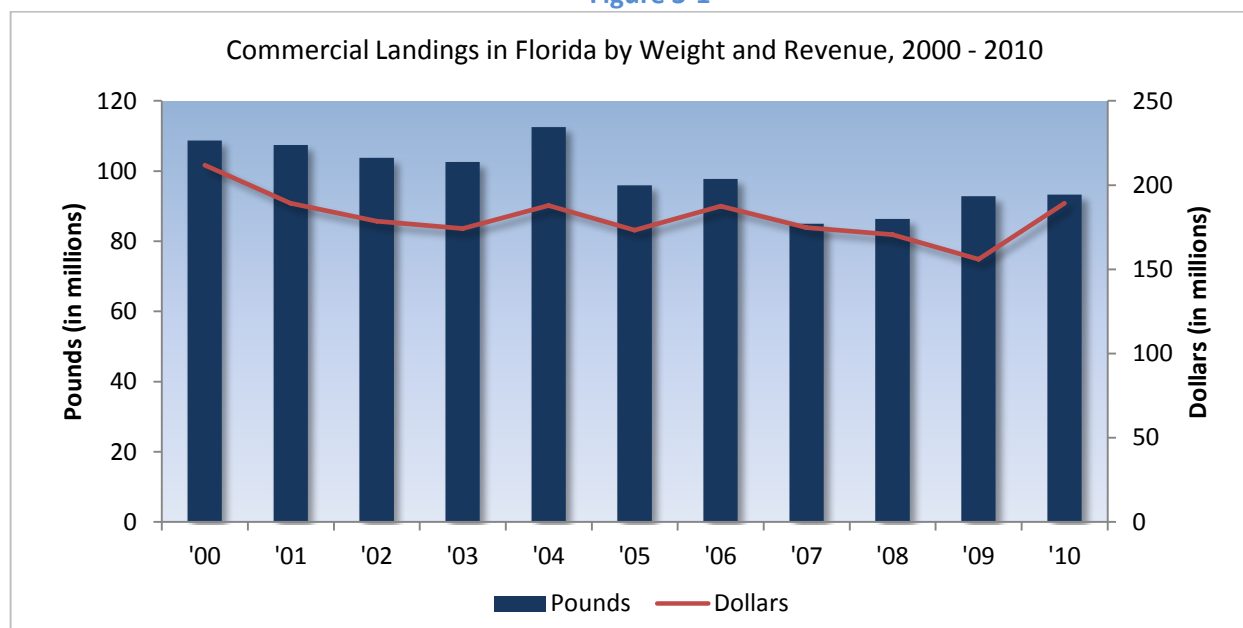


Table 3-2 shows the top ten species in 2000 and in 2010 by commercial landings according to weight. In 2000, these species totaled nearly 66 million pounds and accounted for 61 percent of all landings. Pink Shrimp, Blue Crab and Striped Mullet were the top three species. By 2010, the rankings had changed slightly. Striped Mullet topped the list while Pink Shrimp and King and Cero Mackerel were ranked second and third respectively. New to the top ten were Spanish Mackerel and Finfishes, Unclassified Bait and Animal Food. In 2010, the top ten species accounted for almost 59 million pounds landed and 54 percent of all commercial landings.

Table 3-2

Table 3-2 shows the top ten species landed in 2000 and in 2010 by weight. Rock Shrimp and Atlantic Thread Herring (highlighted in red) both dropped from the 2000 list making way for Spanish Mackerel and Finfishes, Unclassified Bait and Animal Food in 2010 (highlighted in green).

Landings in 2000		Landings in 2010	
Species	Pounds	Species	Pounds
Shrimp, Pink	11,686,229	Mullet, Striped (Liza)	9,592,820
Crab, Blue	11,113,601	Shrimp, Pink	9,264,820
Mullet, Striped (Liza)	8,598,402	Crab, Blue	8,236,816
Shrimp, Rock	6,948,874	Lobster, Caribbean Spiny	5,760,795
Grouper, Red	6,945,409	Mackerel, King and Cero	5,471,959
Florida Stone Crab Claws	6,864,333	Florida Stone Crab Claws	5,198,579
Lobster, Caribbean Spiny	5,766,106	Shrimp, White	4,949,302
Mackerel, King And Cero	2,977,575	Mackerel, Spanish	4,081,070
Shrimp, White	2,767,970	Grouper, Red	3,493,477
Herring, Atlantic Thread	2,740,618	Finfishes, Unc Bait And Animal Food	2,298,484
TOTAL	66,409,117	TOTAL	58,348,122

Figure 3-2 shows the top five landed species for the state of Florida in 2000 and the number of pounds landed for each species over the course of the decade. Pink Shrimp and Striped Mullet remained the state's top two species in 2010 (although in reverse order) but Rock Shrimp and Red Grouper were no longer ranked in the top five. Pink shrimp landings increased by four million pounds in two years beginning in 2001 peaking at nearly 16 million pounds in 2002. By 2007 pink shrimp landings had dropped 67 percent of their 2002 total to 5.2 million. The FWC reported that the decline in shrimp landings over the last 11 years was primarily due to competition from foreign imports and increase fuel and operating costs (Florida Inshore and Nearshore Species: Status and Trends report, 2010).

Figure 3-2

Figure 3-2 illustrates the top five landed species in 2000 as trend indicators for the decade.

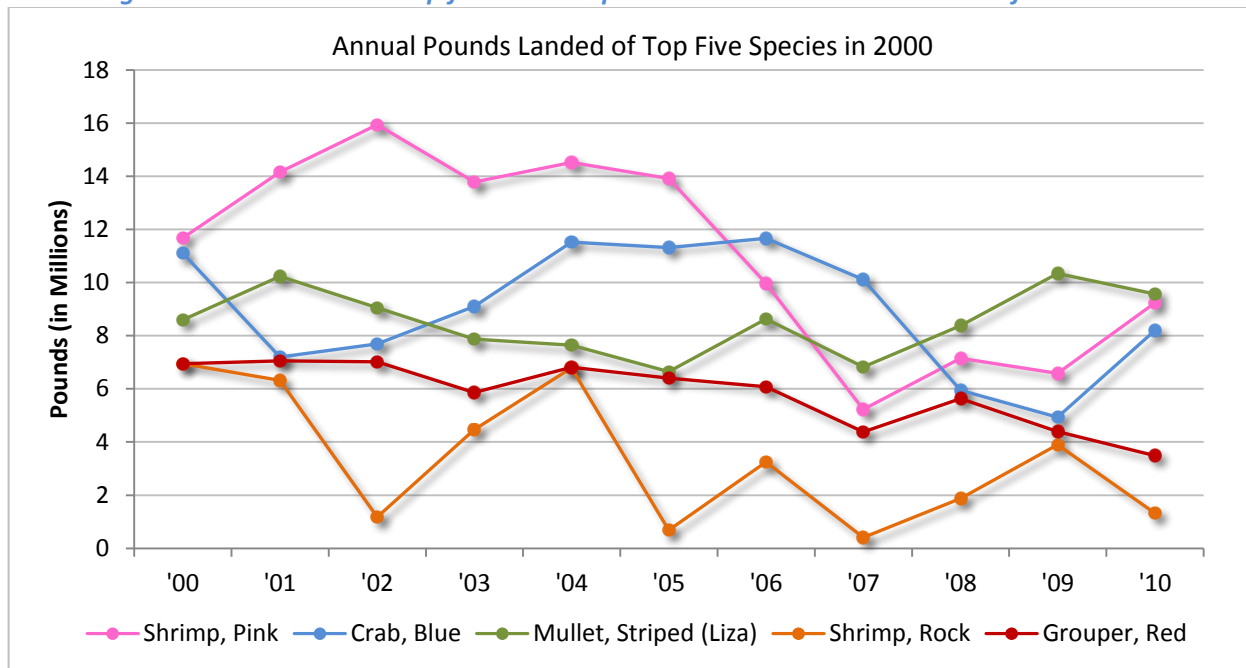


Table 3-3 shows the top ten species in 2000 and in 2010 of commercial landings ranked by revenue amounts. In 2000, these species totaled nearly 150 million dollars and accounted for 71 percent of all landings' revenue. Pink Shrimp, Florida Stone Crab Claws and Caribbean Spiny Lobster were the top three species. By 2010, the rankings had changed slightly. Caribbean Spiny Lobster topped the list while Florida Stone Crab Claws and Pink Shrimp were ranked second and third respectively. New to the top ten were King and Cero Mackerel, Dendrobranchiata Shrimp, and Eastern Oyster. These ten species totaled almost 133 million dollars and accounted for 70 percent of all commercial landings' revenue in 2010.

Table 3-3

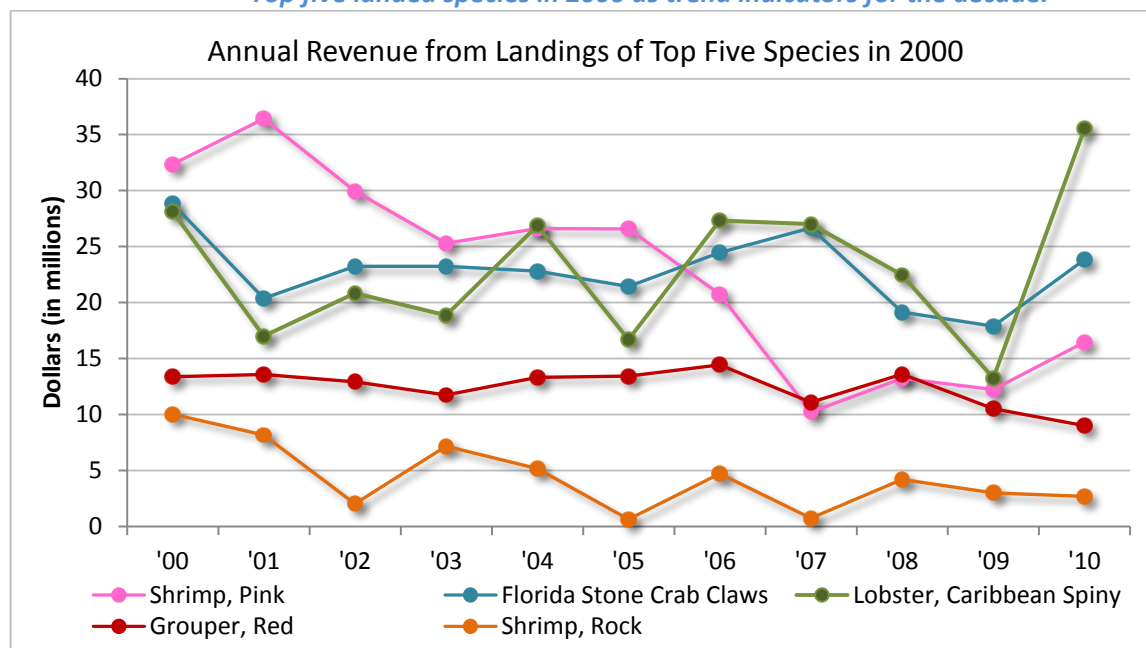
Table 3-3 shows the top ten species landed in 2000 and in 2010 by dollars. Rock Shrimp, Quahog Clam, and Gag (highlighted in red) all dropped from the 2000 list making way for King and Cero Mackerel, Dendrobranchiata Shrimp, and Eastern Oyster in 2010 (highlighted in green).

Landings in 2000		Landings in 2010	
Species	Dollars	Species	Dollars
Shrimp, Pink	32,355,622	Lobster, Caribbean Spiny	35,531,460
Florida Stone Crab Claws	28,831,136	Florida Stone Crab Claws	23,848,631
Lobster, Caribbean Spiny	28,157,038	Shrimp, Pink	16,471,585
Grouper, Red	13,383,617	Shrimp, White	10,358,631
Shrimp, Rock	10,042,468	Crab, Blue	9,491,573
Shrimp, White	9,380,306	Grouper, Red	9,007,025
Crab, Blue	9,239,976	Mackerel, King And Cero	8,837,934
Clam, Quahog	6,436,099	Shrimp, Dendrobranchiata	7,136,624
Gag	6,116,335	Oyster, Eastern	6,475,472
Mullet, Striped (Liza)	5,740,757	Mullet, Striped (Liza)	5,688,703
TOTAL	149,683,354	TOTAL	132,847,638

Figure 3-3 shows the top five landed species for the state of Florida in 2000 based on revenue for each species over the course of the decade. Pink Shrimp, Florida Stone Crab Claws, and Caribbean Spiny Lobster remained the state's top three species in 2010 with Caribbean Spiny Lobster surpassing both Stone Crab Claws and Pink Shrimp. Pink shrimp landings decreased by almost 10 million dollars in two years beginning in 2001. By 2007 pink shrimp landings had dropped 68 percent of their 2000 total to 10.2 million, reflecting the drop in landings.

Figure 3-3

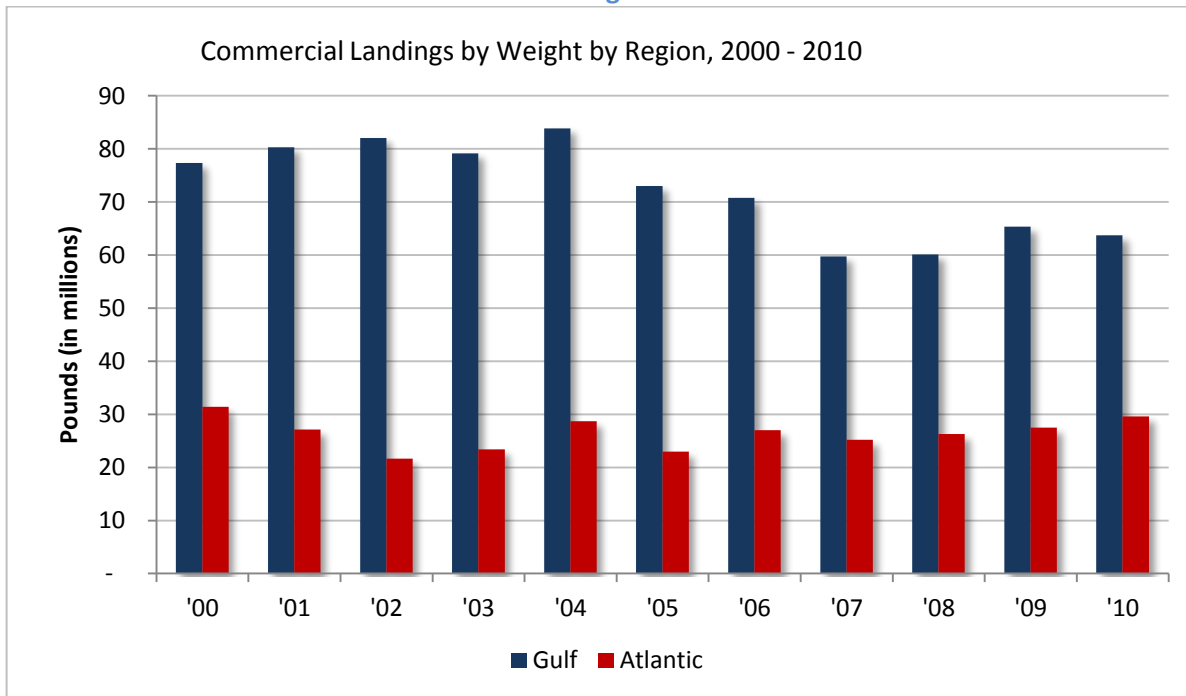
Top five landed species in 2000 as trend indicators for the decade.



Gulf vs. Atlantic Landings

Landings in the Gulf overwhelmingly exceeded landings in the Atlantic each year (Figure 3-4). The largest margin of difference between these two regions occurred in 2002 when Atlantic landings accounted for only 21 percent of the combined total. By 2007 Atlantic landings had increased to 30 percent and continued to account for 30 percent through 2009. Although Atlantic landings accounted for a higher percentage during this time, such an increase was caused by a decrease in Gulf Landings rather than an actual increase in Atlantic landings.

Figure 3-4



Between 2000 and 2010, there were 120 species with landings that totaled over 10,000 pounds. While many of the state's top landed species are found in both the Gulf and the Atlantic, Gulf landings accounted for 75 percent or more of the total catch in half the cases or in 73 species. Table 3-4 is a list of the top ten species total pounds landed from 2000 to 2010 and the percent that each coast contributed. The Gulf's contribution exceeded more than 80 percent in five of the top six species and nearly 72 percent of the combined top ten species landed statewide.

Table 3-4

Table 3-4 shows the top ten species landed in Florida between 2000 and 2010. Gulf landings accounted for more than 80 percent of the total landings in five of the top six species. Gulf landings accounted for nearly three-quarters of the top ten landed species statewide.

Species	Total Landed Pounds	Percent of Total Landed Pounds	
		Gulf	Atlantic
<i>Shrimp, Pink</i>	122,324,951	95.0	5.0
<i>Crab, Blue</i>	99,842,119	66.0	34.0
<i>Mullet, Striped (Liza)</i>	93,868,454	84.9	15.1
<i>Grouper, Red</i>	64,065,225	99.7	0.3

Living Resources

<i>Florida Stone Crab Claws</i>	63,492,852	98.6	1.4
<i>Lobster, Caribbean Spiny</i>	48,327,433	90.3	9.7
<i>Shrimp, White</i>	44,069,953	16.0	84.0
<i>Mackerel, King and Cero</i>	43,330,461	35.5	64.5
<i>Shrimp, Rock</i>	38,205,869	16.5	83.5
<i>Mackerel, Spanish</i>	36,995,987	20.0	80.0
Total	653,523,304	71.5	28.4

The 1995 net ban

Striped mullet and Spanish mackerel are two of the primary species of finfish that were sought by commercial fishers with entangling nets prior to the net ban. In wake of the constitutional amendment, striped mullet landings rapidly declined but steadily increased shortly afterwards except for a brief decline in gulf landings from 2001-2003. Spanish mackerel landings declined after the 1995 ban and averages remained low for the remainder of the 1990s but increased in the 2000s.

Indicator 3.2 - Coral Reef Percent Cover, Coral Species Richness, Disease Incidence

In 1996, the Coral Reef Evaluation and Monitoring Project (CREMP) began systematically documenting changes in coral reefs located in the Florida Keys and the Dry Tortugas. The project began with 160 stations but the number of stations that were monitored each subsequent year varied. In 2003, the program expanded to include reefs in Miami-Dade, Broward, and Palm Beach which was known as the Southeast Coral Reef Evaluation and Monitoring Project (SECREMP). SECREMP expanded again in 2006 to include reefs in Martin County. This indicator uses CREMP and SECREMP data to track the loss of stony corals.

Data for this indicator have been divided into six different regions. These regions include Martin, Palm Beach, Broward, Miami-Dade Counties, the Florida Keys, and the Dry Tortugas. The Dry Tortugas data is presented separate from the Florida Keys data due to the dramatic changes exhibited in the Dry Tortugas. Data are collected at sites which are typically comprised of several stations. Only data from stations that were monitored each year are included in this analysis (Table 3.5). In the Florida Keys and the Dry Tortugas, 109 sites were monitored each year between 2000 and 2010. In Palm Beach, Broward, Miami-Dade counties, data collection began in 2003 and ten sites were monitored each year between 2003 and 2010. In Martin County, data collection began in 2006 and two sites were monitored each year between 2006 and 2010.

Table 3-5

Table 3-5 shows the number of sites and the number of stations associated with each of the six regions. Also included is the year in which data collection began in each region.

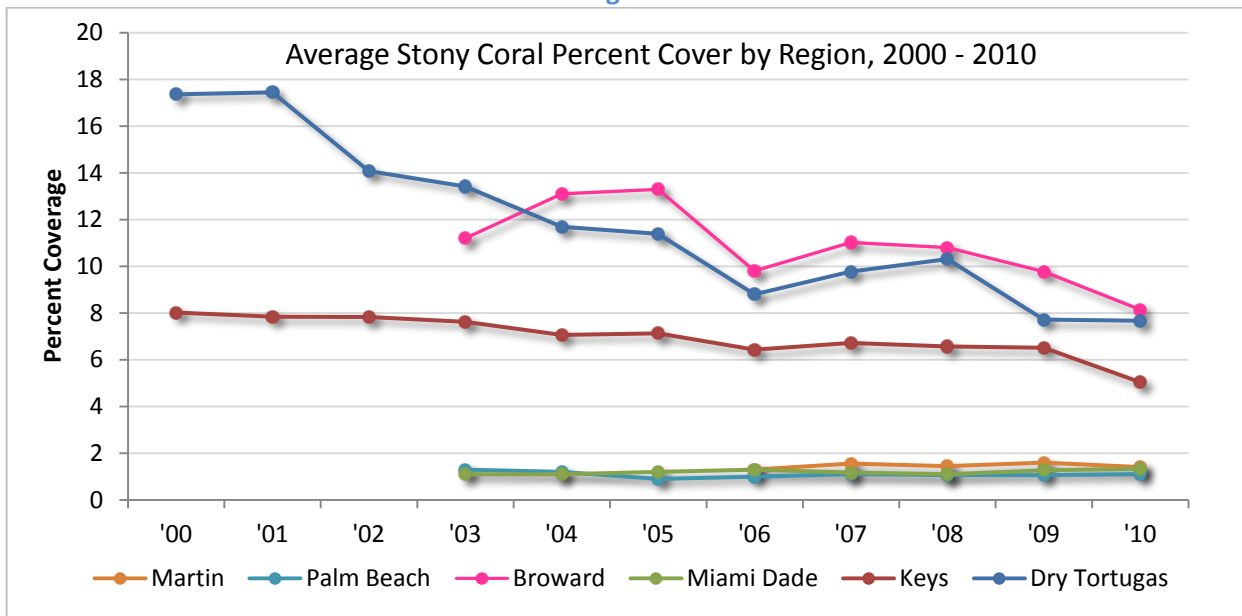
Region	Number of Sites	Number of Stations	Initial Year
Martin	2	8	'06
Palm Beach	3	12	'03
Broward County	4	16	'03
Miami-Dade	3	12	'03
Keys	34	97	'00*
Dry Tortugas	3	12	'00*

* Data collection began before 2000 in the Keys and the Dry Tortugas but results prior to 2000 are not included in FACT 2010.

Stony Coral Loss by Region

Each of the six regions experienced a decline in stony coral at some point between 2000 and 2010. Losses in some regions were larger than others (Figure 3.5). Broward County experienced a large decline in percent cover of stony coral dropping from 13.3 percent in 2005 to 8.2 in 2010 (38 percent). In the Dry Tortugas, percent cover decreased from 17.4 in 2000 percent to 7.7 in 2010 (56 percent). In this region, stony coral decreased or remained the same in nine of the eleven years included in this analysis. Palm Beach experienced a slight decline in 2005, while Miami-Dade remained fairly constant in percent cover. The Keys experienced steady decline from 8 percent in 2000 to 5 percent in 2010 (38 percent).

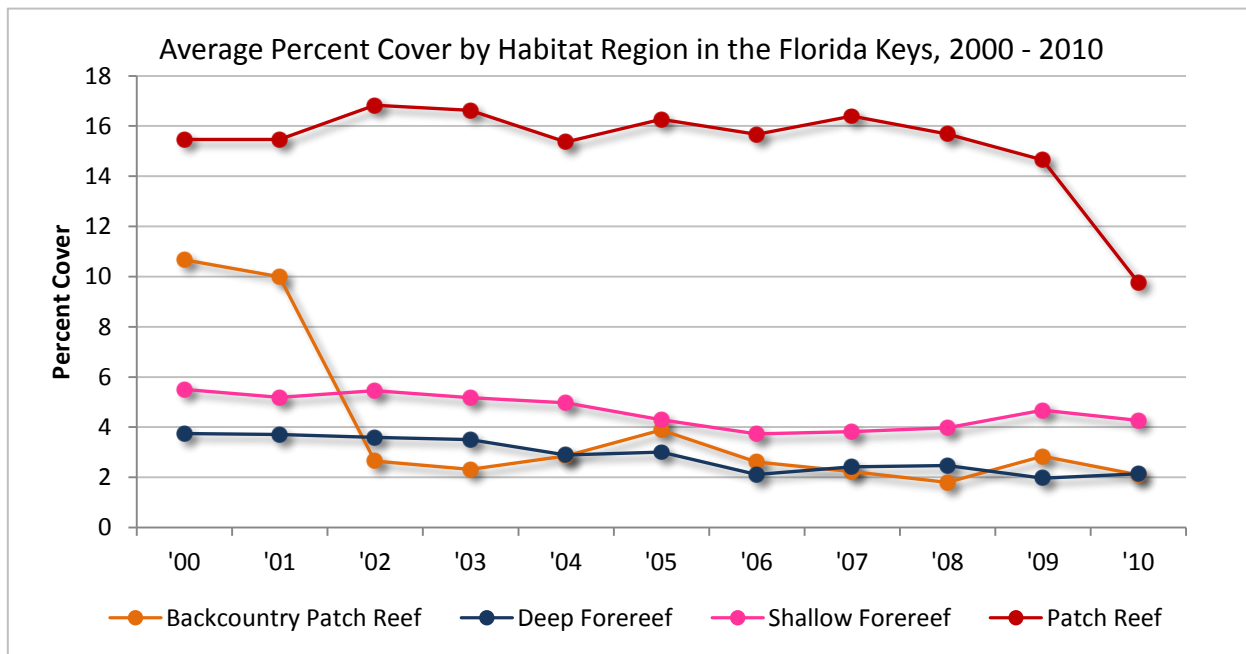
Figure 3-5



Average Stony Coral Loss by Habitat Region in the Florida Keys and the Dry Tortugas

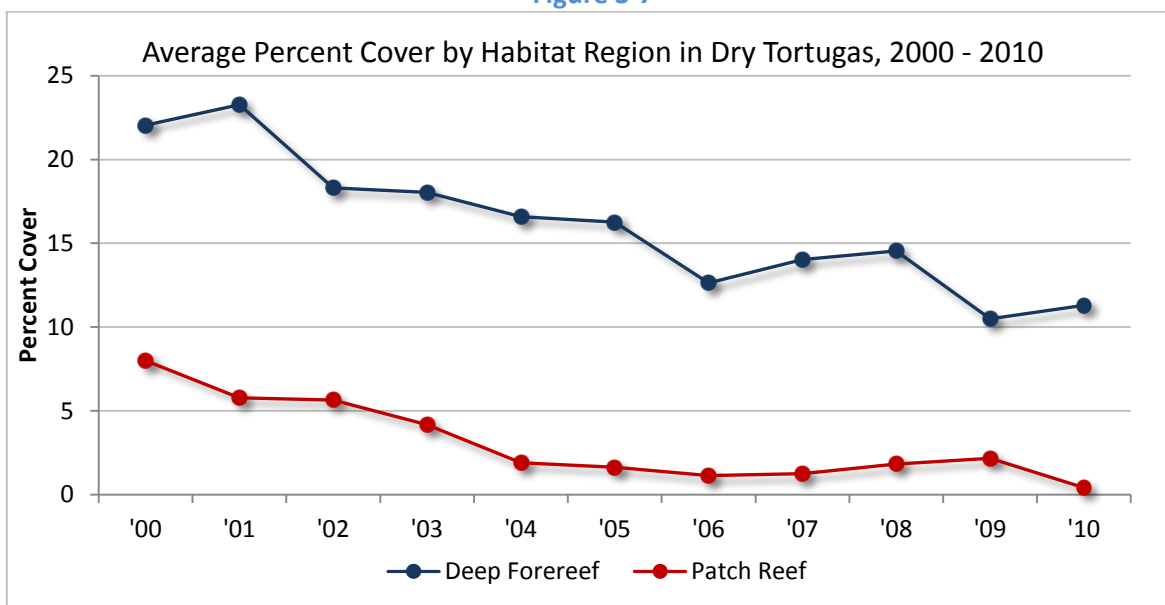
Stony Coral loss in the Florida Keys and the Dry Tortugas has been tracked based on habitat regions. These regions include backcountry patch reef, deep forereef, shallow forereef, and patch reef. In the Keys, backcountry patch reef dropped from 10 percent coverage to 2.6 percent (74 percent). This was the largest loss experienced in a single year. The second largest drop to occur in a single year took place in 2010 when average stony coral coverage in patch reef dropped from 14.6 percent to 9.7 percent (34 percent). Stony coral in shallow forereef and deep forereef both declined steadily from 2002 to 2006. All habitats but backcountry patch reef experienced decline in 2010.

Figure 3-6



In the Dry Tortugas, stony coral losses took place in both deep forereef and patch reef habitats. Backcountry and shallow forereef habitats are not present at stations in this region (Figure 3-7). Average stony coral coverage in deep forereef typically represented more than twice the average stony coral coverage located in patch reefs each year. Thus, most of the stony coral loss that took place in the Dry Tortugas discussed in the previous section was located in deep forereef habitats. Coverage in both habitats decreased between 2001 and 2006 but more dramatically in deep forereef habitats. During this time percent coverage of stony coral in patch reef dropped below one percent (2010).

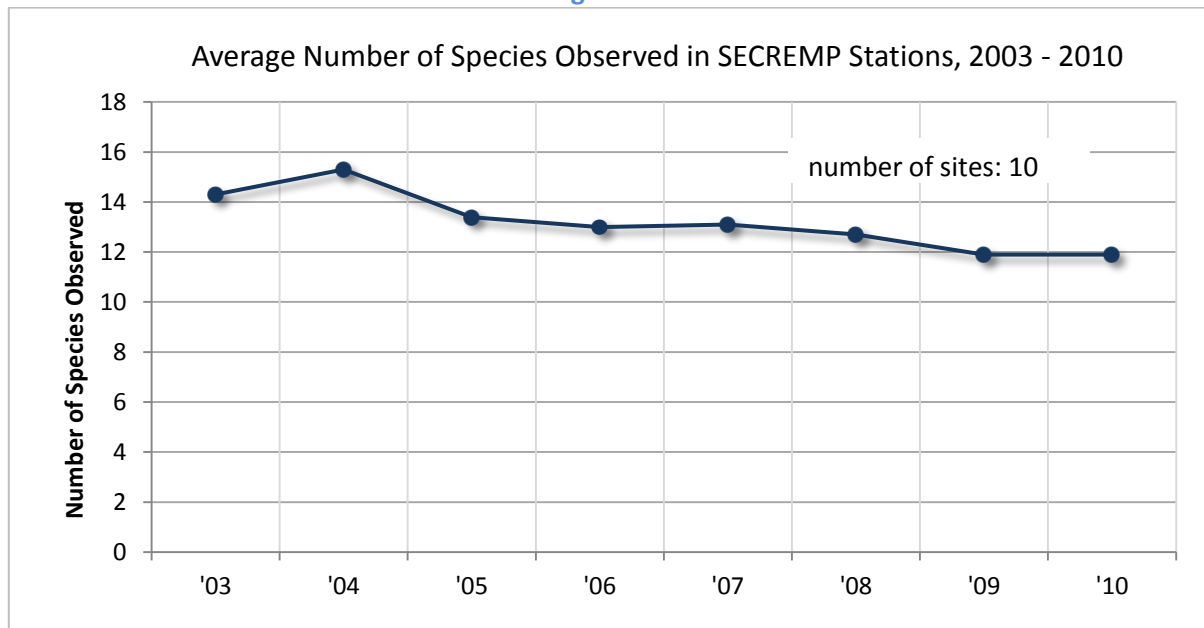
Figure 3-7



Species Richness in Southeast Florida

The Southeast Florida Region includes ten sites that were surveyed each year between 2003 and 2010. They are located in Palm Beach County (3), Broward County (4), and Miami-Dade County (3). The average number of species observed at these ten sites decreased or remained the same each year between 2003 and 2010 (Figure 3-8). In 2010, there were 28 different stony coral species identified and the average number of species observed at each site was 12. This average is down from 14 species in 2003 and 15 species in 2004. The largest decline in average number of stony coral species per site that took place in a single year occurred in 2005 when the average dropped from 15 species in 2004 to 13 species.

Figure 3-8



Coral Reef Disease

Corals in Florida are susceptible to a number of diseases. These diseases are typically grouped into the following three categories: black band disease, white band disease, and other diseases. Historical CREMP reports indicate that disease incidence in the FKNMS and the Dry Tortugas peaked in 2002 and decreased annually during the subsequent three years. Although disease was responsible for stony coral losses, such losses were minimal and disease did not have a major impact on stony coral declines through 2004. In 2006 however incidence of white disease increased while black band and other diseases decreased.

The status of the southeast Florida reef system changed little from 2003 to 2010. In the early part of the decade SECREMP reports indicate that coral diseases in Miami-Dade, Broward, and Palm Beach counties, occurrences were low, with generally less than one diseased colony identified per site.

2010 Cold Water Event

Disease isn't the only factor that contributes to stony coral losses. Hurricanes, bleaching, declines in water quality, and physical impacts with coral substrate such as groundings can all be harmful to stony coral and result in significant losses. In addition to these factors, water temperatures that reach levels beyond a coral's tolerable temperature threshold can also damage reefs. The most notable cold water event occurred in January 2010 when temperatures caused an unprecedented amount of mortality to stony corals. The prolonged period of record low temperatures in the region marked the first time since the late 1970s that temperatures dropped so low for such an extended period of time. Patch reefs, which are normally more tolerant to variations in water temperature, experienced catastrophic mortality in the middle and upper Keys with the most adverse affects occurring at sites that had the longest exposure to lethal temperatures.

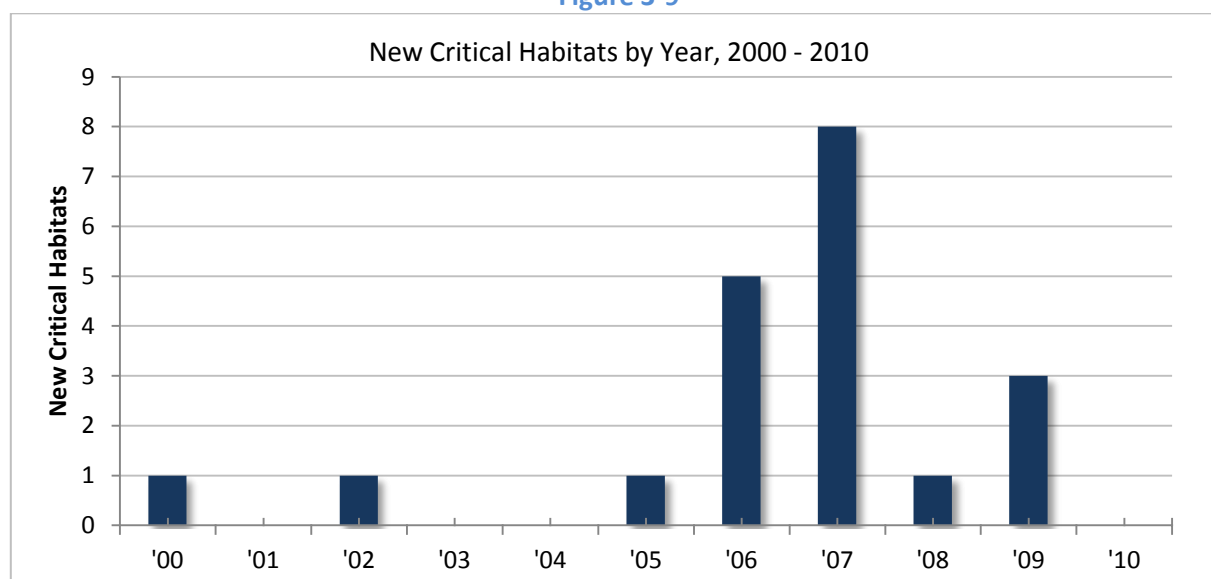
Indicator 3.3 - Number of Vulnerable, Endangered, and Threatened Species

Between 2000 and 2010 the U.S. Fish and Wildlife Service and NOAA's Office of Protected Resources designated 4 new species in Florida as threaten or endangered and delisted one (Table 3-6). Also during this time period 20 critical habitats were designated to help manage the impacts to the imperiled species (Figure 3-9).

Table 3-6

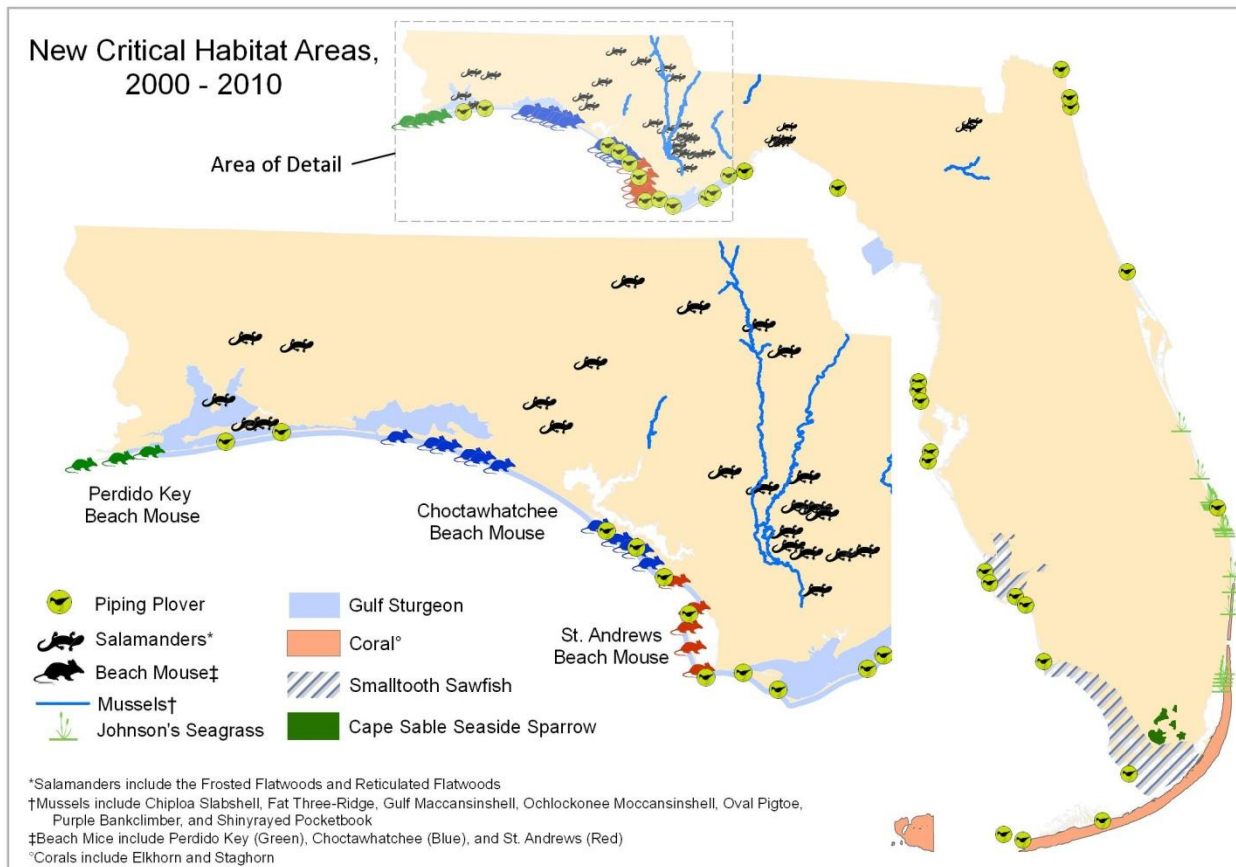
Species	Year	Level of Imperilment
Smalltooth sawfish	2005	Endangered
Elkhorn coral	2006	Threatened
Staghorn coral	2006	Threatened
Bald Eagle	2007	Delisted
Reticulated flatwoods salamander	2009	Endangered

Figure 3-9



Critical habitat designation is often a key element in the long term management of endangered species. The newly designated critical habitat areas are in a variety of coastal habitats around the state, from riverine shellfish habitat, dune habitat for beach mice, or nearshore habitat for the smalltooth sawfish (Figure 3-10).

Figure 3-10



The Florida Fish and Wildlife Conservation Commission (FWC) also maintains the Florida list of species of special concern, threatened species, and endangered species as designated in Florida law. In 2005 the FWC listing process changed and in 2010 the process is being revised to include management plans for all listed species. Between 2000 and 2010, FWC added the Miami Blue Butterfly and delisted the eagle, common snook, and peregrine falcon. In addition, the flatland salamander and the gopher tortoise listings changed from species of special concern to threatened, while the red-cockaded woodpecker was down listed from threatened to species of special concern. Also, in 2009 the U.S. Fish and Wildlife Service determined that the Flatland salamander is two separate species, the frosted (threatened status) and the Reticulated (endangered status).

Indicator 3.4 - Number of Sea Turtle Nests and Number of Strandings

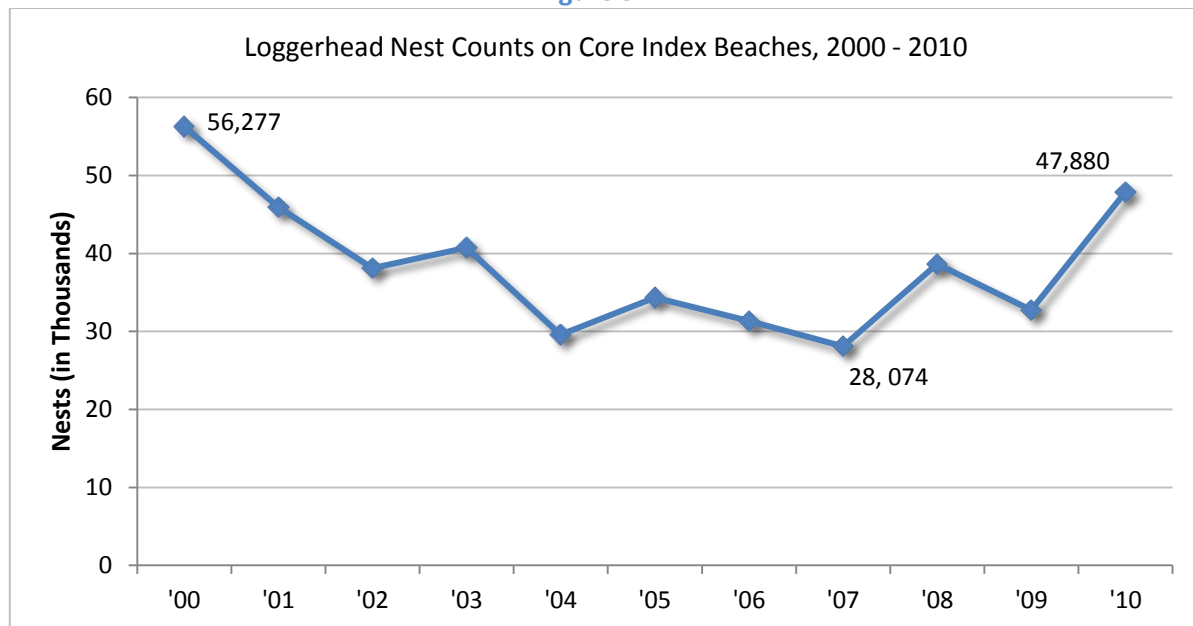
Five different species of sea turtles have been known to nest on Florida's beaches but only three—the loggerhead, the green turtle, and the leatherback—do so regularly in large numbers. These numbers have been tracked through surveys on a consistent set of beaches known as core index beaches. These beaches have remained the same since 1989. This indicator tracks the change in the number of nests from each of these three species that have been found on core index beaches from 2000 – 2010.

Nest Counts on Core Index Beaches

Loggerhead

Between 2000 and 2010, Loggerhead nests counts experienced an overall net decrease of nearly 10,000 for the whole period (Figure 3-11). Nest counts declined during the majority of the decade and reached an all time low in 2007 (28,074). Despite such a drop, Loggerhead nests counts far exceeded nest counts from other species.

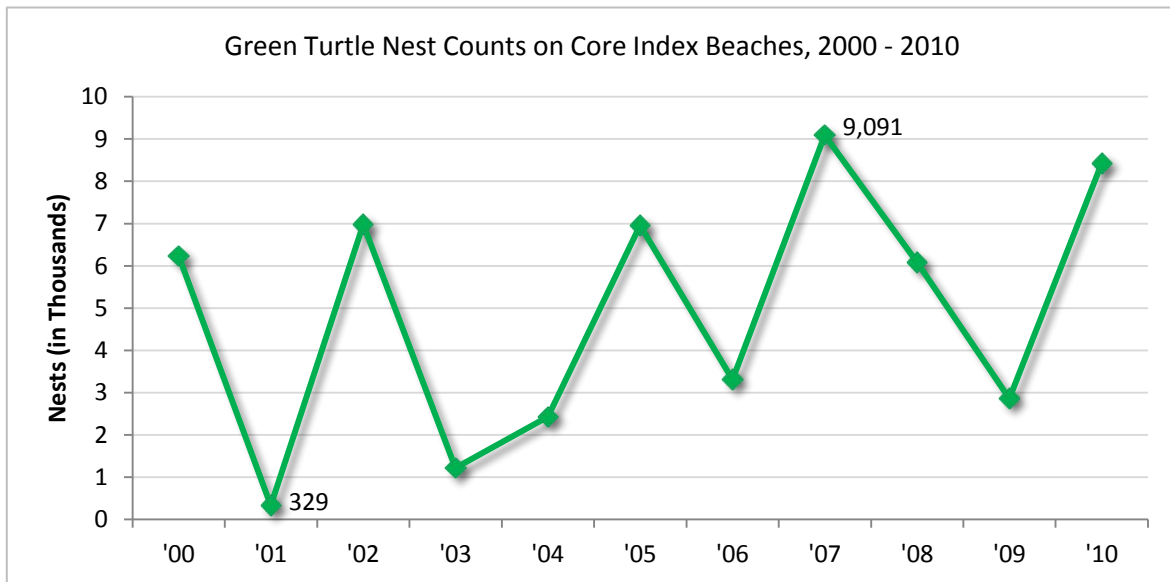
Figure 3-11



Green Turtle

Green Turtle nest counts exhibited a nearly biennial cycle (Figure 3-12). While loggerhead turtle nest counts were at their lowest in 2007, green turtle nest counts reached their highest that same year (9,091). The lowest nest count during this period (329) occurred in 2001. This was the third lowest green turtle nest count since the survey began in 1989 (289 nests in 1999 and 267 in 1993).

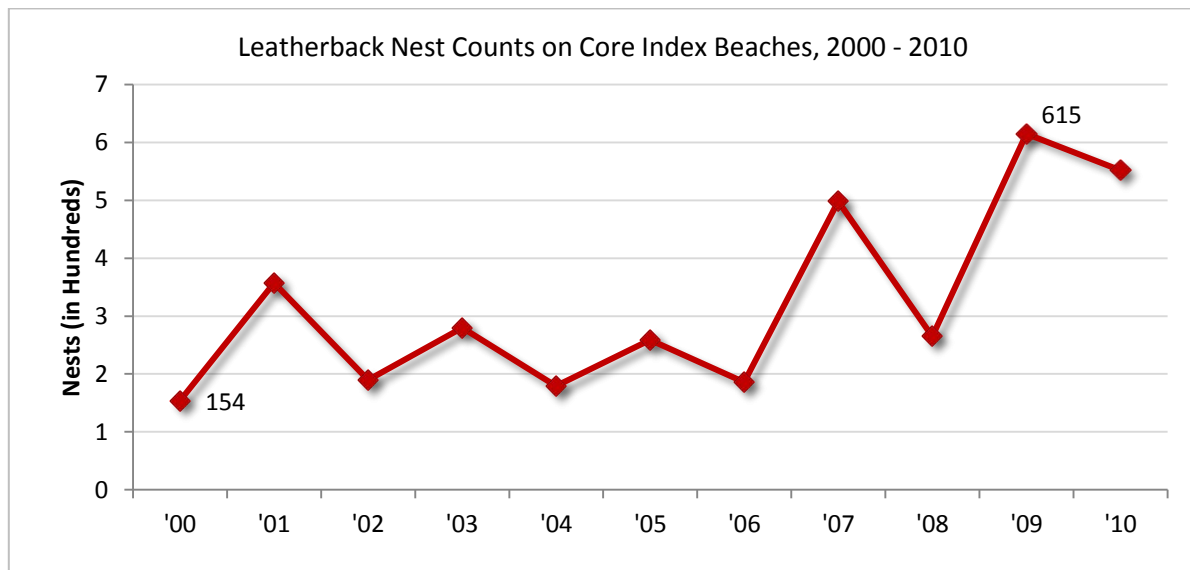
Figure 3-12



Leatherback

Leatherback nest counts exhibited an increasing trend over time (Figure 3-13). Like green turtles, leatherbacks also experienced a notably high nest count in 2007. The highest nest count during this period (615) occurred in 2009 and was the also the highest nest count since the survey began in 1989. The lowest nest count during this period (154) occurred in 2000, which, at the time, was the second highest nest count for leatherbacks since 1989. The largest increase (350) took place between 2008 and 2009.

Figure 3-13



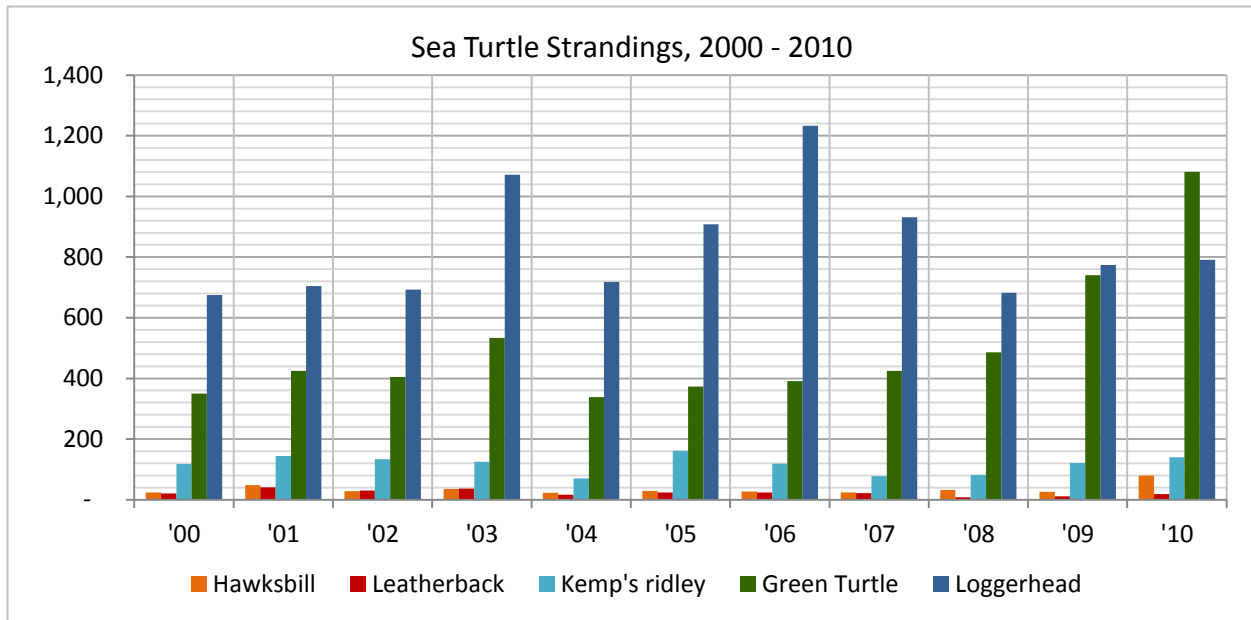
Turtle Mortality

This section addresses sea turtle mortality through stranding data. Stranding data is collected by the Florida Sea Turtle Stranding and Salvage Network (STSSN). A stranding is any dead sea turtle that is found floating or washed ashore. Strandings range in age from small immature animals to full-grown adults. Living turtles can also be considered strandings if they are found with life threatening problems. Roughly 20 percent are alive when they are found. These turtles are taken to rehabilitation facilities and the ones that survive are released. Strandings such as these are still counted as mortalities because it is assumed they would have died if they had not been rescued and successfully treated.

Figure 3-14 shows the number of strandings reported each year for each species. Typically, loggerhead turtles were found stranded more than any other species each year. One exception occurred in 2010 when green turtle stranding counts exceeded that of loggerhead turtles. Increases in loggerhead stranding counts took place in 2005 and 2006 counts increased by 26 percent and 36 percent respectively. Significant increases in green turtle counts occurred each year beginning in 2005 through 2010. A significant decrease in loggerhead strandings occurred in 2004 when counts dropped by 33 percent.

Annual increases and decreases in stranding counts often coincided among all five species. In 2001, 2005, and 2010, each species experienced increases while in 2002 and 2004, each species experienced a decrease in stranding counts. Three species, Leatherback, Hawksbill, and Kemp's ridley, each peaked in 2001 with 41, 48, and 144 strandings respectively. Loggerhead counts were highest in 2006 with 1,233 strandings while green turtle strandings peaked in 2009 with 740 strandings.

Figure 3-14



Stranding data are used as an index of mortality, but they do not represent all mortality because not all dead turtles are found. It is estimated that a majority of dead turtles do not wash ashore and many that do may become hidden in vegetation. It is however assumed that an increase in strandings indicate an increase in mortality while a decrease in strandings indicate a decrease in mortality.

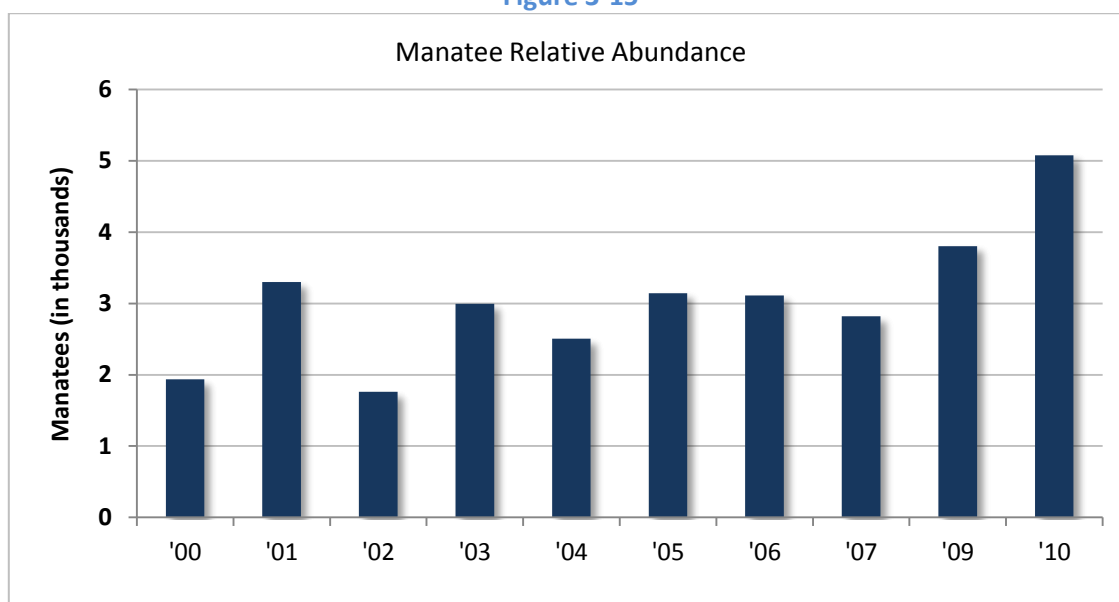
The data presented in Figure 3-14 do not include all strandings. Wash-backs of post-hatchling turtles (those less than 10 cm in carapace length) are not included. In addition, records where species could not be identified (which typically account for less than 50 per year), records where the turtle was captive-reared, records of nesting females that encountered some problem on the nesting beach, and records of sea turtles involved in cold-stunning events have also been omitted from this stranding data.

Indicator 3.5 - Manatee Population and Mortality

A synoptic survey is conducted most years by FWC at the manatees wintering habitats in Florida. This survey provides a minimum count of the manatees in the areas surveyed. These numbers are not a true population count because not all of the manatees' habitat is surveyed and, in the areas surveyed, some manatees are probably not observed to be counted due to weather and water visibility conditions on the day of the survey. The survey is conducted at all survey locations during the same time period and requires specific weather conditions for accuracy. For example, the weather forecast must be for air temperatures of equal or less than 49° F at least 3 days prior to the survey and the wind must be at or below 15 knots in the survey area on survey days. These weather conditions were not met in the winter of 2008, therefore no survey was conducted.

These minimum count numbers show a relative abundance of 2,000 to 3,000 individuals from 2000 - 2007 then an increase to a high of 5,076 manatees in 2010 (Figure 3-15).

Figure 3-15

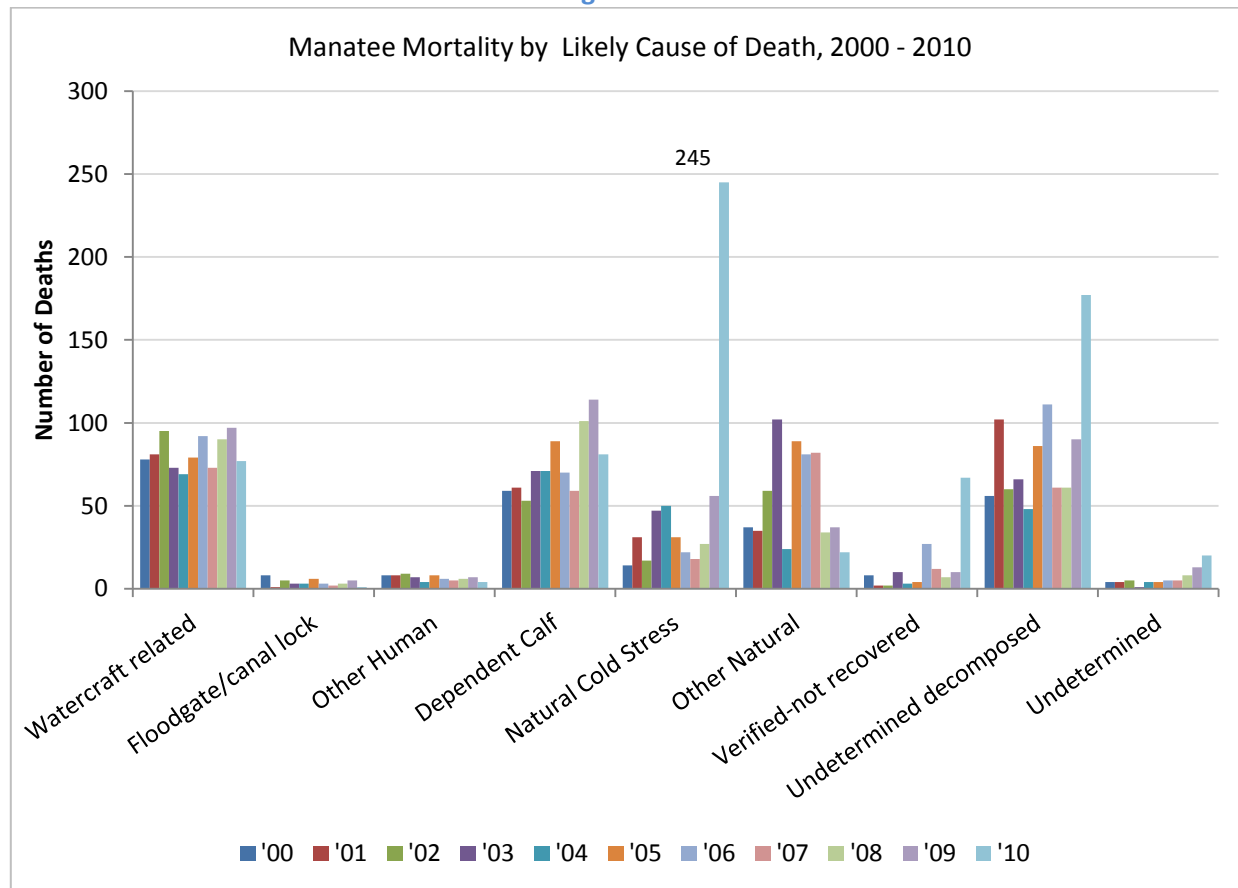


The next figures show manatee mortality trends between 2000-2010: by specific causes of mortality per year (Figure 3-16), then as total mortality per year (Figure 3-17), and finally by total mortality by specific cause (Figure 3-18). In 2010, in addition to the high relative abundance number there was also a sharp increase in mortality due to natural cold stress. Manatee Mortality has been subdivided into the categories defined below by FWC to be able to better assess the causes of manatee mortality and attempt to minimize impacts.

- ◆ **Watercraft:** Manatees hit by boats, barges or any type of watercraft. Death may result from propeller wounds, impact, crushing, or any combination of the three.
- ◆ **Crushed/Drowned in Flood Gate or Canal Lock:** Manatees killed by crushing or asphyxiation in flood gates and canal locks.

- ◆ **Other Human-Related:** Manatee deaths caused by vandalism, poaching, entrapment in pipes and culverts, complications due to entanglement in ropes, lines, and nets, or ingestion of fishing gear or debris.
- ◆ **Dependent Calf (Perinatal):** Manatee less than 150 cm (5 ft.) in total length which were not determined to have died due to human-related causes.
- ◆ **Natural Cold Stress:** Manatees which die as a result of exposure to prolonged cold weather. Animals are usually emaciated and in a general state of malnutrition.
- ◆ **Other Natural:** Manatee deaths resulting from infectious and non-infectious diseases, birth complications, natural accidents, and natural catastrophes such as red tide poisoning.
- ◆ **Verified/Not Recovered:** Manatee deaths that were reported and verified, but the carcass was not available.
- ◆ **Undetermined; Too Decomposed:** Manatee deaths in which the cause of death could not be determined due to an advanced stage of decomposition.
- ◆ **Undetermined; Other:** Manatee deaths in which the carcass was in good condition (fresh or moderately decomposed), but necropsy findings were inconclusive.

Figure 3-16



Human activities, mainly watercraft related, were a steady constant source of manatee fatality each year. Natural causes also had an impact, with a reported red tide poisoning in 2003 and the natural cold stress in 2010.

Figure 3-17

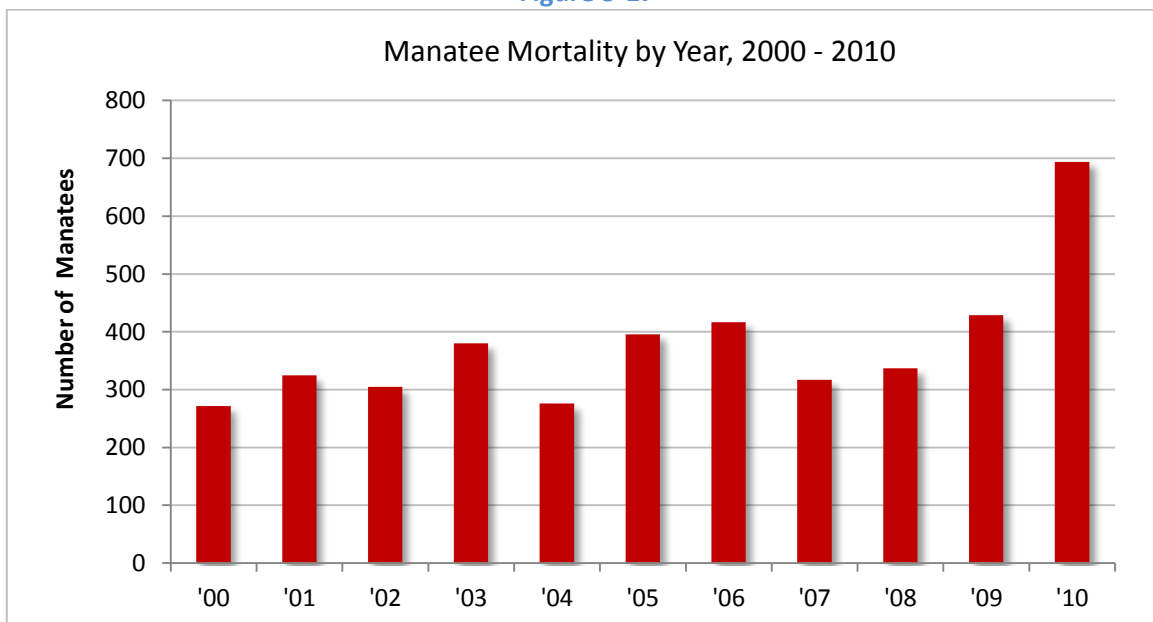
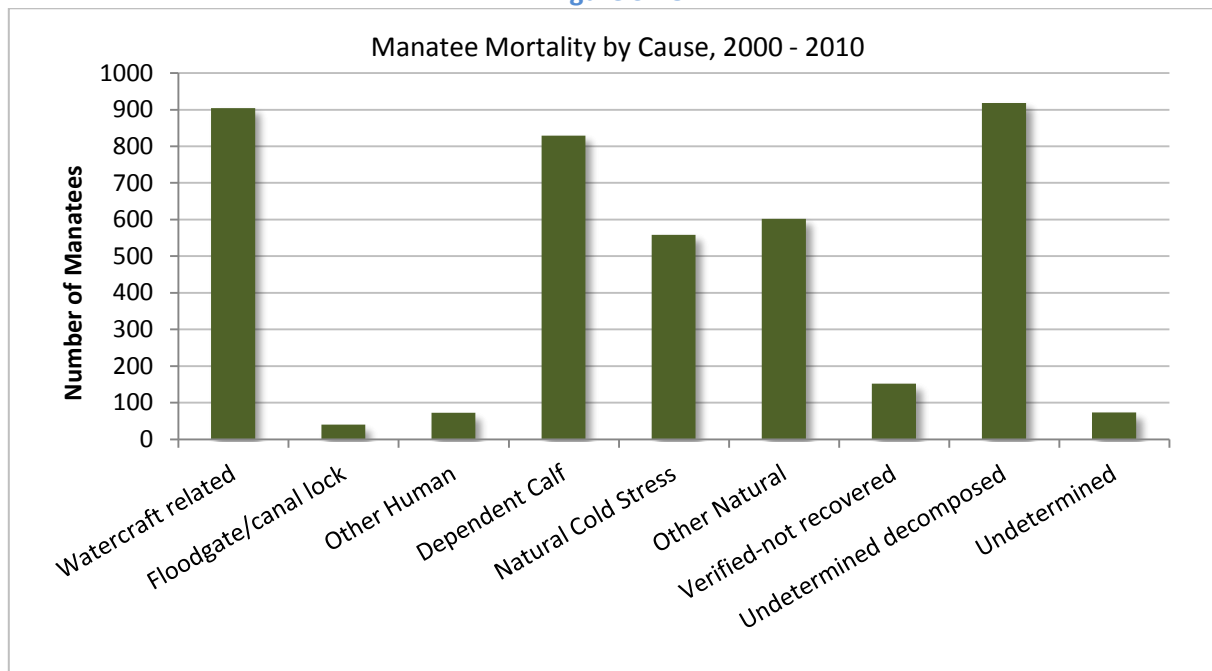


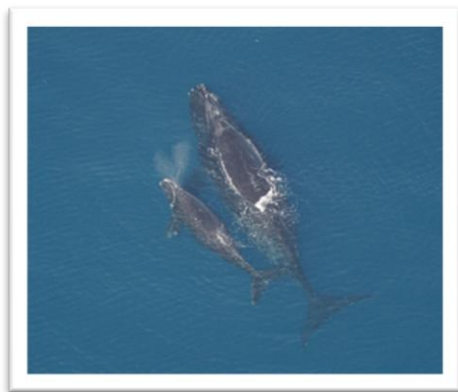
Figure 3-18



Indicator 3.6 - Right Whale Population and Mortality

Adult right whales (Figure 3-19) are approximately 55 feet long and can weigh 50 tons while a newborn calf can measure 15 feet and weigh 2,000 pounds at birth. Currently the right whale population is estimated at 300-400 whales. Right whales are of particular interest in Florida because from December through March pregnant females migrate to the only known calving area off the northeast coast of Florida and southern Georgia to give birth. The area in Florida extends offshore from the state line south to Cape Canaveral. Right whales are often visible from the beach in this area at this time of year.

Figure 3-19
Right Whale Mother and Calf



**Source: NOAA,
National Marine Fisheries Service**

Right whales had been pushed to near extinction when hunting was finally banned in 1935. Even though whaling is now illegal, these whales are still strongly affected by human activities since approximately 30 percent of all mortalities result from collisions with large vessels or entanglement in fishing gear.

In 1994 the calving area off the coastal waters of Florida and Georgia was designated as critical habitat for the right whale. In order to protect right whales from vessel collisions, both Florida and Georgia fly early warning surveys to determine the current location of whales within the critical area during calving season. In 1999, the Mandatory Ship Reporting system (MSR) was developed in conjunction with NMFS and the U.S. Coast Guard. The MSR is implemented in cooperation with the International Maritime organization. Now when ships greater than 300 gross tons enter the right whale key habitat they are required to report to a shore-based station. In return, ships receive a message about right whales, their vulnerability to ship strikes, precautionary measures the ship can take to avoid hitting a whale, and locations of recent sightings. Also, citizens along Florida's eastern coast are involved in a right whale sighting network to help relay whale locations to mariners.

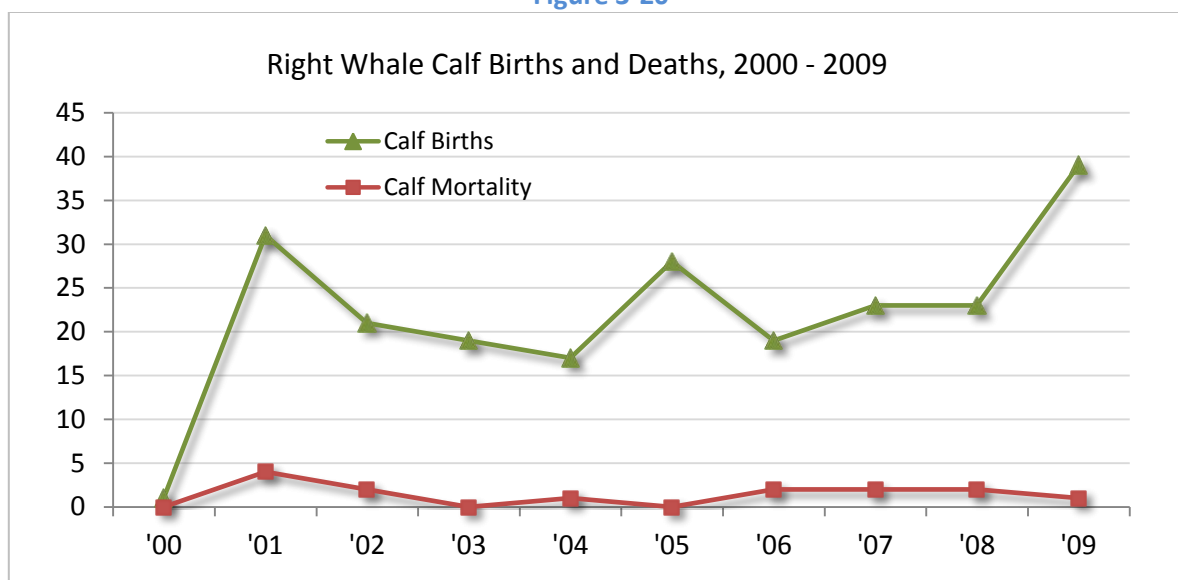
These additional efforts to locate and provide information to avoid right whales, are hopefully helping prevent vessel strikes on both adult right whales and their calves. The right whale

Living Resources

population appears to have increased slightly between 2000 and 2010 but the manner in which the population data is gathered by the various agencies differed somewhat, so it may not be directly comparable.

The 2010 stock assessment report by the NOAA Northeast Fisheries Science center provided the total calf production and mortality numbers reported (Figure 3-20). It appears the calf mortalities are level while the calf births are increasing. It is difficult to draw any long-term trends for the right whale, since too many basic population characteristics are unknown, such as number of adult whales.

Figure 3-20



Indicator 3.7 - Non-Native Species and Invasive Species

Native plants and animals are also affected by invasive species. The invasive species can out-compete the native species for space and food or can consume native species at such a high rate that the native population is impacted. Four species, the lionfish, burmese python, nile monitor lizard, gambian pouched rat are briefly discussed below as examples of invasive species in marine waters, wetlands, and uplands in Florida.

Lionfish (*Pterois volitans/miles*)

Lionfish (Figure 3-21) are a non-native predatory reef fish from the indo-Pacific that competes with and consumes native fish. Lionfish have long and showy pectoral fins, and with a row of long, dorsal spines. Each spine contains a venom gland in the distal third of the spine (but not at the tip). A lionfish sting is usually non-fatal to humans but in extreme cases could lead to allergic reactions, nausea, vomiting, and cardiovascular events.

Figure 3-21
Lionfish



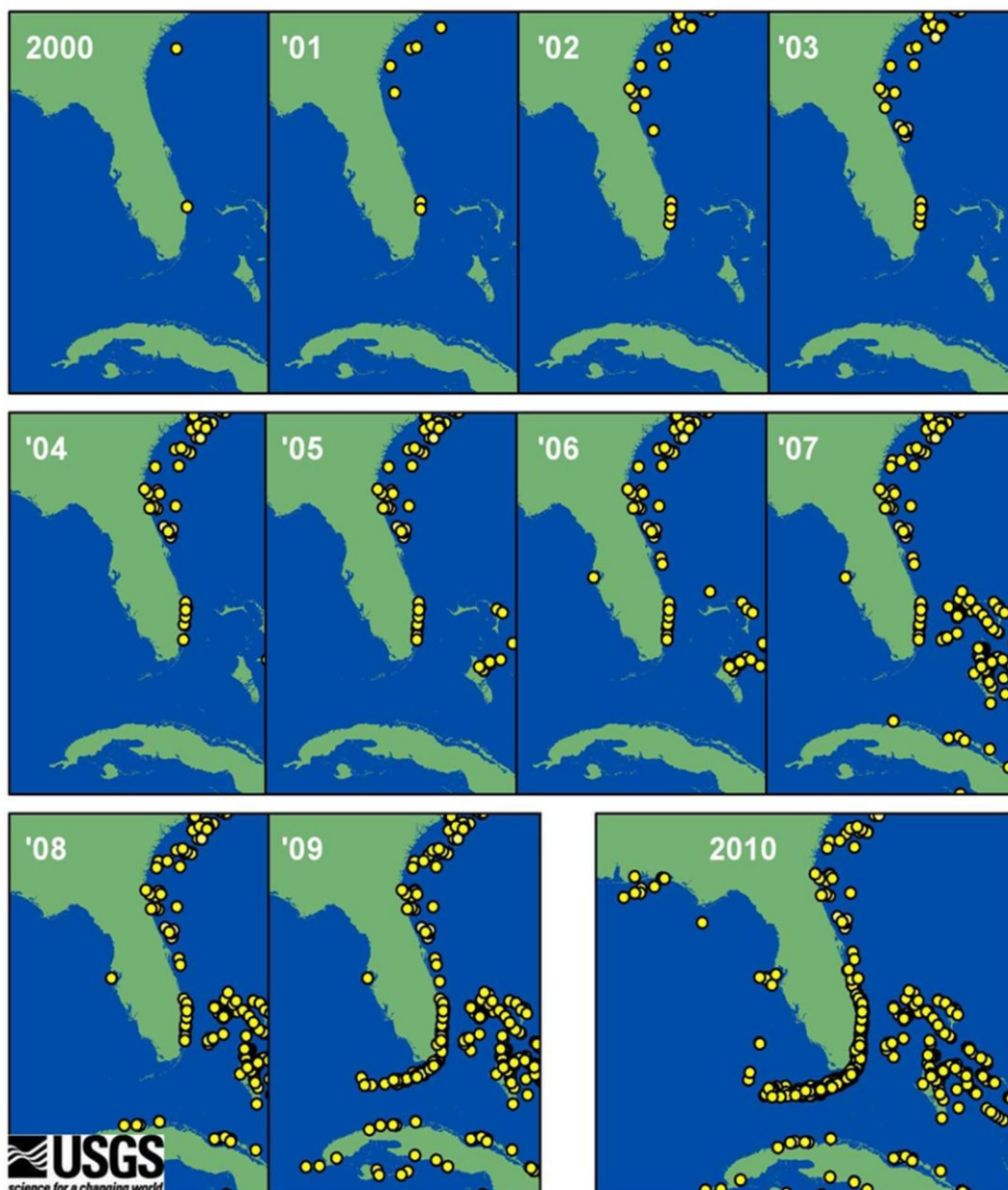
Source: Paula Whitfield,
NOAA, Center for Coastal Fisheries
and Habitat Research

Lionfish were first observed on south Florida reefs in 1985 and were probably introduced to the Atlantic and Caribbean through release of aquarium specimens. The sightings continued to grow through 2000-2010 (Figure 3-22). The populations on the south Florida reefs appear to be reproducing and have been found from shallow waters to depths of 1,000 feet. Individual Lionfish were first sighted off Pensacola and Apalachicola in 2010.

The species is so prevalent that “Lion Fish Rodeo” contests are being held in an attempt to control the increasing population. In 2010 a total of 664 Lionfish were removed from the Keys during the upper, middle and lower Keys “Lionfish Rodeo” events.

Figure 3-22

Cumulative Lionfish Sightings, 2000 - 2010



Burmese Python (*Python molurus bivittatus*)

Figure 3-23
Burmese Python

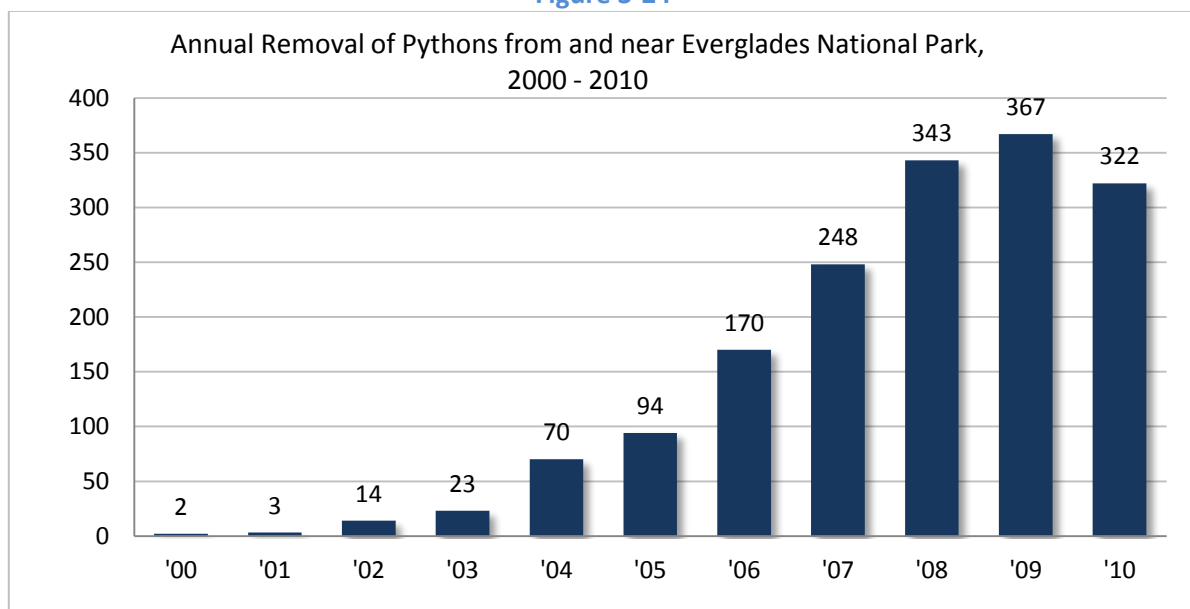


Source: Lori Oberhofer, National Park Service

Burmese pythons (Figure 3-23) are native to Asia, eastern India through Vietnam and southern China. They currently have been found in the Everglades and Big Cypress areas of south Florida. The Burmese pythons found in the wild in Florida are assumed to have originated from unauthorized pet release.

A python was first found in the wild in Florida in the 1980s and a reproducing population was determined to be established in the Everglades in 2000. The Everglades National Park started a python eradication program in 2000 in conjunction with FWC. Figure 3-24 illustrates the number of pythons removed each year from the park. These snakes consume native wildlife including birds, mammals, and alligators causing concern of the status of the native animal populations.

Figure 3-24



Nile Monitor Lizard (*Varanus niloticus*)

Figure 3-25
Nile Monitor Lizard



Source: SFWMD

The Nile Monitor (Figure 3-25) is a large lizard native to Africa that was first collected in Florida near Lake Kanapaha in Alachua County in 1981. The species has been established in at least two coastal counties (Charlotte and Lee) since 1990. With favorable conditions, monitor lizards will increase their numbers quite rapidly. Small females produce clutches of up to thirteen eggs once every year while larger females are known to lay up to 60 eggs in one clutch. Monitors live an average of 12 years. The current population in these areas is likely descended from a small group of animals that were released intentionally or some that escaped from a pet store. Because of such favorable conditions that exist in many areas of south Florida, the monitor population may have become so large that total eradication of the species is not feasible.

With a maximum length of 9 feet, the establishment of *V. niloticus* in these two counties makes it the largest, most dangerous nonindigenous lizard in the United States. While these animals pose only a minimal threat to humans, because they prey on eggs, they represent a significant threat to native animal species in the coastal zone including the burrowing owl, gopher tortoise, various waterbirds, and sea turtles. Numerous sightings have occurred in other coastal counties located in south Florida including Collier, Miami-Dade, Broward, and Palm Beach but it is unclear if there are established populations in these areas.

Gambian Pouched Rat (*Cricetomys gambianus*)

Figure 3-26
Gambian Pouched Rat



Source: USDA APHIS Wildlife Services

The Gambian giant pouched rat (Figure 3-26) is an invasive animal that first became established in Florida as early as 2006. It is native to Sub-Saharan region of Africa. According to a 2006 article published in the Journal of Mammalogy, the U.S. Fish and Wildlife (Perry et al., 2006) became aware of the existence of the Gambian Rat in Florida in early 2004 after local residents in Grassy Key reported several sightings. The 2004 population is allegedly descended from a group of eight such rats that escaped from an exotic breeder on Grassy Key in 1999.

Grassy Key is an island located approximately midway through the Florida Keys chain. While experts believe the rat has not become established outside the island, there is concern that its range will increase and the population will become established on the mainland. The animal can reach weights up to 6.2 pounds and poses a potential threat to agriculture and natural resources in the coastal zone. In 2007, an eradication strategy was designed and implemented in 2007 and continued through 2010 (Witmer et al. 2010).

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- Florida Fish and Wildlife Conservation Commission. (December 2007). Florida Manatee Management Plan (*Trichechus manatus latirostris*)
- Perry , N.D.,B. hanson, W. Hobgood, R.L. Lopez, C.R. Okraska, K. Karem, and D.S. Carroll. 2006. New invasive species in southern Florida: Gambian rat (*Cricetomys gambianus*). J. Mammal. 87:262-264.
- Witmer, et al 2010, "Evaluating commercially available rodenticide baits for invasive Gambian giant pouched rats (*Cricetomys gambianus*)"

Environmental Health



Executive Summary

The focus area of Environmental Health is composed of nine indicators to provide an overview of the trends from 2000 – 2010. The indicators (Table 4-1) examine the factors of water quality that reflect environmental health and affect human health.

Table 4-1
Environmental Health Indicators

4.1	Overall Conditions of Coastal Waters
4.2	Watershed Based Initiatives to Improve and Support Water Quality Monitoring
4.3	Onsite Sewage Treatment and Disposal System (OSTDS) Management Measures
4.4	Number of Acres of Water Designated as Outstanding Florida Waters
4.5	Number And Type of Aquaculture Facilities and Businesses
4.6	Number and Type of Fish Consumption Advisories
4.7	Healthy Beaches Water Sampling Program and Advisories by County
4.8	Major Algal Blooms and Red Tide Events
4.9	FCMP Grants to Improve Environmental Health

Water quality can be used as an indicator of environmental health due to several factors. Degraded water quality, often the result of increased nutrients or chemical pollution, may result in waters that are unsafe or human recreational and commercial use, such as aquaculture. Increased nutrients from upland or stormwater treatment systems runoff can cause increased algal growth which may result in harmful algal blooms, decreased water clarity, or lower dissolved oxygen. These conditions not only limit human use, but can cause fish kills and decreased seagrass growth. Mercury levels, even if low in prey fish, can accumulate in predator fish resulting in dangerous levels of mercury in fish tissue for consumption. On the other hand, if water quality is good then the water is safe for human recreational use and for commercial activities such as aquaculture.

Thus, proper and complete monitoring of water quality to determine problem areas and the correction of those problem areas increases overall environmental health and human use of the state's waterways. Much of the long term water quality monitoring was organized and initiated in a state-wide, systematic, ecosystem based manner during these past 10 years.

Indicator 4.1 - Overall Condition of Coastal Waters

There is a very close and constant interaction between the surface water and ground water in Florida. Ground water rises up to the surface through springs on uplands and offshore springs into the marine environment. Figure 4-1 shows the hydrographic divide that separates most of the flow of surface and ground water (Water Resources Atlas of Florida, 1998). Only the St. Johns and Ocklawaha Rivers provide any major flow across this divide. South of the divide is therefore isolated from outside water flows and natural fresh water is derived exclusively from rainfall.

Figure 4-1

Hydrologic Divide



As the fresh water is utilized and the freshwater aquifer levels decrease, saltwater from the coast increases intrusion into the groundwater along the coast of Florida. Therefore, the water quality of the surface and ground water are intertwined and cannot be separated.

Stormwater runoff, which can provide a pathway for the introduction of nutrients or chemicals, is an additional threat to coastal waters and can significantly impact environmental health. The regulatory criteria for stormwater treatment in Florida is presumptive criteria. In other words, if the stormwater treatment system is designed in one of the manners outlined in the criteria it is presumed the water quality and quantity standards will not be violated. In 2008, DEP started revisions to the stormwater rule due to the higher than expected nutrient levels that have been found in stormwater.

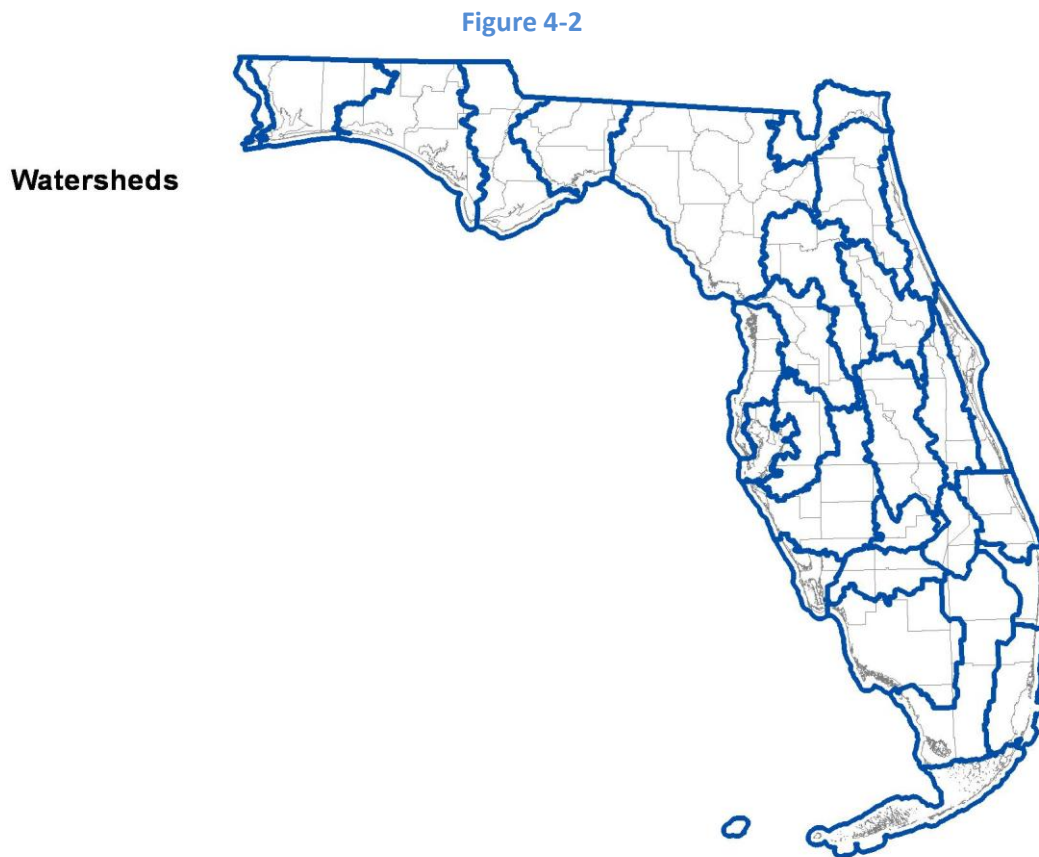
A possible emerging issue in environmental health is the increase in arsenic found in potable water and monitoring wells in some regions of Florida. The source of the arsenic could be release from the limestone with the introduction of oxygen to the aquifer, with the pumping of freshwater or drought lowering the water table, or from pesticide use that enters the groundwater.

In Florida there are a total of 73 separate entities conducting coastal water quality monitoring: 10 federal government entities, 9 state government entities, 39 local government entities, and 15 private/volunteer organizations (DEP 2010 draft 305b report). The coastal waters are being specifically monitored for red tide and fecal coliform on a biweekly bases around the state.

Indicator 4.2 - Watershed Based Initiatives to Improve and Support Water Quality Monitoring

Florida has been using basin management strategies to protect water and natural resources since the early 1980s. In the 1980s the Water Management Districts designated, for special management, certain waterbodies as Surface Water Improvement and Management (SWIM) waterbodies.

In the late 1990s that process evolved into the Total Maximum Daily Load (TMDL) program. All of Florida has been delineated into 29 water basins or watersheds (Figure 4.2). Each basin has been further divided into Waterbody Identifiers, or WBIDS, for sampling and impaired waters determinations. The state has been divided into approximately 6,600 WBIDS. Since basins are based on source and flow of both surface and ground waters, many of the basins cross county borders and therefore cross coastal and non-coastal county boundaries.



The water basins are further clustered together into five basin groups (Figure 4-3) in order to manage monitoring and assessment logistics with limited resources. Sampling of the water groups has been conducted since 2001 in a rotational manner each year as part of a strategic monitoring

program (Table 4-2). Water basins sampled each year are in different regions of the state to ensure one fifth of state waters can be assessed each year.

Figure 4-3

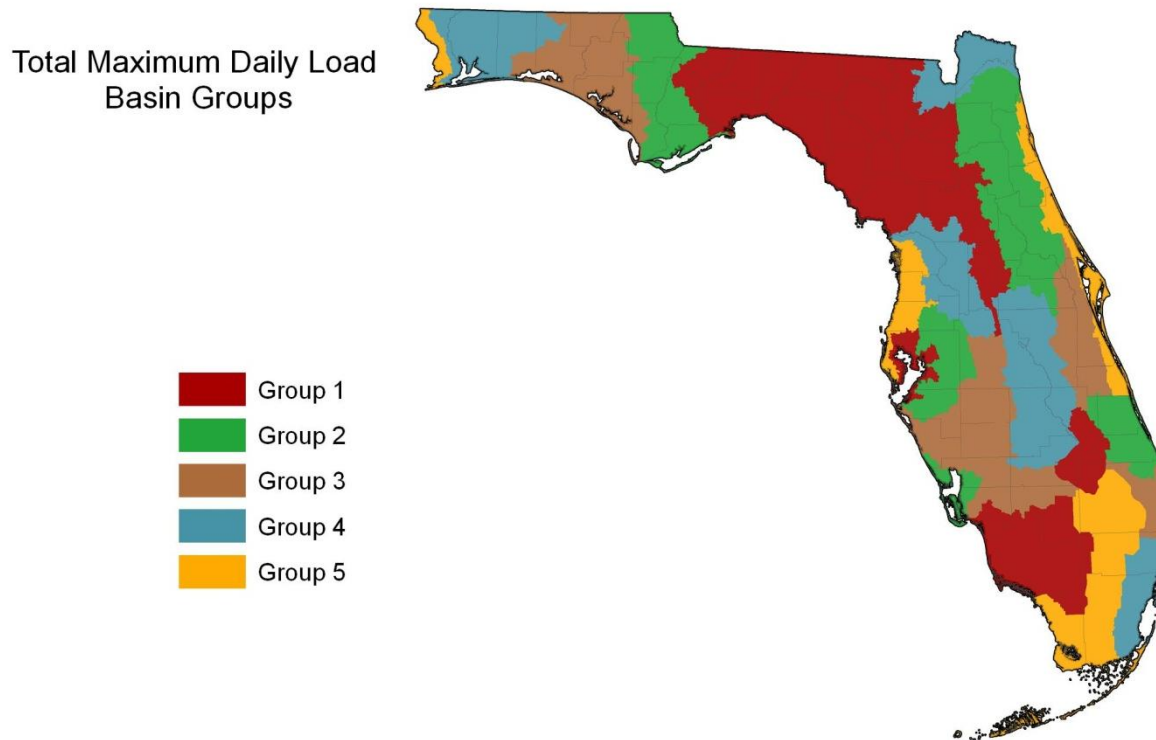


Table 4-2
Sampling Timing for Basin Groups

Basin Group	Strategic Monitoring Period	Second Strategic Monitoring Period
1	2001	2006
2	2002	2007
3	2003	2008
4	2004	2009
5	2005	2010

If a WBID's surface waters are determined to not meet water quality standards for a specific parameter then the waters are considered impaired and a TMDL is developed for that WBID for that parameter. Table 4-3 lists the current number of waterbody segments that have been assessed.

Table 4-3

Assessed Waters for the Statewide Basin Assessments by Type of Waterbody

Waterbody Type	Number of Waterbody Segments	Total Assessed
Rivers and Steams	3,996	13,919 miles
Lakes	1,324	1,203,632 acres
Estuaries	695	2,473 square miles
Coastal waters	154	6,699 square miles

Source: 2010 integrated assessment report

For the TMDL program estuaries are defined as marine regions of water where there is interaction between rivers and nearshore ocean waters. Examples of estuaries are bays, lagoons, and mouths of rivers. Coastal waters are defined as non-estuary waters that are landward of the natural 90 foot isobaths.

Tables 4-4 and 4-5 list the number of estuarine or coastal waters, respectively, that have been determined impaired and the percentage of the waterbodies impaired for each parameter in the estuarine or coastal water category (Integrated Water Quality Assessment for Florida, 2010). It should be noted that one waterbody may be impaired for more than one parameter at a time so waterbodies are listed under each parameter for which they do not meet water quality standards. There are a total of 695 estuarine waterbodies and 564 of them are impaired for at least one parameter. There are a total of 154 coastal waterbodies and all of them are impaired for mercury in fish.

Table 4-4

Estuaries Impaired by Cause

Parameter	Number of Waterbodies	Percent of Waterbodies Impaired	Square Miles Impaired
Mercury in Fish	495	71	2,683
Dissolved Oxygen	129	19	432
Chlorophyll a	99	14	470
Fecal Coliform	97	14	472
Bacteria in Shellfish	71	10	846
Copper	22	3	100
Historical Chlorophyll a	21	3	99
Iron	17	2	98
Lead	4	1	7
Nickel	3	< 1	40
Arsenic	2	< 1	8
Turbidity	1	< 1	1

Table 4-5

Coastal Waters Impaired by Cause

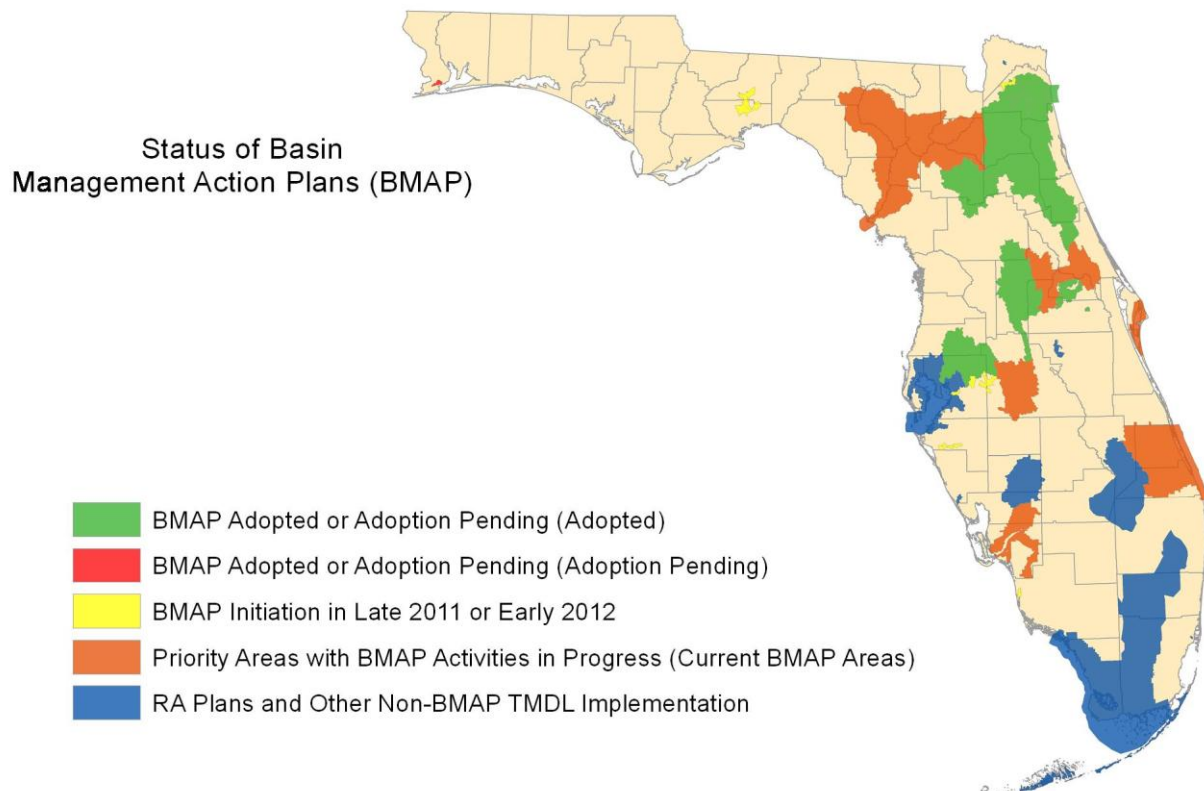
Parameter	Number of Waterbodies	Percent of Waterbodies Impaired	Square Miles of Impairment
Mercury in Fish	154	100	6,830
Dissolved Oxygen	17	11	294
Copper	9	6	93

Bacteria in Shellfish	6	4	403
Fecal Coliform	3	2	430
Chlorophyll a	1	1	102

Because of the wide variations of types and natural conditions of the waterbodies in Florida, some waterbodies do not meet the state-wide water quality standards in their natural state, without anthropogenic inputs. For example, some creeks that are created mainly from groundwater flows or flows from wetland areas have naturally low dissolved oxygen levels. TMDLs are not developed for these naturally occurring exceedances of water quality standards.

After a TMDL is designated for an area by rule and approved by EPA, a Basin Management Action Plan (BMAP) is developed with extensive input from the local community. The BMAP outlines what will be done in the area to bring the waters of the basin back into compliance with the state-wide water quality standards. For example, retrofitting a stormwater treatment system in already developed areas to a more advanced treatment level would improve water quality for some parameters. The BMAPS are also used to guide grant funding to help local communities complete the required tasks. The results from the BMAP are re-evaluated every 5-years and the Plan may be adapted and adjusted. Figure 4-4 shows the current status of BMAPS in 2011.

Figure 4-4



Indicator 4.3 - Onsite Sewage Treatment and Disposal System (OSTDS) Management Measures

Several new OSTDS maintenance measures were started between 2000 and 2010. The long term goal has been to determine the specific location of all the existing septic tanks systems in Florida and to begin regular inspection and maintenance of those systems. The Florida Department of Health commissioned an inventory of septic systems by inventorying which developed areas had sewer service provided and assumed the remaining developed lots had septic systems. This endeavor relied upon reporting from each local County Health Department.

Identification and location of existing septic systems has been initiated from several different avenues. The DEP National Pollutant Discharge Elimination System (NPDES) program contracted the use of the “Carmody” septic search website (<http://www.septicsearch.com>). This database is for the public to be able to determine if a property had a permitted septic system and to add the newly permitted system into one overarching database. In conjunction with septic search is a computer database system for County Health Departments. Each County Health Department can modify the database within set parameters to utilize the system in a manner most useful to them; therefore, the entire system is compatible statewide but also tailored to each community.

Ordinances have been passed in the coastal counties of Monroe, Charlotte, and Santa Rosa requiring identification of the type of sewage treatment utilized for each residence. For instance, in Santa Rosa County, the septic system must be evaluated at the point of sale. In 2010, Chapter 381.065 F.S. was amended to require by January 1, 2016, a 5 year evaluation, maintenance, and repair, if needed, cycle for onsite sewage treatment systems statewide. To obtain an accurate state-wide inventory of the OSTDS systems will require a door-to-door determination at each residence in some areas.

Indicator 4.4 – Number of Acres of Water Designated as Outstanding Florida Waters

Outstanding Florida Waters (OFW) are a regulatory designation of specific surface water bodies and adjacent wetlands. Within an OFW, activities must meet more stringent water quality standards to order to protect the special attributes of the OFWs.

In 2000, there were 13,692.49 square miles of designated OFWs . Between 2000 and 2010 three new areas were designated OFW: Lake Disston in 2001, Weekiwachee River system in 2003, and in 2006 Rose Sink was added to the OFW designation of Ichetucknee State Park. These three new areas added an additional 31.05 square miles of designated waters, for a new total of 13,723.54 square miles of OFW in Florida in 2010 (Figure 4-5), with 11,167.27 square miles of those OFWs in the coastal counties.

Figure 4-5



In general, DEP cannot issue permits for **direct** discharges to OFWs that would lower existing water quality. In most cases, this deters new wastewater discharges directly into an OFW, and requires increased treatment for stormwater discharging directly into an OFW. DEP and the Water Management Districts also may not issue permits for **indirect** discharges that would significantly degrade a nearby waterbody designated as an OFW.

Indicator 4.5 - Number and Type of Aquaculture Facilities and Businesses

Florida aquaculture reported more than 408.89 million dollars in sales between 2001- 2007 (DACs personal communication) as shown in Table 4-6. Aquaculture in Florida is a diverse industry with an estimated 1,500 species or varieties of fish, plants, shellfish, crustaceans, and reptiles being cultured across the state. For example, aquaculture includes tropical and temperate ornamental fish and invertebrates, aquatic plants, marine ornamental species, live rock, shellfish (clams, oysters, scallops, shrimp and mussels), alligator, and food fish.

Sales by Florida aquaculturists declined from a peak of \$102 million in 1997 to \$61 million in 2007 (Florida Aquaculture Plan 2011-2012). The Department of Agriculture and Consumer Services (DACS) attributes the decline to farmer's voluntarily leaving aquaculture because of extensive hurricane damage in 2004 and 2005, rising energy and feed costs, and increasing competition from global trade (Florida Aquaculture Plan 2011-2012).

Table 4-6
Florida Aquaculture Biennial Survey**
(Number of Farms and Farm-gate Sales in Millions of Dollars)

Year	Tropical Fish	Clams/Oysters	Aquatic Plants	Alligators	Catfish	Tilapia	Sport and Game Fish	Other Aquatics	Shrimp	Live Rock
'99	178	356	43	26	62	29	16	27	*	*
	\$43	\$16.2	\$13.6	\$3.35	\$1.2	\$0.881	\$0.63	\$6.50		
'01	170	336	39	21	48	35	*	23	13	7
	\$42.4	\$18.3	\$21.3	\$3.3	\$1.30	\$0.979		\$0.799	\$7.4	\$0.577
'03	151	244	37	14	41	17	*	14	10	7
	\$47.2	\$12.9	\$20.4	\$2.5	\$1.5	\$1.5		\$0.895	\$5.1	\$0.661
'05	133	153	19	14	23	18	*	NR	*	6
	\$33.2	\$10.7	\$17.6	\$4.1	\$1.4	\$0.477		\$5.30		\$0.341
'07**	203	130	NR	*	54	*	31	85	17	*
	\$32.2	\$15.3			\$0.979		\$0.622	\$9.8	\$2.5	

* Combined into the Other Aquatics category. ** USDA-Census of Agriculture NR – Not Reported.

** There is some variation from survey-to-survey when certain categories of production were lumped or split apart depending upon the number of farmers producing a product and their relative production value within that category. Source: FL DACS communication

More detailed sales information is available specific to clam and oyster aquaculture from the biennial survey, Table 4-7.

Table 4-7
Cultured Hard Clam and Oyster Production

Production Year	Number of Growers Reporting	Acreage Cultivated	Sales Value (millions)	Clams Sold (millions)	Clams Planted (millions)
1999	356	1,086	\$16.2	134	285
2001	336	1,261	\$18.3	142	350
2003	224	930	\$12.9	134	350
2005	153	NR	\$10.7	92	350
2007	130	NR	\$15.3	NA	NA

NR – Not Reported NA – Not Available

Table 4-8 outlines the nearshore sovereign submerged land that is leased to aquaculture farmers to grow clams or oysters. Much of the aquaculture in the state occurs in earthen ponds, indoor tank systems with recirculated water and hybrid systems of indoor tanks and outside ponds.

Table 4-8

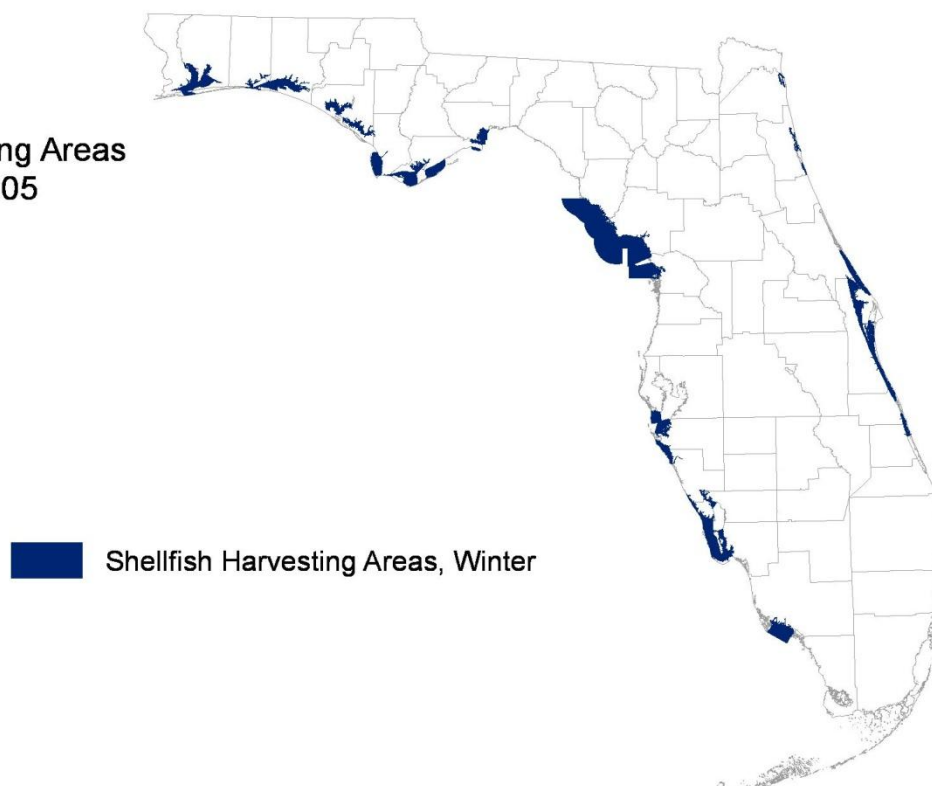
Fiscal Years	Oyster Cultch Planted (bushels)	Aquaculture Leases		Shellfish Leases		Lease Fees Collected* (dollars)
		Number	Acres	Number	Acres	
1999-2000	111,240	NA	NA	NA	NA	49,814
2000-01	175,584	690	1,700	NA	NA	53,297
01-02	291,712	688	1,702	96	1,456	66,727
02-03	340,368	685	1,675	79	1,114	66,153
03-04	261,870	664	1,581	82	1,301	71,802
04-05	258,868	652	1,551	78	1,277	66,433
05-06	376,446	633	1,508	80	1,287	58,781
06-07	87,552	609	1,496	79	1,285	58,781
07-08	252,432	628	1,553	73	1,190	59,971
08-09	142,080	533	1,217	71	1,184	53,858

* Calendar year NA – Not Available

Shellfish harvesting also occurs in natural water outside aquaculture sites. Figure 4-6 shows areas open to shellfish harvesting in winter 2005. The most up-to-date shellfish harvesting maps can be found on DACS's web site at http://www.floridaaquaculture.com/seas/seas_shamap.htm.

Figure 4-6

Shellfish Harvesting Areas
(Winter), 2005



The shellfish harvesting waters are monitored and are closed if rain events or other known impacts occur. The waters are then reopened to harvest after the water quality monitoring has shown the waters are again safe for harvest and consumption.

Indicator 4.6 - Number and Type of Fish Consumption Advisories

In the late 1980 the Department of Health started issuing fish consumption advisories regarding mercury, and in 2003 a statewide advisory was issued regarding consumption of largemouth bass. Due to unsafe levels of mercury and other contaminants in fish, the Department of Health has developed a fish consumption advisory website:

<http://www.doh.state.fl.us/environment/medicine/fishconsumptionadvisories/index.html>.

This website provides information for waterbody, fish type, and recommended consumption amount within a set time frame. The specific fish are listed by common name and divided into fresh water or estuarine/marine and specific water body if in freshwater systems. The human consumption columns are divided into adult and children/pregnant woman categories. The Department of Health also maintains a web site where fish consumption advisors can be found by County. For example, Table 4-9 is the fish consumption advisory for Pinellas County, which is a typical list for all of the coastal counties. The fish consumption waters advisory is consistent for coastal waters around the state.

Table 4-9
Fish Advisory in Pinellas County (2011)

Water Body (Location)	Species	Women of childbearing age, young children (Number of Meals)	All Other Individuals (Number of Meals)
Lake Tarpon	Bluegill, Redear sunfish	Two per week	Two per week
	Black crappie	One per week	Two per week
	Largemouth bass, Bowfin, Gar	One per month	Two per week
Whitsell Lake	Bluegill	One per week	Two per week
	Largemouth bass, Bowfin, Gar	One per month	One per month
ACW	Almaco jack	One per month	One per week
ACW	Atlantic croaker	Two per week	Two per week
ACW	Atlantic spadefish	One per week	Two per week
ACW	Atlantic stingray	One per month	One per week
ACW	Atlantic thread herring	One per week	Two per week
ACW	Atlantic weakfish	One per week	Two per week
ACW	Black drum	One per week	Two per week
ACW	Black grouper	One per month	One per week
ACW	Blackfin tuna	Do not eat	One per month
ACW	Bluefish	One per month	One per week
ACW	Bluntnose sting ray	One per week	Two per week
ACW	Bonefish	One per month	One per week
ACW	Crevalle jack	One per month	One per week
ACW	Cobia	Do not eat	One per month
ACW	Dolphin	One per week	Two per week
ACW	Fantail mullet	Two per week	Two per week
ACW	Florida pompano	One per week	Two per week
ACW	Gafftopsail catfish	One per month	One per week
ACW	Gag	One per month	One per week
ACW	Gray snapper	One per week	Two per week

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ACW	Greater amberjack	One per month	One per week
ACW	Great barracuda	One per month	Two per week
ACW	Gulf flounder	One per month	Two per week
ACW	Hardhead catfish	One per week	Two per week
ACW	Hogfish	One per week	Two per week
ACW	King mackerel less than 31 inches	Do not eat	One per month
ACW	King mackerel 31 or more inches	Do not eat	Do not eat
ACW	Ladyfish	One per month	One per week
ACW	Lane snapper	One per month	Two per week
ACW	Little tunny	Do not eat	One per month
ACW	Lookdown	One per week	Two per week
ACW	Mutton snapper	One per month	Two per week
ACW	Pigfish	One per week	Two per week
ACW	Pinfish	One per month	Two per week
ACW	Red drum	One per month	Two per week
ACW	Red grouper	One per month	Two per week
ACW	Red snapper	One per week	Two per week
ACW	Sand seatrout	One per month	One per week
ACW	Scamp	One per month	Two per week
ACW	Shark, all species less than 43 inch	Do not eat	One per month
ACW	Shark, all species 43 or more inches	Do not eat	Do not eat
ACW	Sheepshead	One per month	Two per week
ACW	Silver perch	One per month	Two per week
ACW	Skipjack tuna	One per month	Two per week
ACW	Snook	One per month	Two per week
ACW	Snowy grouper	One per month	One per week
ACW	Southern flounder	One per week	Two per week
ACW	Spanish mackerel	One per month	One per week
ACW	Spot	One per week	Two per week
ACW	Spotted seatrout	One per month	Two per week
ACW	Striped mullet	Two per week	Two per week
ACW	Striped mojarra	Two per week	Two per week
ACW	Tarpon	One per week	Two per week
ACW	Tripletail	One per week	Two per week
ACW	Vermillion snapper	One per week	Two per week
ACW	Wahoo	One per month	Two per week
ACW	White grunt	One per month	Two per week
ACW	White mullet	Two per week	Two per week
ACW	Yellow-edge grouper	One per month	Two per week
ACW	Yellowfin tuna	One per month	Two per week
ACW	Yellowtail snapper	One per week	Two per week

** All Other Individuals should eat no more than one six ounce meal per week of Largemouth Bass, Bowfin, or Gar from freshwater bodies in Florida not listed in this brochure.*

The fish consumption advisory listing for contaminants other than mercury was first issued in 2005. Table 4-10 shows the current fish consumption advisory for contaminants other than mercury with coastal counties in red.

Table 4-10
Special Fish Advisories

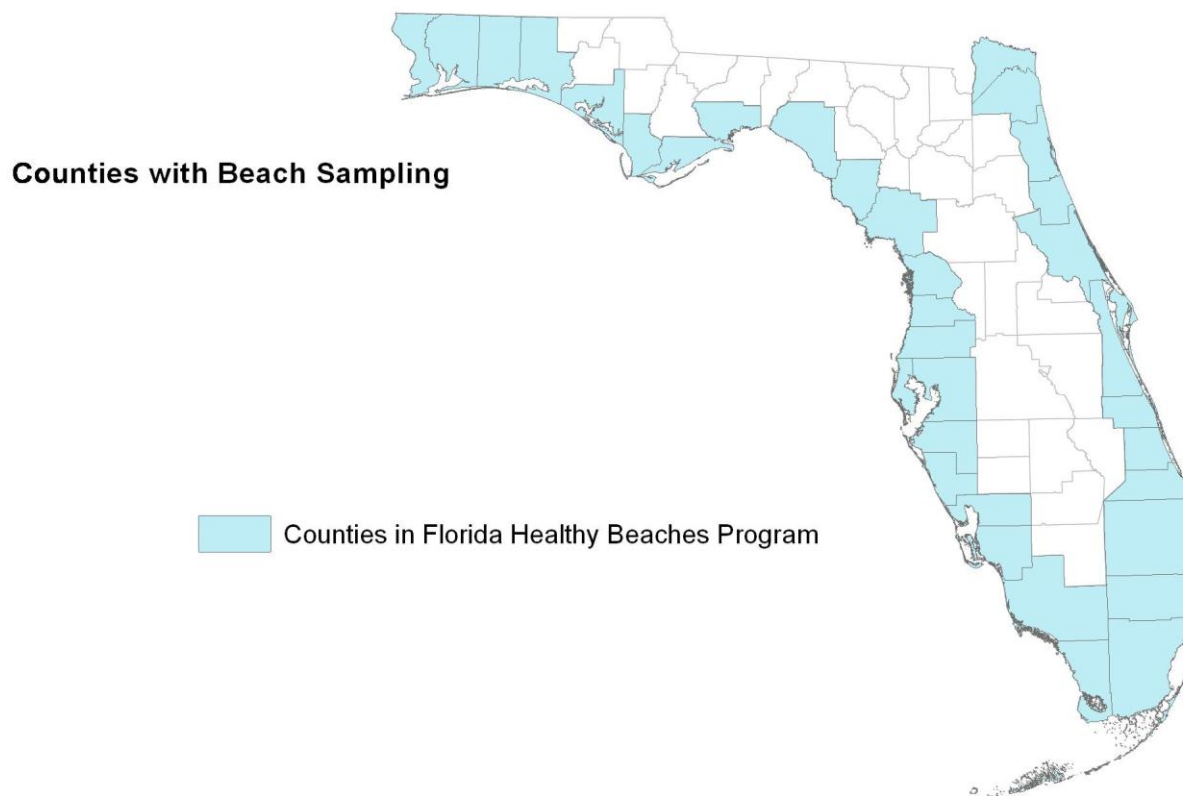
Body of Water	Contaminant	County	Species	Everyone
Emeralda marsh area 7	Pesticides	Lake	Largemouth bass, Bowfin, Gar, Brownbull Catfish	Do not eat
	Pesticides	Lake	Black crappie	One meal per month
Escambia river south of SR 184 to mouth of river	PCBs	Santa Rosa Escambia	Striped mullet (prepared without skin)	One meal per week
Escambia Bay: Upper and Lower	PCBs	Santa Rosa Escambia	Striped mullet (prepared without skin)	One meal per week
Lake Apopka	Pesticides	Orange Lake	Brown bullhead Catfish	Do not eat
Lake Munson	PCBs	Leon	Largemouth bass 19 inches or more	One meal per month
Wagner creek	Dioxin	Miami-Dade	Checker puffer fish or striped mojarra	Do not eat
Indian River Lagoon and all marine waters of the listed counties	Saxitovin	Brevard St. Lucie Martin Volusia Indian river	All puffer fish	Do not eat

Keep in mind that these advisories are not based on documented impacts on public health. The thresholds are conservatively designed to protect public from potential effects of exposure to mercury and other contaminants in fish tissue.

Indicator 4.7 - Healthy Beaches Water Sampling Program and Advisories by County

In 1998 five of the coastal counties began monitoring for enterococci bacteria. In August of 2000 the beach water sampling program was extended to all of the coastal counties except Jefferson, which has no beach access points (Figure 4-7).

Figure 4-7



Currently, the program samples for both fecal coliform and enterococci. DEP has a fecal coliform water quality standard for both fresh and salt water whereas, enterococci has been recommended by the U.S. Environmental Protection Agency as the best salt water bacteria indicator. If a sample and the follow-up resampling events both exceed either 399 units/100 milliliter for fecal coliform or 103 units/ 100 milliliter for enterococci an advisory is posted for that site.

Table 4-11 provides a ten year summary by year, by County, of the number of beach advisories issued. State-wide the highest number of advisories for a single year was issued in Okaloosa County in 2003 and 2005, but Escambia County has the highest total number of advisories for the entire 10 year time period.

Table 4-11
Number of Beach Advisories Issued by County, 2000 - 2010

County	Sampling Sites	'00	'01	'02	'03	'04	'05	'06	'07	'08	'09	'10	County Totals
Escambia	12	-	21	41	106	93	122	90	95	49	83	90	790
Santa Rosa	7	-	-	1	2	7	12	-	-	3	2	1	28
Okaloosa	12	-	2	32	160	136	163	60	120	17	43	47	780
Walton	9	-	1	-	1	7	4	-	-	-	-	-	13
Bay	10	-	4	22	74	29	51	48	44	18	13	23	326
Gulf	6	-	2	9	23	1	4	14	6	2	11	7	79
Franklin	6	-	-	1	32	75	67	32	84	134	59	5	489
Wakulla	2	-	11	15	31	24	76	33	41	74	25	9	339
Taylor	3	1	11	12	84	52	120	114	122	129	37	41	723
Dixie	1	-	-	-	5	15	43	46	51	52	19	7	238
Levy	1	-	-	5	3	20	18	13	20	15	7	3	104
Citrus	1	-	-	-	-	-	10	1	4	18	13	12	58
Hernando	1	-	-	2	1	10	11	-	2	-	1	2	29
Pasco	7	-	2	37	100	86	82	65	80	69	40	28	589
Pinellas	14	-	-	5	28	17	3	2	27	19	2	4	107
Hillsborough	9	-	1	16	44	21	7	5	6	2	11	6	119
Manatee	10	-	-	3	41	18	12	7	-	3	17	12	113
Sarasota	16	-	-	1	9	17	-	3	6	21	8	1	66
Charlotte	7	-	2	-	26	17	12	17	1	16	10	1	102
Lee	13	-	1	-	7	-	3	6	7	2	-	3	29
Collier	14	-	8	11	11	-	-	-	2	-	-	-	32
Monroe	17	5	13	42	61	83	97	89	80	49	46	59	624
Miami-Dade	17	-	1	13	11	13	4	11	3	18	19	19	112
Broward	15	-	-	-	7	1	5	1	1	1	-	24	40
Palm Beach	14	5	4	-	7	61	8	1	4	-	1	1	92
Martin	9	-	-	-	-	20	40	-	-	-	-	9	69
St. Lucie	4	-	-	-	-	-	-	-	-	-	-	-	-
Indian River	6	-	-	5	11	18	8	-	-	1	-	-	43
Brevard	9	-	-	-	-	-	-	-	-	-	2	4	6
Volusia	15	-	12	12	66	31	12	3	23	10	12	19	200
Flagler	6	-	-	-	-	-	-	-	-	-	-	-	-
St John's	7	-	-	-	1	2	-	-	-	-	-	-	3
Duval	10	-	-	-	2	-	-	1	-	-	-	-	3
Nassau	11	2	-	1	1	2	10	4	1	-	3	-	24
State Totals		13	96	286	955	876	1,004	666	830	722	484	437	

Figure 4-8 illustrates the number of advisories by County, by year, for the east coast of Florida. Volusia County has the highest number of advisories for the entire time frame and had the highest number of advisories in a single year in 2003. St. Lucie and Flagler Counties each did not have a single advisory for this time period.

Figure 4-8

East Coast Beach Advisories by County, 2000 - 2010

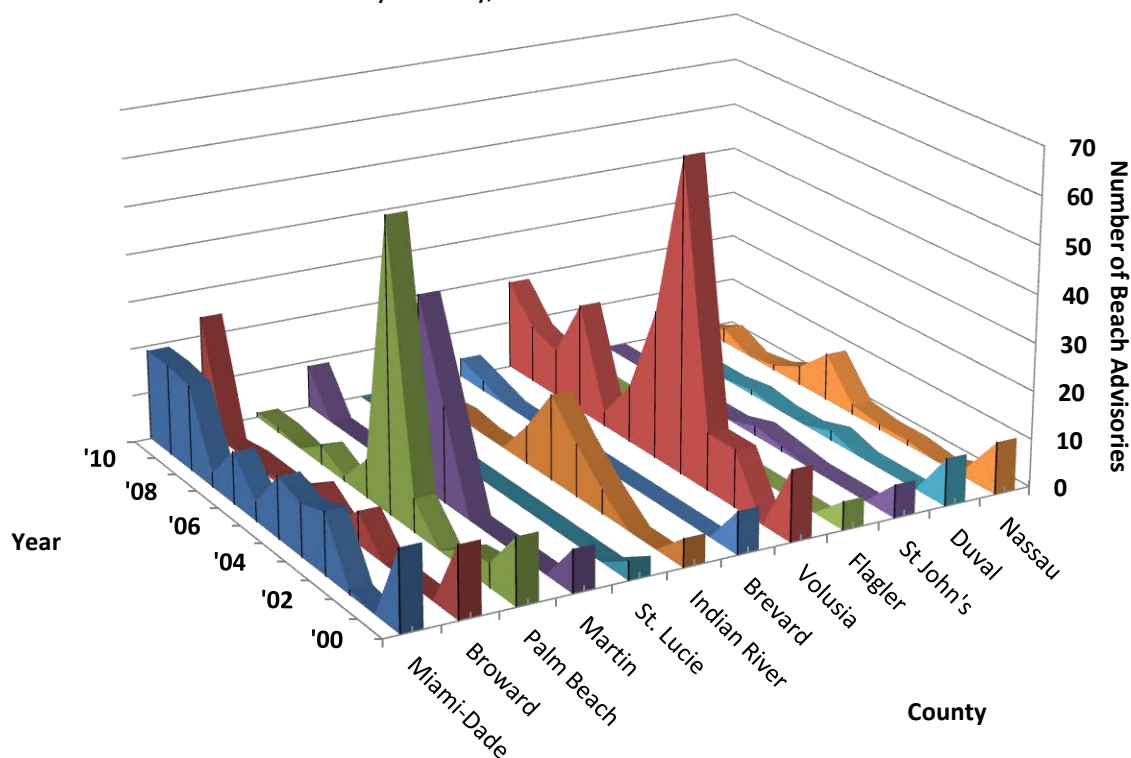


Figure 4-9 illustrates the number of advisories by County, by year, for the southwest gulf coast. Taylor County has the highest number of advisories for the entire time frame and had the highest number in a single year in 2008. Hernando and Lee Counties each had the lowest number of advisories for this time period in this region with only 29 advisories.

Figure 4-9

Southwest Coast Beach Advisories by County,
2000 - 2010

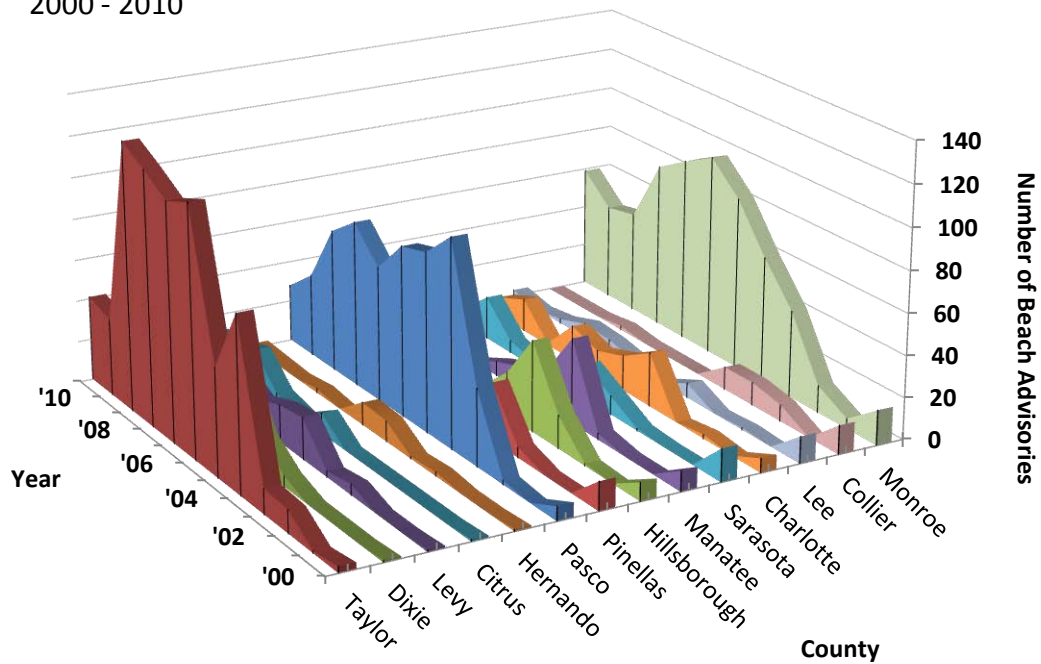
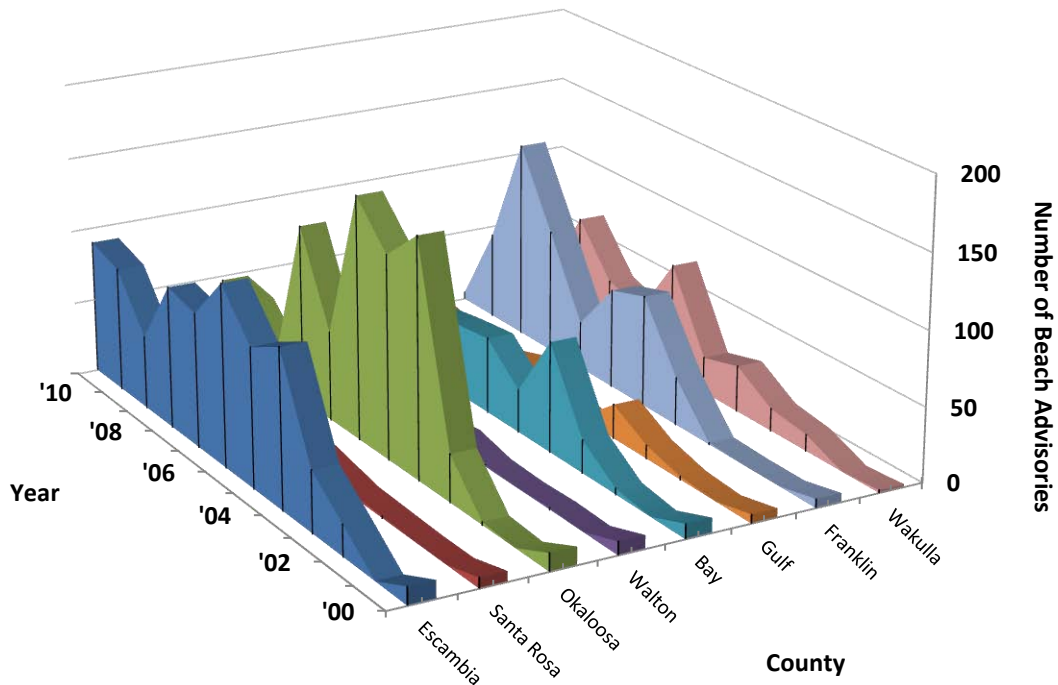


Figure 4-10 illustrates the number of advisories by County, by year, for the panhandle region of the state. This region reflects the state-wide highs with Escambia County having the highest number of advisories for the entire time period and Okaloosa having the highest number in a single year. Walton County had the lowest number of advisories for this time period in this region with only 13 advisories for the 10 year period.

Figure 4-10

Panhandle Beach Advisories by County, 2000 - 2010



Keep in mind that these advisories are not based on documented impacts on public health. The thresholds are conservatively designed to protect public from potential effects of exposure to bacteria.

Human health based sampling monitoring impacts from Deepwater Horizon oil spill

After the Deepwater Horizon Oil spill occurred in April 2010, Florida developed criteria for human health based screening levels so that chemicals of concern could be sampled and monitored. Sediment (beach sand) and water sampling was conducted from February 7, 2011 through August 25, 2011. There were two sediment sampling screening levels, one for short term exposure, another for long term exposure. Water quality screening levels were conservative, in that they were based on a shorter exposure time than standard EPA protocol, thus providing maximum protection for human health.

All coastal counties along the panhandle were sampled twice a month. No results were found to be above the set screening levels. The web site http://www.dep.state.fl.us/labs/cgi-bin/beach_health/index.asp was developed to provide public access to this data. Sampling was discontinued in September of 2011.

Indicator 4.8 - Major Algal Blooms and Red Tide Events

Harmful algal blooms are caused when naturally occurring single cell algae, or phytoplankton, undergo explosive growth. This sudden grow of algae can cause depletion of oxygen in the water through decomposition of the algae which can result in fish kills.

There are four basic harmful algal blooms that occur in Florida: red tide, cyanobacteria, saxitoxin and ciguatera. Saxitoxin and ciguatera blooms impacts may be more in the human consumption of fish that feed on the algae than from the blooms themselves. In 2002-2004 there were 28 cases of human illness linked to saxitoxin poisoning from consumption of puffer fish from the Indian river. Table 4-12 shows the reported poisoning cases from ciguatera resulting from consumption of fish with ciguatera toxins.

Table 4-12
Ciguatera Poisoning Cases in Florida, 2000 - 2010

Coastal County	'00	'01	'02	'03	'04	'05	'06	'07	'08	'09	'10	County Total
Nassau									13			13
Duval	3		1					6	1			11
Volusia					1							1
Brevard									1		1	2
St Lucie		2	2				1				1	6
Martin		3			1		1	1				6
Palm Beach	6	5	1	3		3	6	11	11			46
Broward	2	3		2			8	3	2	7	1	28
Miami-Dade	2		2	2	2		3	4	20	35	15	85
Monroe	1											1
Collier							7	3				10
Lee							3	1				4
Sarasota							1					1
Pinellas									1			1
Pasco										1		1
Hernando			1									1
Santa Rosa							1					1
Escambia							1		1			2
Non-coastal County												
Orange						7						7
Marion									3			3
Alachua										6		6
Leon											3	3
Annual Total	14	13	7	7	4	10	32	29	53	49	21	

Cyanobacteria, or blue-green algae, blooms occur in both fresh and salt water. Swimming in a blue-green algae bloom can cause skin irritation, hives, blisters, or a rash and the water should not be consumed. Red tide can cause eye, nose, and throat irritation if the sea spray mixed with red tide is inhaled. Symptoms usually disappear if the affected individual leaves the red tide area. Marine animals that filter sea water, such as oysters, from red tide areas should not be consumed. In 2005

there was an offshore benthic mortality event off Pinellas County affecting the patch reefs and resulting in fish kills. Red tide toxins and decomposition of the algae that resulted in depletion of oxygen in the water were indicated as probably causes for the environmental impacts.

In 1999 a conference was held regarding recommended sampling and responses to red tide outbreaks. Starting in 2001 sampling has been conducted on a monthly basis along both coasts of Florida to monitor for red tide outbreaks (<http://myfwc.com/research/redtide/maps>). Harmful algae response plans have been developed for all 67 county governments in the state providing guidance and instruction on what to do in the case of a harmful algal bloom. These plans are tailored to meet the needs of each county.

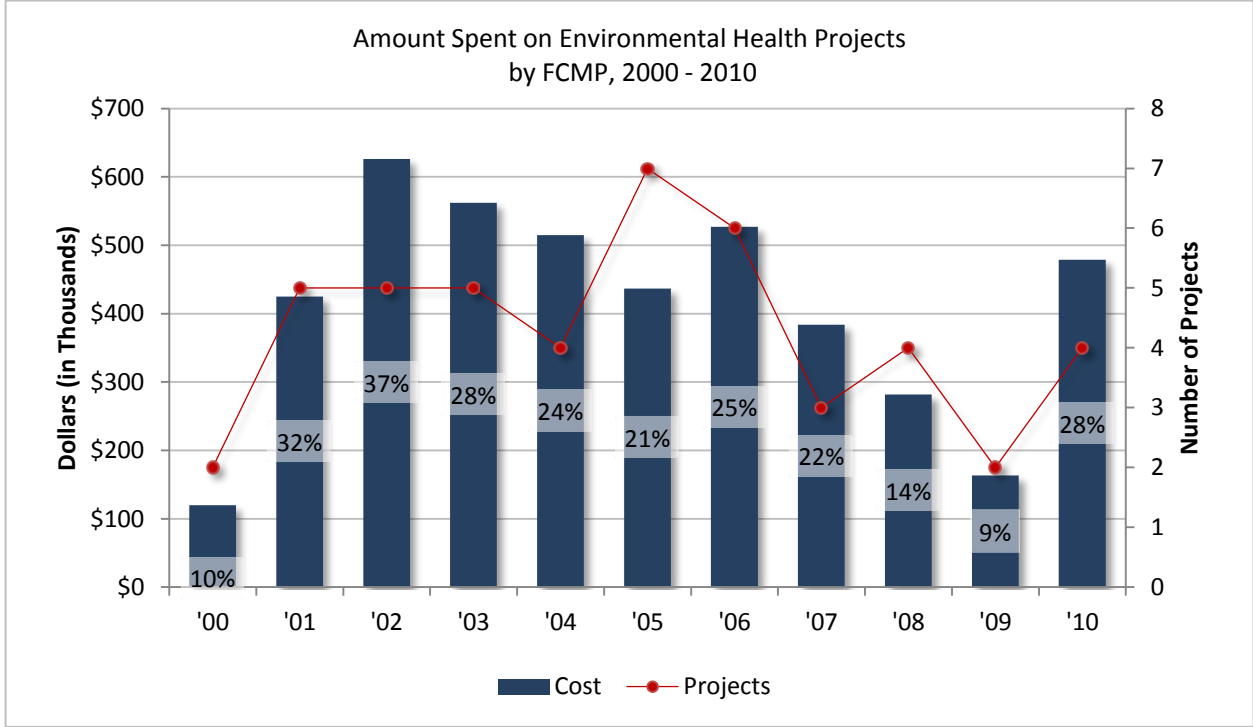
Indicator 4.9 - FCMP Grants to Improve Environmental Health

The FCMP administers the Coastal Partnership Initiative grant program and the State Agency and Water Management District grant program, <http://www.dep.state.fl.us/cmp/grants/index.htm>, which are competitive grant programs to support the protection, management, and enhancement of Florida's ocean and coastal resources. The annual grant funding for environmental health varied over time from \$120,000 to \$626,000 from FY 00-01 to FY 10-11 (Table 4-13) with a total of \$4,520,421 for this time period. Between 2000-2010 forty-seven environmental health projects, out of a total of 302, projects have been funded. The environmental health projects funded were selected from a pool of coastal partnership applications. Table 4-13 provides a summary of all project types funded between 2000 and 2010. Figure 4.11 illustrates the number of projects funded by year plus the amount of funding and percent of the total funding was granted to Environmental Health projects each year. Environmental Health projects received the second highest amount of the total funding for this time period, with only coastal habitats projects receiving more funding.

Table 4-13

Fiscal Year	Year	Funding	Total Funding	Percent of Funding	Projects	Total All Projects	Percent of All Projects
FY 00-01	'00	120,000	\$1,239,593	10	2	27	7
FY 01-02	'01	425,000	\$1,320,000	32	5	30	17
FY 02-03	'02	626,399	\$1,687,782	37	5	27	19
FY 03-04	'03	562,240	\$1,990,240	28	5	26	19
FY 04-05	'04	514,811	\$2,125,623	24	4	28	14
FY 05-06	'05	436,906	\$2,037,309	21	7	30	23
FY 06-07	'06	527,104	\$2,126,881	25	6	32	19
FY 07-08	'07	384,000	\$1,730,751	22	3	22	14
FY 08-09	'08	281,690	\$1,955,629	14	4	27	15
FY 09-10	'09	163,200	\$1,900,218	9	2	29	7
FY 10-11	'10	479,071	\$1,727,081	28	4	24	17
Total		4,520,421	\$19,841,107		47	302	

Figure 4-11



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Coastal Access



Executive Summary

The Coastal Access focus area is comprised of ten indicators (Table 5-1) to assess the level of service of coastal, public access opportunities provided to the residents and visitors of Florida. The essential element of coastal access is the balance between the supply (availability of facilities and natural areas) and the demand for the facilities and natural resources of the coastal zone of the state.

The state of Florida is fortunate to have extensive coastal resources and vast opportunities to access and enjoy these resources. While the number of activities in which people are engaged in Florida's coastal environment is extensive, this chapter mainly presents participation data on three of the most popular: use of sandy beaches, visitation and use of park lands, and recreational boating.

Table 5-1
Coastal Access Indicators

5.1	Number of Access Points
5.2	Number and Acres of Park Areas, Lands, and Trails Managed for Recreation
5.3	Number of Recreational Boating Facilities
5.4	Adequacy of Public Access and Ways to Improve Access
5.5	Frequency of Visits to the Coast
5.6	Types of Coastal Access and Number of Participants
5.7	Number of Visitors at Recreational Areas - State Parks, Greenways and Trails, Aquatic Preserves
5.8	Number of Visitors on Southeast Florida Reefs
5.9	Number of Recreational Boat Registrations
5.10	FCMP Grants and Programs to Improve Coastal Access

The popularity of Florida beaches can be gauged by the estimated 192 million visitor beach days and 500 million resident beach days spent at the coast each year. Beach access can be limited through a number of processes including: encroachment by adjacent property owners, conversion of public access points, a lack of awareness of public access locations (especially for non-local visitors), loss of beach frontage or dune walkovers due to erosion or storm events, and limited parking and facilities. As the density of coastal populations and the incidence of storm landfalls on the coast causing significant erosion has increased, there has been a loss of public access points to the beach. Nevertheless, as of 2010, there were 1,820 saltwater beach access points distributed along the 825 miles of sandy beaches in Florida, or slightly more than one access point every half mile.

According to the Florida Coastal Issues 2009 Survey, 84% of respondents perceive coastal access in Florida to be adequate. While this is a drop of 5% from the previous survey results in 1999, the overwhelming majority of Florida resident respondents were satisfied with the 2009 level of access to beaches. However, a shift in the frequency of visits to the beach was seen from 1999 to

2009 in which more residents are going to beaches less frequently than previously, e.g. monthly instead of weekly. The percentage of residents who said they never visit the beach also increased from 7% to 12%. Features that respondents said would encourage more visits to the coast included more of the following: parking, facilities, access points, and restrooms. The majority of residents identified four beach activities that they engaged in most along the shoreline: sunbathing, swimming or surfing, picnicking, and enjoying the environment (photography, birding, or shell-collecting).

The Florida State Park System is nationally renowned, and consists of a diverse landscape of opportunities to experience the wide range of environments in Florida. More than half of the parks are located along the coast, with water access to estuaries or beaches. An active land acquisition program has increased the acreage of State Park lands by 32% between 2001 and 2010 to a total of more than 700,000 acres. The Greenways and Trails program increased the network of local public trails and lands by more than 23,000 acres (42%) between 2000 and 2010 for a total of more than 87,000 acres. The 41 Aquatic Preserves, managed by DEP-Coastal and Aquatic Managed Areas (CAMA), encompass over 2 million acres of submerged lands and wetlands, mostly in the estuaries of the 8,460 miles of tidally-influenced coastline of Florida. A 1,500 mile circumnavigation saltwater paddling trail has been established for canoes and kayaks through launch sites and access points in the numerous national and state parks, aquatic preserves, and waterways along the entire 1,260 linear miles of Florida coastline. The ten years between 2001 and 2010 have seen State Parks, Aquatic Preserves, and other programs increase in the number of acres managed and facilities provided to support public access throughout the state.

The annual attendance at State Parks increased from 18.1 million to 20.4 million people annually between 2001 and 2010, for a total of more than 190 million visitors over ten years. District 4, Southwest Florida, grew in park attendance (33%) more than any other district. Attendance within District 4 increased from 4.5 million to 6 million annually between 2001 and 2010, for a total District attendance of 59 million visitors over nine years. Greenways and Trails reported steadily increasing numbers of visitors from 2002 to more than 4.5 million in 2010. The total number of visitors exceeded 21 million for the nine year period. The Aquatic Preserves reported over 3 million visitors over the period 2001 to 2010. The majority of visits to the Preserves occurred since 2004. Reported attendance in the Aquatic Preserves was over 650,000 in 2010. The increase in annual visits between 2002 and 2010 exceeded 800% for the Aquatic Preserves and 1400% for Greenways and Trails.

In 2009, recreational boating was more popular in Florida than any other state in the United States (State of the Coast, NOAA). Eighty-two million Americans participated in recreational boating, and more than 9 million (greater than 10%) of them were Floridians. Of the 12.7 million boats in the United States in 2009, most (934,367) were registered in Florida (USDOT & FDOT). The number of registered recreational boats increased statewide steadily from 2000 to 2007, with a peak of nearly 980,000 registrations in 2007. In 2008 and 2009, successive years of decreases were seen amounting to a drop of 45,000 total registrations, or 4.5% from 2007. The total additional number of boats in Florida between 2000 and 2009 was over 108,000, averaging nearly 11,000 per year. Six counties (Miami-Dade, Pinellas, Broward, Lee, Hillsborough, and Palm Beach) account for 30% of

all boats registered in the state, with vessel populations of 40,000 to 60,000 in each county. Eight counties accrued more than 4,000 additional boats each between 2000 and 2009 (Miami-Dade – 7020, Pasco – 5794, Lee – 5446, Lake – 4630, Citrus – 4539, St. Johns – 4142, and Brevard – 4121, and Volusia – 4043). The percentage change of newly registered boats was greater in certain counties (Flagler – 67%, Jefferson – 65%, and Sumter – 58%), but these large increases occurred in counties which had relatively small initial vessel populations. Three counties (Duval, Orange, and Pinellas) showed decreases in the total number of annual registered recreational boats between 2000 and 2009 (-2200, -3160, and -660), respectively. The statewide total increase in annual boat registrations between 2000 and 2009 was 13%.

The Division of Recreation and Parks maintains an inventory of recreational resources statewide. The database includes the quantities of 74 resource-based and user-oriented recreational items in each county, and the associated provider, e.g. federal, state, municipal, or private. A number of these resources are supportive of recreational boating in Florida. For example, there are 932 saltwater and 1,692 freshwater boat ramp sites, statewide. There are also 45,475 saltwater and 11,233 freshwater boat slips and over 149,000 linear feet of saltwater pier and nearly 93,000 linear feet of freshwater pier in Florida. Such an inventory is important in planning for facility additions to maintain the level of service appropriate to an area's access needs.

The FCMP attempts to provide balanced means to enhance access to the coastal Florida environment without allowing damage to the natural characteristics found there. The annual allocation of funds for coastal access through projects statewide ranged from \$159,410 to \$586,325 from FY 2000 through FY 2010 for a total of \$3.9 million. A total of 72 coastal access projects have been supported over the last eleven years.

The FCMP also administers an outreach program for beach safety and awareness providing access signs and warning flags to local governments and other entities to assist the public in identifying beach access locations and being aware of coastal hazards. A total of 1,501 beach access signs, 3,516 warning flag signs, and 4,969 rip current signs have been distributed to city, county, and state parks between 2004 and 2010.

Coastal Access Program Goals

Coastal access involves the ability of the general public to reach beaches and other public recreational and natural environments in the coastal zone. In Florida, the foreshore, wet sand beach between the mean low tide and mean high tide, belongs to the public. The legal right of the public to use this portion of the coast is referred to as “public trust rights.” The public trust doctrine gives the state of Florida ownership of the coast up to the mean high tide line to hold for the benefit of all citizens; however, these rights can only be exercised if the foreshore can be reached. In some locations, private development along the shore forms a legal and physical barrier, and blocks access to the public trust zone of the coast. Public access to the coast is not limited to sandy beaches, but includes the ability to enjoy all the natural, historical, cultural and recreational resources of the coastal zone.

Human population, tourism, and development of coastal properties in Florida have all been increasing over time. The demand for coastal access corresponds directly to changes in population magnitude and density, tourist visitation, and the presence and attractiveness of natural and recreational areas. In some areas, beachfront has been privatized and public lands have been converted to other uses. As a result, the demand for access has been escalating, while public accessibility has been decreasing.

Balancing the sustainability of sensitive habitats with the various human uses of the coastal zone is an important issue for coastal management programs. To ensure there is adequate access to coastal resources, it is important to inventory the supply of access points, continuously monitor and maintain facilities and amenities, plan for current and projected access needs, and identify potential funding sources to support enhancing and developing additional access sites. While understanding and increasing the supply of coastal access points is important, a fully adequate system of access can be under-utilized if there is a lack of awareness of the types and locations of the points of access.

The primary objectives of managing public access include providing sufficient land area and points of access to meet the resident and visitor demand for Florida’s natural resources and increasing the public awareness of the access opportunities in Florida. In order to address the complex issues involved with access to Florida’s coastal resources, the Florida Coastal Management Program (FCMP) developed the following two goals:

- 1) To provide and enhance public access to natural, historical, cultural, and recreational coastal resources that does not damage or degrade these resources.
- 2) To promote and enhance community awareness of public access points, as well as the rights and responsibilities surrounding access.

These coastal access goals correspond with the Florida State Comprehensive Plan (Chapter 187, F.S.) “to ensure the public’s right to reasonable access to beaches.” The FCMP goals are also in accord with NOAA’s strategic framework for the Coastal Zone Management Program that identifies “providing public access to the coast” as a priority issue. The FCMP devotes technical and

financial resources to achieve its coastal access goals. Significant FCMP funding is provided to local governments and partner entities through Coastal Partnership Initiative grants to improve coastal access. The grants have provided funding for a variety of coastal access projects, including picnic facilities, trails, dune walkovers, park facilities, paddling guides, and informational kiosk and signage.

The focus area of coastal access consists of several aspects which categorize the indicators used to measure the progress and degree of change occurring in relation to public access. The indicators of coastal access fall into three categories:

- A. Supply of Coastal Access**
- B. Demand for Access to Coastal Resources**
- C. Programmatic Activities Related to Public Access**

Barrier Island Management & Education Center, Brevard County, Florida

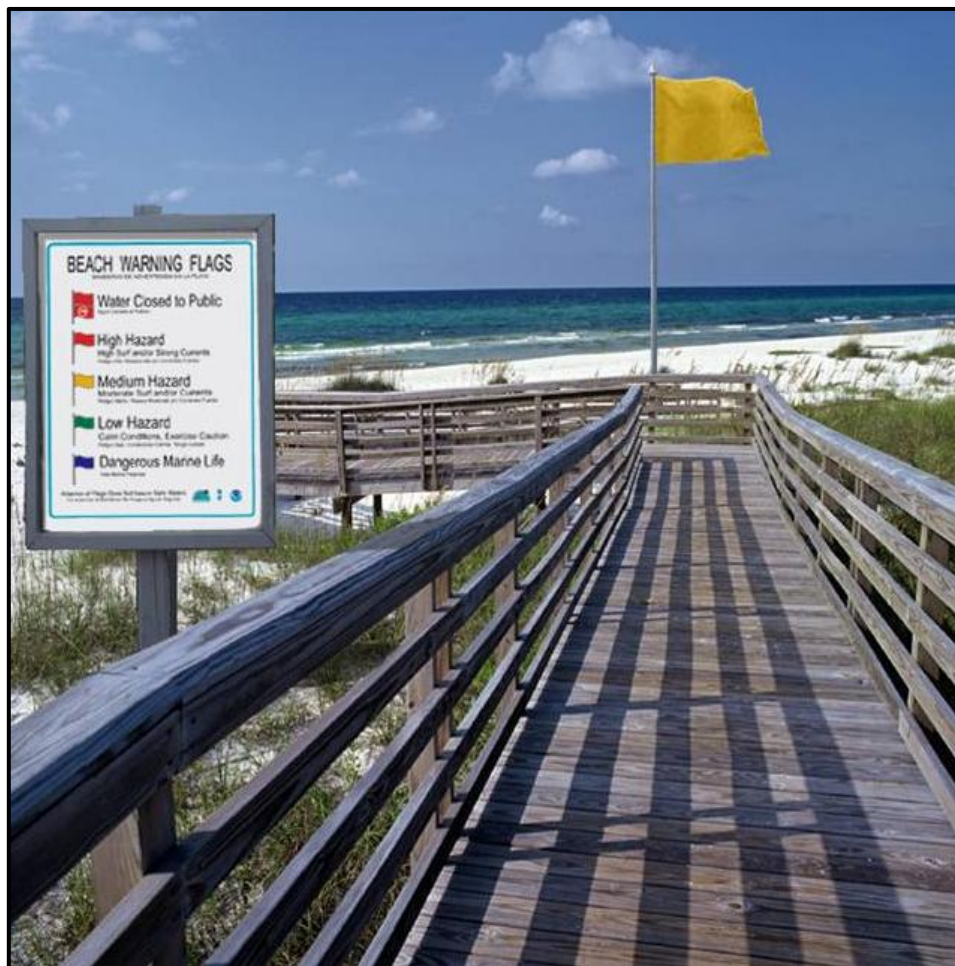


FCMP has partnered with Brevard County in numerous public access and stewardship projects.

A. Supply of Coastal Access

Public access to coastal lands and beaches in Florida did not become a matter of concern until the increase in population growth and land development after World War II. Availability of access to shorelines for outdoor recreational use was identified as a national priority in 1962 by the Outdoor Recreation Resources Review Commission, which spurred the creation of the Land and Water Conservation Fund in 1965 for the purchase of property for beach access and beach parks. This led to the acquisition and designation of Gulf Islands National Seashore and Canaveral National Seashore in Florida the 1970s. In the 1980s, state public land acquisition programs became more active with initiatives such as the Save Our Coast program.

Numerous efforts have been made to inventory the access points to coastal resources, and to disseminate this information to the public. Maintaining an inventory of access points over time is a difficult task to manage. Public access is continually changing due to coastal erosion, privatization of land and conversion to other uses. Beach access is continually in flux with the changing landscape of population growth and development.



Indicator 5.1 - Number of Access Points

The FCMP published the “Florida’s Sandy Beaches – An Access Guide” in 1985, and updated the inventory in the 1995 report “Public Access to the Florida Coast.” In 2012 the FCMP completed an update to the access guide, which provides access information in GIS format. A website was also developed to better distribute the information to Florida residents and tourists. The website is an interactive state-wide beach access guide that details the locations and amenities of the numerous sandy beach points of access for three regions of the state: Panhandle (from Escambia County to Citrus County), Gulf (from Hernando County to Monroe County) and Atlantic (Nassau County to Miami-Dade County). The 2012 updated Coastal Access guide is available at <http://www.dep.state.fl.us/cmp/beachaccess/default.htm>.

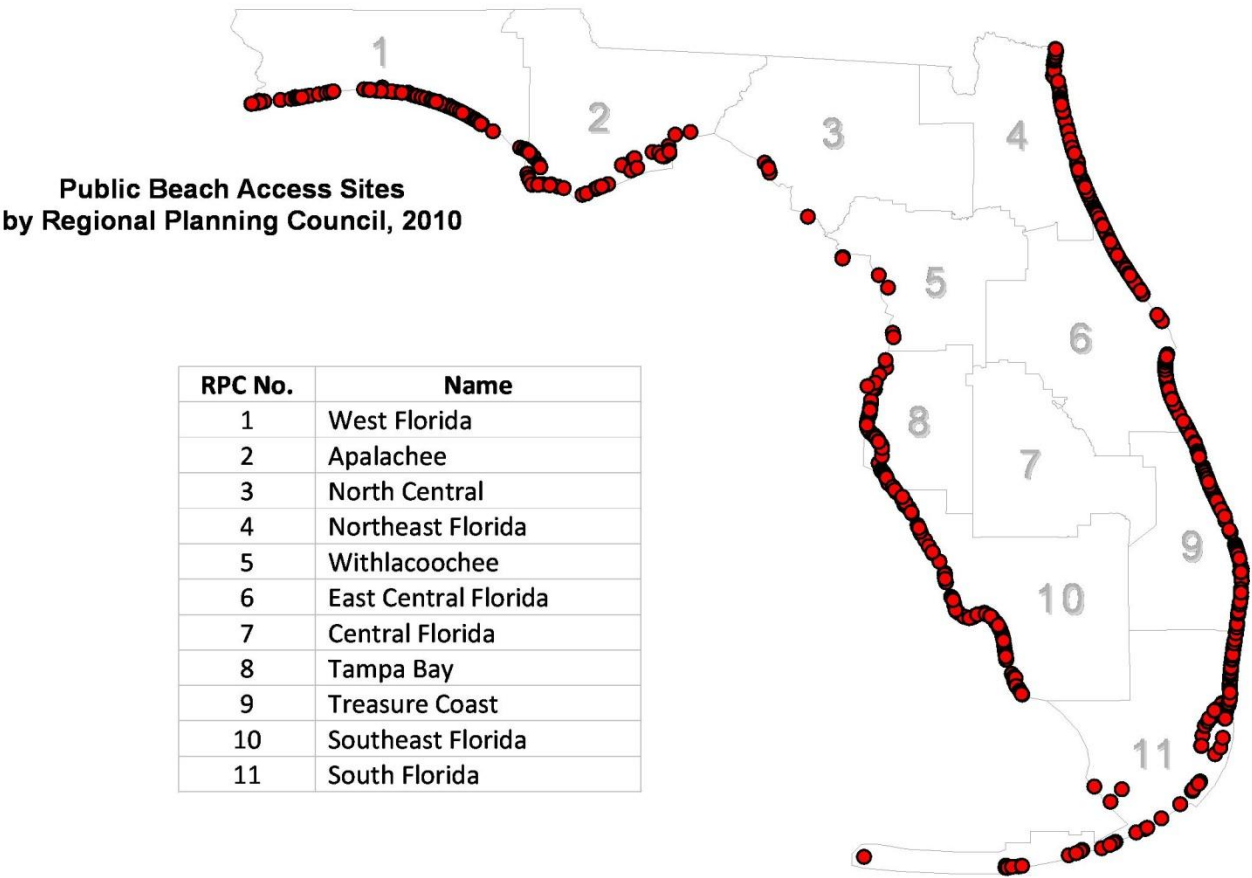
The 2000 Florida Assessment of Coastal Trends Report (FACT) reported 33% of Florida’s 825 miles of sandy coastline was in public ownership, with 274 linear miles of accessible beach and an estimated 1,692 access points. Of the total number of beach access points, Atlantic beaches accounted for 1,021 access points (including Monroe County) and the Gulf Coast 671 access points. Based upon recent information, the beach access points located along the Gulf of Mexico have increased by 163 beach access points for a total of 834 while the access points on the Atlantic have increased by 287 for a total of 1,308 access points (Table 5-2). Therefore the total number of access points increased from 2000 to 2010 from 1,692 to 2,142 showing a 26.6 percent change. Table 5-2 Number of Access Points distributed by Regional Planning Council Boundaries.

Table 5-2

Gulf Access Points			Atlantic Access Points		
	2000	2010		2000	2010
Region 1	231	286	Region 4	372	344
Region 2	95	99	Region 6	320	363
Region 3	2	5	Region 10	162	246
Region 5	4	7	Region 11	167	355
Region 8	190	236			
Region 9	149	201			
Total	671	834	Total	834	1,308

Figure 5-1 shows the locations for coastal access along the coast of Florida. The central portion in the Big Bend is an area with few sandy beaches, large stretches of mangrove and salt marsh coastline, and large areas of shallow soft bottom sediments with extensive submerged seagrass beds. The other areas around the state have numerous beach and public access points to meet the high demand for recreational use of the waters in state.

Figure 5-1
Public access points along the Gulf of Mexico shoreline and Florida Keys



According to DEP Division of Recreation and Parks data from the Statewide Comprehensive Outdoor Recreation Plan (SCORP) 2000 and Outdoor Recreation Planning (ORP) Inventory, October 2010, the total number of saltwater beach access points decreased 3.3% from 1,883 to 1,820 statewide between 1998 and 2010 (Table 5-3).

Table 5-3
Number of Saltwater Beach Access Points in 1998 and 2010

Resource	Unit	1998	2010	Percent Change
Saltwater Beaches	Number of Beach Access Points	1,883	1,820	-3.3

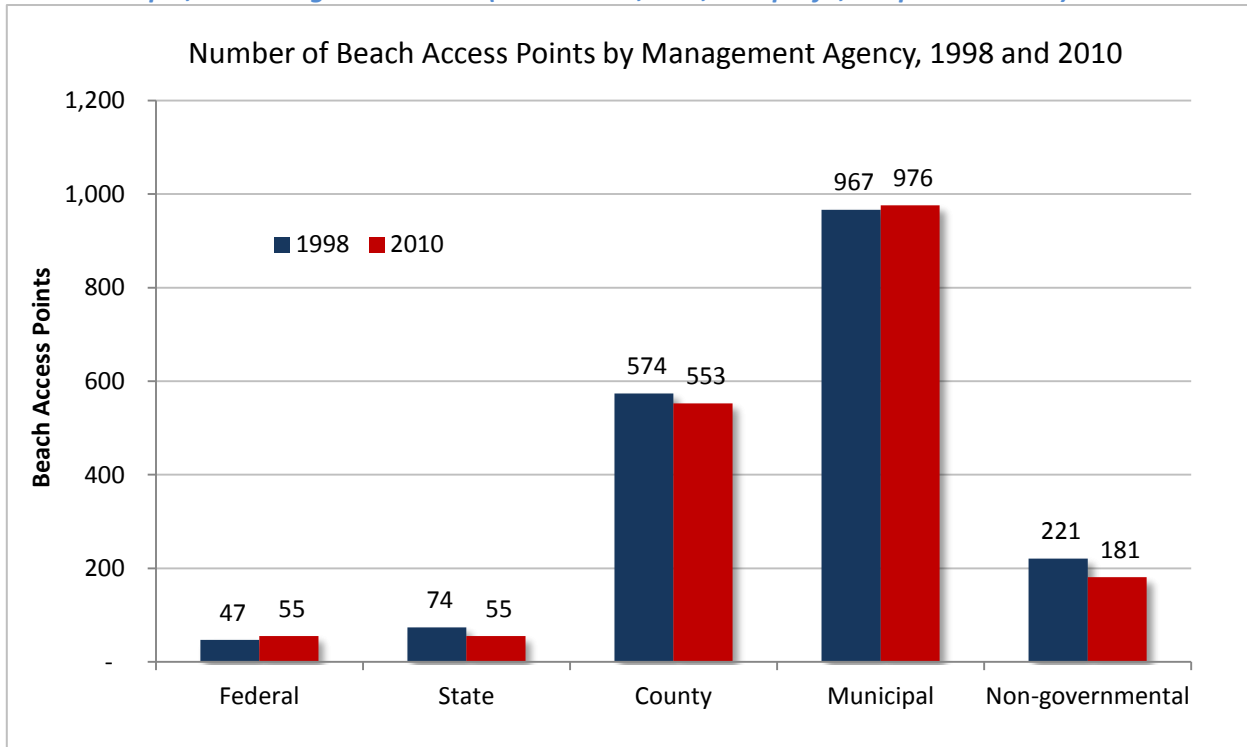
Source: SCORP 2000 and ORP Inventory, October 2010

When the access points are categorized by management agency (Figure 5-2), the majority of the loss is found in the state and non-governmental beach access points (-25.7% and -18.1%, respectively). Non-governmental beaches, which include commercial, club, non-profit, and special district shoreline, decreased by 40 access points from 221 to 181. Municipal beaches represent the greatest source of public access to sandy saltwater shoreline, accounting for 54% of the total number of coastal shore access points (976) in 2010. County beaches represent 30% of beach

access, and decreased by a total of 21 access points between 1998 and 2010. This data is obtained through volunteer participant's input. Therefore, the decrease in access points may reflect a decrease in voluntary reporting rather than a decrease in access points.

Figure 5-2

Number of beach access points in 1998 and 2010 categorized by provider: federal, state, county, municipal, and non-governmental (commercial, club, non-profit, or special district) shoreline.



Source: SCORP 2000 and ORP Inventory, October 2010

Table 5-4 shows the change in number of saltwater beach access points by regional planning council divisions between 1998 and 2010. Sixty-three fewer beach access points were listed on the statewide Outdoor Recreation Planning (ORP) inventory in 2010 compared to 1998. Losses were seen in every region, except North Central Florida (Region 3), which has only three sandy beaches. Southwest (Region 9) and South Florida (Region 11) saw the greatest number of access points lost, 18 and 12 respectively. Region 5, Withlacoochee, lost 2 of its 7 beach access points, or 22%. Region 2, Apalachee, decreased in number of saltwater access points by 12%. Regional Planning Council region 7 consists of all non-coastal counties, and has no saltwater beach access.

Table 5-4
Number of Saltwater Beach Access Points by Regional Planning Council

RPC	1998	2010	Numeric Change	Percent Change	Region
1	277	274	-3	-1.1	Panhandle
2	51	45	-6	-11.8	Panhandle
3	3	3	-	-	Panhandle
4	210	208	-2	-1.0	Atlantic
5	9	7	-2	-22.2	Panhandle
6	285	278	-7	-2.5	Atlantic
7	-	-	-	-	-
8	335	330	-5	-1.5	Gulf
9	233	215	-18	-7.7	Gulf
10	205	197	-8	-3.9	Atlantic
11	275	263	-12	-4.4	Atlantic
Total	1,883	1,820	-63	-3.3	-

Source: SCORP 2000 and ORP Inventory, October 2010

Indicator 5.2 - Number and Acres of Park Areas, Lands, and Trails Managed for Recreation

The Florida Division of Recreation and Parks maintains information on the public access opportunities and location of the 160 State Parks (www.floridastateparks.com). The information provided is for the entire State of Florida; however, the majority of the state parks (129) are located along the coast. The Division of Recreation and Parks publishes the Statewide Comprehensive Outdoor Recreation Plan or SCORP (most recently in 2008), a catalogue, assessment, and planning document of outdoor recreation (public access) in Florida. The data for these reports is available online in the ORP Inventory database (http://appprod.dep.state.fl.us/www_orp/Total/Total_Q.asp), which describes all Park and Recreation facilities and their locations.

The Florida State Park system (Figure 5-3), as of 2010, consists of 160 parks, recreation areas, preserves, and special sites spanning over 700,000 acres. The 100 miles of sandy beaches and numerous rivers, springs, natural areas provide access and vast opportunities for residents and visitors to enjoy Florida's coastal resources such as swimming, boating, paddling, fishing, birding, hiking, biking, camping, and enjoying archeological and cultural activities. This is only a partial list of numerous services provided by the Florida State Parks, which manage a substantial portion of the public access opportunities throughout the state. Nationally, the Florida State Park System is considered exemplary, and twice has been awarded the Gold Medal rating, in 1999 and 2005 (the only State Park system to have done so twice).

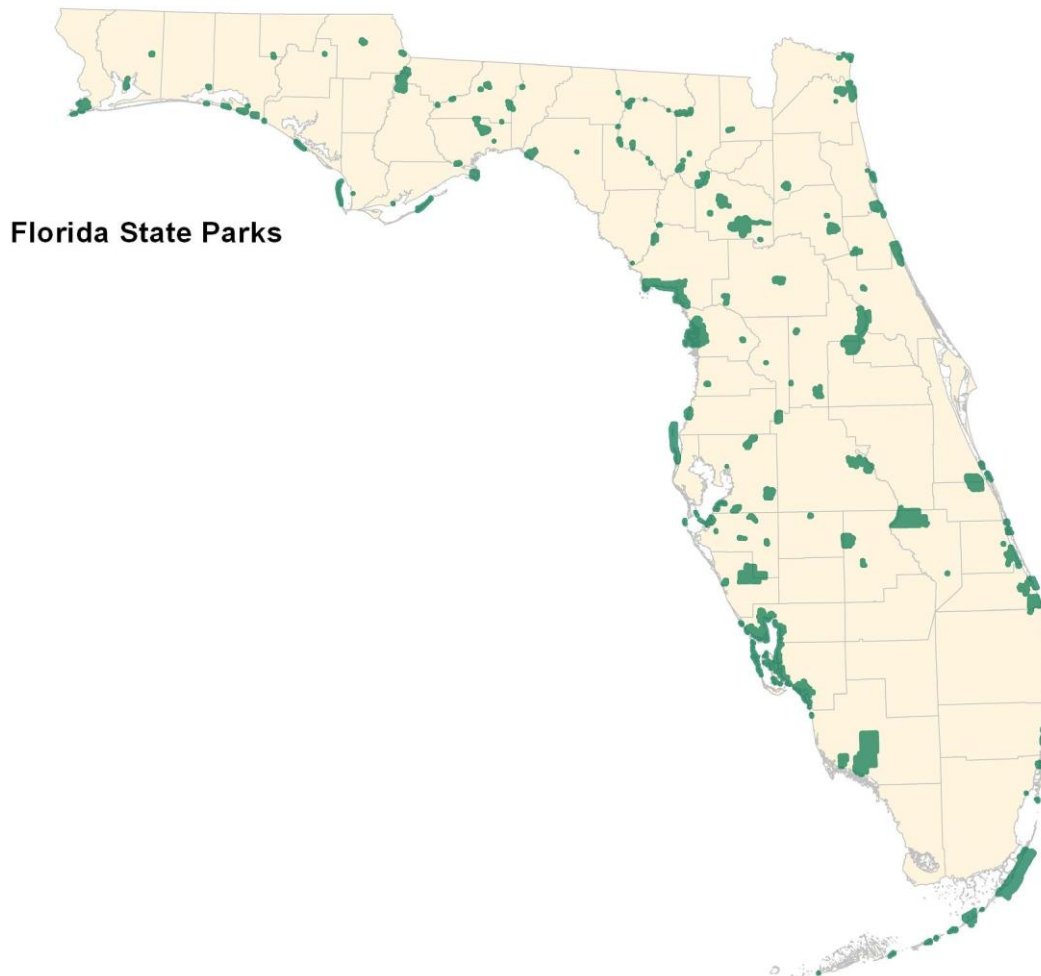
Since the time of the Civil Conservation Corps in 1933, land acquisition has been an important part of conservation of natural resources and management of the parks. The State Park system has continued an active acquisition and expansion of public lands through time. In 1963, the Land Acquisition Trust Fund was established to support land additions and growth of public access and use of Florida natural resources. Since that time, the state has implemented several substantial land acquisition programs including: the Conservation and Recreation Lands (CARL) program in 1979; Save Our Coast and Save Our Rivers programs in 1981; and the Florida Preservation 2000 program in 1990. The \$3 billion Florida Preservation 2000 Trust Fund was enacted to invest in public lands acquisition over ten years in annual bonded disbursements of \$300 million. Approximately three percent of these funds were directly designated for State Park additions.

In 1999, the Florida Legislature created the Florida Forever Program. The goals of the Florida Forever Program extend beyond land acquisition and include environmental restoration, water resource development and supply, increased public access, public lands management and maintenance, and increased protection of land by acquisition of conservation easements. The Florida Forever Program is funded under similar monetary terms (\$300 million over ten years for a total of \$3 billion), and has been instrumental in conserving a variety of habitats and special areas as well as providing public access opportunities. For the Florida Forever Program, the allocation for funds was changed to distribute 1.5% for State Park additions, 1.5% for Greenways and Trails, and

2% for development of recreational facilities. In 2008, the Florida Forever Program was extended through 2020, at the same funding level. Information on the history of lands acquisition can be found at the DEP Division of State Lands (<http://www.dep.state.fl.us/lands/history.html>).

Figure 5-3

The Florida State Park System consists of 160 public parks of which 70% are located in coastal counties and 129 have water access. More than 55% of all state parks in Florida are located on ocean or estuarine frontage. Total acreage in 2010 exceeded 704,000 acres.

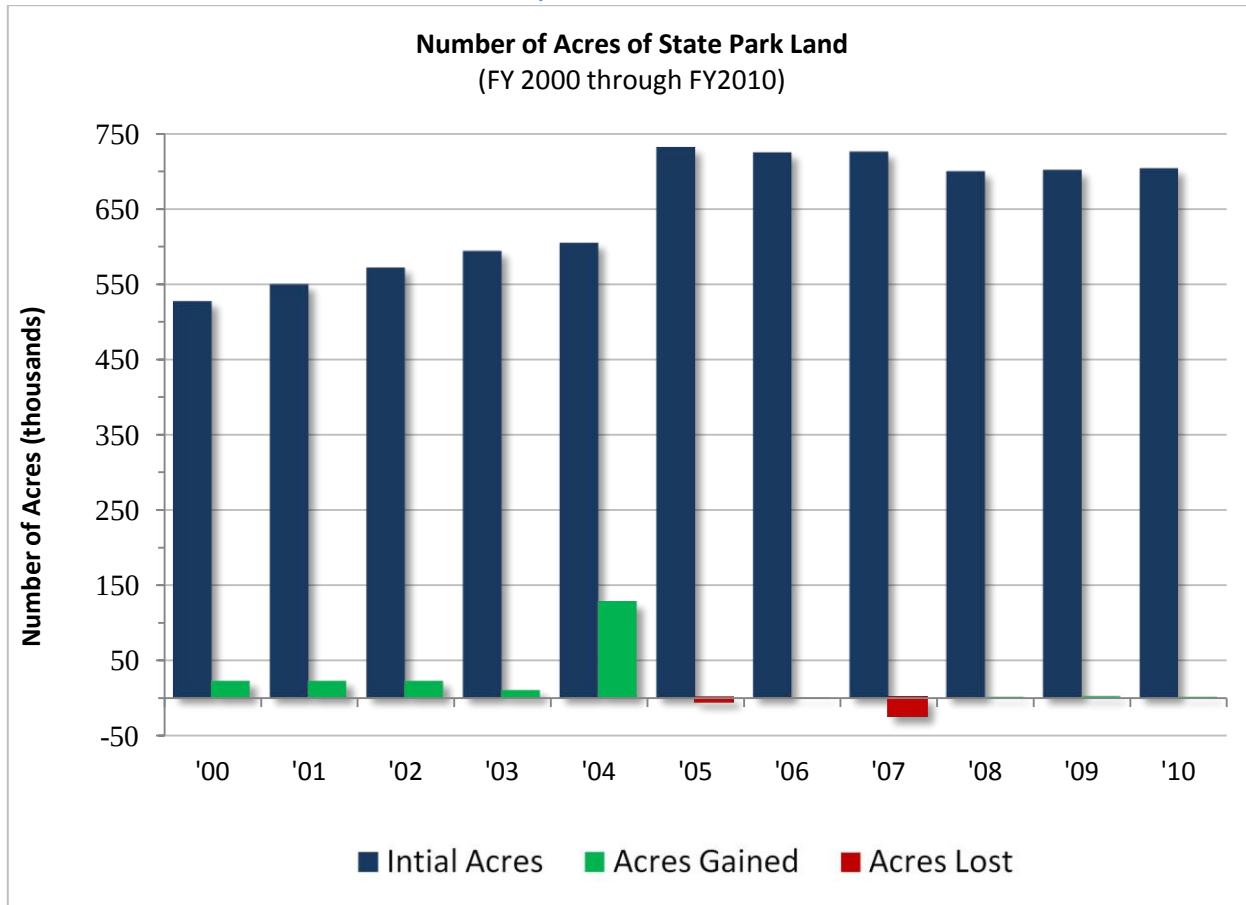


The number of acres of State Park lands has increased substantially from 548,977 acres in 2000 to 704,139 acres in 2010, primarily due to a large increase (126,620 acres) in 2004 (Figure 5-4). This area is split between 84% upland acreage and 16% submerged acreage. In 2009, the amounts of upland and submerged lands were 589,910 acres and 112,820 acres, respectively (Data from the DEP Office of Park Planning, Jurisdiction Report Update; July, 2009). The first half of the decade showed larger annual land acquisitions (1.8% to 4.2%, plus the 21% increase in 2004). The latter half, from 2005 to 2010, showed minimal increases (< 1%) or losses in lands managed as State

Parks. State Park lands have reduced from a peak of 730,573 acres in 2005 to the 2010 level of 704,139 acres. A total of 177,463 acres were added to State Park lands from FY 2000 to 2010. Most years showed positive changes in park land acreage; although, negative changes occurred in two years (2005 and 2007). The loss in land in 2007 was from a transfer of the 34,060 acre Tosohatchee Reserve State Park to Fish and Wildlife Conservation Commission management.

Figure 5-4

The number of acres of State Park lands increased 177,463 acres (32%) from 548,977 acres in 2000 to 704,139 acres in 2010.



Greenways and trails play a critical role in meeting the demand for public access to Florida's coastal resources. The DEP Office of Greenways & Trails works with local governments, developers, private landowners, and state and federal agencies to establish a statewide system of greenways and trails for recreational and conservation purposes (Figure 5-5). Currently, 769,603 acres (public and private lands) are designated as part of the state's greenways and trails system.

The Office of Greenways & Trails manages funds for the development of trails and facilities on state managed properties. The acquisition program for greenways and trails is a component of the Florida Forever Trust Fund, and receives \$4.5 million dollars annually. A total of 26,618 acres of greenways and trails were acquired for the Greenways and Trails network between FY 2000 and

2010, increasing in area by 36.4% from 64,327 acres to 87,768 acres (Table 5-5). Additions to greenways and trails remained less than 4% prior to 2006, with the exception of FY 2001, which had an increase of 20% of the total number of acres. Fiscal Year 2007 showed greatly reduced acquisition activity (< 1%), and near zero activity was seen for Fiscal Years 2008 through 2010.

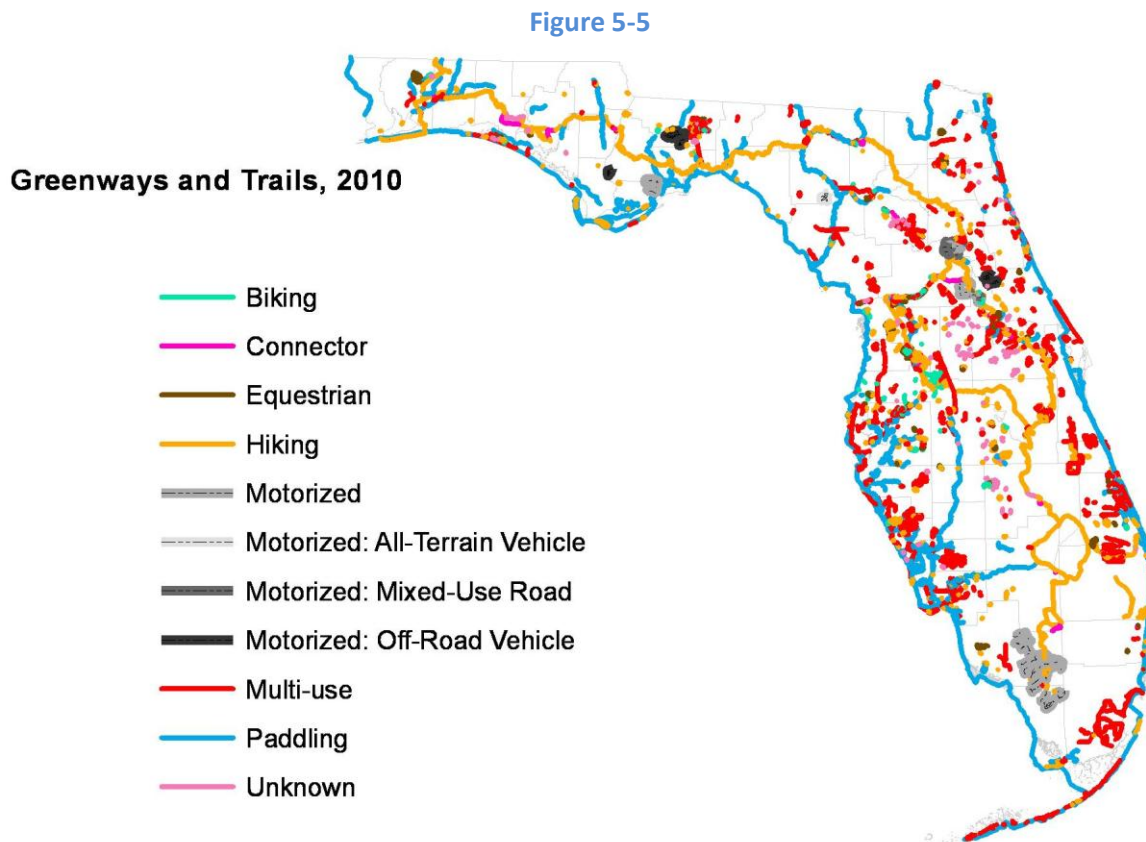


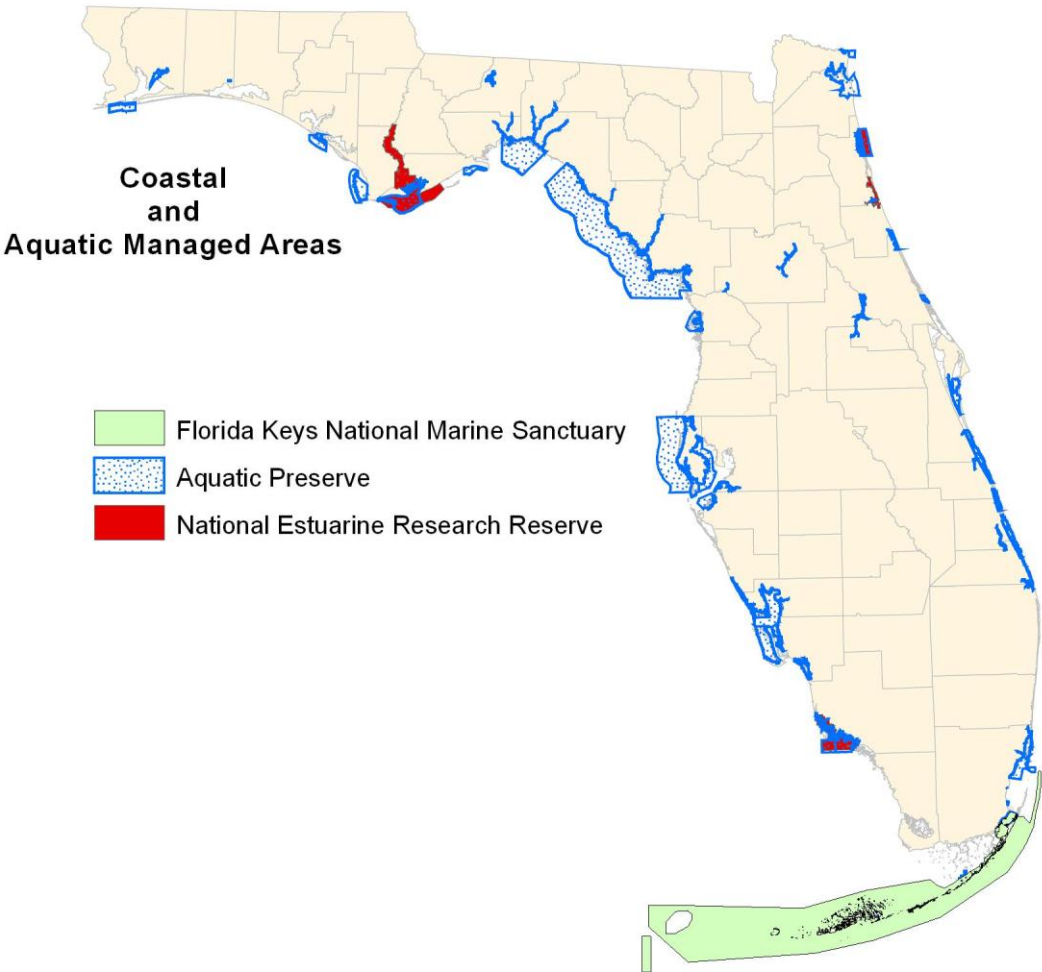
Table 5-5
Acres managed by the Office of Greenways & Trails. 26,618 acres were acquired for the Greenways and Trails network between FY2000 and 2010.

Fiscal Year	Acres Acquired	Total Acres
'99-'00	2,177	64,327
'00-'01	12,981	77,308
'01-'02	588	77,896
'02-'03	2,210	80,106
'03-'04	2,041	82,147
'04-'05	2,948	85,095
'05-'06	1,943	87,038
'06-'07	-16	87,022
'07-'08	715	87,737
'08-'09	5.22	87,742
'09-'10	25.52	87,768
Total	26,618	

In 2005, the State began to establish the 1,500 mile sea kayaking trail, the Florida Circumnavigational Saltwater Paddling Trail, which passes through 37 coastal preserves, 20 national parks and wildlife refuges, and 47 state parks. The Florida Circumnavigational Saltwater Paddling Trail is divided into 26 segments which includes every Florida coastal habitat type, from barrier island dune systems to salt marsh to mangroves. Information on the saltwater paddling trail can be found at DEP's Office of Greenways & Trails website (<http://www.dep.state.fl.us/gwt/paddling/saltwater.htm>).

The DEP Office of Coastal and Aquatic Managed Areas (CAMA) manages more than 4 million acres of the most valuable submerged lands and select coastal uplands. In 1975, the Aquatic Preserve Act was enacted to protect coastal areas so that "their aesthetic, biological, and scientific values may endure for the enjoyment of future generations." The aquatic preserves are one way in which the state has designated areas of coastal use to sustain the unique natural resources and functional ecosystems in coastal waters. CAMA manages 41 aquatic preserves and, in coordination with the National Oceanic and Atmospheric Administration, three National Estuarine Research Reserves [Rookery Bay NERR - 96,277 acres, Apalachicola NERR - 238,079 acres, Guana Tolomato Matanzas NERR - 73,352 acres] and the Florida Keys National Marine Sanctuary [2,900 square nautical mile] (Figure 5-6). These areas are open to recreational public access, and have seen rapidly increasing attendance since 2004 (see Indicator 5.7).

Figure 5-6



Indicator 5.3 - Number of Recreational Boating Facilities

Boating is a very popular recreational activity in Florida and is a significant element of coastal access. Over one-half of Florida residents and one-quarter of out-of-state visitors, or over 25 million people, participated in recreational boating activities in 2000. In 2007, there were an estimated 21.7 million recreational boating trips taken in Florida (Florida Fish and Wildlife Conservation, Boating Access Facilities Inventory and Economic Study, 2009). Economically, this translates to \$8.5 billion in expenditures, \$3.1 billion in labor income, and an additional \$5.3 billion in economic value with indirect business taxes amounting to \$726 million, and an equivalency of 97,000 boating related jobs annually. (Florida Fish and Wildlife Conservation, Boating Access Facilities Inventory and Economic Study, 2009)

Managing and supporting the demand for water access requires accurate information on the condition of existing facilities and their use. Through the Blueways Initiative, the FCMP has supported the development of boating characterization studies to describe the availability, use, and condition of boating facilities. In October 2005, the Florida Sea Grant published the “Recreational Vessel Registration Atlas 1996-2004,” which identified the distribution of recreational boats throughout the state. Successive regional studies have provided detailed characterizations of boat ramp and coastal waterway usage, boating preferences, travel patterns, and boater perceptions of boating detractions and needs through surveys, site visits, and modeling for the recreational water areas of Tampa Bay, Sarasota Bay, Greater Charlotte Harbor, Lee County, Manatee County, Sarasota County, Brevard County, Bay County, and Collier County from 2001 through 2009.

Both the Florida Fish and Wildlife Conservation Commission and the DEP Division of Recreation and Parks have developed statewide databases of facilities supporting recreational water use. As described in Indicator 5.2, the Division of Recreation and Parks maintains the ORP Inventory database (http://appprod.dep.state.fl.us/www_orp/Total/Total_Q.asp), which describes all Park and Recreation facilities and their locations. In 2006, the Division of Recreation and Parks and Florida Fish and Wildlife Conservation Commission published the report “Recreational Boating Access in Florida State Parks” (<http://www.dep.state.fl.us/parks/planning/forms/boating%20report%2012-20-05.pdf>). State parks play a critical role in providing the facilities needed to meet the demand for public access to Florida’s water resources. This report evaluated the status of boating access and facilities in the 129 state parks with waterfront access. The assessment determined what opportunities exist throughout the state park system for improving recreational boating access.

In 2009, the Florida Fish and Wildlife Conservation Commission concluded a four-year project, which produced a comprehensive inventory of recreational boating access facilities of Florida coastal and inland waters. The study compiled baseline data for recreational boating facilities throughout Florida. The inventory database contains over 3,100 boat ramps (of which, 51% are open to the public) and 2,700 other boating access facilities. Data are available on the Florida Fish and Wildlife Conservation Commission, Fish & Wildlife Research Institute website (http://ocean.floridamarine.org/mrgis/Description_Layers_Marine.htm).

Recreational boating and water-related facilities from the ORP Inventory database will be presented here to compare with previously published data in the 2000 FACT. Table 5-6 and 5-7 provides the number of saltwater and freshwater boating related facilities for Florida's 35 coastal counties. The supply of boating facilities is an indicator of the availability of resources to meet the increasing pressure of population growth and tourism, and the demand for access to Florida waters. Access supply is a necessary part of models used to project future needs and to develop management plans.

Table 5-6
Number of Saltwater Boating Facilities in Coastal Counties.

County	Ramps	Lanes	Marinas	Marina Slips	Marina Dry Storage	Piers
Bay	41	55	27	1,602	777	27
Brevard	72	101	40	2,691	2,055	30
Broward	44	53	112	3,339	3,064	13
Charlotte	18	23	21	900	867	17
Citrus	10	13	3	45	0	4
Collier	17	25	14	622	975	9
Dade	55	106	93	6,221	3,590	26
Dixie	12	13	3	61	17	1
Duval	15	20	5	666	804	4
Escambia	29	41	29	1,475	515	11
Flagler	10	13	4	180	0	6
Franklin	23	36	10	335	320	8
Gulf	5	5	2	120	75	1
Hernando	4	5	1	35	0	3
Hillsborough	33	46	15	1,107	528	8
Indian River	17	23	11	403	267	4
Jefferson	0	0	0	0	0	0
Lee	47	56	85	2,876	2,098	26
Levy	6	7	2	37	0	6
Manatee	25	31	28	1,603	408	14
Martin	24	33	31	1,034	910	8
Monroe	101	119	125	4,311	4,388	35
Nassau	6	14	4	304	200	2
Okaloosa	43	48	29	1,205	1,021	17
Palm Beach	40	53	72	3,119	2,721	8
Pasco	13	13	5	167	80	8
Pinellas	66	117	54	4,795	4,210	39
Santa Rosa	16	21	2	62	165	11
Sarasota	25	35	40	1,849	1,493	23
St Johns	24	25	13	1,142	193	11
St Lucie	12	18	13	886	926	10
Taylor	11	12	4	170	100	5
Volusia	47	64	19	1,651	784	38
Wakulla	12	16	6	359	191	2
Walton	9	11	2	103	0	1

Source: 2000 SCORP and 2010 ORP Inventory database October 2010

Table 5-7
Number of Freshwater Boating Facilities in Coastal Counties.

County	Ramps	Lanes	Marinas	Marina Slips	Marina Dry Storage	Piers
Bay	20	24	0	0	0	24
Brevard	23	22	1	22	0	8
Broward	57	78	1	110	0	40
Charlotte	20	21	1	25	0	6
Citrus	41	46	19	540	535	12
Collier	7	9	3	82	12	8
Dade	45	53	2	134	155	2
Dixie	18	41	6	123	102	5
Duval	60	63	15	1,634	678	19
Escambia	15	17	1	20	97	4
Flagler	6	6	0	0	0	5
Franklin	16	19	5	110	55	2
Gulf	24	29	0	0	0	1
Hernando	5	5	1	30	0	2
Hillsborough	39	49	4	116	0	8
Indian River	15	19	4	320	0	2
Jefferson	5	5	0	0	0	0
Lee	16	15	5	142	260	9
Levy	17	19	4	128	10	3
Manatee	12	13	0	7	0	6
Martin	14	17	8	155	125	5
Monroe	2	1	2	46	0	1
Nassau	8	7	0	0	0	1
Okaloosa	49	49	0	0	0	7
Palm Beach	40	57	9	402	40	21
Pasco	11	12	4	32	50	37
Pinellas	11	24	2	16	0	14
Santa Rosa	54	57	3	21	0	13
Sarasota	11	10	0	0	0	6
St Johns	12	13	3	69	0	7
St Lucie	6	7	1	60	0	2
Taylor	11	13	1	29	9	0
Volusia	51	65	12	612	131	33
Wakulla	14	17	1	75	130	1
Walton	31	33	1	20	0	9

Source: 2000 SCORP and 2010 ORP Inventory database October 2010

Data for several facilities are reported here related to freshwater (FW) and saltwater (SW) access and boating including: boat ramps, marinas, boat storage, and other shoreline structures. Negative changes were observed in almost all resource categories in 2010 when compared to 1998 (Table 5-

8a and Table 5-8b). Only the numbers and lengths of FW catwalks, FW jetties, FW piers, and FW boat ramps showed substantial (near or above 10%) increases from 1998 to 2010. Many facilities directly supporting boating revealed large decreases in abundance (e.g., SW piers, SW and FW marinas, total number of FW marina slips and FW dry boat storage) from 1998 and 2010. The largest portion of negative change in saltwater facilities occurred during the 1998 to 2007 time period, and may be attributed to the impacts of two devastating years of hurricane landfalls on all coasts of Florida in 2004 and 2005. Economic constraints in the years 2007 to 2010 have slowed the recovery to the pre-2000 facility levels.

Table 5-8a

Saltwater Facilities that Support Boating and Recreational Use of Water Resources, 1998, 2007, and 2010

Resource	Unit	1998	2007	2010	Percent Change		
					'98 -'07	'07 -'10	'98 -'10
Boat Ramps	number of ramps	1,055	939	932	-11.0	-0.7	-11.7
Boat Ramp Lanes	number of lanes	1,328	1,268	1,271	-4.5	0.2	-4.3
Catwalks	number of catwalks	675	631	627	-6.5	-0.6	-7.1
Catwalks	linear feet	263,151	270,239	268,361	2.7	-0.7	2.0
Jetties	linear feet	63,934	48,197	63,920	-24.6	32.6	0.0
Piers	number of piers	578	412	436	-28.7	5.8	-24.6
Piers	linear feet	na	na	149,156			
Marinas	number of marinas	1,123	937	924	-16.6	-1.4	-17.7
Marina Slips	number of slips	45,839	45,716	45,475	-0.3	-0.5	-0.8
Marina Dry Storage	number of boats	33,791	na	33,742			-0.1

Source: SCORP 2000 and SCORP 2008 and ORP inventory online October 2010.

Table 5-8b

Freshwater Facilities that Support Boating and Recreational Use of Water Resources, 1998, 2007, and 2010

Resource	Unit	1998	2007	2010	Percent Change		
					'98 -'07	'07 -'10	'98 -'10
Boat Ramps	number of ramps	1,558	1,739	1,692	11.6	-2.7	8.6
Boat Ramp Lanes	number of lanes	2,017	2,049	1,995	1.6	-2.6	-1.1
Catwalks	number of catwalks	803	834	899	3.9	7.8	12.0
Catwalks	linear feet	139,412	141,560	157,864	1.5	11.5	13.2
Jetties	linear feet	74,991	74,797	83,052	-0.3	11.0	10.7
Piers	number of piers	375	570	616	52.0	8.1	64.3
Piers	linear feet	na	na	92,919			
Marinas	number of marinas	511	457	326	-10.6	-28.7	-36.2
Marina Slips	number of slips	12,237	11,762	11,223	-3.9	-4.6	-8.3
Marina Dry Storage	number of boats	4,980	na	4,348			-12.7

Source: SCORP 2000 and SCORP 2008 and ORP inventory online October 2010.

B. Demand for Access to Coastal Resources

A favorable climate, easy access to the ocean, sandy beaches, and endless outdoor, recreational opportunities are characteristics of Florida that have produced a steadily increasing visitor and resident population. Coastal access is important to the quality of life for both Florida residents and visitors. Consequently, the fixed supply of Florida's beaches and other coastal resources are experiencing increasing demands from the growth in population and tourists. Each year, over 150 million Americans (70% of survey respondents) visited natural locations in order to view or photograph scenery (National Survey on Recreation and the Environment, 2004). In the same survey, American households indicated participation in the following outdoor activities: visits to nature centers - nearly 136 million; visits to the beach - 122 million; visits to swim in lakes, streams, and springs - 116 million; visits to historic places - 114 million; and outdoor picnic days - 112 million. Nearly 95 million Americans engaged in boating trips at least one time per year with nearly 70% of those in motorboats. Over 80 million Americans participated in fishing activities in 2004. These data were surveyed from citizen households, and therefore do not include tourist impacts.

The list of resource-based activities in which people are engaged in coastal Florida is extensive (see 2008 Statewide Comprehensive Outdoor Recreation Plan for details). The highest demand activities for residents and tourists in Florida annually include: saltwater beach activities (57.6 million people), visiting archeological/historical sites (29.5 million people), nature study (27.5 million people), bicycling on paved and unpaved trails (20.5 million people), picnicking (20.2 million people), saltwater boat and non-boat fishing (17.0 million people), hiking (8.6 million people), and freshwater boat and non-boat fishing (7.9 million people), to name only a few.

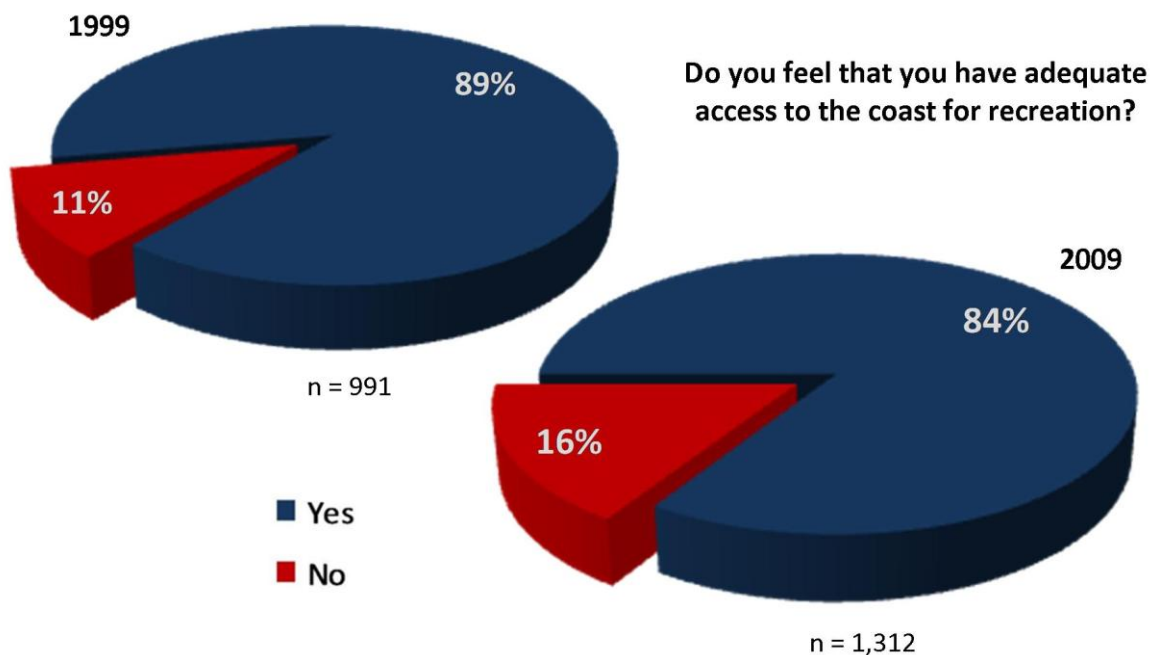
The primary resource-based recreation activity in Florida is visiting the beach. The economic impact of visits to beaches by citizens and tourists alike is far-reaching. In 2000, beach visits represented \$41 billion in total spending (equivalent to 8.7% of the Gross State Product in that year and 80% of all state tourism spending). In 2008, the number of out-of-state (domestic) and international visitors was 84.2 million (Visit Florida FY09 Annual Report). These tourists infused \$65.2 billion into the Florida economy. Generally, more than one third of non-Floridian tourists are vacationing at beaches. In 2008, it is estimated that at least 23 million out-of state visitors were at Florida beaches on average 5 days, and another 5.5 million international visitors for an average of 14 days. This equates to 192 million visitor beach days. In the *Florida Coastal Issues 2009 Survey* (Appendix A), over 89% of Florida's 18.5 million residents visit the beach at least once per year with many (46%) making repeated trips compounding the number by monthly, weekly, or daily frequencies, and exceeding 500 million resident visitor days annually (as a conservative estimate).

Indicator 5.4 - Adequacy of Public Access and Ways to Improve Access

The *Florida Coastal Issues 2009 Survey* (Appendix A) included a question concerning the survey participant's perceived measure of whether the supply of coastal access points is adequate. These data are compared to results from a similar 1999 survey reported in the FACT 2000 publication. The percentage of respondents who answered yes to the question concerning coastal access is an indicator of the adequacy of the level of facilities, information and signage provided for the public to enjoy activities on the beach and along the coast of Florida. Eighty four percent of respondents claimed to have adequate access to the coast for recreation in 2009. This represents a 5% decrease from the results of 1999 (Figure 5-7). Those residents who felt they did not have adequate access to the coast for recreation cited more access points (i.e., lack of parking areas, piers, or boardwalks) as the primary reasons. Respondents who live further away from the coast as well as respondents between the ages of 35 and 54 (40%) indicated that more web-based information and maps would encourage them to visit the coast more often.

Figure 5-7

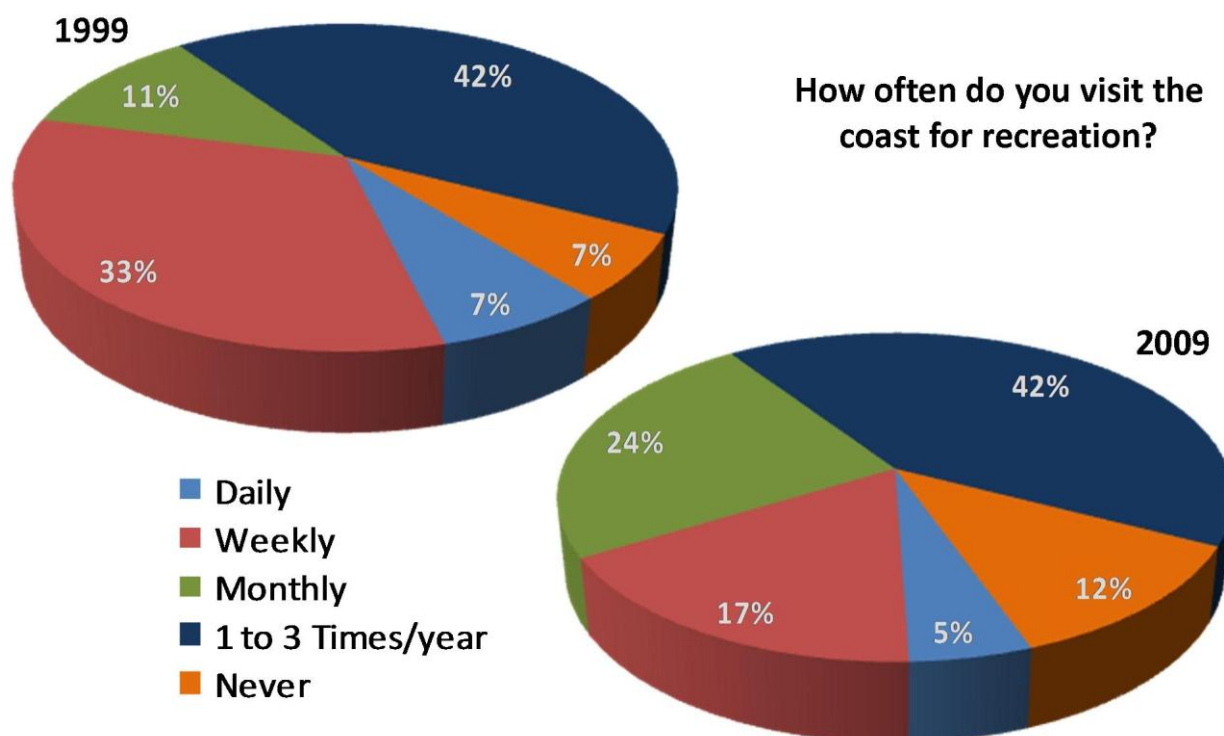
The percentage of respondents who answered yes to the question concerning the adequacy of the level of facilities and information and signage provided for the public on the beach and along the coast of Florida.



Indicator 5.5 - Frequency of Visits to the Coast

The *Florida Coastal Issues 2009 Survey* (Appendix A) also questioned people about the frequency of their visits to Florida beaches and coastal areas for recreation. A shift in frequency of visitation was seen indicating an overall decline in use of coastal areas for recreation by residents of Florida (Figure 5-8). Twenty four percent (24%) of respondents to the 2009 survey said they visit the coast for recreation once a month compared to 11% in the 1999 survey. At the same time, the number of Floridians that visit the coast weekly or daily decreased in 2009 from 40% to 22%. Furthermore, the number of 2009 respondents claiming to never visit the coast increased from 7% to 12%. Of the respondents who said they never visit the coast, 31% said that having points accessible for the disabled would encourage them to visit. No change was seen in the number of respondents who said they visit the coast 1 to 3 times per year.

Figure 5-8

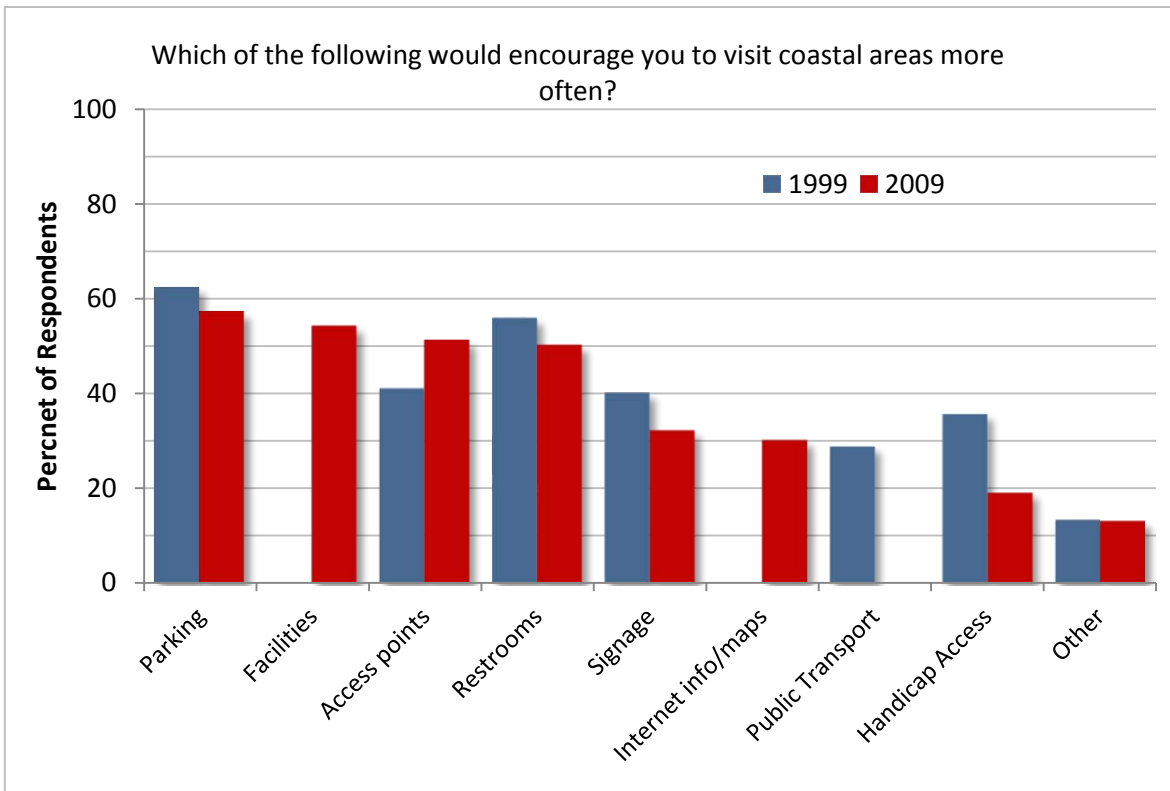


When asked if any of a series of items would encourage them to visit the coast more frequently, the item that increased most in percentage of responses was “an increase in the number of access points.” In 2009, fifty one (51) percent of all respondents identified “more access points” as an improvement that would encourage them to visit coastal more often, compared with 41% in 1999 (Figure 5-9). Four items were picked by 50% or more respondents of the 2009 survey as influencing them to visit the coast more often. These items were: parking, facilities, access points, and restrooms. Respondents between the ages of 34 and 44 (70%) were most likely to cite facilities as a feature that would encourage coastal visits. Parking, restrooms, and signage showed decreased concern by respondents (by 5% to 8%) as items that would have them visit the coast

more from 1999 to 2009. Having “handicapped accessible points” decreased by 19% as an item of concern for visiting the coast for recreation, from 36% in 1999 to 19% in 2009.

Figure 5-9

Percentage of respondents of the total number of survey respondents indicating that these items would encourage Floridians to visit the coast more frequently [1999 and 2009 Florida Coastal Issues Survey]



Of the respondents who visit the coast for recreation, 46% percent drive less than 30 minutes to access the coast from their residence, 24% drive 30 minutes to an hour, and 15% drive more than one hour. Twelve percent of residents are within walking distance of their coastal access.

In a separate survey of statewide outdoor recreation participation (SCORP, 2008) respondents were asked what measures would encourage greater participation at state parks and on public lands. Tourists responded strongly (more than 60% agreed) that “More information about facilities” would encourage greater participation. About 50% of respondents “disagreed, were uncertain, or [had] no opinion,” on the seven other categories, suggesting these factors were not strongly motivating in decisions to participate (Table 5-9). Resident respondents were much more opinionated than visitors, and had fewer responses of “no opinion” or “uncertainty” (10%-15%). Residents strongly agreed that three factors were important in greater participation at state parks: Increased accessibility (68%), more information about facilities (66%), and more outdoor facilities (61%).

Table 5-9

Percentage of respondents of the total number of survey respondents indicating that these items would encourage people (residents or tourists) to visit the coast more frequently

Participation Motivator	Residents		Tourists	
	Agree	Disagree, Uncertain, No opinion	Agree	Disagree, Uncertain, No opinion
Increased accessibility to parks and public lands	68.1	31.9	40.7	59.2
More information about facilities	66.0	34.0	62.0	38.0
More outdoor facilities	61.1	38.9	37.8	62.1
No fees required to participate	58.0	42.0	51.0	48.9
Better repair of facilities	57.9	42.1	22.7	77.3
Lower fees required to participate	56.6	43.4	51.1	49.0
Better security	53.6	46.4	31.4	68.7
More organized activities and programs	49.1	50.9	26.2	73.8

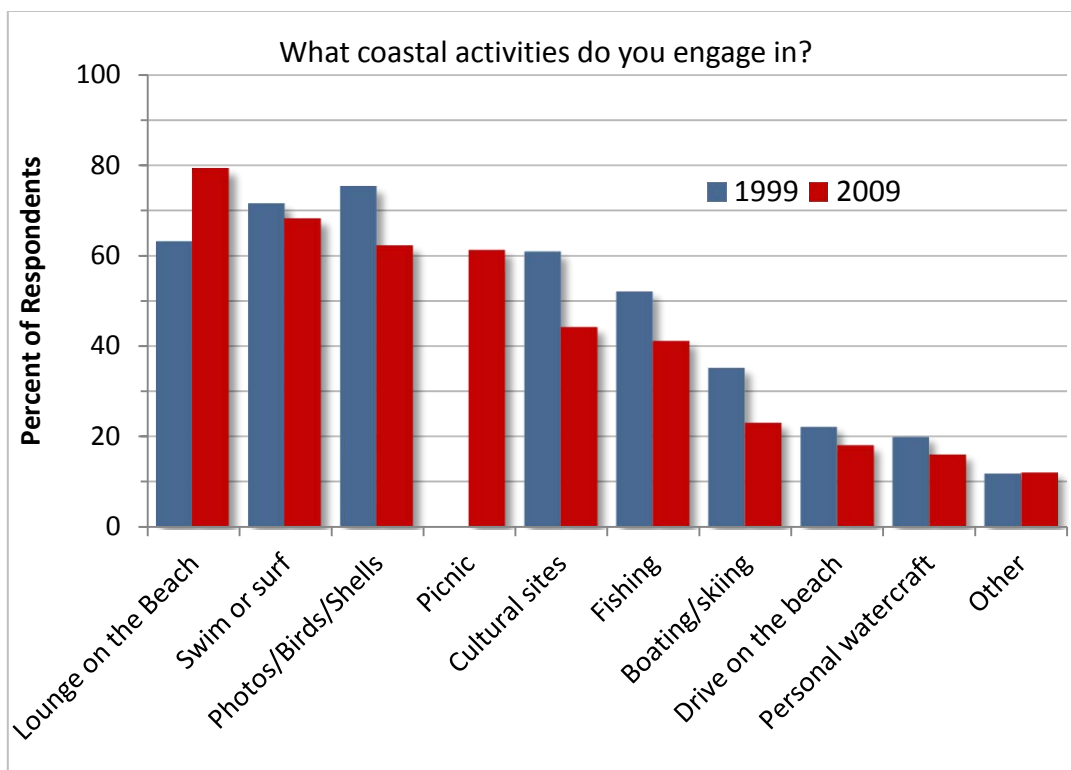
Source: SCORP, 2008

Indicator 5.6 - Types of Coastal Access and Number of Participants

In order to understand better how Floridians use coastal access points or facilities, and what types of coastal environments they prefer for recreation, a list of activities was provided in the *Florida Coastal Issues 2009 Survey* (Appendix A). The survey recipients were asked to respond affirmatively to all of the coastal activities in which they engage. Florida residents appear to be sunbathing more and participating in outdoor coastal hobbies less, e.g. birding, shell-collecting, outdoor photography, fishing, boating, and visiting cultural sites, than when previously surveyed (Figure 5-10). In the 2009 survey, sunbathing (79%), swimming or surfing (68%), photography or birding or shell-collecting (62%), and picnicking (61%) were the four activities most frequently performed. Other activities with frequent responses included visiting cultural sites and fishing (i.e., greater than 40%). The priority of activities differed from the 1999 survey, which ranked photography-birding-shell collecting highest (75%) followed by swimming-surfing and then sunbathing. Picnicking was not a part of the 1999 survey. The 1999 respondents also indicated cultural sites and fishing more frequently (by 17% and 11%, respectively) than the 2009 respondents.

Figure 5-10

Percentage of respondents of the total number of survey respondents indicating that they engage in these coastal activities. [1999 and 2009 Florida Coastal Issues Survey]



Source: Florida Coastal Issues Survey, 1999 and 2009

Non-coastal county residents cited several activities at a higher rate (approximately 10% more often) than coastal county respondents including: picnicking, visiting cultural or historical sites, and driving on the beach. Respondents with children were more likely to engage in picnicking (65%), fishing (44%), and cultural activities (49%) at a higher rate than respondents without children (57%, 38% and 38%, respectively). Respondents between the ages of 45 and 54 report fishing (54%) as an activity in which they engage more than any other age group; while those between the ages of 35 and 54 report bird watching, collecting shells, and taking pictures most often (71%). Individuals between the ages of 45 to 54 also visited cultural and historical sites 24% more frequently than those under age 45, and 8% more than those 55 and older.

Statistical estimates, derived from the Florida Statewide Outdoor Recreation Participation Study completed by the University of Florida, determined that 57.2% of residents and 54.4% of tourists participate in saltwater beach activities each year. Applying these percentages to 2009 population estimates of these groups (18.5 million residents and 80.9 million tourists) produces estimates of 10.6 million residents and 44.6 million tourists participating in beach activities that year.

According to the Visit Florida FY09 Annual Report, the total number of tourists visiting Florida increased from 73 million in 2000 to 84 million in 2005, with a 4.5% drop in 2001 in wake of the terrorist attacks on September 11 of that year (Figure 5-11). Total annual visitors remained steady between 2005 and 2008, and showed a 4.2% decrease in 2009, most likely due to ongoing economic recession in the U.S. The majority of these tourists are from other states in the U.S (domestic visitors). The number of international tourists declined from 11% of the total annual visitors (in 2000) to 7.4% in 2006, a reduction from 8 million to 6.2 million per year. The years 2007 and 2008 saw a recovery of international travelers to Florida, when the total number exceeded 8 million again (Table 5-10). The domestic visitors come from throughout the United States; however, 56% come from ten specific points of origin (Figure 5-12), with Georgia and New York being the top two.

Figure 5-11

The number of tourists (in millions) annually between 2000 and 2009. Number includes international tourists and domestic visitors from other states.

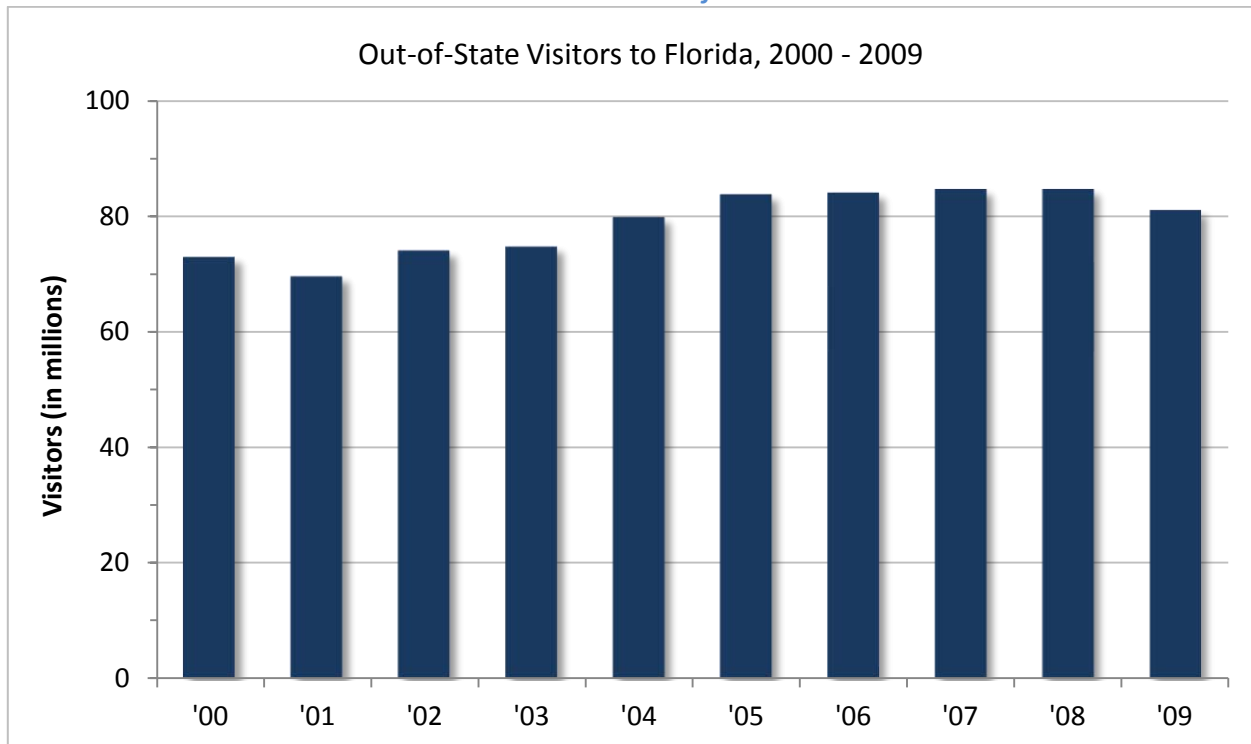


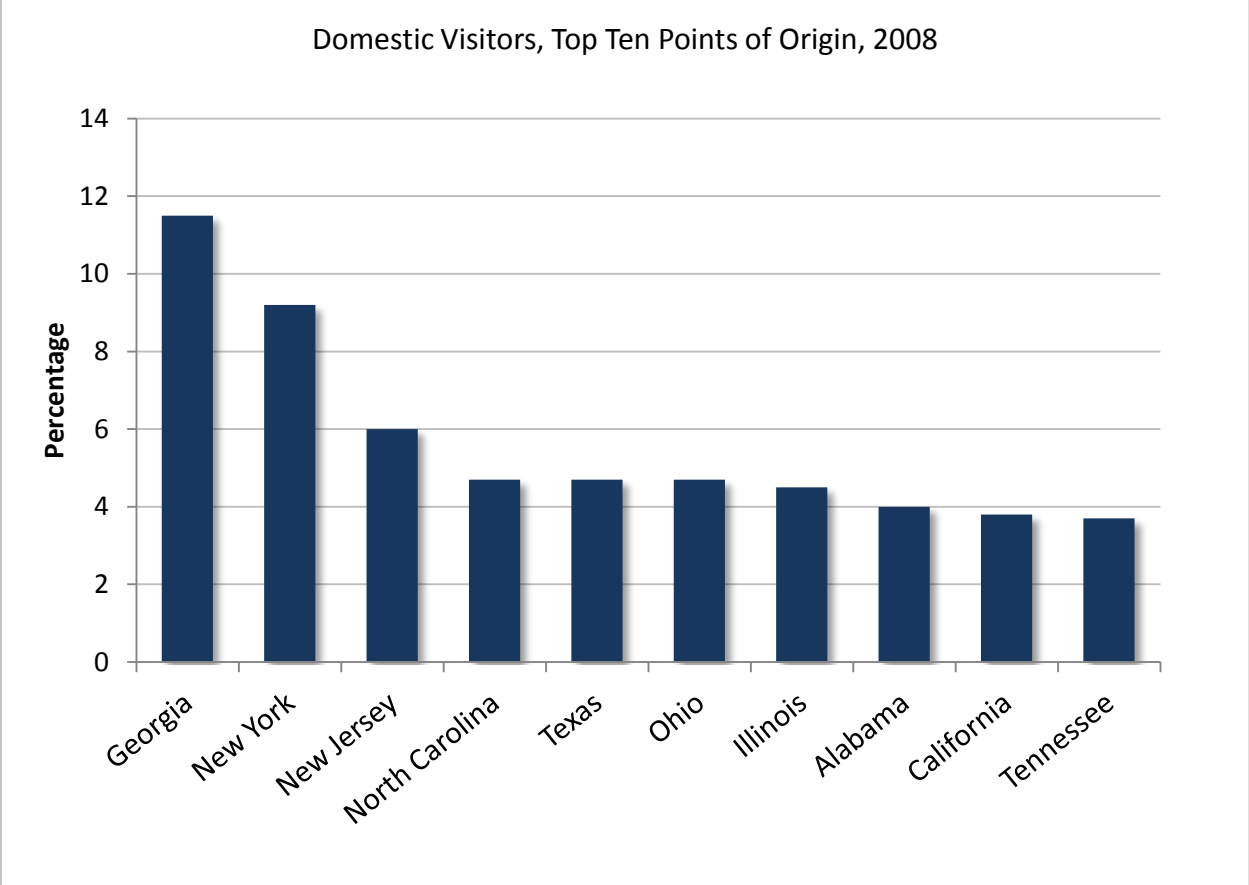
Table 5-10

Annual Number of Domestic and International Visitors, 2000, 2009

Year	Visitors to Florida (in millions)			Percent International
	Domestic	International	Total	
'00	64.8	8.0	72.8	11.0
'01	62.3	7.2	69.5	10.4
'02	67.9	6.0	73.9	8.1
'03	68.7	5.9	74.6	7.9
'04	73.4	6.3	79.7	7.9
'05	77.2	6.4	83.6	7.7
'06	77.7	6.2	83.9	7.4
'07	77.3	7.2	84.5	8.5
'08	76.4	8.1	84.5	9.6
'09			80.9	

Figure 5-12

The percentage of visitors to Florida from the top ten points of origin within the United States in 2008.



Indicator 5.7 - Number of Visitors at Recreational Areas - State Parks, Greenways and Trails, Aquatic Preserves

The Florida State Park system is an integral part of providing access to the variety of landscapes and resources that comprise coastal Florida. Of the 160 State Parks, 70% are found in coastal counties, and 129 have either saltwater or freshwater frontage. More than 55% of the parks are directly adjacent to bay or coastal waters. The annual attendance, in excess of 20 million visitors, is an indicator of the demand for public access to the various water and coastal resources.

Figure 5-13 displays State Park attendance by district for fiscal years 2001 through 2010. District 4, in Southwest Florida, was the area of greatest growth in visitation, totaling 53.9 million over the last decade. Annual visits increased steadily from 4.53 million in FY 2001 to 6.75 million in FY 2009 in District 4, with an especially large jump in 2006 (>15%)(Figure 5-14, Table 5-11). The change in annual park attendance for District 4, from FY 2001 to FY 2010, showed an increase of 33.2%. Districts 1, 2, and 3 had variable annual attendance with increases in visits some years offset by decreases in other years. The percent changes for Districts 1, 2, and 3 from FY 2001 to FY 2010 were -0.6%, 12.6%, and 7.8%, respectively. The annual number of visits for the decade for the three districts (1-Northwest, 2-Northeast, and 3-Central) ranged from 2.6 to 3.6 million, totaling 29 to 33 million visitors per district for the decade. District 5 in Southeast Florida had more years of decreases in attendance than increases, and dropped 8.4% from 4.8 million visits in FY 2001 to 4.4 million visits in FY 2010. All five districts had decreases in attendance from FY 2009 to FY 2010; -6.3%, -1.2%, -2.6%, -10.7%, and -6.5% in districts 1 through 5, respectively. It is unknown whether these decreases in visitation can be attributed to economic pressures, weather conditions, increases in park admission fees, or a combination of these factors. Florida also experienced an extremely cold winter from January through March 2010. In many places throughout the state, unusually low temperatures of less than 30°F occurred for 21 days in a row.

Figure 5-13

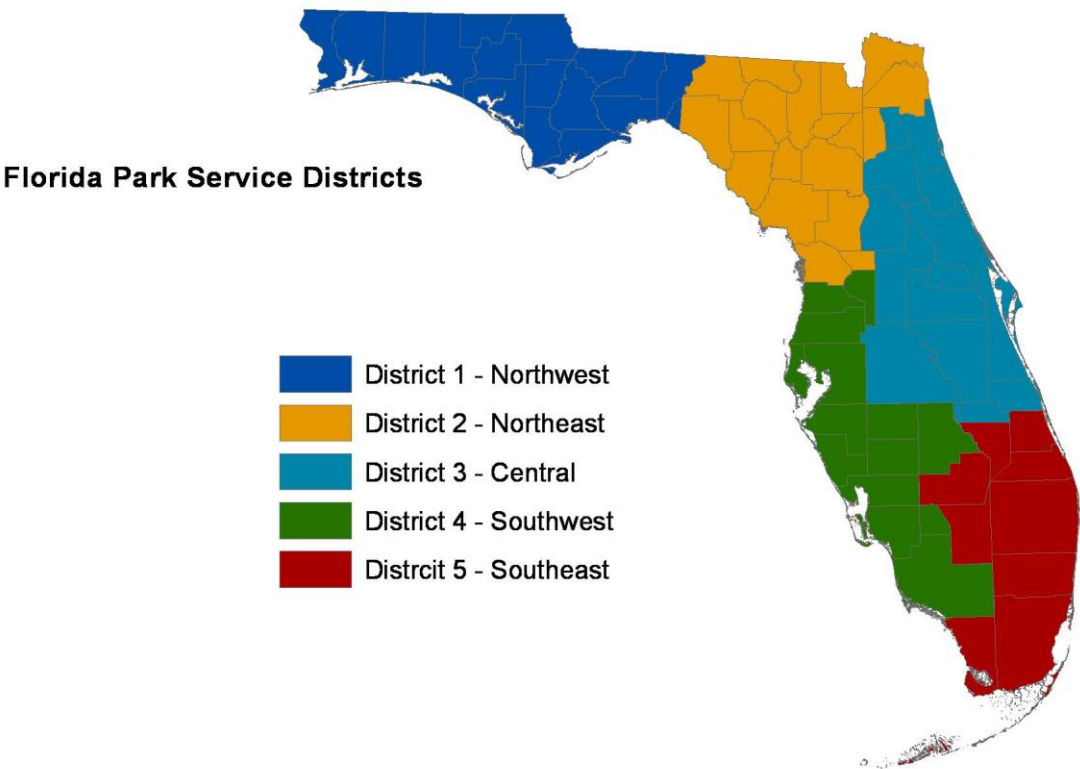


Figure 5-14

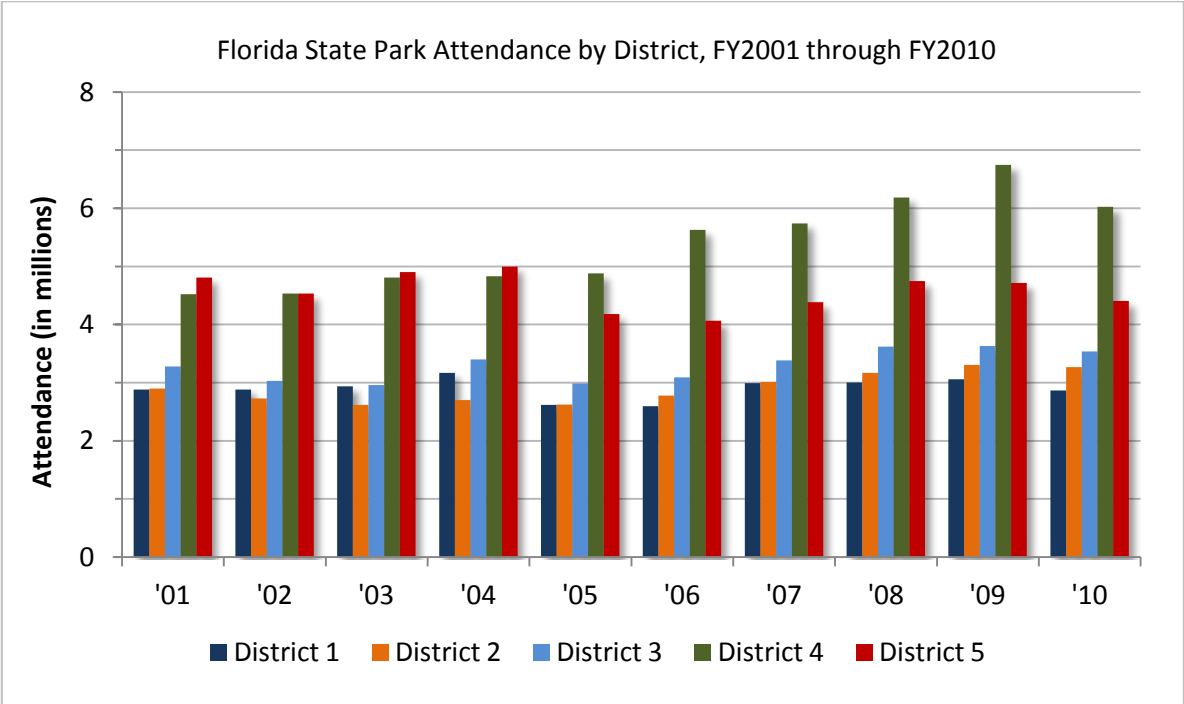


Table 5-11

Percent change in state park attendance by district for fiscal years 2001 through 2010.

District	Percent Change by Fiscal Year									
	'01 - '02	'02 - '03	'03 - '04	'04 - '05	'05 - '06	'06 - '07	'07 - '08	'08 - '09	'09 - '10	'01 - '10
1	0.1	1.9	7.8	-17.4	-0.8	15.1	0.4	1.8	-6.3	-0.6
2	-5.9	-4.1	3.3	-3.0	5.9	8.5	5.2	4.2	-1.2	12.6
3	-7.6	-2.2	14.7	-12.0	3.5	9.4	7.0	0.2	-2.6	7.8
4	0.2	6.1	0.4	1.0	15.4	1.9	7.8	9.1	-10.7	33.2
5	-5.8	8.2	2.0	-16.4	-2.7	7.8	8.4	-0.7	-6.5	-8.4

Recorded attendance at all Florida State Parks increased from 14,686,150 visitors in 1999 to 16,760,822 in 2000. Overall attendance from FY 2001 to FY 2009 increased from 18.4 to 21.5 million visitors, followed by a decrease of 6.3% to 20.1 million visitors in FY 2010 (Table 5-12).

Table 5-12

Statewide State Park Attendance and Percent Change for FY2001 through FY2010.

Fiscal Year	Number of Visitors	Annual Percent Change
'01	18,404,042	9.8
'02	17,717,242	-3.7
'03	18,239,511	2.9
'04	19,106,966	4.8
'05	17,296,273	-9.5
'06	18,172,559	5.1
'07	19,519,202	7.4
'08	20,737,052	6.2
'09	21,458,588	3.5
'10	20,110,021	-6.3
Total	190,761,456	-

Decreases in attendance were seen in two other years, -3.7% in FY 2002 and -9.5% in FY 2005. The majority of annual changes in attendance were increases, and the average year to year positive change was 5.7% during the decade. The increase in number of park visitors from FY 2001 to FY 2010 was 8.5%, and the total number in attendance at all State Parks during that time exceeded 190 million people. The ten-year trend of State Park attendance is depicted graphically in Figure 5-15. The number of visitors to other public recreational areas; Greenways and Trails (Figure 5-16) and the Florida Aquatic Preserves (Figure 5-17), are also shown.

Figure 5-15

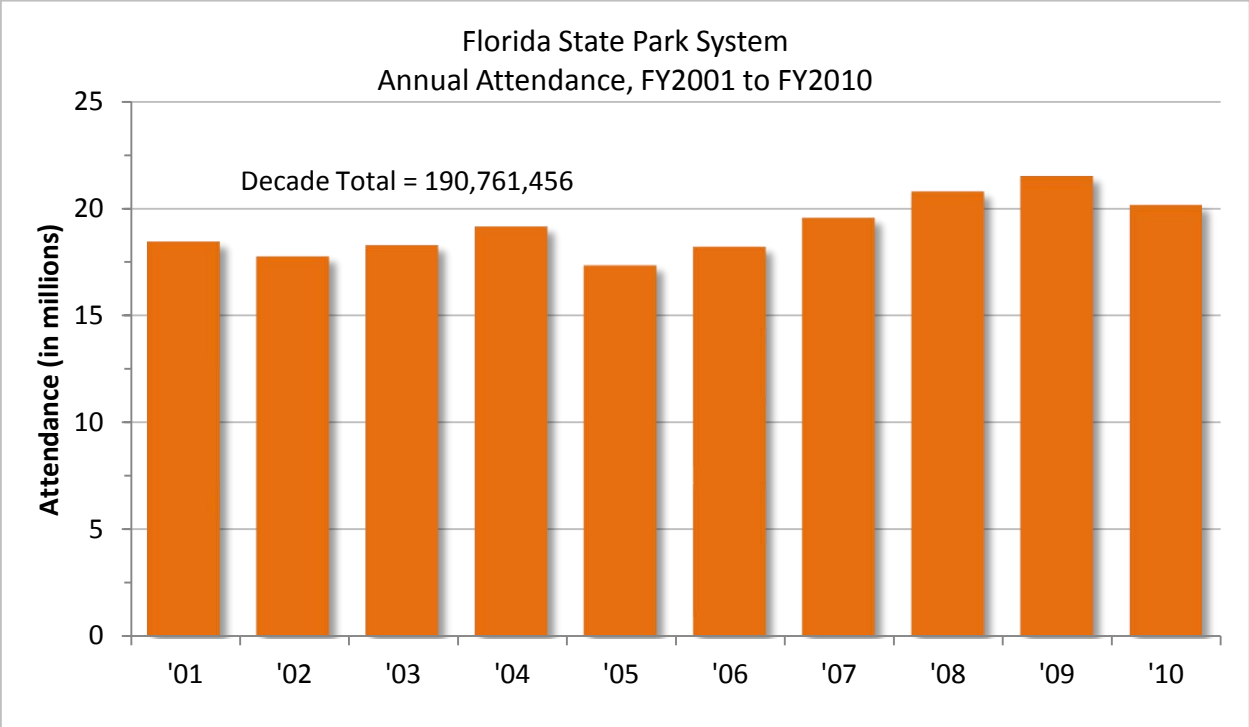


Figure 5-16

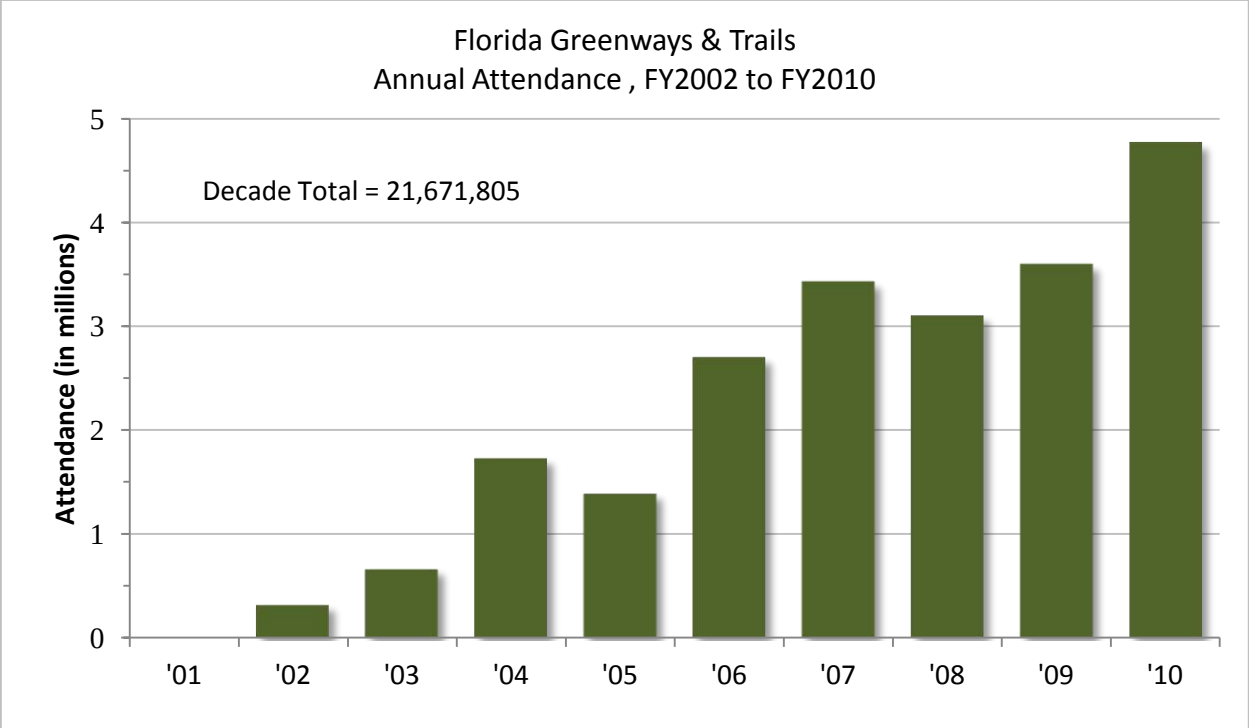
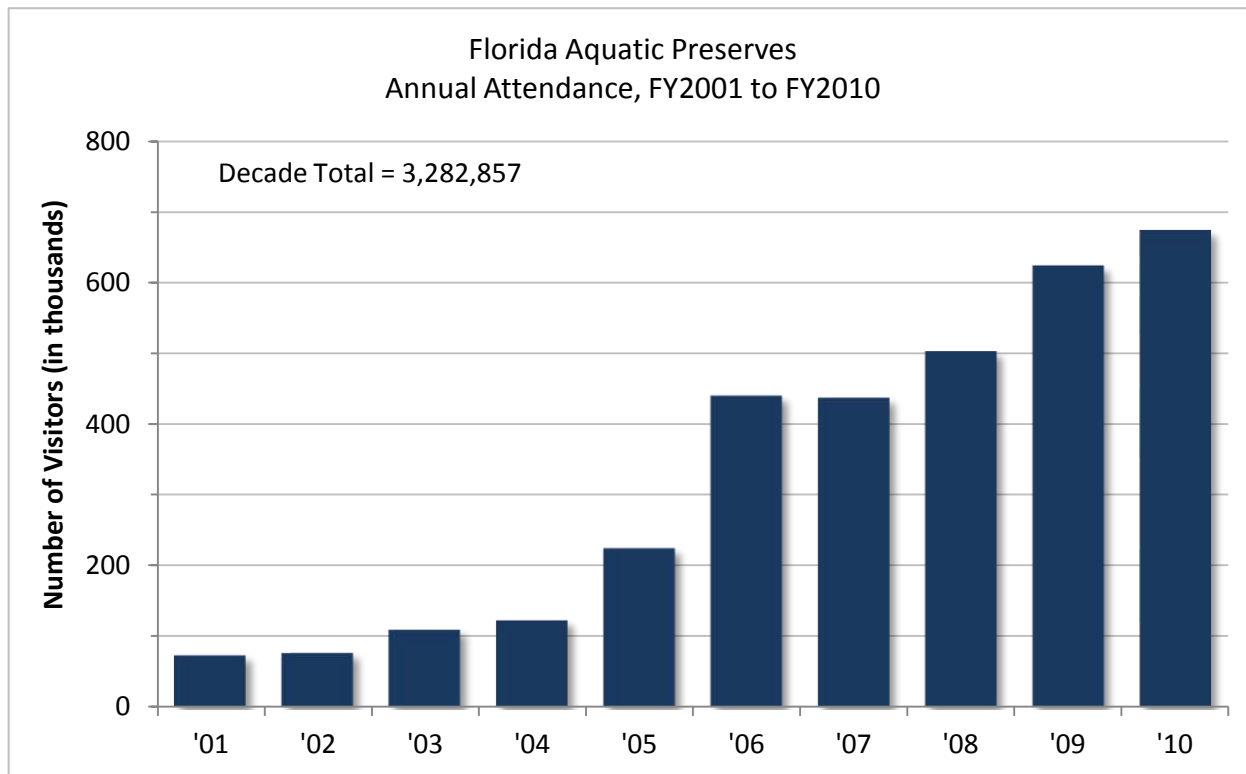


Figure 5-17



Data for usage of Greenways and Trails for the fiscal years 2002 to 2010 reveal annual fluctuations with an overall sharp increase in time from 300,000 to 4.7 million visitors annually, representing a 1400% increase. Approximately 21.7 million visits have been recorded for greenways and trails use since its establishment. Segments continue to be added to the system each year through the acquisition of the lands needed to connect the regional hub areas to one another throughout the state.

The recorded number of visitors to the Aquatic Preserves increased by more than 820% between fiscal years 2001 and 2010, from state-wide totals of 73,071 to 673,437. Records of Aquatic Preserve attendance show small incremental increases in usage by visitors until 2004. Thereafter, large annual increases have occurred, sometimes doubling the previous year, resulting in nearly 3.3 million total visitors overall. Nearly 90% of all recorded visitation is represented in the time period 2005 to 2010.

Indicator 5.8 - Number of Visitors on Southeast Florida Reefs

Florida is the only state in the continental United States to have extensive shallow coral reef formations near its coasts. The reefs in southeast Florida extend from the Dry Tortugas and Florida Keys in the south to Martin County in the north. Generally, the reefs in southeast Florida occur in three parallel lines extending north from Miami-Dade County, changing to more isolated patch reefs in Martin County. The attractions of the coral reef communities contribute greatly to Florida's tourism and fisheries. The artificial and natural reefs are public resources that provide recreational benefits to tourists and residents of Florida. Millions of tourists and local residents enjoy scuba diving, snorkeling, and fishing on Florida's coral reefs.

The Socioeconomic Study of Reefs in Southeast Florida (October 19, 2001 Final Report) provides information on reef use by residents and visitors in terms of person days. While this data is from 2000-2001, it still provides some insight on the demand for access to the reefs in Florida. The following figures provide the number of days people participated in recreational use of the reefs (presented in person-days). A person-day is defined as one person participating in an activity for a portion or all of a day.

The number of person-days of reef use by county and by reef type is presented in Table 5-13. Visitors are defined as nonresidents of the county that are visiting. Visitors and residents spent 28 million person-days using artificial and natural reefs in southeast Florida during the 12-month period from June 2000 to May 2001. Visitors and residents spent 10 million person days using artificial reefs and 18 million person-days using natural reefs. Residents spent 14.2 million person-days and visitors spent 13.7 million person-days in Florida's reefs (Table 5-14).

Table 5-13
The Number of Person-Days of Residents and Visitors Spent on Artificial and Natural Reefs in Southeast Florida from June 2000 to May 2001.

County	Number of Person-Days (in millions)		
	Artificial Reefs	Natural Reefs	All Reefs
Palm Beach	1.41	2.83	4.24
Broward	3.98	5.46	9.44
Miami-Dade	2.95	6.22	9.17
Monroe	1.47	3.64	5.11
Total	9.81	18.15	27.96

Table 5-14

Comparison of Visitor versus Resident Use on All Reefs in Southeast Florida from June 2000 to May 2001.

County	Number of Visitor Person-Days (in millions)		
	Residents	Visitors	All Users
Palm Beach	2.98	1.26	4.24
Broward	3.72	5.72	9.44
Miami-Dade	4.51	4.66	9.17
Monroe	3.03	2.08	5.11
Total	14.24	13.72	27.96

Visitors to the four counties spent about 14 million person-days on the reef systems of southeast Florida from June 2000 to May 2001. About 5 million of these days were spent on artificial reefs and about 9 million of these days were spent on natural reefs (Table 5-15).

Table 5-15

Total Person-Days of Visitors Spent on Artificial and Natural Reefs in Southeast Florida from June 2000 to May 2001.

County	Number of Visitor Person-Days (in millions)		
	Artificial Reefs	Natural Reefs	All Reefs
Palm Beach	0.33	0.93	1.26
Broward	2.69	3.03	5.72
Miami-Dade	1.41	3.25	4.66
Monroe	0.48	1.6	2.08
Total	4.91	8.81	13.72

Table 5-16 provides summary of reef use by type of activity. Overall, fishing activity on the reefs appears to dominate when snorkeling and scuba diving are compared separately. When snorkeling and scuba diving are considered together as diving activities, diving and fishing contribute about equally to total reef use in southeast Florida. In Palm Beach County, diving is a bit more prevalent than fishing while in Miami-Dade County, fishing is more prevalent than diving. In Broward and Monroe counties, the levels of diving and fishing are about equal.

Table 5-16

Number of Person-Days for Residents and Visitors on All Reefs by Recreational Activity for June 2000 to May 2001.

Activity	Palm Beach	Broward	Miami-Dade	Monroe	Total- Southeast Florida
Snorkeling	0.74	1.09	2.11	1.75	5.69
Scuba Diving	1.73	3.85	1.14	0.83	7.55
Fishing	1.76	4.45	5.9	2.45	14.56
Total	4.23	9.39	9.15	5.03	27.8

Demographic characteristics of visitor and resident reef users are provided in Table 5-17a - Table 5-17e. These characteristics were obtained from the resident boater survey and the visitor boater survey conducted for *The Socioeconomic Study of Reefs in Southeast Florida* (October 19, 2001 Final Report).

Table 5-17a
Median Age

County	Resident Reef-Users	Visitor Reef-Users
Palm Beach	48	41
Broward	48	39
Miami-Dade	46	41
Monroe	54	44

Table 5-17b
Gender

County	Resident Reef-Users		Visitor Reef-Users	
	Male	Female	Male	Female
Palm Beach	95%	9%	79%	21%
Broward	92%	8%	77%	23%
Miami-Dade	93%	7%	75%	25%
Monroe	86%	14%	70%	30%

Table 5-17c
Race

County	Resident Reef-Users			Visitor Reef-Users		
	White	Black	Other	White	Black	Other
Palm Beach	97%	0%	3%	94%	2%	4%
Broward	93%	2%	5%	89%	7%	4%
Miami-Dade	88%	1%	11%	83%	7%	10%
Monroe	94%	0.20%	5.80%	95%	2%	3%

Table 5-17d
Percent Hispanic/Latino

County	Resident Reef-Users	Visitor Reef-Users
Palm Beach	4%	5%
Broward	5%	13%
Miami-Dade	33%	29%
Monroe	7%	8%

Table 5-17e
Median Household Income

County	Resident Reef-Users	Visitor Reef-Users
Palm Beach	\$ 71,695	\$ 87,500
Broward	\$ 72,310	\$ 87,500
Miami-Dade	\$ 69,722	\$ 55,000
Monroe	\$ 56,393	\$ 87,500

Indicator 5.9 - Number of Recreational Boat Registrations

The number of boater registrations is an indicator of the potential demand for resources associated with water access. Registration is required of all recreational vessels for use in Florida waterways. Fees are collected dependent upon vessel class (determined by size and type, Table 5-18) and provide some support for construction and maintenance of boating facilities. The Florida Boating Improvement Program FY 2010 Annual Report published by the Fish and Wildlife Conservation Commission highlighted that vessel registration fees for 29 counties left a \$10.5 million shortfall of financial need for boating facilities.

Table 5-19 and Table 5-20 provide the number of recreational vessels registered (classes A1, A2, and 1 through 5) in each of the 35 coastal and 32 non-coastal counties of Florida from 2000 to 2009. Coastal counties represent 75% of all recreational boater registrations. Statewide, total registrations increased each year from 2000 to 2007, and decreased by 1.7% in 2008 and 3.0% in 2009. Total registrations have increased 13% from 826,324 in 2000 to 934,367 in 2009 (Figure 5-19). This is an additional 108,043 registered boats statewide over nine years. Six counties (Dade, Pinellas, Broward, Lee, Hillsborough, and Palm Beach), each averaging between 40,000 to 60,000 registrations per year, represent 30% of all recreational boat registrations. In descending order, the eight counties showing the largest increases in registrations between 2000 and 2009 were: Dade – 7020, Pasco – 5794, Lee – 5446, Lake – 4630, Citrus – 4539, St. Johns – 4142, and Brevard – 4121, and Volusia – 4043. Three counties showed decreases in registrations between 2000 and 2009: Pinellas, Duval, and Orange (-660, -2200, and -3160, respectively).

Table 5-18

Vessel Classifications	
Class A-1	less than 12'
Class A-2	12 – 15' 11"
Class 1	16 – 25' 11"
Class 2	26 – 39' 11"
Class 3	40 – 64' 11"
Class 4	65 – 109' 11"
Class 5	greater than 110'

Table 5-19
Number of Recreational Boats Registered by Coastal County, 2000 - 2009

County	Year										Change '00 to '09
	2000	'01	'02	'03	'04	'05	'06	'07	'08	'09	
Bay	16,981	18,370	18,669	18,696	18,937	19,441	19,773	19,790	19,414	19,181	2,200
Brevard	32,094	35,001	35,775	36,624	36,921	37,928	38,313	38,181	37,987	36,215	4,121
Broward	39,983	45,462	45,545	46,621	47,009	48,689	49,011	48,499	48,617	43,455	3,472
Charlotte	17,614	20,695	20,874	21,264	21,333	21,644	21,763	21,736	21,661	20,833	3,219
Citrus	12,142	13,940	14,520	15,232	15,816	16,558	17,172	17,309	16,572	16,681	4,539
Collier	18,397	21,324	21,586	21,788	22,068	22,898	23,526	23,281	23,009	21,937	3,540
Dade	53,190	54,816	55,036	55,063	54,449	56,039	57,859	59,366	56,029	60,210	7,020
Dixie	2,017	2,384	2,430	2,529	2,452	2,528	2,634	2,623	2,527	2,581	564
Duval	33,488	32,622	32,890	33,018	32,818	32,972	33,240	33,328	32,983	31,288	-2,200
Escambia	17,023	17,511	17,793	17,852	17,685	17,798	17,601	17,807	17,779	17,100	77
Flagler	3,157	3,873	4,145	4,358	4,542	4,642	4,865	5,108	4,648	5,268	2,111
Franklin	1,859	2,151	2,359	2,440	2,454	2,602	2,665	2,717	2,633	2,630	771
Gulf	2,213	2,522	2,580	2,686	2,779	2,893	2,935	3,001	2,888	2,862	649
Hernando	6,998	7,902	8,183	8,399	8,629	9,189	9,682	9,862	9,148	9,512	2,514
Hillsborough	42,740	44,026	45,266	45,675	45,174	45,965	46,834	46,554	46,073	44,541	1,801
Indian River	8,947	9,679	10,042	10,288	10,358	10,737	10,944	11,062	10,774	10,682	1,735
Jefferson	804	1,273	1,877	1,483	1,152	1,239	1,317	1,356	1,241	1,330	526
Lee	39,048	41,711	43,408	45,269	46,209	48,694	49,046	48,690	48,495	44,494	5,446
Levy	3,563	3,730	3,693	3,776	3,837	3,853	4,039	4,297	3,861	4,176	613
Manatee	17,983	18,956	19,056	19,427	19,176	19,458	19,491	19,177	19,444	18,207	224
Martin	12,677	14,824	15,727	16,425	16,615	16,659	16,362	15,866	16,807	15,025	2,348
Monroe	23,283	25,592	26,146	26,341	26,204	26,802	26,335	25,298	26,819	23,620	337
Nassau	3,984	4,955	5,164	5,304	5,440	5,640	5,954	6,148	5,674	6,130	2,146
Okaloosa	15,495	17,659	18,114	18,513	18,954	19,310	19,429	19,370	19,344	17,967	2,472
Palm Beach	38,553	40,516	41,838	42,636	42,860	43,618	43,257	42,704	43,572	40,820	2,267
Pasco	18,442	21,777	22,654	23,428	24,022	25,166	25,811	25,924	25,046	24,236	5,794
Pinellas	49,969	52,841	53,983	54,210	53,635	53,842	53,590	53,519	53,736	49,309	-660
Santa Rosa	11,172	12,760	13,076	13,577	13,746	14,018	14,204	14,650	13,965	14,716	3,544
Sarasota	19,431	21,439	22,075	22,292	22,963	24,019	24,190	23,903	24,121	22,537	3,106
St. Johns	9,071	10,344	10,681	10,993	11,285	11,938	12,481	13,144	11,947	13,213	4,142
St. Lucie	10,480	11,515	11,994	12,443	12,699	13,281	13,470	13,377	13,188	12,939	2,459
Taylor	3,298	3,436	3,489	3,578	3,721	3,814	3,817	3,776	3,808	3,742	444
Volusia	25,113	27,009	28,029	28,692	28,718	29,497	30,228	30,533	29,461	29,156	4,043
Wakulla	3,057	3,645	3,774	3,948	4,053	4,224	4,412	4,673	4,172	4,666	1,609
Walton	3,796	4,129	4,333	4,518	4,810	5,212	5,485	5,661	5,220	5,518	1,722
Coastal	618,062	670,389	686,804	699,386	703,523	722,807	731,735	732,290	722,663	696,777	78,715
State	826,324	895,320	914,587	930,815	936,351	963,244	977,181	979,719	963,062	934,367	108,043
Percent Coastal	74.8	74.9	75.1	75.1	75.1	75.0	74.9	74.7	75.0	74.6	72.9

Table 5-20
Number of Recreational Boats Registered by NonCoastal County, 2000 - 2009

County	Year										Average	Change '00 - '09
	2000	'01	'02	'03	'04	'05	'06	'07	'08	'09		
Alachua	8,882	9,602	10,052	10,324	10,419	10,664	10,872	11,075	10,691	10,924	10,351	2,042
Baker	1,753	2,009	1,976	2,002	2,088	2,130	2,253	2,333	2,147	2,383	2,107	630
Bradford	1,946	2,096	2,155	2,129	2,127	2,151	2,167	2,174	2,162	2,341	2,145	395
Calhoun	1,217	1,297	1,355	1,337	1,377	1,445	1,490	1,535	1,440	1,621	1,411	404
Clay	9,486	11,420	11,897	12,383	12,383	12,613	12,637	13,018	12,584	13,006	12,143	3,520
Columbia	4,525	4,716	4,549	4,567	4,547	4,667	4,738	4,828	4,609	4,658	4,640	133
Desoto	2,151	2,254	2,291	2,353	2,335	2,282	2,347	2,383	2,299	2,318	2,301	167
Gadsden	2,179	2,446	2,468	2,575	2,522	2,582	2,573	2,554	2,595	2,638	2,513	459
Gilchrist	1,377	1,508	1,520	1,580	1,623	1,652	1,729	1,788	1,657	1,774	1,621	397
Glades	992	1,190	1,234	1,357	1,353	1,444	1,362	1,336	1,413	1,196	1,288	204
Hamilton	729	807	843	861	870	888	928	931	921	1,007	879	278
Hardee	1,494	1,680	1,648	1,627	1,566	1,613	1,607	1,586	1,595	1,619	1,604	125
Hendry	2,637	3,048	3,170	3,098	3,049	3,017	3,035	3,011	3,019	2,898	2,998	261
Highlands	8,334	9,103	9,470	9,750	9,911	10,319	10,396	10,315	10,285	9,210	9,709	876
Holmes	1,538	1,789	1,776	1,840	1,820	1,932	2,065	2,069	1,915	2,149	1,889	611
Jackson	3,924	4,368	4,370	4,348	4,401	4,564	4,732	4,872	4,548	4,896	4,502	972
Lafayette	690	796	813	840	850	876	914	952	877	974	858	284
Lake	17,621	18,838	18,764	19,414	20,359	22,021	23,022	23,285	22,111	22,251	20,769	4,630
Leon	12,901	13,118	13,193	13,244	13,268	13,400	13,437	13,583	13,429	13,255	13,283	354
Liberty	848	1,030	1,008	1,046	1,040	1,075	1,122	1,118	1,079	1,134	1,050	286
Madison	1,023	1,152	1,194	1,201	1,185	1,220	1,198	1,215	1,217	1,176	1,178	153
Marion	17,027	18,414	18,600	18,685	18,901	19,764	20,347	20,555	19,763	19,945	19,200	2,918
Okeechobee	4,788	5,279	5,435	5,588	5,676	5,845	5,833	5,554	5,855	5,052	5,491	264
Orange	34,440	33,656	33,741	33,816	33,105	33,901	34,636	34,402	33,621	31,280	33,660	-3,160
Osceola	6,548	7,990	8,219	8,587	8,673	8,981	9,336	9,537	8,999	8,893	8,576	2,345
Polk	28,208	30,034	30,428	31,028	31,017	31,807	32,342	32,775	31,811	31,334	31,078	3,126
Putnam	7,359	8,146	8,388	8,443	8,435	8,659	8,706	8,821	8,639	8,564	8,416	1,205
Seminole	15,817	18,452	18,248	18,199	18,545	19,101	19,273	19,229	19,261	18,388	18,451	2,571
Sumter	2,781	3,291	3,444	3,563	3,650	3,885	4,170	4,292	3,932	4,395	3,740	1,614
Suwannee	2,637	2,693	2,764	2,802	2,815	2,887	2,970	3,004	2,862	3,009	2,844	372
Union	631	714	723	761	751	807	840	868	816	908	782	277
Washington	1,779	1,995	2,047	2,081	2,167	2,245	2,369	2,431	2,247	2,394	2,176	615
NonCoastal	208,262	224,931	227,783	231,429	232,828	240,437	245,446	247,429	240,399	237,590	233,653	29,328
State	826,324	895,320	914,587	930,815	936,351	963,244	977,181	979,719	963,062	934,367	932,097	108,043
Percent Noncoastal	25.20	25.12	24.91	24.86	24.87	24.96	25.12	25.26	24.96	25.43	25.07	27.14

Figure 5-18

Total recreational boater registrations have increased 13% from 826,324 in 2000 to 934,367 in 2009.

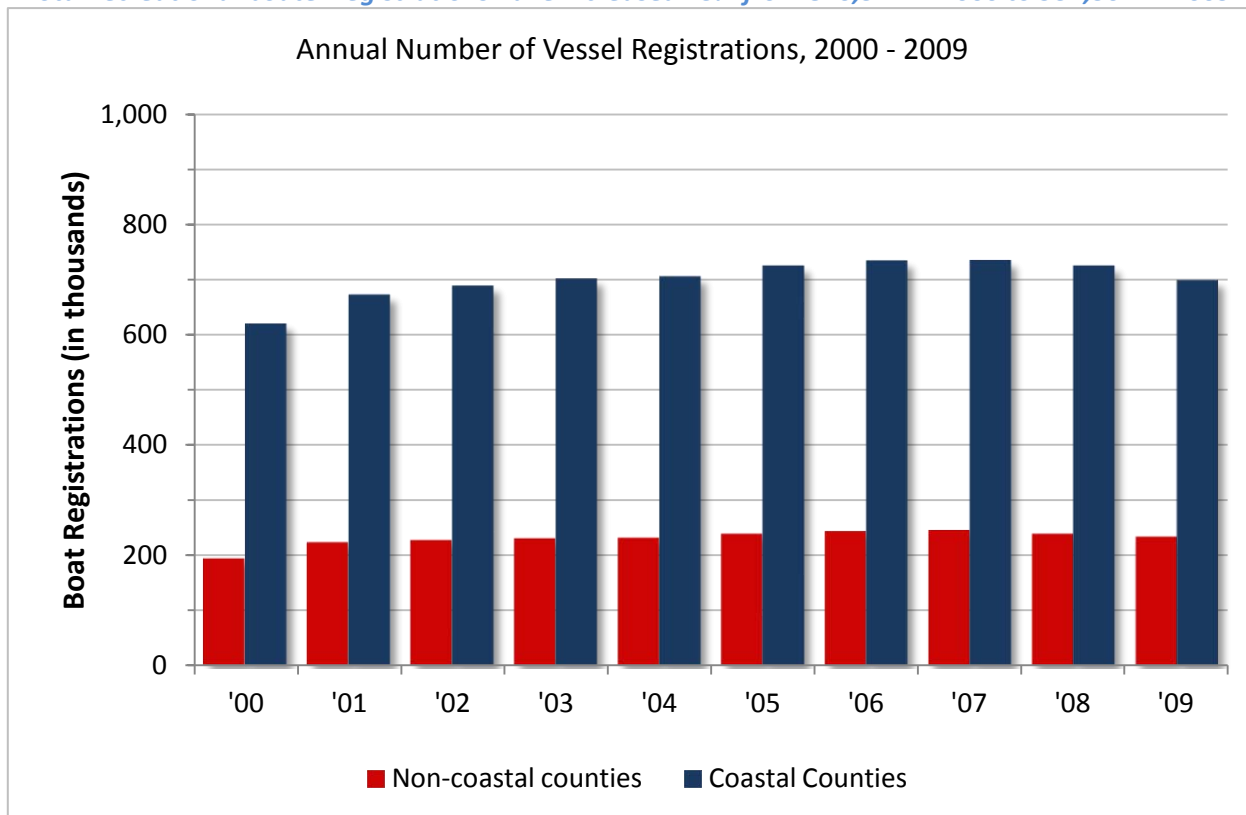


Table 5-21 and Table 5-22 show the year to year percent change in the number of recreational vessel registrations for coastal and non-coastal counties, respectively. The change in vessel registrations can be used as an indicator of the demand for water-related resources, and counties can be categorized by the total increase over time to assess the need for facilities such as boat ramps, docks, and boat storage.

Two coastal counties (Flagler at 66.9% and Jefferson at 65.4%) showed extremely high percentage increases in vessel registrations from 2000 to 2009. This represents average rates of increase greater than 6% per year. Both of these counties had relatively low total numbers (3,157 for Flagler and 804 for Jefferson) of recreational vessels in 2000. Two coastal counties recorded decreases in registered vessels between 2000 and 2009; Duval (-6.6%) and Pinellas (-1.3%). Non-coastal counties showed no extremely high rates of increase, and only one county with a decreased number of boater registrations (Orange County, -9.2%). Most of the additional 108,000 Florida vessel registrations reported for the 2000 to 2009 period were recorded between 2000 and 2006. Numerous year to year decreases have been seen in all counties from 2007 through 2009, especially coastal counties. The year 2007 to 2008 showed decreases of 1 to 10% in the number of vessel registrations in nearly 80% of counties.

Table 5-21
Percent Change in Vessel Registrations by Coastal County, 2000 - 2009

Coastal County	Percent Change									
	'00 - '01	'01 - '02	'02 - '03	'03 - '04	'04 - '05	'05 - '06	'06 - '07	'07 - '08	'08 - '09	'00 to '09
Bay	8.2	1.6	0.1	1.3	2.7	1.7	0.1	-1.9	-1.2	13.0
Brevard	9.1	2.2	2.4	0.8	2.7	1.0	-0.3	-0.5	-4.7	12.8
Broward	13.7	0.2	2.4	0.8	3.6	0.7	-1.0	0.2	-10.6	8.7
Charlotte	17.5	0.9	1.9	0.3	1.5	0.5	-0.1	-0.3	-3.8	18.3
Citrus	14.8	4.2	4.9	3.8	4.7	3.7	0.8	-4.3	0.7	37.4
Collier	15.9	1.2	0.9	1.3	3.8	2.7	-1.0	-1.2	-4.7	19.2
Dade	3.1	0.4	0.0	-1.1	2.9	3.2	2.6	-5.6	7.5	13.2
Dixie	18.2	1.9	4.1	-3.0	3.1	4.2	-0.4	-3.7	2.1	28.0
Duval	-2.6	0.8	0.4	-0.6	0.5	0.8	0.3	-1.0	-5.1	-6.6
Escambia	2.9	1.6	0.3	-0.9	0.6	-1.1	1.2	-0.2	-3.8	0.5
Flagler	22.7	7.0	5.1	4.2	2.2	4.8	5.0	-9.0	13.3	66.9
Franklin	15.7	9.7	3.4	0.6	6.0	2.4	2.0	-3.1	-0.1	41.5
Gulf	14.0	2.3	4.1	3.5	4.1	1.5	2.2	-3.8	-0.9	29.3
Hernando	12.9	3.6	2.6	2.7	6.5	5.4	1.9	-7.2	4.0	35.9
Hillsborough	3.0	2.8	0.9	-1.1	1.8	1.9	-0.6	-1.0	-3.3	4.2
Indian River	8.2	3.8	2.4	0.7	3.7	1.9	1.1	-2.6	-0.9	19.4
Jefferson	58.3	47.4	-21.0	-22.3	7.6	6.3	3.0	-8.5	7.2	65.4
Lee	6.8	4.1	4.3	2.1	5.4	0.7	-0.7	-0.4	-8.3	13.9
Levy	4.7	-1.0	2.2	1.6	0.4	4.8	6.4	-10.1	8.2	17.2
Manatee	5.4	0.5	1.9	-1.3	1.5	0.2	-1.6	1.4	-6.4	1.2
Martin	16.9	6.1	4.4	1.2	0.3	-1.8	-3.0	5.9	-10.6	18.5
Monroe	9.9	2.2	0.7	-0.5	2.3	-1.7	-3.9	6.0	-11.9	1.4
Nassau	24.4	4.2	2.7	2.6	3.7	5.6	3.3	-7.7	8.0	53.9
Okaloosa	14.0	2.6	2.2	2.4	1.9	0.6	-0.3	-0.1	-7.1	16.0
Palm Beach	5.1	3.3	1.9	0.5	1.8	-0.8	-1.3	2.0	-6.3	5.9
Pasco	18.1	4.0	3.4	2.5	4.8	2.6	0.4	-3.4	-3.2	31.4
Pinellas	5.7	2.2	0.4	-1.1	0.4	-0.5	-0.1	0.4	-8.2	-1.3
Santa Rosa	14.2	2.5	3.8	1.2	2.0	1.3	3.1	-4.7	5.4	31.7
Sarasota	10.3	3.0	1.0	3.0	4.6	0.7	-1.2	0.9	-6.6	16.0
St. Johns	14.0	3.3	2.9	2.7	5.8	4.5	5.3	-9.1	10.6	45.7
St. Lucie	9.9	4.2	3.7	2.1	4.6	1.4	-0.7	-1.4	-1.9	23.5
Taylor	4.2	1.5	2.6	4.0	2.5	0.1	-1.1	0.8	-1.7	13.5
Volusia	7.5	3.8	2.4	0.1	2.7	2.5	1.0	-3.5	-1.0	16.1
Wakulla	19.2	3.5	4.6	2.7	4.2	4.5	5.9	-10.7	11.8	52.6
Walton	8.8	4.9	4.3	6.5	8.4	5.2	3.2	-7.8	5.7	45.4
Coastal Counties	8.5	2.4	1.8	0.6	2.7	1.2	0.1	-1.3	-3.6	12.7

Table 5-22
Percent Change in Vessel Registrations by NonCoastal County, 2000 - 2009

NonCoastal County	Percent Change									
	'00 - '01	'01 to '02	'02 to '03	'03 to '04	'04 to '05	'05 to '06	'06 to '07	'07 to '08	'08 to '09	'00 to '09
Alachua	8.1	4.7	2.7	0.9	2.4	2.0	1.9	-3.5	2.2	23.0
Baker	14.6	-1.6	1.3	4.3	2.0	5.8	3.6	-8.0	11.0	35.9
Bradford	7.7	2.8	-1.2	-0.1	1.1	0.7	0.3	-0.6	8.3	20.3
Calhoun	6.6	4.5	-1.3	3.0	4.9	3.1	3.0	-6.2	12.6	33.2
Clay	20.4	4.2	4.1	0.0	1.9	0.2	3.0	-3.3	3.4	37.1
Columbia	4.2	-3.5	0.4	-0.4	2.6	1.5	1.9	-4.5	1.1	2.9
Desoto	4.8	1.6	2.7	-0.8	-2.3	2.8	1.5	-3.5	0.8	7.8
Gadsden	12.3	0.9	4.3	-2.1	2.4	-0.3	-0.7	1.6	1.7	21.1
Gilchrist	9.5	0.8	3.9	2.7	1.8	4.7	3.4	-7.3	7.1	28.8
Glades	20.0	3.7	10.0	-0.3	6.7	-5.7	-1.9	5.8	-15.4	20.6
Hamilton	10.7	4.5	2.1	1.0	2.1	4.5	0.3	-1.1	9.3	38.1
Hardee	12.4	-1.9	-1.3	-3.7	3.0	-0.4	-1.3	0.6	1.5	8.4
Hendry	15.6	4.0	-2.3	-1.6	-1.0	0.6	-0.8	0.3	-4.0	9.9
Highlands	9.2	4.0	3.0	1.7	4.1	0.7	-0.8	-0.3	-10.5	10.5
Holmes	16.3	-0.7	3.6	-1.1	6.2	6.9	0.2	-7.4	12.2	39.7
Jackson	11.3	0.0	-0.5	1.2	3.7	3.7	3.0	-6.7	7.7	24.8
Lafayette	15.4	2.1	3.3	1.2	3.1	4.3	4.2	-7.9	11.1	41.2
Lake	6.9	-0.4	3.5	4.9	8.2	4.5	1.1	-5.0	0.6	26.3
Leon	1.7	0.6	0.4	0.2	1.0	0.3	1.1	-1.1	-1.3	2.7
Liberty	21.5	-2.1	3.8	-0.6	3.4	4.4	-0.4	-3.5	5.1	33.7
Madison	12.6	3.6	0.6	-1.3	3.0	-1.8	1.4	0.2	-3.4	15.0
Marion	8.1	1.0	0.5	1.2	4.6	2.9	1.0	-3.9	0.9	17.1
Okeechobee	10.3	3.0	2.8	1.6	3.0	-0.2	-4.8	5.4	-13.7	5.5
Orange	-2.3	0.3	0.2	-2.1	2.4	2.2	-0.7	-2.3	-7.0	-9.2
Osceola	22.0	2.9	4.5	1.0	3.6	4.0	2.2	-5.6	-1.2	35.8
Polk	6.5	1.3	2.0	0.0	2.5	1.7	1.3	-2.9	-1.5	11.1
Putnam	10.7	3.0	0.7	-0.1	2.7	0.5	1.3	-2.1	-0.9	16.4
Seminole	16.7	-1.1	-0.3	1.9	3.0	0.9	-0.2	0.2	-4.5	16.3
Sumter	18.3	4.6	3.5	2.4	6.4	7.3	2.9	-8.4	11.8	58.0
Suwannee	2.1	2.6	1.4	0.5	2.6	2.9	1.1	-4.7	5.1	14.1
Union	13.2	1.3	5.3	-1.3	7.5	4.1	3.3	-6.0	11.3	43.9
Washington	12.1	2.6	1.7	4.1	3.6	5.5	2.6	-7.6	6.5	34.6
Non-Coastal Counties	8.0	1.3	1.6	0.6	3.3	2.1	0.8	-2.8	-1.2	14.1

Figure 5-19 and Figure 5-20 depict the total number of boat registrations in 2009 and the increases in number of recreational boats between 2000 and 2009 in the 35 coastal counties. Eighty percent of all counties were found in categories 2 and 3, which equate to rates of increase of less than

4.5% per year, with the majority of counties experiencing less than 3% annual increases in recreational boating registrations. A small number of counties have seen high or very high increases in numbers of vessels from 2000 to 2009 (greater than 4.5% per year equivalent), which may suggest the need for additional facilities to support greater boating usage of waterways in those areas.

Figure 5-19

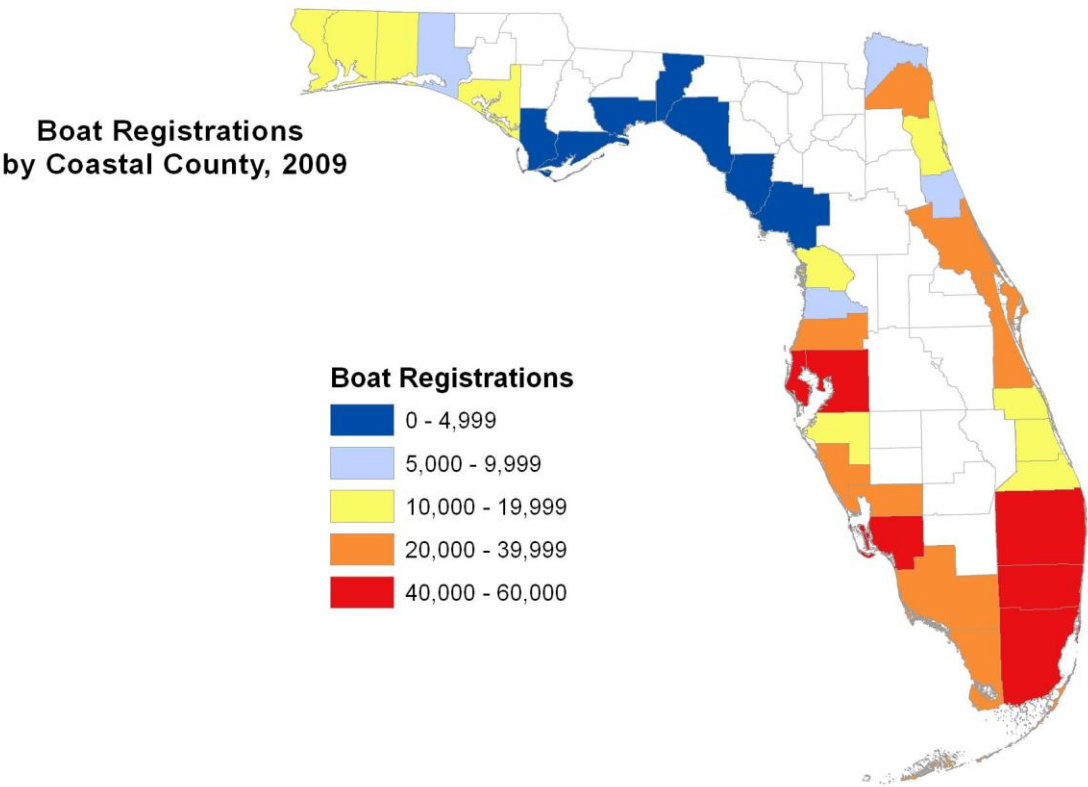
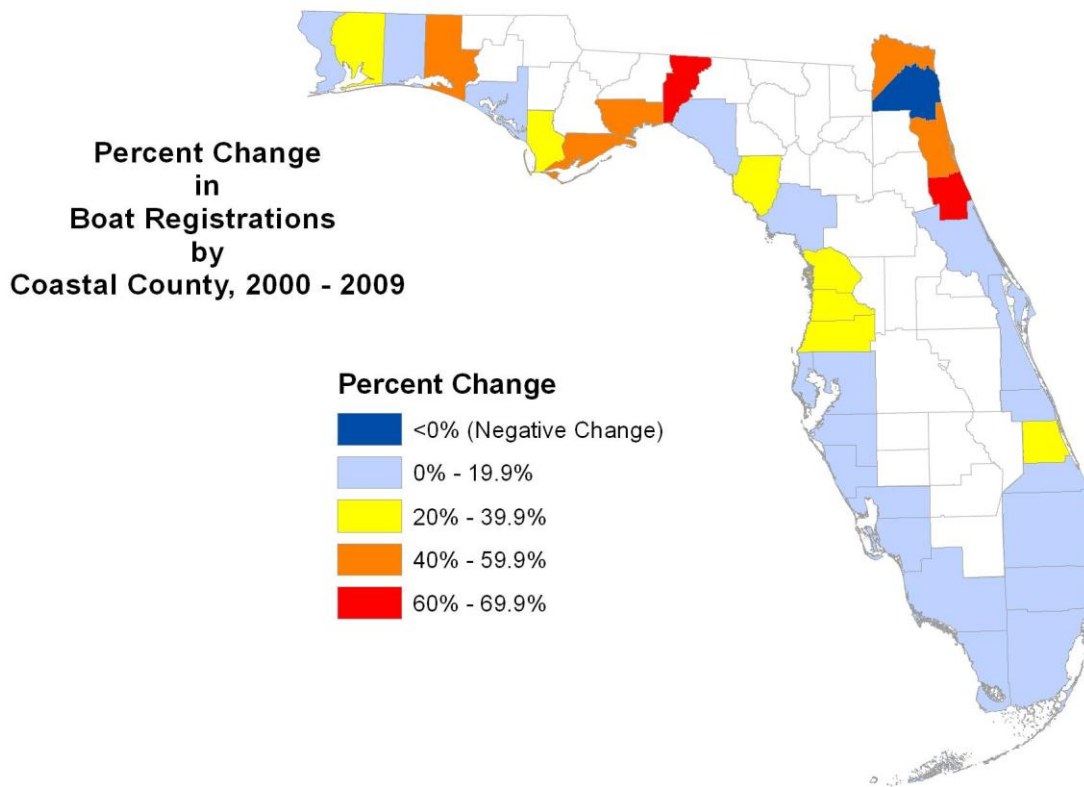


Figure 5-20



The annual percent change in number of recreational vessels registered was ranked for coastal and non-coastal counties from greatest to least for each year (Table 5-23 and Table 5-24, respectively). The top ten counties with the greatest increase were reported for both coastal and inland areas, and those counties appearing in the list in 5 or more years were highlighted. Identifying these counties on the map in Figure 5-20 indicates that most areas of high vessel registration percentage increases over the last ten years occurred in counties with low densities of vessels in 2000 (St. Johns and Citrus Counties excepted).

Table 5-23

Top ten coastal counties ranked in decreasing order by percentage annual increase of registered recreational vessels for the years 2001 to 2009. Highlighted counties were in the top ten for at least 5 of the nine years.

Rank	'01	'02	'03	'04	'05	'06	'07	'08	'09
1	Jefferson	Jefferson	Flagler	Walton	Walton	Jefferson	Levy	Monroe	Flagler
2	Nassau	Franklin	Citrus	Flagler	Jefferson	Nassau	Wakulla	Martin	Wakulla
3	Flagler	Flagler	Wakulla	Taylor	Hernando	Hernando	St. Johns	Palm Beach	St. Johns
4	Wakulla	Martin	Martin	Citrus	Franklin	Walton	Flagler	Manatee	Levy
5	Dixie	Walton	Lee	Gulf	St. Johns	Levy	Nassau	Sarasota	Nassau

6	Pasco	Nassau	Walton	Sarasota	Lee	Flagler	Walton	Taylor	Dade
7	Charlotte	Citrus	Gulf	Hernando	Pasco	St. Johns	Santa Rosa	Pinellas	Jefferson
8	Martin	St. Lucie	Dixie	Wakulla	Citrus	Wakulla	Jefferson	Broward	Walton
9	Collier	Lee	Santa Rosa	St. Johns	Sarasota	Dixie	Dade	n/a	Santa Rosa
10	Franklin	Pasco	St. Lucie	Nassau	St. Lucie	Citrus	Gulf	n/a	Hernando

na = not applicable; in 2008 there were no other counties that had positive changes

Table 5-24

Top ten non-coastal counties ranked in decreasing order by percentage annual increase of registered recreational vessels for the years 2001 to 2009. Highlighted counties were in the top ten for at least 5 of the nine years.

Rank	'01	'02	'03	'04	'05	'06	'07	'08	'09
1	Osceola	Alachua	Glades	Lake	Lake	Sumter	Lafayette	Glades	Calhoun
2	Liberty	Sumter	Union	Baker	Union	Holmes	Baker	Okeechobee	Holmes
3	Clay	Calhoun	Osceola	Washington	Glades	Baker	Gilchrist	Gadsden	Sumter
4	Glades	Hamilton	Gadsden	Calhoun	Sumter	Washington	Union	Hardee	Union
5	Sumter	Clay	Clay	Gilchrist	Holmes	Gilchrist	Calhoun	Hendry	Lafayette
6	Seminole	Highlands	Gilchrist	Sumter	Calhoun	Lake	Clay	Seminole	Baker
7	Holmes	Hendry	Liberty	Seminole	Marion	Hamilton	Jackson	Madison	Hamilton
8	Hendry	Glades	Holmes	Highlands	Highlands	Liberty	Sumter	n/a	Bradford
9	Lafayette	Madison	Lake	Okeechobee	Jackson	Lafayette	Washington	n/a	Jackson
10	Baker	Putnam	Sumter	Jackson	Washington	Union	Osceola	n/a	Gilchrist

na = not applicable; in 2008 there were no other counties that had positive changes

These areas represent the greatest potential need for increased facilities supporting boating. All of the high frequency “growth” counties, in relation to recreational boating, are in the northern half of the state, except for Glades County, located next to Lake Okeechobee in south central Florida. Among coastal counties, Flagler and Walton were most frequently in the list of counties with high increases in vessel registrations, followed by Jefferson, Wakulla, and Nassau, and including St. Johns and Citrus. Among non-coastal counties, Sumter was listed most frequently with high increases in recreational watercraft registrations. Baker, Calhoun, Gilchrist, Glades, and Holmes all appeared on the list in five of the years between 2001 and 2009.

It may be evident from the section above that percent change data have the bias of showing greater impacts on smaller initial numbers. For example, Lake County was the non-coastal county with the greatest magnitude change in registered boats (4,630) between 2000 and 2009; a number higher than all of the boats registered in most of the counties listed in Table 5-23 and Table 5-24, but since the base number of registered boats was 17,621, the percentage increase was approximately only 2.5% per year. Clay, Polk, Marion, and Seminole counties are similar to Lake County in this respect. Nevertheless, this may suggest the need for additional facilities to service the boaters in the counties frequently listing high percent changes over the last decade.

C. Programmatic Activities Related to Public Access

The Florida Coastal Management Program seeks to improve coastal access through a variety of activities which provide information to the public and support developing, maintaining, and enhancing coastal access. By means of an assortment of education and outreach material, FCMP assists in making the public aware of existing access opportunities. As mentioned in Indicator 2.1, FCMP has updated its inventory of sandy beach access points and will produced an online access guide. The FCMP also provides Public Access Signs, Beach Warning Flag Signs, Beach Warning Flag Sets and Rip Current Awareness Signs to state and local governments or other governmental entities that provide public access to and use of the coast.

Furthermore, through competitive grant programs, the FCMP makes funds available for projects and activities that protect and enhance coastal resources, stewardship, public access, water quality and coastal communities. Grant projects support a variety of efforts aimed at increasing public access to the coast.

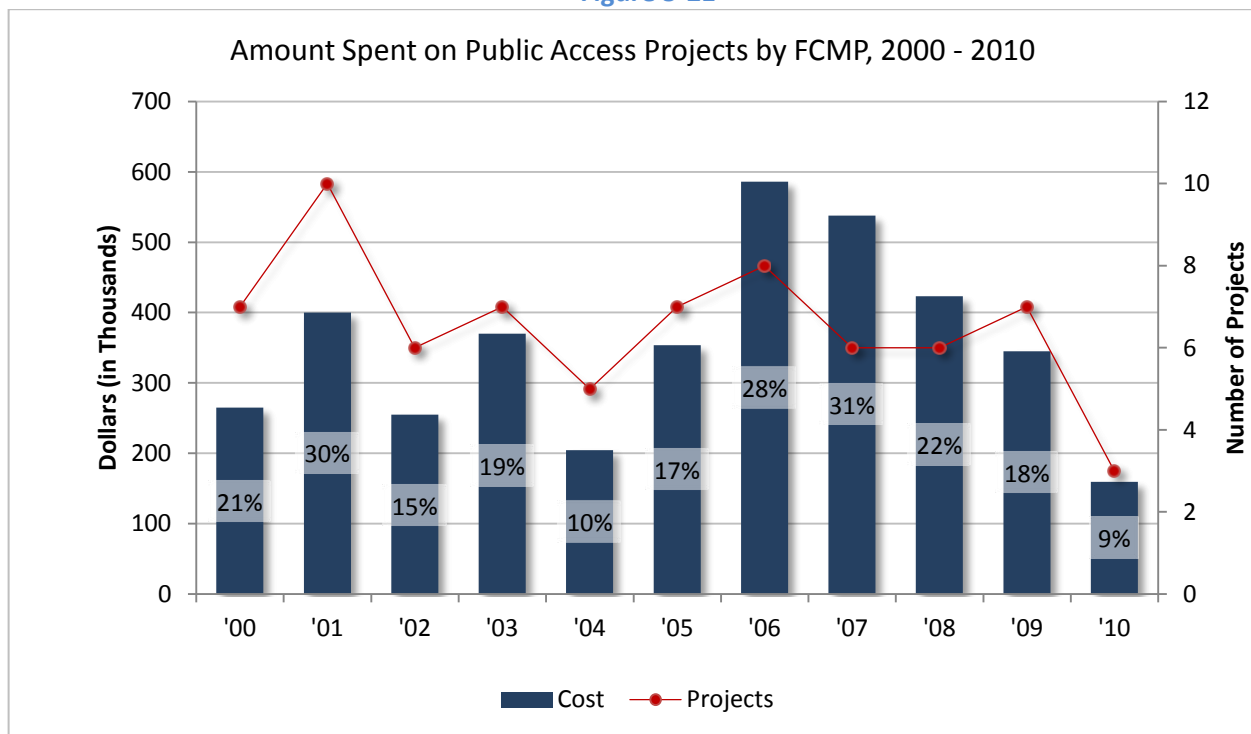
Indicator 5.10 - FCMP Grants and Program to Improve Coastal Access

The FCMP administers the Coastal Partnership Initiative and the State Agency and Water Management District grant program (<http://www.dep.state.fl.us/cmp/grants/index.htm>); both are competitive grant programs that support the protection, management and enhancement of Florida's ocean and coastal resources. The annual allocation of funds for public access projects statewide was variable over time during the period FY 2000 through FY 2010, for a total of \$3.9 million (Table 2-25). The annual allocation has ranged between \$159,410 to \$586,325. Between 2000 and 2010 seventy-two Public Access projects have been funded for an average of 6.5 per year. Figure 5-21 illustrates the number of projects funded by year plus the amount of funding and percent of the total funding that was granted to Public Access projects each year. Public Access projects received the second highest number of projects funded and the third highest amount of the total funding for this time period between the six categories.

Table 5-25

Fiscal Year	Year	Funding	Total Funding	Percent of Funding	Projects	Total All Projects	Percent of All Projects
FY 00-01	'00	265,000	\$1,239,593	21	7	27	26
FY 01-02	'01	400,000	\$1,320,000	30	10	30	33
FY 02-03	'02	255,000	\$1,687,782	15	6	27	22
FY 03-04	'03	370,000	\$1,990,240	19	7	26	27
FY 04-05	'04	204,538	\$2,125,623	10	5	28	18
FY 05-06	'05	353,663	\$2,037,309	17	7	30	23
FY 06-07	'06	586,325	\$2,126,881	28	8	32	25
FY 07-08	'07	538,051	\$1,730,751	31	6	22	27
FY 08-09	'08	423,366	\$1,955,629	22	6	27	22
FY 09-10	'09	345,250	\$1,900,218	18	7	29	24
FY 10-11	'10	159,410	\$1,727,081	9	3	24	13
	Total	\$3,900,603	\$19,841,107		72	302	

Figure 5-21



In addition to grant programs funding public access enhancement projects, the FCMP also provides educational flags & signs to enhance public access facilities. The FCMP provides Public Access Signs, Beach Warning Flag Signs, Beach Warning Flag Sets and Rip Current Awareness Signs free of charge to Florida's coastal communities and governmental agencies. These signs and flags are provided to promote beach safety and the protection of the state's fragile coastal environment while facilitating public access to cultural, historic and natural resources along the coast.

- **Beach Access Signs** help minimize environmental damage to beaches by designating points of entry for pedestrians and vehicles.
- Florida's uniform **Beach Warning Flags** come in four colors, red, yellow, green and purple, plus a second red imprinted with a Do-Not Swim Logo. The flags are accompanied by interpretive signs that explain the meaning of each color. The beach warning flags provide general warnings of overall surf conditions. The safety and enjoyment of Florida's public beaches are affected by changes in tide and surf conditions. To minimize the risks of drowning or serious injury, the FCMP worked with the Florida Beach Patrol Chiefs Association, the United States Lifesaving Association, and the International Life Saving Federation to develop a uniform warning flag program for use by Florida's beachfront communities.
- The **Rip Current Educational Signs** bring attention to the dangers of rip currents and educate people how to respond in the event that they are caught in a rip current.

A total of 3,720 beach access signs have been distributed for posting at Florida beaches throughout the state since 1997, with 1,501 of them provided between 2004 and 2010 (Table 2-

26). Signs describing the Florida beach warning flag system are also distributed by request, and 3,516 warning flag signs have been sent to city, county and state park entities between 2004 and 2010. Warning flags are provided in sets of five or individually, as requested, and a total of 3,966 flag sets and additional 1,634 single flags have been distributed between 2004 and 2010. Another part of the beach signage program concerns the hazard of rip currents. Four thousand nine hundred and sixty nine (4,969) rip current signs have been provided for posting at beaches between 2004 and 2010. In 2010, rip current signs in Spanish were started, and 117 signs delivered to requesting entities.

Table 5-26

*The number of beach access signs and warning flags for coastal access, warning flag information, and rip currents (*117 signs were produced in Spanish in 2010), provided to local entities between 2004 and 2010 [beach access sign program was established in 1997].*

Year	Number of Access Signs	Number of Warning Flag Signs	Number of Sets of Warning Flags (**)	Number of Rip Current Signs
'97	664			
'98	233			
'99	303			
'00	336			
'01	54			
'02	409			
'03	220			
'04	126	932	1,007	616
'05	289	1,190	937	1,553
'06	282	130	162	1,224
'07	379	423	721	97
'08	112	265	409	567
'09	113	285	342	396
'10	200	291	388	*516
'04 to '10	1,501	3,516	3,966	4,969
'97 to '10	3,720			

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Coastal Hazards



Executive Summary

Development within coastal areas of Florida increases the vulnerability of both populations and structures. Development within these high hazard areas is expected to continue in the future, thus increasing the vulnerability of the state as a whole. In the coastal zone, hazards can include flooding, hurricanes/coastal storms and associated storm surge, shoreline erosion, tornadoes and other severe storms, wildfires, drought and extreme heat, and winter storms and freezes. Such hazards can result in loss of life, damage to resources, and cost millions of dollars in repairs. The legislature has enacted laws that, through local comprehensive plans, direct development and redevelopment away from areas more vulnerable to natural disasters to protect human life and limit public expenditures. These laws also protect coastal resources and examine cumulative impacts through local government planning efforts. The Coastal Hazards focus area includes indicators that address the vulnerability of life, awareness of coastal hazards, and resiliency in the coastal zone. Table 6-1 shows the 12 indicators for this focus area.

Table 6-1
Coastal Hazards Indicators

6.1	Population in the High Hazard Area
6.2	Emergency Evacuation Shelter Demand and Capacity
6.3	Level of Awareness of Coastal Hazards
6.4	Number of Local Governments Implementing Educational Programs and Activities to Increase Level of Awareness of Coastal Hazards
6.5	Number and List of Local Governments with Inventory of Mapped Areas Affected by Coastal Hazards
6.6	Number of Communities Improving Resiliency through the Community Rating System
6.7	Amount of Funds Received through the Hazard Mitigation Grant Program
6.8	Number of Local Governments Developing Long Term Recovery and Adaptation Plans to Improve Community Resiliency
6.9	Number of Miles of Eroding Beaches
6.10	Number of Vessel Groundings
6.11	Number of Reported Hazardous Material Incidents
6.12	FCMP Funded Projects and Grants for Coastal Hazards

As mentioned in Coastal Society focus area, there are many highly populated areas in the coastal zone and the population in this area increased during much of the previous decade. Such a large population located near the coast means that many individuals are vulnerable to storm surge during and after a hurricane. The first two indicators describe the number of individuals in the population at risk during a storm event as well as the demand and the capacity for public shelter.

One way to reduce the number of injuries and deaths caused by coastal hazards is to increase public awareness of the potential dangers of them. Indicators 6.3 and 6.4 address public awareness of coastal hazards. Indicator 6.3 describes the change in awareness among private individuals while Indicator 6.4 describes the effort made by communities to increase public

awareness of hazards. Indicator 6.5 includes a listing of each community with an inventory of mapped areas that would be affected by coastal hazards.

The amount of damage caused by hurricanes is the result of factors such as wind speed, rainfall, and storm surge. Communities can reduce the amount of damage caused by a hurricane—and the cost of repairing the damage—by improving resiliency. Indicators 6.6, 6.7, and 6.8 describe the coastal zone’s resiliency to hazards. Indicator 6.6 tracks the number of local governments in the Community Rating System. Indicator 6.7 tracks the amount of funds received through the Hazard Mitigation Grant Program. Indicator 6.8 tracks the number of local governments that are developing long term recovery and adaptation plans.

Beaches are an important resource in Florida. Not only do beaches help pump millions of dollars into the state’s tourism driven economy each year, they also serve as buffer between storm waves and onshore development. In many parts of the state, beach erosion, often caused by hurricanes, is deemed critical. Indicator 6.9 tracks the number of miles of critically eroded beach each year between 2000 and 2010.

In addition to natural hazards, manmade hazards can also have a significant impact on the coastal zone’s resources. Two indicators in this focus area address manmade hazards that have either damaged or had the potential to cause damage to natural resources. Indicator 6.10 tracks the number of vessel groundings in the coastal zone and the Florida Keys National Marine Sanctuary while Indicator 6.11 tracks the number of reported hazardous material incidents.

The FCMP has made an effort to improve resiliency and awareness of hazards in the coastal zone through its grants and programs. The last indicator in this focus area tracks the number of projects funded and the amount of money awarded by the FCMP in order increase resiliency and awareness of coastal hazards.

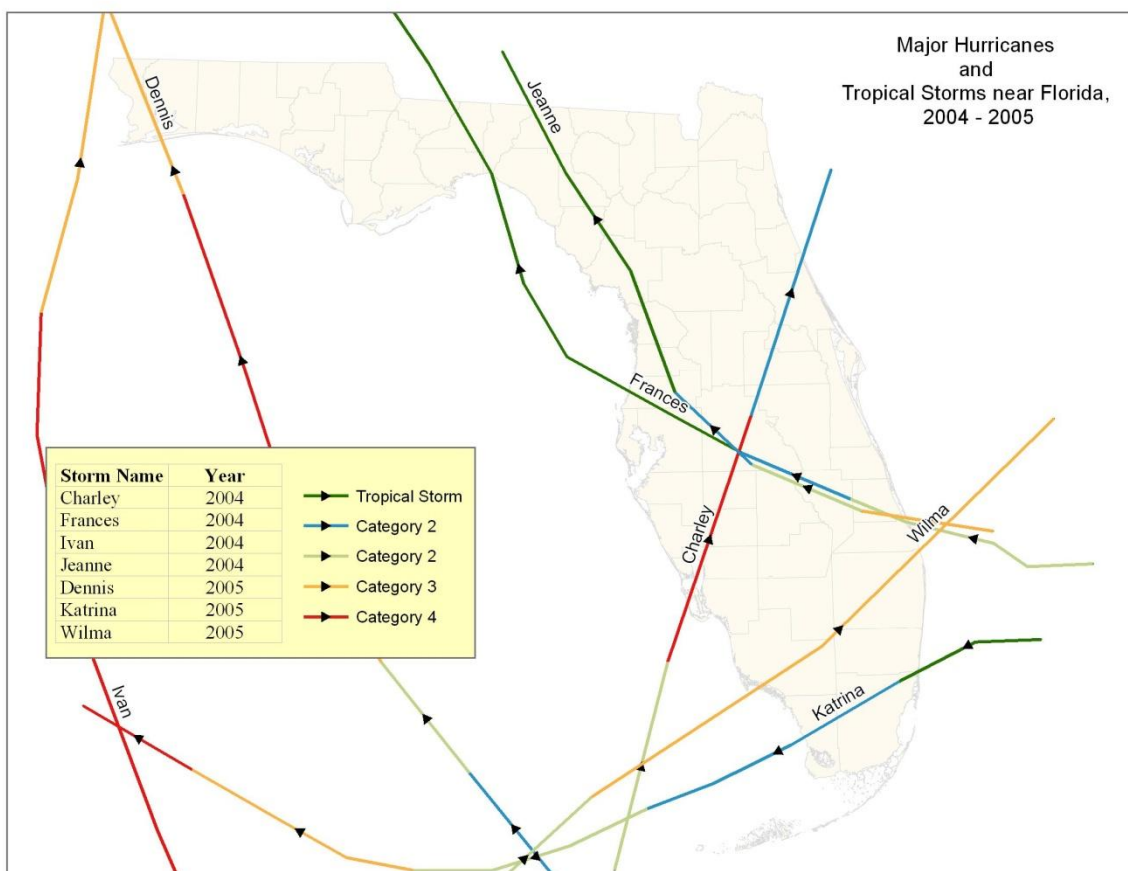
Four indicators in this focus area, Indicators 1.3 through 1.6, are based on surveys that were conducted by Florida State University on behalf of the Coastal Management Program. Indicator 1.3 is based on the results of a telephone and mail-in survey of private individuals conducted in 2009. Indicators 1.4, 1.5, and 1.6 are based on a survey of 41 local governments (20 cities and 21 counties) located in the coastal zone. Twenty-two of these local governments are located on the Gulf coast while the remaining 19 are located on the Atlantic coast.

One type of hazard that takes place in the coastal zone that warrants special attention is hurricanes. Hurricanes can cause major damage to homes and businesses. They can topple large trees which can block road networks and cause extensive power outages. They can cause beach erosion and damage marshes. Hurricanes can also cause flooding in areas located near the shore and areas located further inland. While these storms may cause great physical destruction, they also impact coastal society through increased insurance costs and impacts on property values.

Hurricanes pose a threat to all coastal areas in the southeastern United States but because of its shape and lengthy coastline, Florida is particularly vulnerable to these types of storms. Hurricane activity varies from year to year with some years having three named hurricanes (2009) to other years having 15 named hurricanes (2005). The 2004 and 2005 hurricane seasons were especially active. The 2004 hurricane season was the most active storm season in Florida since weather records began in 1851 while the 2005 season set a record number of named storms.

Figure 6-1 shows seven major hurricanes that passed through Florida in 2004 and 2005. Although none of these storms reached Category 5 status while they were near Florida, several made landfall as Category 4 or Category 3. These storms had a significant impact on several indicators in the Coastal Hazards focus area.

Figure 6-1



Indicator 6.1 – Population in the High Hazard Area

During a storm event, many areas are in danger of flooding and become unsafe as a result of higher water levels caused by storm surge. Collectively, these locations are sometimes referred to as the High Hazard Area. This indicator measures the number of individuals who would be considered “at-risk” based on their location during a Category 1 storm. A similar indicator was included in FACT 2000 (Indicator 3.1, Population in the Coastal High Hazard Area). For planning purposes, the number of individuals at risk is added to individuals who are expected to evacuate based on behavioral studies but would not be considered “at-risk” during a Category 1 storm. This total is known as the “Base Scenario” population. Figures were obtained from the Statewide Regional Evacuation Studies for each of the coastal counties.

Table 6-2 shows the base scenario population for each county in the coastal zone. Included in this table is the total population in the county in 2010 as well as the base scenario population as a percent of the total population. The base scenario population in all the coastal counties is 3,692,388. This figure represents approximately one quarter of the entire population in the coastal counties.

Table 6-2

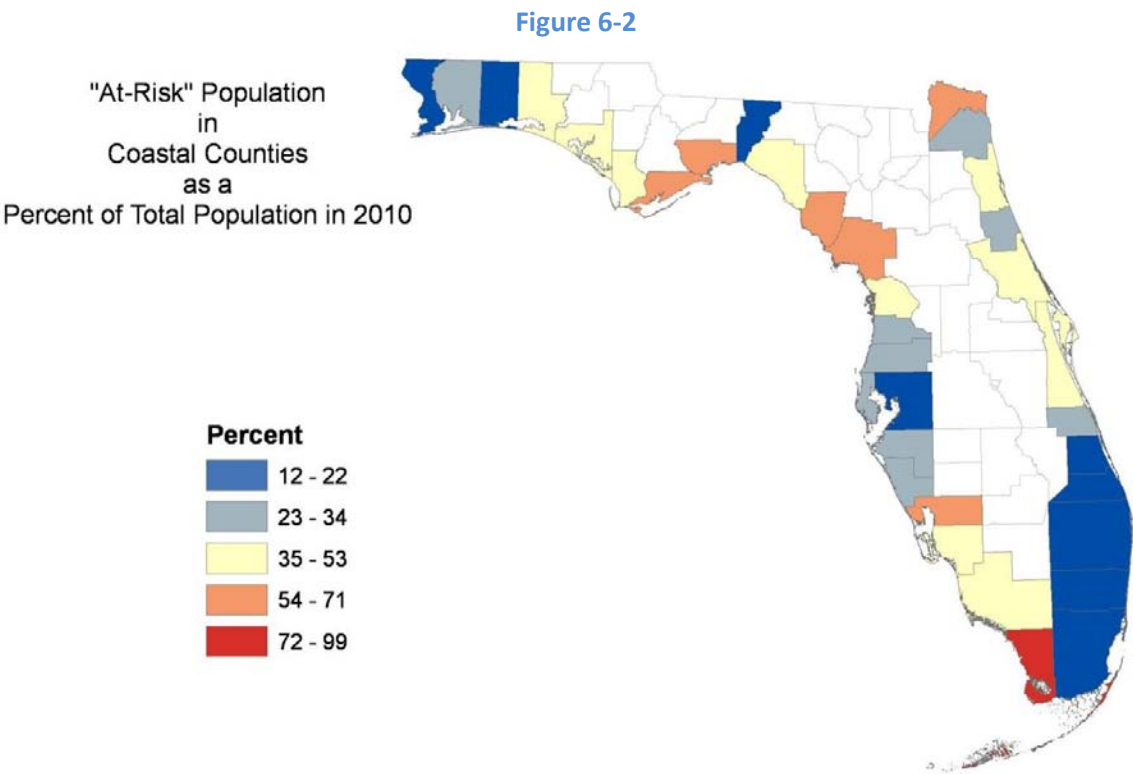
Table 6.2 shows the Base Scenario Population and the Total Population in 2010 for each coastal county.

County	Base Scenario Population	Total Population 2010	Percent of Total Population
Escambia	52,203	297,619	18
Santa Rosa	38,662	151,372	26
Okaloosa	26,430	180,822	15
Walton	23,413	55,043	43
Bay	65,606	168,852	39
Gulf	6,790	15,863	43
Franklin	8,191	11,549	71
Wakulla	20,370	30,776	66
Jefferson	2,607	14,761	18
Taylor	11,003	22,570	49
Dixie	10,679	16,422	65
Levy	25,604	40,801	63
Citrus	62,641	141,236	44
Hernando	51,075	172,778	30
Pasco	153,677	464,697	33
Pinellas	311,942	916,542	34
Hillsborough	267,128	1,229,226	22
Manatee	105,009	322,833	33
Sarasota	108,516	379,448	29
Charlotte	89,731	159,978	56
Lee	266,761	618,754	43

Table 6-2 (continued)

County	Base Scenario Population	Total Population 2010	Percent of Total Population
Collier	159,885	321,520	50
Monroe	72,390	73,090	99
Miami-Dade	355,090	2,496,435	14
Broward	206,928	1,748,066	12
Palm Beach	186,934	1,320,134	14
Martin	29,916	146,318	20
St. Lucie	38,730	277,789	14
Indian River	43,125	138,028	31
Brevard	245,161	543,376	45
Volusia	216,795	494,593	44
Flagler	30,552	95,696	32
St. Johns	101,163	190,039	53
Duval	254,303	864,263	29
Nassau	43,378	73,314	59
Total	3,692,388	14,194,603	26

Figure 6-2 shows the percentage of each county's base scenario population as a percent of the county's total population. Counties in South Florida along the Atlantic Coast have low base scenario populations. Monroe County has the largest percentage base scenario population—99 percent.



Indicator 6.2 - Emergency Evacuation Shelter Demand and Capacity

This indicator describes the change in emergency shelter demand and capacity between 2000 and 2010. Estimates come from the Statewide Emergency Shelter Plan. Each Plan contains figures for each county's demand, capacity, and surplus and deficit figures. Overall, there are two different types of emergency shelters—host (non-risk) and hurricane evacuation (risk). This indicator covers hurricane evacuation (risk) shelters.

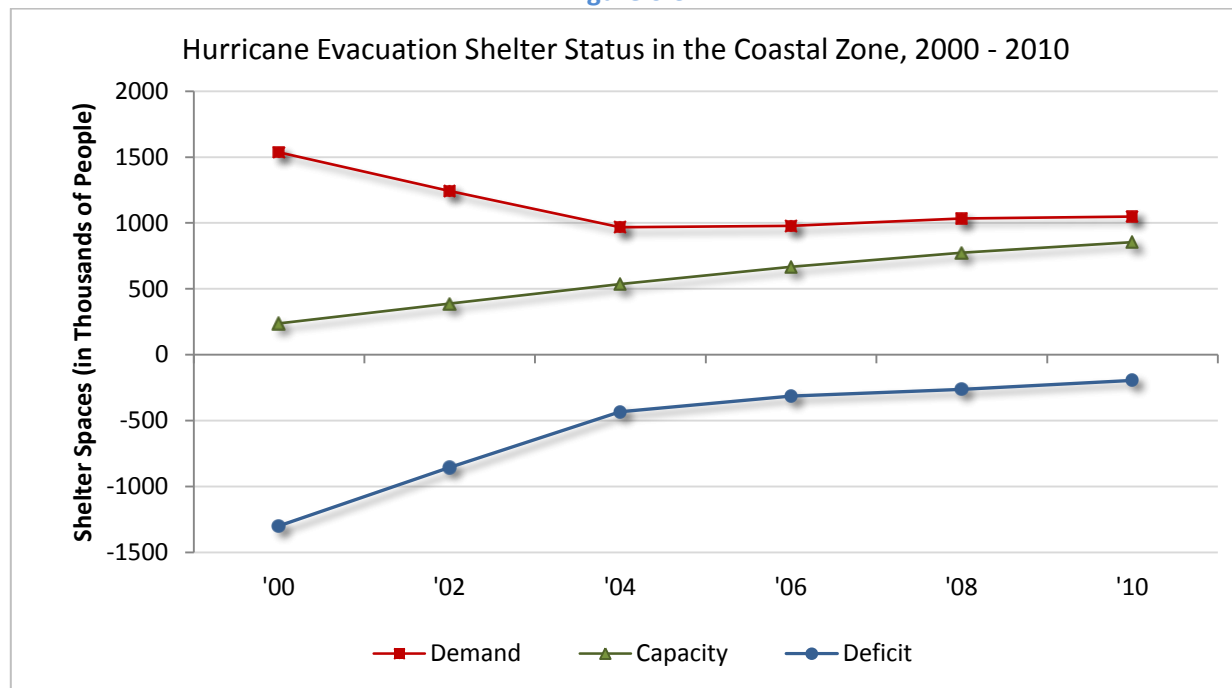
Beginning with the 2006 publication of the Plan, the Division of Emergency Management (DEM) began separating demand and capacity estimates for individuals in need (known as Persons with Special Needs, or PSN) from demand and capacity estimates for the rest of the population (known as the General Population, or GP). Prior to that time, counties could provide PSN figures voluntarily but such figures were combined with General Population (GP) and one estimate for demand and one for capacity was reported for each county. From 2006 onward, GP and PSN figures were separated so that there was a GP demand as well as a PSN demand figure for each county.

Included in this indicator is a description of the change in the demand, capacity, and surplus/deficit for the total population (GP and PSN combined) in the coastal zone from 2000 to 2010 and an explanation of how these figures were calculated. The trend in GP and PSN figures during the period from 2006 to 2010 is also presented.

Total Population

A small decrease in demand and a substantial increase in capacity from 2000 to 2010 was not enough to overcome the deficit in shelter space in the coastal counties by 2010 (Figure 6-3). The demand for shelter space for the total population decreased by 488,665 spaces (32 percent) from 1,537,588 in 2000 to 1,048,923 in 2010. Capacity increased by 617,437 spaces (259 percent) from 238,340 in 2000 to 855,777 in 2010. Although the deficit was not eliminated, it was more than one million spaces less in 2010 than it was in 2000.

Figure 6-3



Demand and Capacity Explained

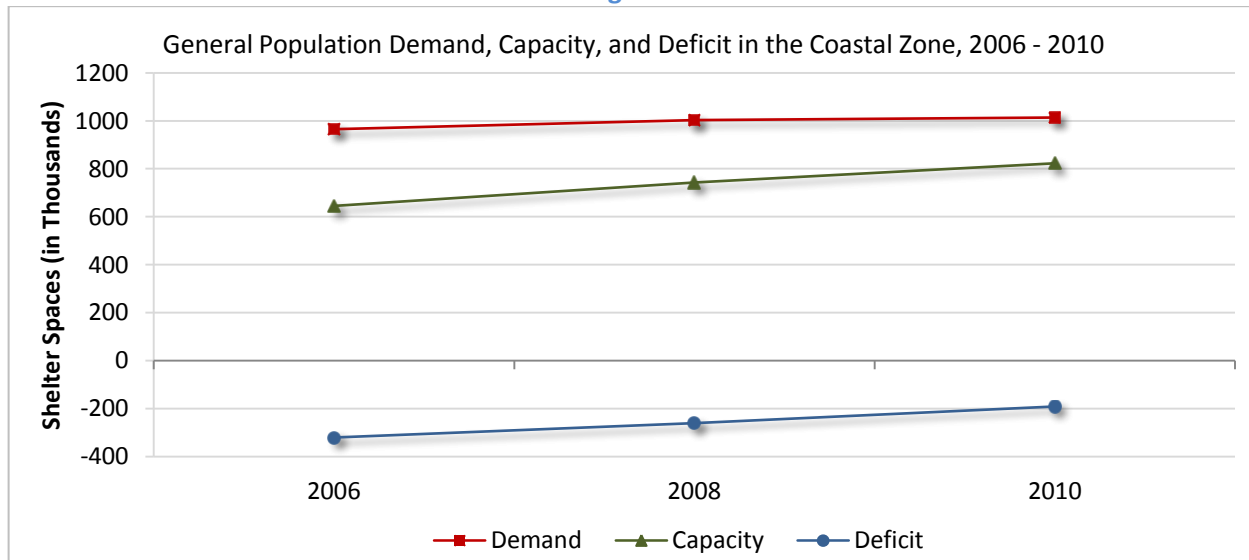
Demand for the General Population is an estimate of the number of individuals expected to seek public shelter during a Category 5 storm. Such values were based on census counts in geographic areas that were considered vulnerable during a hurricane. Advanced computer models used to determine vulnerable geographic locations have become more precise in estimating the possible extent of storm surge and flooding. As a result, the vulnerable population in many areas was reduced. Demand values are also based on estimates and behavioral studies that were included in the most current Hurricane Evacuation Study at the time. Capacity for the General Population was typically found by dividing the total usable square footage of an approved shelter by 20 square feet per person.

Demand and capacity figures for PSN were calculated differently than GP figures. Demand was found by taking the highest of the following three factors—the maximum daily census of PSN clients in Special Needs Shelters (SpNS); in each county during the 2004 and 2005 hurricane season; the local Emergency Management Agencies estimate of demand for PSN clients; or thirty-five percent of the current PSN registry in each county. PSN capacity during this time was found by dividing the total usable square footage of an approved Special Needs Shelter (SpNS) by 60 square feet per person.

General Population

Demand for GP shelter space increased by 48,185 people from 965,519 in 2006 to 1,013,704 in 2010. This was a five percent increase. Capacity however, increased by 178,041 (28 percent) from 645,692 in 2006 to 823,733 in 2010. Such an unbalanced increase in demand and capacity meant that a deficit still existed in 2010 but it was 40 percent less than in 2006. Figure 6-4 shows the increase in capacity and demand and the decrease in the deficit.

Figure 6-4



Demand increased in a large number of counties (20) between 2006 and 2010 and decreased in the remaining 15 counties (Table 6-3). During this time, capacity increased in 26 counties and decreased or remained the same in nine. Such increases in both demand and capacity resulted in changes in shelter status in several counties. Of the 25 counties that had a deficit in shelter space in 2005, six counties had a surplus by 2010. Four of these six counties came from the panhandle region which experienced a notable shift during this period. In 2006, four of its five coastal counties reported deficits but in 2010 all counties in this region reported having a surplus. All counties with a surplus of shelter space in 2006 (10) maintained a surplus in 2010.

Table 6-3

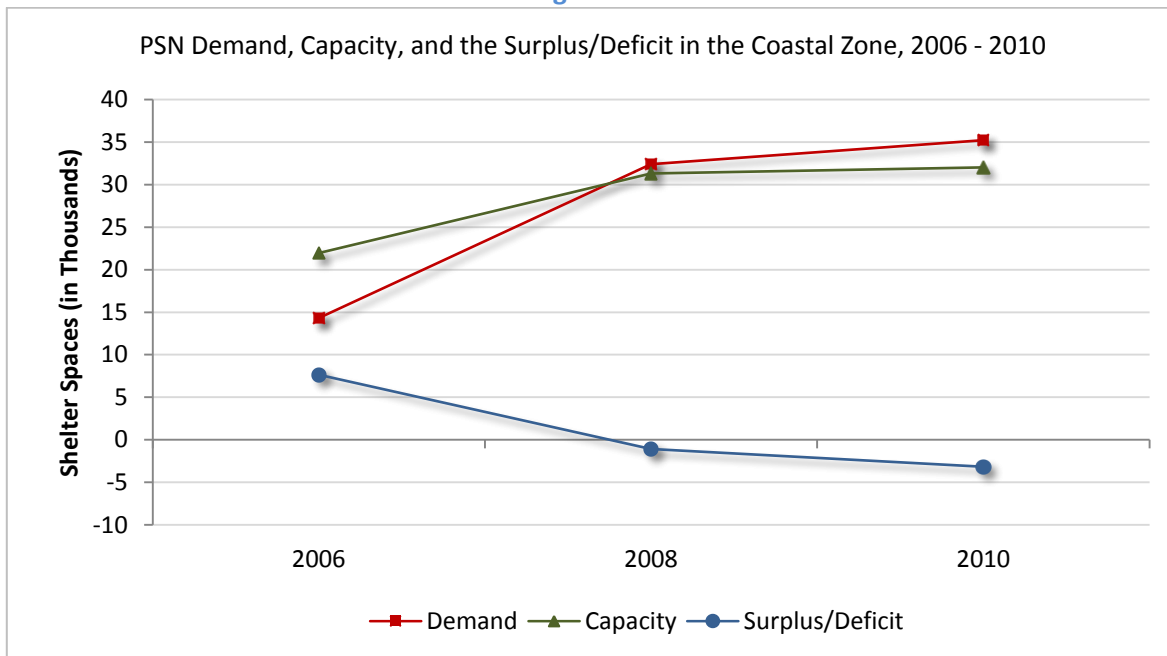
Table 6-3 shows net change in GP demand, capacity, deficit/surplus for each county from 2006 to 2010 and each county's shelter status for 2006 and 2010. A "d" status indicates a deficit while an "s" indicates a surplus. Counties are arranged based on their spatial location along the state's coast. These figures simply represent the difference between 2006 and 2010 and do not include changes that took place each year. A dashed line indicates a value of zero.

County	Net Change in Demand '06 – '10	Net Change in Capacity '06 – '10	Net Change in Deficit/Surplus '06 – '10	Status in 2006	Status in 2010
Escambia	-4,673	2,514	7,187	d	s
Santa Rosa	-1,173	8,291	9,464	d	s
Okaloosa	-1,042	11,649	12,691	d	s
Walton	972	3,544	2,572	s	s
Bay	-346	4,379	4,725	d	s
Gulf	381	357	-24	d	d
Franklin	-7	—	7	d	d
Wakulla	35	400	365	d	d
Jefferson	84	—	-84	d	d
Taylor	254	1,202	948	s	s
Dixie	-220	—	220	d	d
Levy	-292	545	837	d	d
Citrus	3,272	-414	-3,686	d	d
Hernando	-11,459	4,806	16,265	d	s
Pasco	6,649	10,211	3,562	d	d
Pinellas	-12,763	7,485	20,248	d	d
Hillsborough	11,297	19,343	8,046	d	d
Manatee	3,996	5,026	1,030	s	s
Sarasota	-10,044	-6,747	3,297	d	d
Charlotte	-15,610	—	15,610	d	d
Lee	24,442	1,234	-23,208	d	d
Collier	-5,851	3,751	9,602	d	d
Monroe	3,200	602	-2,598	d	d
Miami-Dade	10,179	17,891	7,712	s	s
Broward	4,995	22,058	17,063	s	s
Palm Beach	3,038	9,033	5,995	s	s
Martin	494	8,869	8,375	s	s
St. Lucie	2,311	1,850	-461	s	s
Indian River	889	1,106	217	d	s
Brevard	-889	12,602	13,491	s	s
Volusia	701	3,813	3,112	d	d
Flagler	-2,152	—	2,152	d	d
St. Johns	743	-548	-1,291	s	s
Duval	37,715	24,852	-12,863	d	d
Nassau	-941	-1,663	-722	d	d
Coastal Zone	48,185	178,041	129,856	d	d

Persons with Special Needs

Shelters approved for Persons with Special Needs are known as Special Needs Shelters (SpNS). Demand for SpNS space increased by 20,903 people from 14,316 in 2006 to 35,219 in 2010. This was a 146 percent increase. Capacity also increased but only by 46 percent from 21,958 in 2006 to 32,044 in 2010. Although there was a surplus of nearly 8,000 shelter spaces in 2006, such a large increase in demand coupled with an unmatched increase in capacity resulted in a deficit of 3,000 spaces. Figure 6-5 shows the increase in capacity and demand and the change in the difference between them.

Figure 6-5



More counties reported having a deficit in shelter space in 2010 than in 2006. During this time, the number of counties with a deficit in shelter space increased five from 16 in 2006 to 21 in 2010. During this time, demand for shelter space increased in 25 counties between 2006 and 2010 (Table 6-4). Capacity increased in half of the counties but only 34 percent (12) experienced an increase of more than 200 spaces. Only four counties that began the period with a deficit ended the period with a surplus.

Table 6-4

Table 6-4 shows net change in demand, capacity, and deficit/surplus for SpNS space in each county from 2006 to 2010. The table also includes each county's PSN shelter status for 2006 and 2010. A "d" status indicates a deficit while an "s" indicates a surplus. Counties are arranged based on their spatial location along the state's coast. These figures simply represent the difference between 2006 and 2010 and do not include changes that took place each year. A dashed line indicates a value of zero.

County	Net Change in Demand '06 – '10	Net Change in Capacity '06 – '10	Net Change in Deficit/Surplus '06 – '10	Status in 2006	Status in 2010
Escambia	-9	—	9	d	d
Santa Rosa	-20	327	347	s	s
Okaloosa	-276	-823	-547	s	d
Walton	-6	—	6	s	s
Bay	1,476	615	-861	d	d
Gulf	-269	—	269	d	d
Franklin	38	—	-38	d	d
Wakulla	19	—	-19	d	d
Jefferson	15	—	-15	d	d
Taylor	131	—	-131	d	d
Dixie	-35	—	35	d	s
Levy	109	—	-109	s	d
Citrus	154	138	-16	d	d
Hernando	1,455	275	-1,180	d	d
Pasco	773	145	-628	s	d
Pinellas	5,581	35	-5,546	s	d
Hillsborough	3,479	1,017	-2,462	s	d
Manatee	876	-101	-977	s	d
Sarasota	1,996	2,913	917	d	s
Charlotte	446	—	-446	d	d
Lee	742	1,700	958	d	s
Collier	1,087	-968	-2,055	s	d
Monroe	-238	-112	126	d	d
Miami-Dade	369	1,399	1,030	s	s
Broward	69	-1,115	-1,184	s	s
Palm Beach	-6	467	473	s	s
Martin	152	602	450	s	s
St. Lucie	59	-166	-225	s	d
Indian River	52	—	-52	s	s
Brevard	756	828	72	s	s
Volusia	34	1,234	1,200	s	s
Flagler	456	176	-280	d	d
St. Johns	-112	120	232	d	s
Duval	1,343	1,379	36	s	s
Nassau	207	1	-206	s	d
Coastal Zone	20,903	10,086	-10,817	s	d

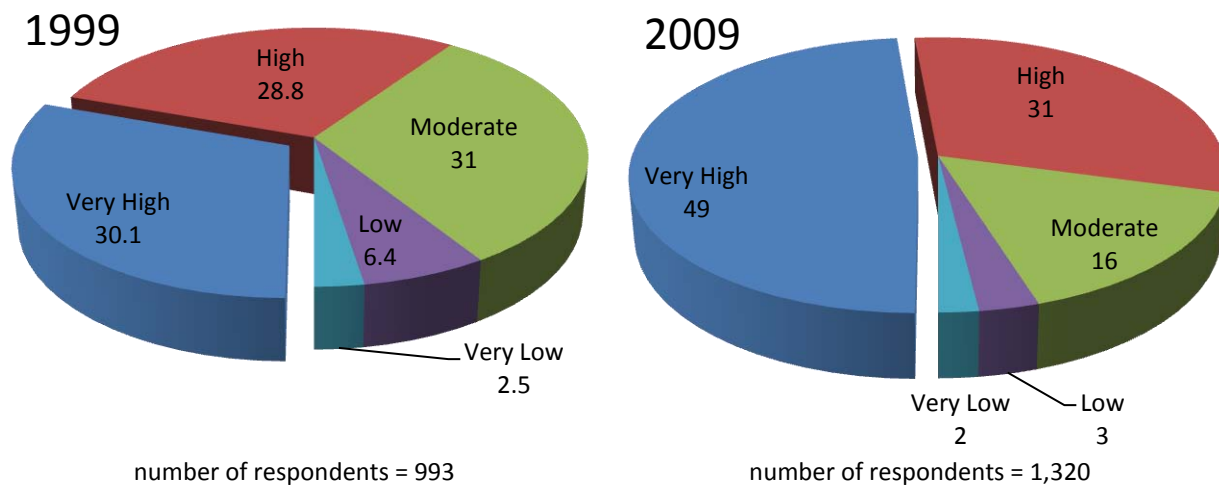
Indicator 6.3 - Level of Awareness of Coastal Hazards

This indicator describes the change in the level of awareness of coastal hazards among Florida residents. The data comes from two different surveys both conducted by the Survey Research Laboratory at Florida State University. The first survey was conducted in 1999 the second survey was conducted in 2009. Both surveys collected responses through telephone interviews and mail forms. Respondents were located across the state.

In both 1999 and 2009 each respondent was asked how he or she would classify his or her own level of awareness of coastal hazards. Survey results indicate that nearly 20 percent more people classified their level of awareness as “very high” in 2009 than in 1999 (Figure 6-6). In 2009, residents in coastal counties and those who visited the coast frequently were more likely to classify their level of awareness as very high.

Figure 6-6

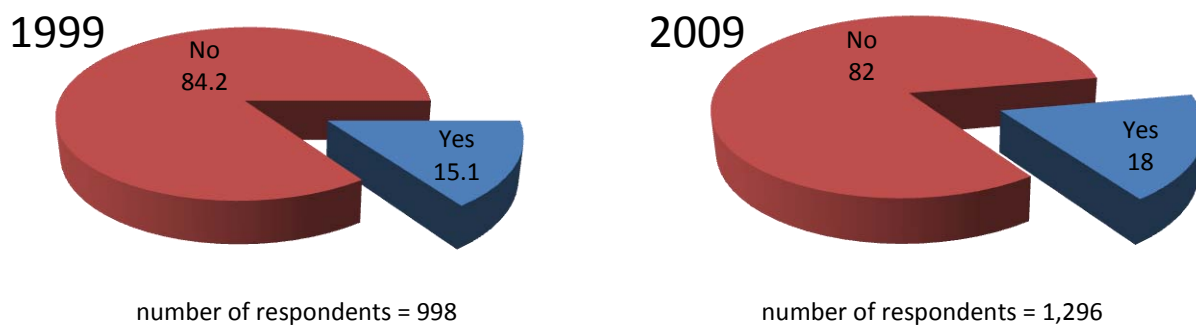
Survey Question: *How would you describe your level of awareness of coastal hazards?*



Despite such an increase in awareness, the percentage of residents who felt content with the amount of information they had or were getting on coastal hazards remained roughly the same (Figure 6-7).

Figure 6-7

Survey Question: *Do you feel you need more information on coastal hazards?*



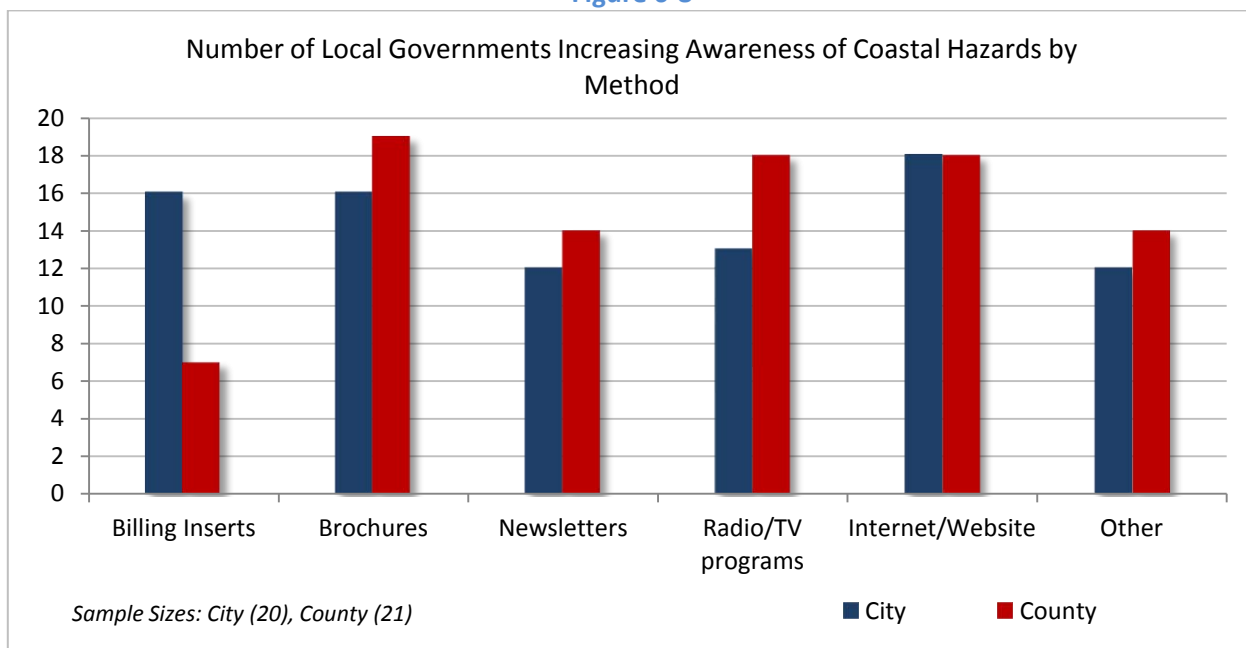
Indicator 6.4 - Number of Local Governments Implementing Educational Programs and Activities to Increase the Level of Awareness of Coastal Hazards

Many local governments in the coastal zone relied on or used education programs or campaigns to increase public awareness of coastal hazards such as hurricanes, tropical storms and floods. These programs and campaigns employed the use of billing inserts, brochures, newsletters, radio and television programs, and the internet. This indicator reports on the number, type, and location of local governments—which include city and county governments—that employed each method. Throughout this indicator, the term *local government* is used and can refer to a city or a county. Data are based on a 2009 survey conducted on behalf of the Florida Coastal Management Program. In this survey, Monroe County is considered a Gulf county.

City vs. County

Figure 6-8 shows the number of local governments that implemented each activity in order to increase level of awareness of coastal hazards. A large percentage of cities and counties reported using newsletters and the internet. However a larger percentage of cities reported using billing inserts (city 80 percent, county 33 percent) while a larger percentage of counties reported using radio and television programs (county 86 percent, city 65 percent). A slightly larger percent of counties reported using brochures (county 90 percent, city 80 percent). Each type of media was used in at least 60 percent of cities and 33 percent of counties. No one single method was used by every single local government.

Figure 6-8



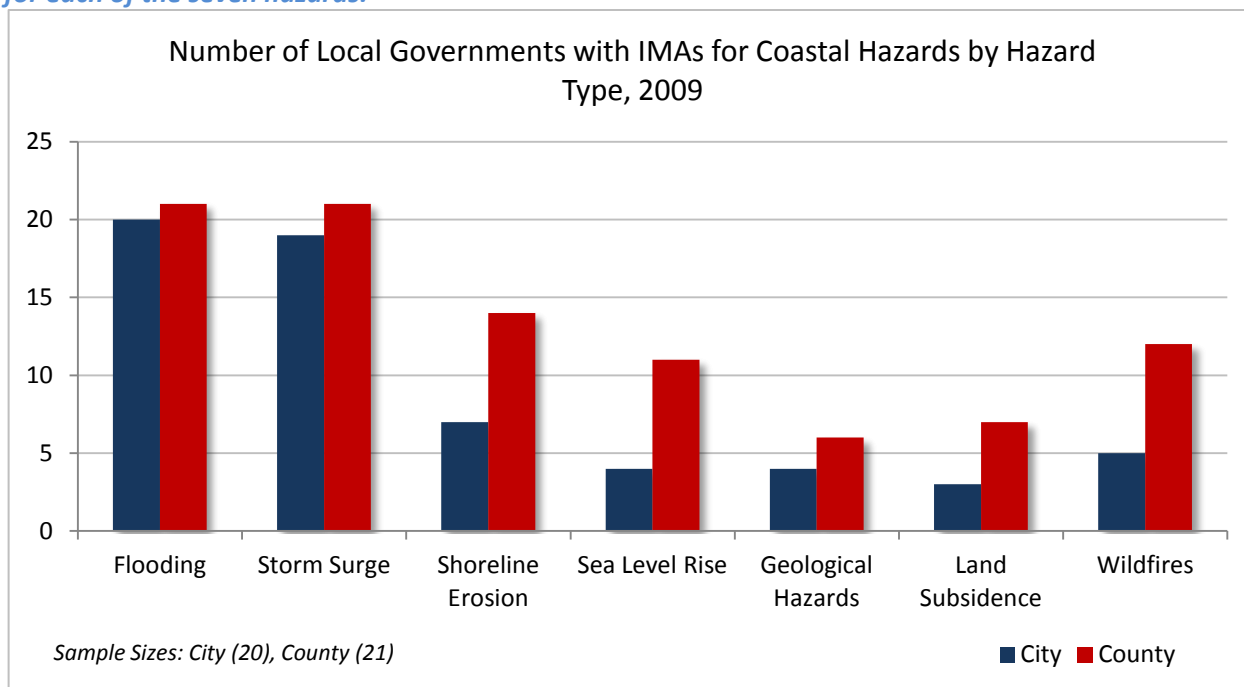
Indicator 6.5 - Number and List of Local Governments with Inventory of Mapped Areas Affected by Coastal Hazards

This indicator reports the number of municipalities with an Inventory of Mapped Areas (IMA) that would likely be affected by a coastal hazard. The data are based on the results of a 2009 survey taken by 41 local governments in which each municipality was asked to indicate whether it had an IMA for each of the seven listed hazards. These hazards include—flooding, storm surge, shoreline erosion, sea level rise, geological hazards, land subsidence, and wildfires. Of these 41 local governments, 20 were counties and 21 were cities. Twenty-two were located on the Gulf coast while the remaining 19 were located on the Atlantic coast.

Two hazards—flooding and storm surge—stand out as hazards for which the majority of these 41 surveyed communities reported having IMAs (Figure 6-9). All of the local governments surveyed had an IMA that would be affected by flooding and only one reported not having an IMA affected by storm surge. A notably smaller number of communities had IMAs for each of the remaining five hazards particularly with regard to geologic hazards, which can include sinkholes, and land subsidence. For each hazard, a higher percentage of counties than cities reported having an IMA. Table 6-5 shows the list of communities by regional planning council. Counties appear in bold while cities appear in italics.

Figure 6-9

Figure 6-9 shows the number of local governments that indicated they had an inventory of mapped areas for each of the seven hazards.



Coastal Hazards

Table 6-5 shows the list of surveyed communities. A check mark in a hazard column indicates the community has an IMA for that type of hazard. Counties are in bold while cities are in italics.

Community	RPC No.	Flooding	Storm Surge	Shoreline Erosion	Sea Level Rise	Geological Hazards	Land Subsidence	Wild-fires
Bay	1	✓	✓	✓	✓	✓	✓	✓
Escambia	1	✓	✓	✓				✓
Santa Rosa	1	✓	✓					
Wakulla	1	✓	✓		✓	✓	✓	
<i>Fort Walton Beach</i>	1	✓	✓					
Franklin	2	✓	✓					✓
Gulf	2	✓	✓	✓			✓	
Taylor	3	✓	✓					
Flagler	4	✓	✓	✓	✓			✓
St. Johns	4	✓	✓	✓				
<i>Fernandina Beach</i>	4	✓	✓					✓
<i>Neptune Beach</i>	4	✓	✓			✓		
Citrus	5	✓	✓			✓	✓	✓
Brevard	6	✓	✓	✓	✓			
Volusia	6	✓	✓	✓		✓	✓	✓
<i>New Smyrna Beach</i>	6	✓	✓		✓			✓
<i>Port Orange</i>	6	✓	✓	✓				
Pasco	8	✓	✓		✓	✓	✓	
Pinellas	8	✓	✓	✓	✓			✓
<i>Bradenton</i>	8	✓	✓					
<i>Clearwater</i>	8	✓	✓	✓				
<i>Largo</i>	8	✓	✓			✓	✓	
<i>New Port Richey</i>	8	✓	✓					
<i>St. Petersburg</i>	8	✓						
<i>Tampa</i>	8	✓	✓	✓	✓	✓	✓	✓
Charlotte	9	✓	✓	✓	✓			✓
Lee	9	✓	✓	✓	✓			✓
<i>Fort Myers</i>	9	✓	✓					
<i>North Port</i>	9	✓	✓	✓	✓			
<i>Sarasota</i>	9	✓	✓	✓		✓	✓	✓
Indian River	10	✓	✓	✓				✓
Palm Beach	10	✓	✓	✓	✓		✓	✓
<i>Boca Raton</i>	10	✓	✓	✓				
<i>Boynton Beach</i>	10	✓	✓					
<i>Port St. Lucie</i>	10	✓	✓					✓
<i>Sebastian</i>	10	✓	✓					
Broward	11	✓	✓	✓	✓	✓		✓
Miami-Dade	11	✓	✓	✓				
Monroe	11	✓	✓		✓			
<i>North Miami</i>	11	✓	✓	✓	✓			
<i>Pompano Beach</i>	11	✓	✓					

Indicator 6.6 - Number of Communities Improving Resiliency through the Community Rating System

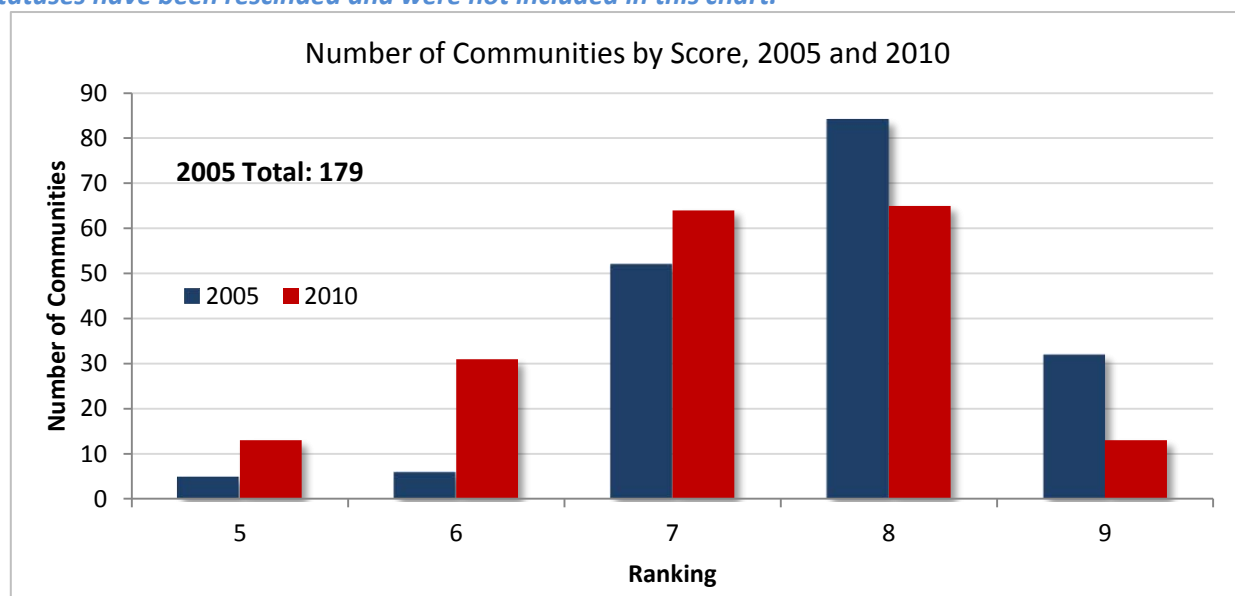
The Community Rating System (CRS) is a voluntary program for communities that participate in the National Flood Insurance Program. Its purpose is to encourage communities to improve flood resiliency by providing incentives to communities that implement approved prevention and awareness measures beyond those that are required. These measures count towards a points system that determines a community's score. A score of 1 requires the most points and communities with this score receive the highest discount on insurance premiums while communities with a score of 10 receive no discount. This indicator describes the change in the number of communities improving flood resiliency as indicated through the CRS.

There were 171 active coastal communities in the CRS in 1999. Six years later in 2005, this figure had increased to 179 and by 2010 the number increased to 186. During this period, a total 21 coastal communities had joined the program while six communities that enrolled in the 1990s had rescinded. The average score of these 21 new communities in 2010 was 7.1.

Overall, there were more communities enrolled in the system with better ratings in 2010 than in 2005 (Figure 6-10). Between 2005 and 2010, 47 percent (85 of the 179) coastal communities in the CRS improved their score. The average score among communities that were current at the time improved from 7.74 in 2005 to 7.18 in 2010. Figure 6-10 shows an increase in the number of communities with numerically lower class in 2010. Half of the communities (89) remained in the same class and ten new communities joined the program. Only two communities had a numerically higher score in 2010 than in 2005.

Figure 6-10

Figure 6.10 shows the number of communities with a rating of 5, 6, 7, 8, or 9. No coastal communities in Florida had a rating better than 5. Although several communities had a rating of 10, their statuses have been rescinded and were not included in this chart.



Indicator 6.7 - Amount of Funds Received through the Hazard Mitigation Grant Program

The Hazard Mitigation Grant Program (HMGP) is designed to assist states, local governments, private non-profit organizations and Indian Tribes in implementing long-term hazard mitigation measures following a major disaster declaration. This indicator tracks the amount of money received by the state of Florida through the HMGP between 2000 and 2009.

There were twenty disasters that took place in Florida for which the state received funds through the HMGP. These disasters include eight hurricanes, four tropical storms, several floods, and one freeze. Table 6-6 shows the names of these twenty disasters and the year in which each one took place. Florida did not receive any funding in 2002 or 2006 but between these two years, the state received large amounts of money mostly as a result of seven hurricanes that struck in 2004 and 2005. The only other hurricane for which Florida received funds through the HMGP was Hurricane Gustav which took place in 2008.

Table 6-6

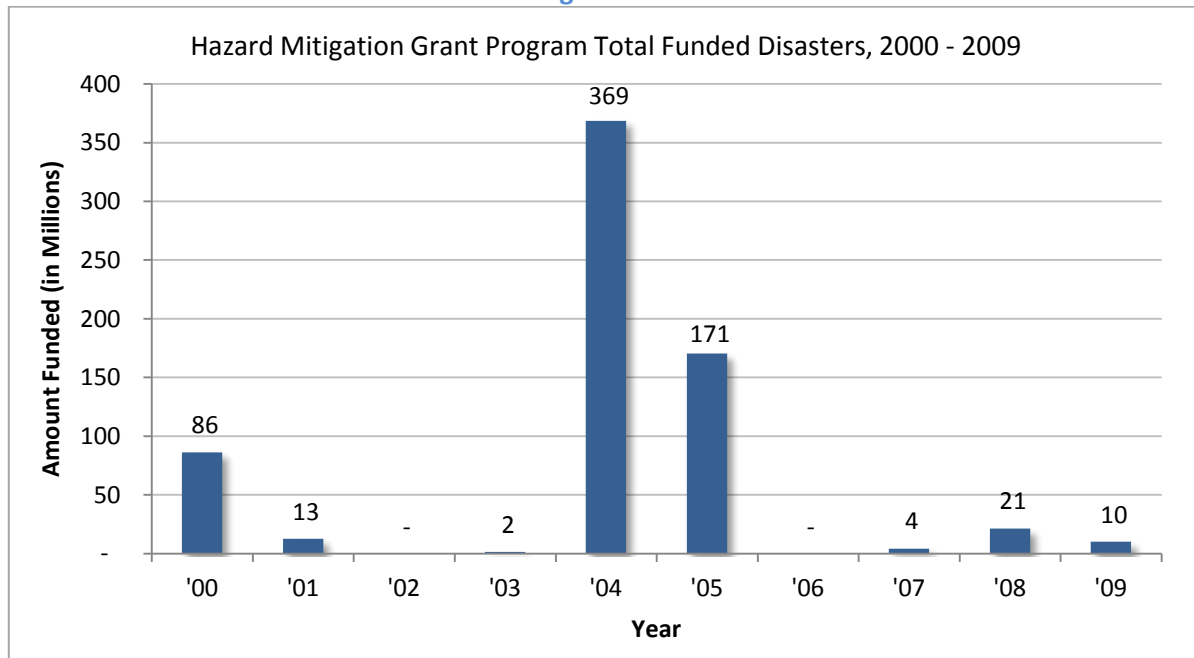
Disaster	Year	Disaster	Year
Tropical Storm Helene	2000	Hurricane Dennis	2005
South Florida Flooding	2000	Hurricane Katrina	2005
Severe Freezes	2001	Hurricane Wilma	2005
Tropical Storm Allison	2001	Groundhog Day Storm	2007
Tropical Storm Gabrielle	2001	Christmas Day Storm	2007
Miami-Dade County Tornadoes	2003	Tropical Storm Fay	2008
Southwest Florida Flooding	2003	Hurricane Gustav	2008
Hurricane Charley	2004	Severe Weather & Flooding	2009
Hurricane Frances	2004	Severe Weather & Flooding	2009
Hurricane Ivan	2004		
Hurricane Jeanne	2004		

The total amount awarded to Florida through the HMGP during this period was \$676,021,805. Figure 6-11 shows the total amount granted to the state for each year between 2000 and 2009 as a result of the disasters included in Table 6-6. These figures are accurate as of January 2010.

Eighty percent of the total was a result of the eight hurricanes that struck the state. Seven of these hurricanes took place in 2004 and 2005. The remaining 20 percent was awarded as a result of flooding (14 percent), tropical storms (4.8 percent), and severe storms, tornadoes, and freezing (less than one percent each).

The state received large amounts of money in 2004 and in 2005. In 2004, Florida received \$368,691,437 through the HMGP as a result of four hurricanes. This figure was by far the largest amount of money the state received in any other single year and accounted for 55 percent of the total amount received during the ten year period. In 2005, the state was awarded \$170,534,517 through the HMGP. This figure accounted for one quarter of the total amount received.

Figure 6-11



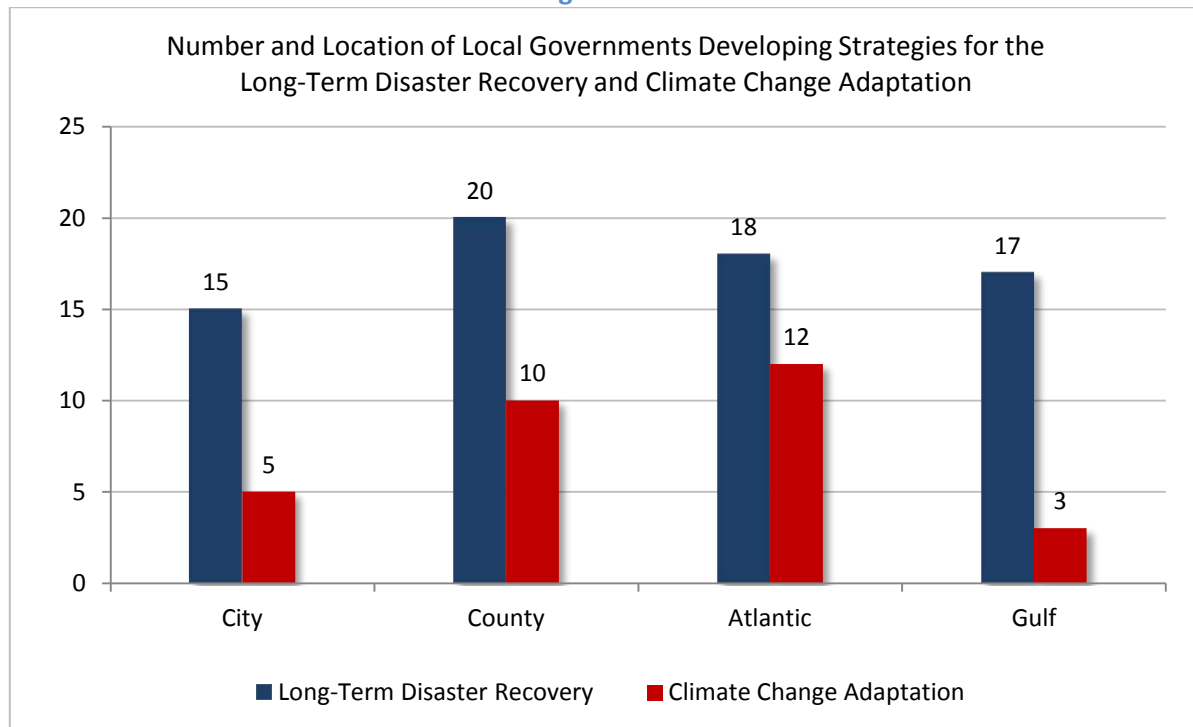
Indicator 6.8 – Number of Local Governments Developing Long Term Recovery and Adaptation Plans to Improve Community Resiliency

This indicator reports the number and location of local governments that indicated they were developing strategies for long-term disaster recovery and climate change adaptation. The data are based on responses to a survey conducted in 2010 to the local governments in 20 cities and 21 counties. Twenty-two were located on the Gulf coast while the remaining 19 were located on the Atlantic coast.

More than twice the number of local governments reported developing strategies for long-term disaster recovery than climate change adaptation (Figure 6-12). In all, 35 governments (85 percent) reported they were developing strategies for long-term disaster recovery whereas only 15 (37 percent) reported developing strategies related to climate change.

More local governments on the Atlantic coast (12, or 63 percent of Atlantic local governments) indicated they are developing strategies for climate change adaptation than communities on the Gulf coast (3, or 14 percent of Gulf local governments). In both regions, the majority of communities were developing strategies for long-term disaster recovery but a higher percent of communities in the Atlantic region (95) were doing so than the Gulf region (77).

Figure 6-12



Indicator 6.9 - Number of Miles of Eroding Beaches

Many of Florida's beaches were severely damaged by erosion during the last decade. This indicator describes the change in the number of miles of the state's 825 miles of sandy beaches that have been considered eroded between 2000 and 2010. Overall, there are two types of eroded beach—critical and noncritical. This indicator addresses both types. Only beaches that are directly exposed to the Gulf of Mexico, the Atlantic Ocean, or the Straits of Florida are included in this indicator; inlet beaches that are protected by barrier islands are not included. The data are from a continuously updated document titled "Critically Eroded Beaches in Florida" from DEP's Bureau of Beaches and Coastal Systems. A similar indicator appeared in FACT 2000 (Indicator 2.2, Number of Miles of Eroding Beach). While these figures can be compared to figures in FACT 2000, it should be noted that the definition of critical eroding area changed in 1999. The current definition used to determine critically eroded areas is as follows:

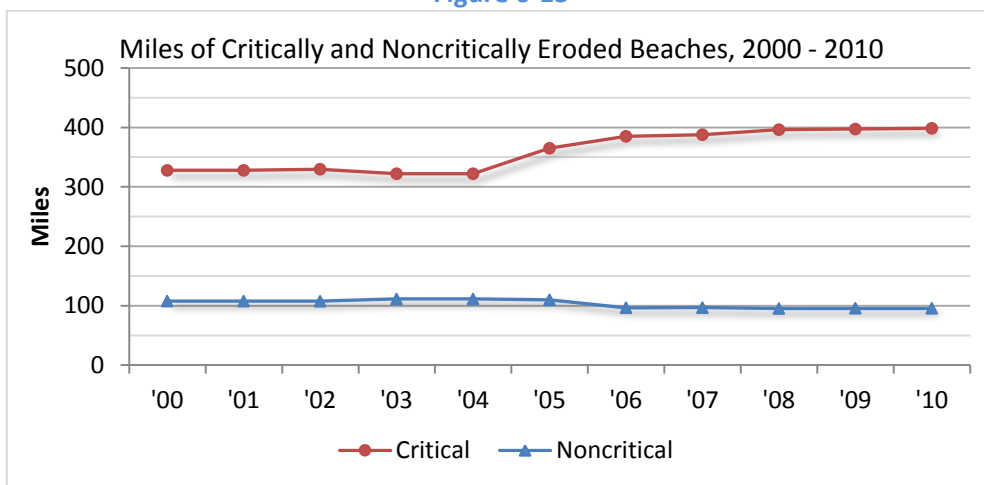
Critically eroded area is a segment of the shoreline where natural processes or human activity have caused or contributed to erosion and recession of the beach or dune system to such a degree that upland development, recreational interests, wildlife habitat, or important cultural resources are threatened or lost. Critically eroded areas may also include peripheral segments or gaps between identified critically eroded areas which, although they may be stable or slightly erosional now, their inclusion is necessary for continuity of management of the coastal system or for the design integrity of adjacent beach management projects.

If none of the four specific interests included in this description—upland development, recreational interests, wildlife habitat, or important cultural resources—are threatened by erosion that is taking place, then such an area would be considered noncritical and would require monitoring in case the erosion taking place began to threaten one of the four interests.

Statewide Change in Eroded Beaches

The length of critically eroded beach has increased a net total of 70.7 miles from 327.9 miles in 2000 to 398.6 miles in 2010 (Figure 6-13). The length of noncritically eroded beach has decreased a total of 12.1 miles from 107.7 in 2000 to 95.9 in 2010. Overall, the total length of eroded beaches—critical and noncritical combined—increased by 58.6 miles. Of the 825 miles of sandy beaches in Florida, 494.5 miles are considered either critically or noncritically eroded.

Figure 6-13



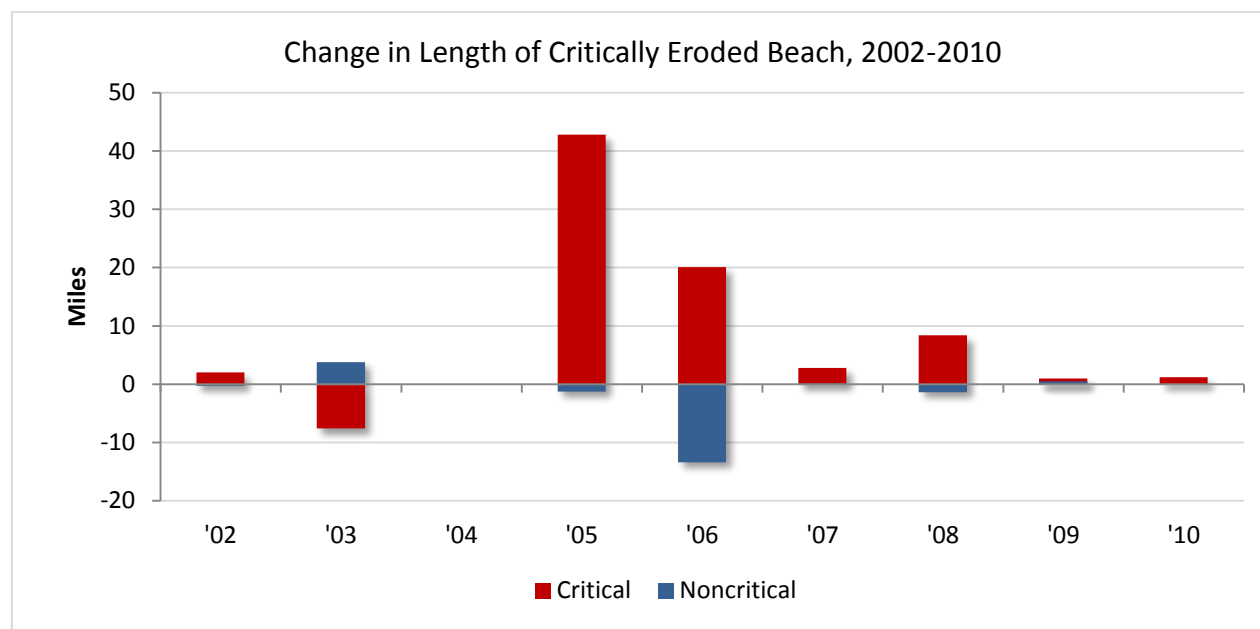
Because reports were usually issued in the summer, the amount of change listed for each year reflects the amount of erosion that took place as a result of the storms that took place during the preceding fall. Much of the increase in erosion that occurred was as a result of hurricanes and tropical storms. The 2004 and 2005 storm seasons were particularly active and caused major increases in eroded areas. Several miles of beaches that were not designated as eroded areas were added after damage sustained as a result of these storms were assessed. Although the tropical storm season in 2007 was mild, nor'easters plagued the Atlantic Coast and caused additional increases in erosion areas.

Figure 6-14 shows the change in length of eroded beaches that took place each year. The largest change in critically eroded beach took place between 2002 and 2005 when the length increased by 35.2 miles. The largest change in noncritically eroded beach took place between 2005 and 2007 when the length decreased by 13.2 miles.

The increases in critically eroded beaches came from one of two sources. One source was noncritically eroded beaches that were reclassified as 'critical' after a storm season. As a result of these changes, the length of noncritically eroded beaches typically decreased after a storm season. This occurred in both 2005 and 2006 (Figure 6-14). Another source is from beaches that were newly added erosion areas, i.e. beaches that were previously neither critical nor noncritical. Although there were numerous beach restoration projects that took place on both the Atlantic and Gulf coasts between 2000 and 2010, because restored beaches are still considered erosional, these projects did not reduce the length of eroded beaches.

Figure 6-14

Figure 6-14 shows the change in length of eroded beaches each year. Since reports were usually issued in the spring or summer these values represent the damage that took place during the preceding hurricane season. Thus, 2005 figures represent damage the 2004 storm season. No report was issued in 2001 or 2004. The change indicated for 2002 is the difference between 2000 and 2002. Note that in 2003 the length of critically eroded beach decreased.



Regional Erosion

For this indicator, beaches are divided into one of three different regions—Atlantic Coast, Gulf Coast, and Keys. In each of the three regions, the length of critically eroded beach experienced a net increase between 2000 and 2010 (Table 6-7). The largest increase, 41.5 miles, took place in the Atlantic Coast Erosion Area and represents 59 percent of the total statewide increase.

Table 6-7

Length of Critically Eroded Beach*

Region	2000	2010	Increase
Atlantic	163.4	204.9	41.5
Gulf	156.8	183.5	26.7
Keys	7.7	10.2	2.5
Total State	327.9	398.6	70.7

*All values are in miles.

The length of noncritically eroded beach experienced a net decrease in each erosion area between 2000 and 2010 (Table 6-8). The largest decrease, 7.6 miles, took place in the Gulf Coast Erosion Area which represented 63 percent of the total decrease in the state.

Table 6-8
Length of Noncritically Eroded Beach*

Region	2000	2010	Decrease
Atlantic	27.3	24.1	3.2
Gulf	77.8	70.2	7.6
Keys	2.9	1.6	1.3
Total State	108.0	95.9	12.1

*All values are in miles.

Critically Eroded Beach by County

The total length of eroded beach in the Atlantic Coast Region increased by 41.5 miles (Table 6-9). The largest increases took place in Brevard County (11.5 miles), St. Lucie County (7.1 miles), and Indian River County (6.6 miles). Several counties experienced no increase (Duval, Broward, and Miami-Dade). No Atlantic counties experienced a decrease in eroded beach.

Table 6-9

County	2000	2010	Numeric Change
Nassau	7.5	7.7	0.2
Duval	10.4	10.4	0
St. Johns	7.6	9.8	2.2
Flagler	3.1	5.7	2.6
Volusia	16.7	22.1	5.4
Brevard	25.0	36.5	11.5
Indian River	9.1	15.7	6.6
St. Lucie	2.3	9.4	7.1
Martin	16.4	18.0	1.6
Palm Beach	27	31.3	4.3
Broward	21.3	21.3	0
Miami-Dade	17	17	0
Total Atlantic	163.4	204.9	41.5

In the Gulf Coast Region, the total length of critically eroded beach increased by 26.7 miles (Table 6-10). The largest increases took place in Escambia, Walton, and Gulf Counties (8.4, 6.5, and 4 miles respectively). Eight counties experienced no change. Two counties—Okaloosa and Bay—experienced a decrease in eroded beach (1.3 and 1.9 miles respectively).

Table 6-10

Table 6-10 shows the number of miles of critical beach erosion areas in 2000, 2010, and the numeric change for each county on the Gulf Coast Erosion Area.

County	2000	2010	Numeric Change
Escambia	6.3	14.7	8.4
Santa Rosa	3.4	4.1	0.7
Okaloosa	7.8	6.5	-1.3
Walton	9.2	15.7	6.5
Bay	21.4	19.5	-1.9
Gulf	4.3	8.3	4
Franklin	10.4	11.1	0.7

Wakulla	1.3	1.3	-
Jefferson	-	-	-
Taylor	0.2	0.2	-
Dixie	0.6	0.6	-
Levy	0.7	0.7	-
Citrus	-	0.2	0.2
Hernando	-	-	-
Pasco	0.2	0.2	-
Pinellas	21	21.4	0.4
Hillsborough	1.6	1.6	-
Manatee	12.1	13.0	0.9
Sarasota	21.4	23.9	2.5
Charlotte	4.9	5.2	0.3
Lee	19.8	21.6	1.8
Collier	10.2	13.7	3.5
Total Gulf	156.8	183.5	26.7

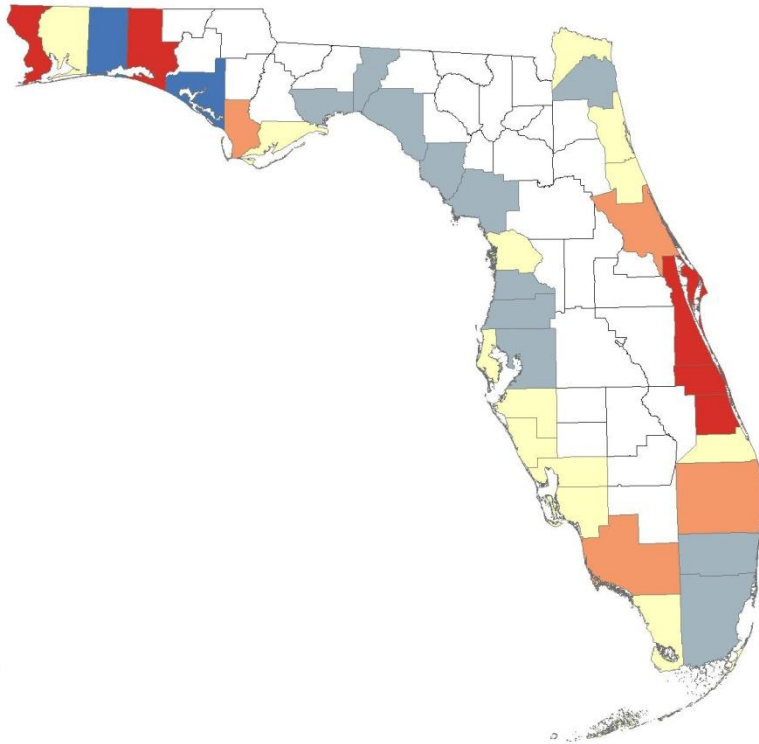
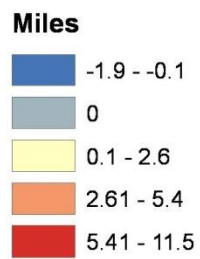
In the Keys region, comprised of Monroe County, the length of eroded beach increased by 2.5 miles.

Table 6-11

Table 6-11 shows the number of miles of critical beach erosion areas in 2000, 2010, and the numeric change for each county on the Florida Keys Erosion Area.

County	2000	2010	Numeric Change
Monroe	7.7	10.2	2.5
Total Keys	7.7	10.2	2.5

Figure 6-15



Indicator 6.10 - Number of Vessel Groundings

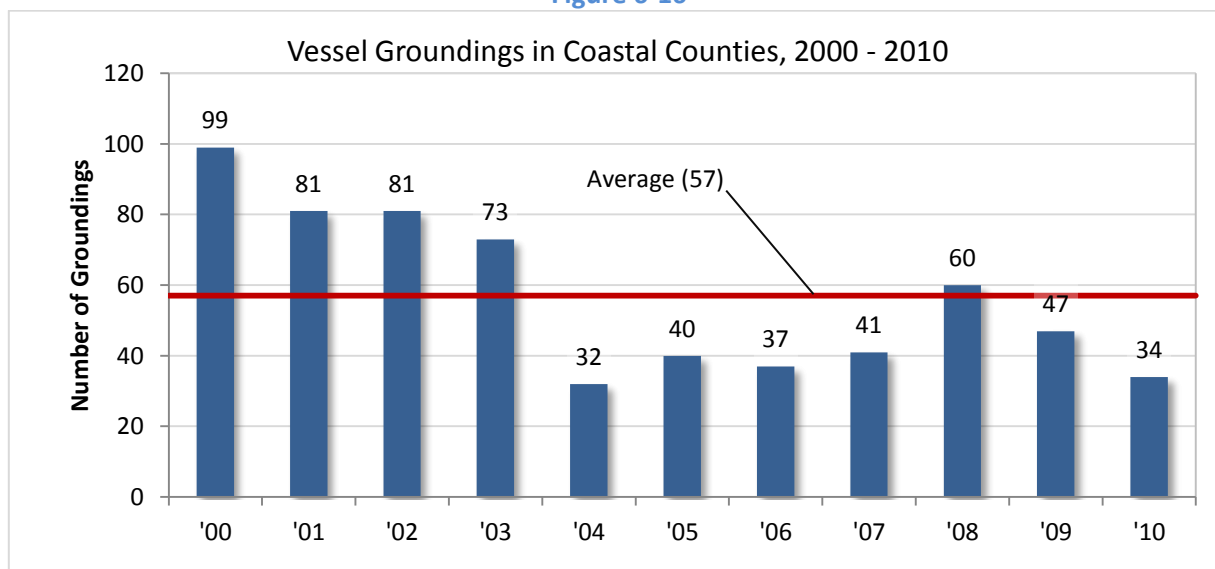
Vessel groundings can cause extensive damage to a vessel and to the seafloor as well as pose a hazard to individuals on board the vessel. The type of seafloor bottom, or *bottom type*, damaged by a grounding might include coral or seagrass. Damage to such underwater resources can seriously impact the integrity of a seagrass or coral structure and as a result, vessel groundings are closely assessed and documented especially in the Florida Keys National Marine Sanctuary where seagrass and coral are abundant.

This indicator describes the number of vessels that have grounded in Florida waters. A similar indicator was included in FACT 2000 (Indicator 3.6: Number of Reported Vessel Incidents). The first section includes groundings in the coastal zone while the second section focuses on groundings in the Florida Keys National Marine Sanctuary (FKNMS).

Coastal Zone

Groundings in the coastal zone only include assessed groundings that caused sufficient monetary damage (more than \$2,000) or caused serious bodily injury. There was an average of 57 vessel groundings in the coastal zone each year from 2000 to 2010 (Figure 6-16). During this period, there were more groundings in 2000 than in any other single year (99). Groundings have been lower since 2000 dropping to their lowest, 32, in 2004. Notable increases took place in 2005 and in 2008 when groundings increased by 26 and 46 percent respectively. The largest decrease took place in 2004 when groundings dropped by 56 percent.

Figure 6-16



Groundings in Florida Keys National Marine Sanctuary

Each grounding in the FKNMS is classed as either *coral* or *seagrass* depending on the bottom type that was affected by the grounding vessel. The groundings included in the section are only groundings that were assessed by FKNMS officials and do not include all groundings that were

Coastal Hazards

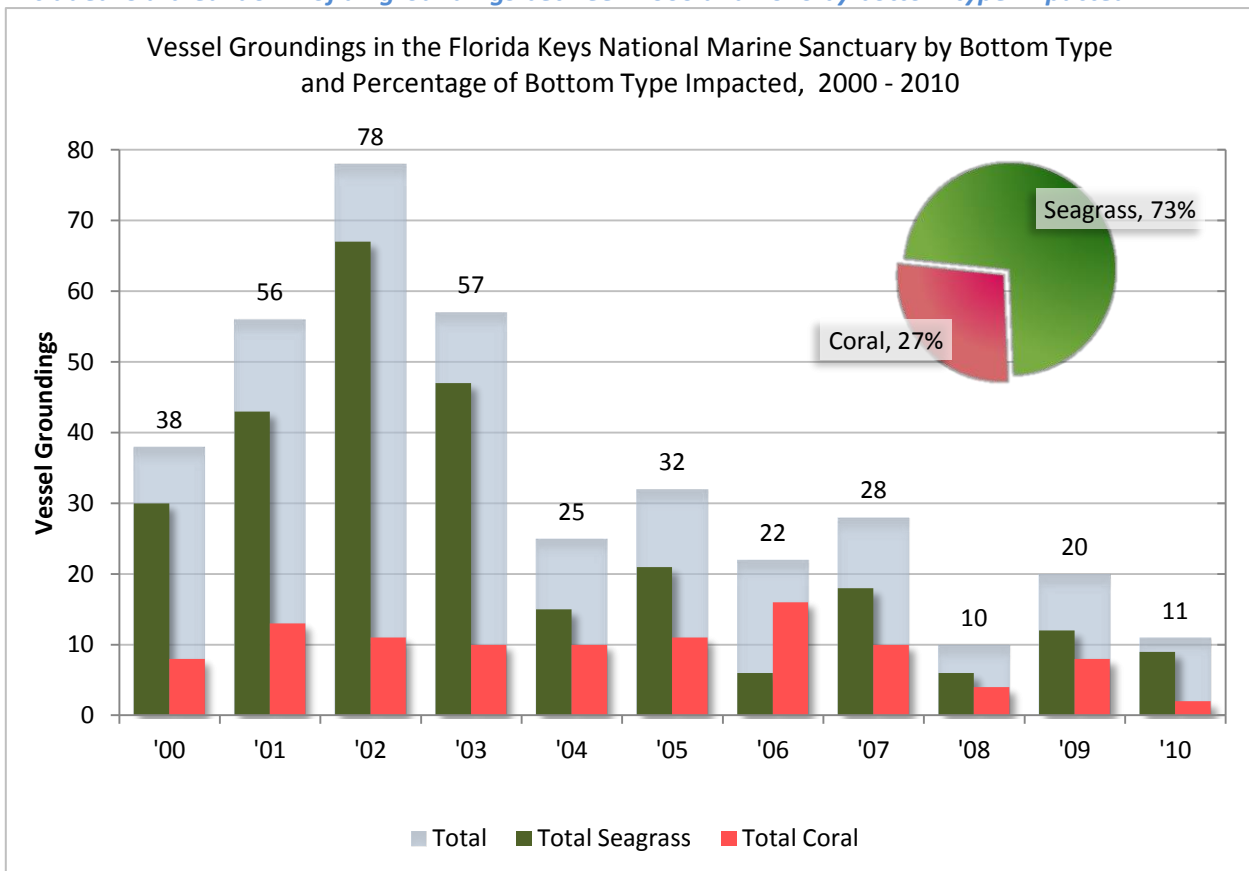
reported. Also, many groundings assessed in the FKNMS are not included in the entire coastal zone count.

There were a total number of 377 assessed groundings in the FKNMS between 2000 and 2010. The largest number of assessed groundings took place in 2002 when there were 78 total incidents (Figure 6-17). The following year the total dropped by 27 percent and in 2003, the number of incidents was one-third of the number of incidents that occurred in 2002. Incidents counts remained low each year for the rest of the period dropping to the lowest amount—ten incidents—in 2008.

In the FKNMS, seagrass groundings comprised a larger percentage of groundings than coral groundings each year except 2006. The large percentage of seagrass groundings relative to coral groundings during most years and across the eleven year period is due, in part, to the relative abundance of these two bottom types in the sanctuary. A larger percentage of the bottom is covered by seagrass than by coral. Of the 377 groundings that took place during this period, 274 (73 percent) were classed as seagrass while the remaining 103 (27 percent) were classed as coral (Figure 6-17).

Figure 6-17

Figure 6-17 shows the number of vessel groundings in the FKNMS. Groundings have been divided in two different groups depending on the bottom type that was impacted (seagrass or coral). Also included is a breakdown of all groundings between 2000 and 2010 by bottom type impacted.



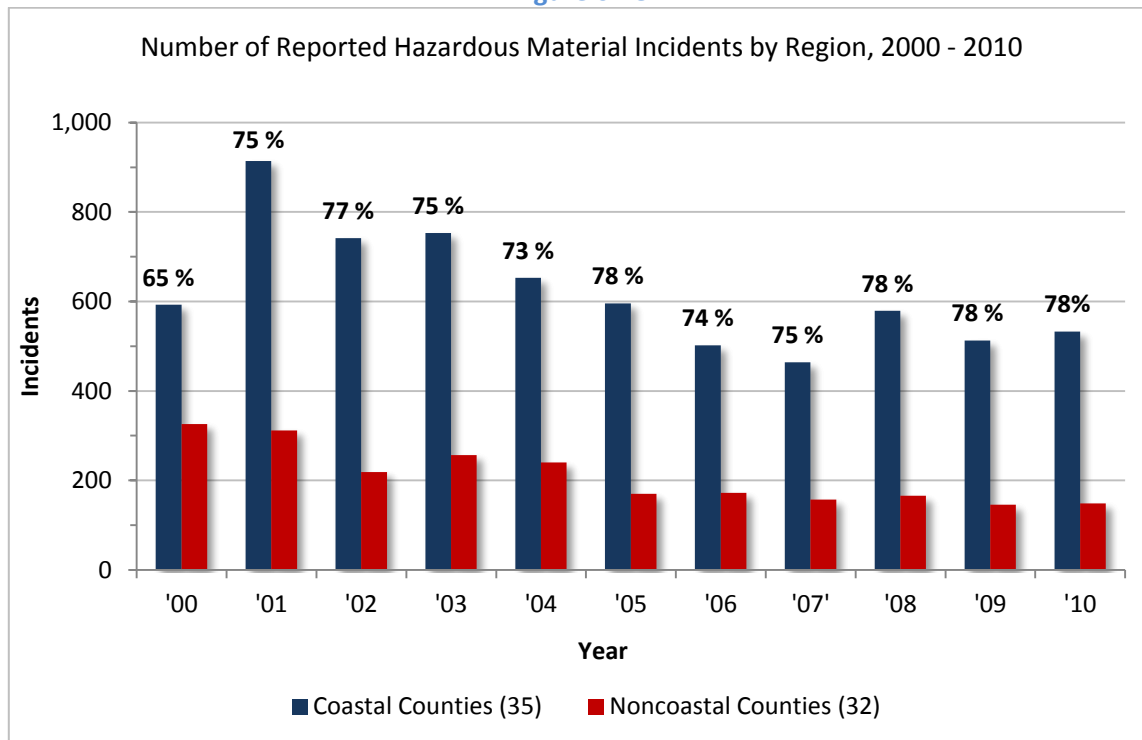
Indicator 6.11 - Number of Reported Hazardous Material Incidents

Any item or agent which has the potential to cause harm to humans, animals, or the environment, either by itself or through interaction with other factors can be considered a hazardous material. This indicator describes the number of reported hazardous material incidents in the coastal zone between 2000 and 2010. This indicator includes two sections—one that describes general hazardous material incidents and another that focuses on petroleum incidents. Each year there were more petroleum incidents than general hazardous material incidents. Data were obtained from the State Watch Officer's database.

Reported General Hazardous Material Incidents

Each year between 2000 and 2010, the number of hazardous material incidents that occurred in the coastal zone accounted for the overwhelming majority of similar incidents that took place statewide (Figure 6-18). On average, there were 622 incidents each year in the coastal zone but the number of incidents varied significantly. In 2001, there were more incidents in the coastal zone (914) than any other year. The next year, the number of incidents decreased steadily until 2007 when it fell to its lowest during this period (464). The coastal zone typically accounted for approximately three-quarters (74% - 78%) of statewide incidents each year. Although the number of incidents in the coastal zone remained below 600, the percent of incidents in the coastal zone still accounted for 78% during those years.

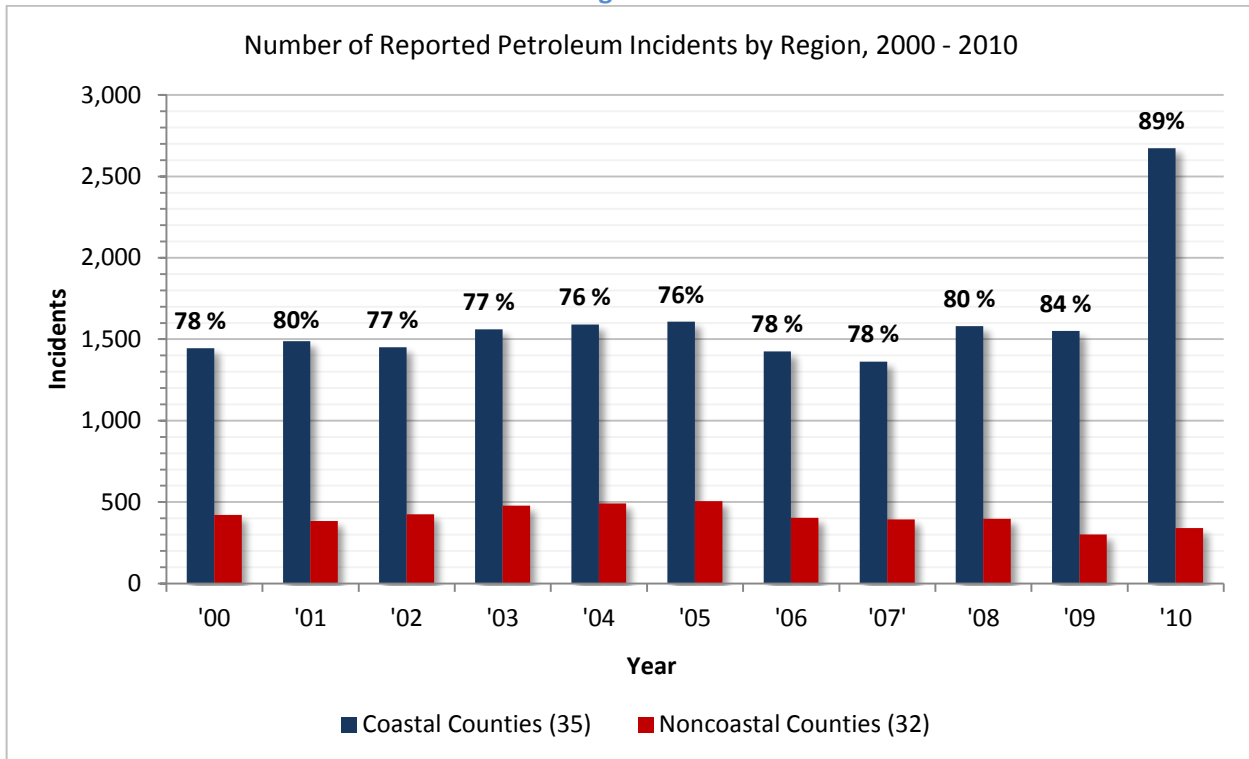
Figure 6-18



Reported Petroleum Incidents

On average, there were 1,611 reported petroleum incidents each year in the coastal zone (Figure 6-19). This is almost 1,200 more incidents than the rest of the state. Typically, reported petroleum incidents accounted for 77 – 84 percent of such incidents statewide. In 2010, the number of reported petroleum incidents climbed to 2,673 which was more than 1,000 more reports than average and accounted for almost 90 percent of state petroleum incidents. In 2007, the coastal zone experienced the lowest number of hazardous materials incidents (covered in Part I) as well the lowest number of reported petroleum incidents (1,362).

Figure 6-19



Indicator 6.12 – FCMP Funded Projects and Grants for Coastal Hazards

The FCMP provides financial assistance to coastal local governments and state agencies to prepare for, and respond to, the effects of climate change and natural hazards and disasters. This effort accelerated in 2006 with a five-year grant awarded to the Florida Division of Emergency Management to facilitate development of Post-Disaster Redevelopment Plans (PDRP) at the local level. Over the five-year period, “pilot projects” were selected to complete and implement PDRPs. The PDRP initiative resulted in completion of a *Best Practices Guidebook* for preparing PDRPs, and produced great interest in many Florida governments to seek financial assistance for disaster planning.

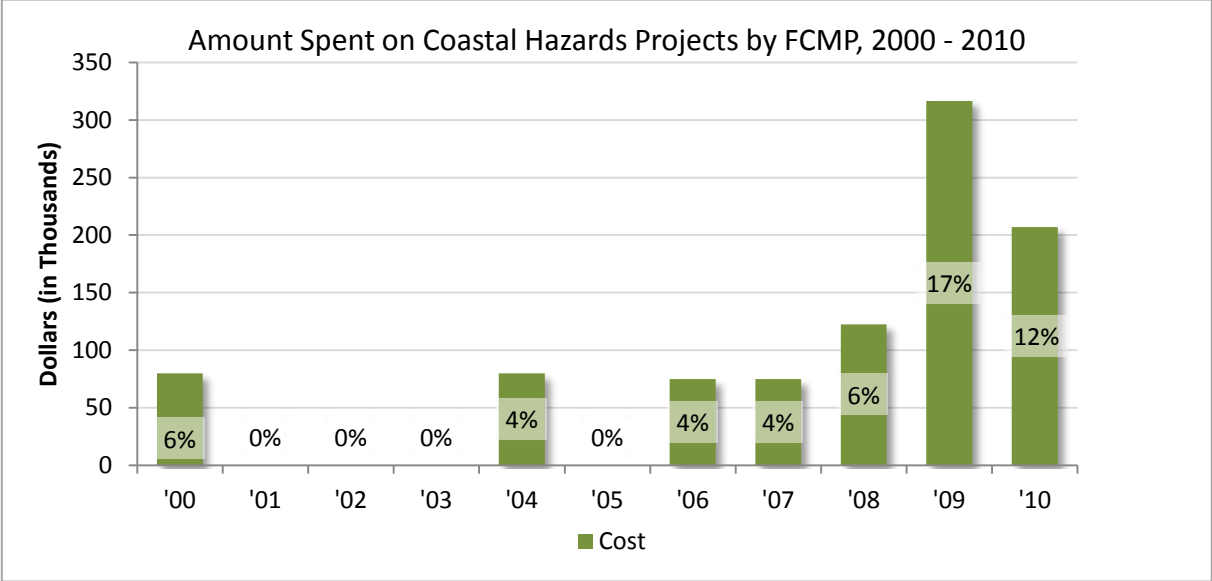
In 2010, the FCMP added the “Resilient Communities” category to its Coastal Partnership Initiative grant program to provide financial assistance to local governments seeking to address natural hazards and potential climate change effects. Two local projects were funded in 2010 to 1) develop adaptation strategies through sea level rise (SLR) modeling; and 2) for development of the Pinellas County PDRP. Also in 2010, the Florida Department of Community Affairs was awarded a five-year grant to model SLR and storm surge impacts to examine the vulnerability of Florida’s at-risk coastal resources. This effort will include developing risk assessments and adaptation plans for two pilot communities and recommendations on integrating SLR into hazard mitigation and land use planning.

Since 2000, the FCMP has awarded almost one million dollars to fund eleven resiliency/coastal hazards projects (Table 6-12, Figure 6-20).

Table 6-12

Fiscal Year	Year	Funding	Total Funding	Percent of Funding	Projects	Total All Projects	Percent of All Projects
FY 00-01	'00	80,000	\$ 1,239,593	6	1	27	4
FY 01-02	'01	-	\$ 1,320,000	-	-	30	-
FY 02-03	'02	-	\$ 1,687,782	-	-	27	-
FY 03-04	'03	-	\$ 1,990,240	-	-	26	-
FY 04-05	'04	80,000	\$ 2,125,623	4	1	28	4
FY 05-06	'05	-	\$ 2,037,309	-	-	30	-
FY 06-07	'06	75,000	\$ 2,126,881	4	1	32	3
FY 07-08	'07	75,000	\$ 1,730,751	4	1	22	5
FY 08-09	'08	122,670	\$ 1,955,629	6	1	27	4
FY 09-10	'09	316,785	\$ 1,900,218	17	3	29	10
FY 10-11	'10	207,000	\$ 1,727,081	12	3	24	13
	Total	956,455	\$ 19,841,107	5	11	302	4

Figure 6-20



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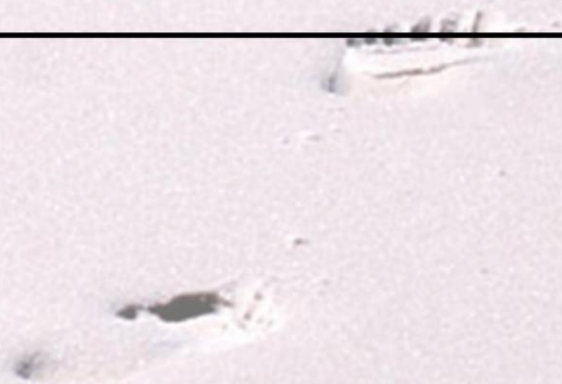
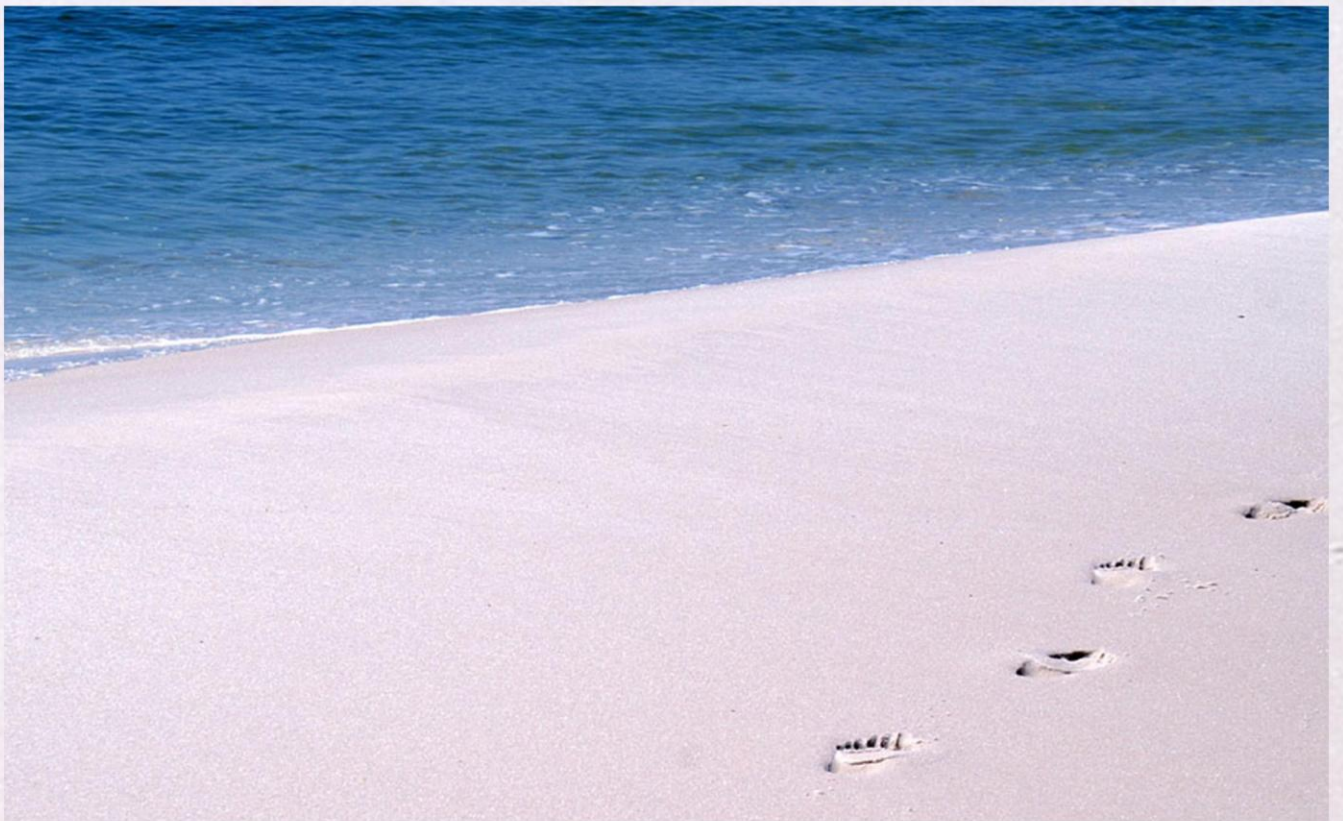
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Environmental Stewardship



Executive Summary

The focus area of environmental awareness and community stewardship is comprised of seven indicators to assess the current level of knowledge, attitudes, and behavior of citizens, organizations, and government in Florida by reviewing trends over the last ten years. These indicators, listed in Table 7-1, examine topics that range from 1) membership in environmental organizations to 2) self-assessed citizen knowledge of coastal issues and 3) participation in coastal conservation and restoration activities to 4) government support of community stewardship partnerships. In assessing stewardship, it is sometimes necessary to infer from behaviors that a conservation ethic is the source of an activity. Motivation is an inherently difficult characteristic to measure, although it is the basis of the concept of stewardship. Concern for coastal resources and a desire for environmental preservation of natural elements are primary motivations for stewardship activities, as described by a survey collected from interviews with citizen and official organizer participants of volunteer programs (Jacobson, 2009). The indicators presented here include a mix of individual and community actions. Integrating both the individual and community results will help provide a better overall view of stewardship in Florida.

Table 7-1
Environmental Stewardship Indicators

7.1	Membership and Participation in Stewardship Organizations and Activities
7.2	Level of Awareness of Coastal Issues
7.3	Environmental Stewardship Money Derived from Specialty License Plate Sales
7.4	Number of Volunteers and Amount of Debris Removed in the Annual Florida Coastal Cleanup
7.5	Number of Volunteers Participating in Selected Florida Stewardship Programs that Protect and Restore Coastal Resources
7.6	Number of Marinas, Businesses, and Boaters Participating in Florida Clean Waterways Programs
7.7	FCMP Grants for Environmental Awareness and Community Stewardship

Environmental stewardship activities in Florida have increased considerably over the last 10 years. Volunteerism is becoming profoundly integrated into scientific and management efforts to conserve and restore the natural and cultural coastal resources throughout the state; however, in many cases, records of participation in programs have not been kept until recently. From the available records, annual participation on a volunteer basis is widespread, amounting to millions of hours of commitment of individuals to the goal of environmental monitoring, research, restoration, and education in coastal Florida. Other areas of commitment, for example, purchase of specialty motor vehicle tags supporting environmental conservation efforts, reveal the willingness of numerous Floridians to contribute money to various issues of concern. Specialty license plate revenue in the environmental stewardship category averaged over \$10 million annually between fiscal years 2000 and 2009. Commitment to special conservation events, such as the Florida Coastal Cleanup, is high, and response to the cleanup has averaged 26,000 participants annually over the last decade.

One area of concern in terms of commitment to stewardship on an individual level was revealed in the Coastal Issue Survey commissioned by the Florida Coastal Management Program (FCMP). Individual commitment in terms of membership in conservation organizations has remained essentially unchanged from the 2000 level. Only 9% of Floridians surveyed were members of an organization involved in coastal protection and environmental education. While membership in an organization is not necessary for individual environmental action, it is an indicator of longer-term commitment to environmental and coastal preservation goals. Individuals who have memberships in environmental organizations show high levels of commitment with 42% of them contributing more than \$100 a year (17% contributing above \$500).

Finally, community stewardship is being actively supported in partnerships between local governments, non-government organizations, and citizen groups by grants specifically addressing stewardship and coastal restoration and preservation through the Florida Coastal Management Program. Sponsored by NOAA as outlined in the Coastal Zone Management Act, annual grants support coastal activities improving coastal access and resilience to coastal hazards, enhancing environmental health and water quality, restoring and conserving habitats and coastal lands including traditional working waterfronts, and promoting citizen stewardship and participation through local projects to improve coastal conditions. The FCMP has provided, on average, \$1.8 million annually to support projects of the kind just mentioned. Between 2001 and 2009, 249 projects were supported with over \$16.7 million in grants. Trends show year to year fluctuations, but generally steady support for the focus areas working waterfronts, environmental health, coastal habitats, and public access. A slight decline in applications for stewardship projects has emerged over the last decade (the 5-year running average decreased from 7 projects per year in 2005 to 5 in 2009). In contrast, in recent years, greater interest has been seen in the number of applications for coastal hazard projects (since 2006).

Community Stewardship Goals

Community stewardship of coastal resources can be defined as collective action to become educated and participate in the protection and restoration of coastal ecosystems. Stewardship is manifested by avoiding activities that damage coastal resources and engaging in activities to conserve and sustain those resources. Florida is a peninsula; therefore, the majority of citizens and visitors to the state make frequent use of coastal resources. The actions of individuals, community groups, and local governments to conserve the living resources and unique characteristics of the state are essential to the continued enjoyment and sustainability of Florida's coastal resources for future generations.

The FCMP actively promotes and facilitates community stewardship in Florida. The goal of community stewardship is threefold:

1. Increase public understanding of and concern for coastal resources, including natural, cultural, historical, and recreational resources.
2. Promote personal and community action to protect, restore, and enhance coastal resources.
3. Identify and plan for the protection of important coastal resources.

Education and engagement are fundamental to the development of a culture of environmental stewardship in the attitude and behavior of individuals, and the community as a whole. A lack of understanding of the current condition of the environment and the impact our actions have upon coastal ecosystems is a primary barrier to stewardship behavior which can be addressed on many levels through educational programs; however, other barriers must also be overcome. Inadequate publicity of opportunities to volunteer for conservation and restoration actions can deprive many willing individuals from participating in community stewardship activities. Without awareness of the opportunities and the visible example of good leadership, many individuals and communities may fail to recognize their capacity to help with coastal problems and management efforts. Effective coastal environmental community stewardship protects and enhances coastal resources, conserves biodiversity, provides ecological economic benefit, and sustains and improves quality of life in Florida. Many citizens and visitors take action every day to conserve coastal resources. In addition, many local governments and community groups organize and implement plans and programs that protect and restore those resources. Beach cleanups, dune restorations, along with numerous other stewardship activities take place in Florida every year. These efforts are invaluable because they instill responsible use of coastal resources and revitalize the environment in which we live. Local governments and other entities identify important coastal resources and build capacity for protecting those resources with community participation. Through partnerships and grants, the FCMP supports projects that directly involve citizens in research and protection efforts.

Evaluation of Florida's environmental stewardship requires the analysis of the general public's level of awareness of coastal issues, the willingness of citizens to contribute time and money, and the investment of state agencies in the protection of natural resources through public participation. Successful stewardship will result in sustainable communities and the maintenance of a healthy natural environment. Indicators to represent the focus area of community stewardship were categorized into three topics:

- A. Awareness of Environmental Issues**
- B. Participation in Stewardship Activities**
- C. FCMP Contribution toward Citizen Stewardship**

Data concerns

Quantification and tracking of stewardship activities have levels of uncertainty and error associated with them that are generally unmeasured. Data for volunteer action and community-level conservation are based on non-standardized methods and inconsistent application. Individual entities track volunteer participation with variable rigor, often dependent upon managing staff capacity and workloads. The data available are localized and program-specific, and acquiring data of comparative temporal and spatial scales is difficult. Despite the data concerns, community involvement in environmental stewardship is an important indicator of the level of commitment of the population to behaviors leading to a sustainable society that preserves the existing environment and resources of Florida. An effort was made to collect information on volunteer participation in various programs from all regions of the state. As such, the data presented for this topic are representative, not scientifically sampled.

A. Awareness

Most of Florida's population lives within one hour's drive of the coast, and many visitors come specifically to enjoy the coastal areas of the Sunshine State. This proximity means many people impact coastal and marine resources every day; therefore, an understanding by the citizens and visitors of the unique attributes of Florida's environment and the effect of human activities upon its resources is essential to the preservation of those resources into the future. Generally, people are not motivated to engage in stewardship behaviors to maintain and to improve the condition of coastal ecosystems without understanding the cost of a degraded environment and the benefit of healthy natural resources. Awareness is one of the foundations necessary in building a societal commitment to conserve the natural environment and sustain coastal resources.

Concepts such as awareness and concern can be measured directly via survey methodology and directly by examining behaviors indicative of people's interest. The *Florida Coastal Issues 2009 Survey* (Appendix A) provided information to analyze public involvement in stewardship activities and organizations and self-evaluated levels of awareness of coastal environmental issues. The *Florida Sea Grant Coastal Marine Issues Survey* provided information to analyze prioritized coastal issues identified by educated environmental professionals, stakeholders and citizens of Florida. Specialty license plate sales were used as an indication of general public commitment to environmental and conservation programs supported by those sales. This indicator measures the distinct behavior of individuals' commitment through purchase, at extra cost, of vehicular license plates of specific environmental concern (e.g., Florida panther, manatee, or sea turtle plates). License plate data were gathered from published annual reporting by the Florida Department of Highway Safety and Motor Vehicles (<http://www.flhsmv.gov/html/safety.html>), and the accessible online database (<http://www3.hsmv.state.fl.us/apps/spectagsales/>).

Indicator 7.1 - Membership and Participation in Stewardship Organizations and Activities

The percentage of the general population that belongs to organizations involved in coastal stewardship serves as one indicator of individual-level awareness and concern. Identifying the percentage of people who have participated in hands-on stewardship activities, such as beach cleanups and monitoring efforts, provides a second measure. Results from the *Florida Coastal Issues 2009 Survey* are presented to describe these two indicators of community stewardship. These data are compared to results from a similar 1999 survey reported in the FACT 2000 publication.

Membership in non-profit organizations involved in coastal issues continued at the level of participation seen in the 1999 survey. One of every eleven respondents supports groups involved in coastal protection and environmental education through membership or financial contribution. Of the respondents who do support coastal activities financially, 17% spend considerable personal income (greater than \$500 annually) on one or more coastal environmental activities.

Under the topic of stewardship, respondents to the survey were asked a number of pertinent questions. The primary question for this topic was “*Do you currently belong to any non-profit groups that are involved in coastal environmental, educational, or recreational activities?*” Nine percent of respondents said yes to this question (Figure 7-1), which was only slightly higher than the number reported in 1999 (7.6%). Of the respondents with organizational memberships in environmental groups in the 2009 Survey, 72% said they contributed financially to the organization; and of these, 42% provided over \$100/year support (Figure 7-2).

Figure 7-1

Percentage of respondents claiming membership or financial support for one or more groups involved in coastal protection and environmental education in 1999 and in 2009.

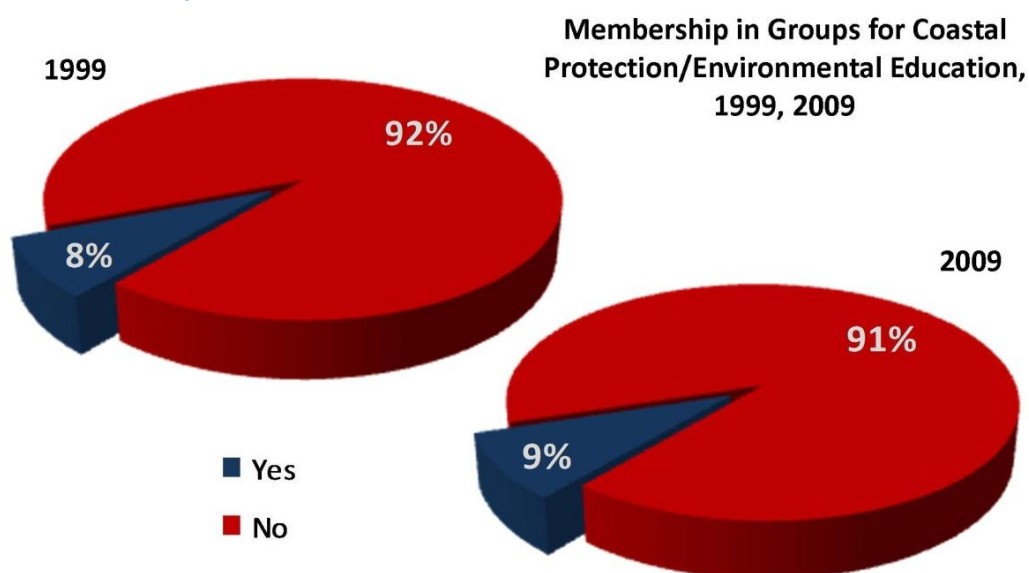
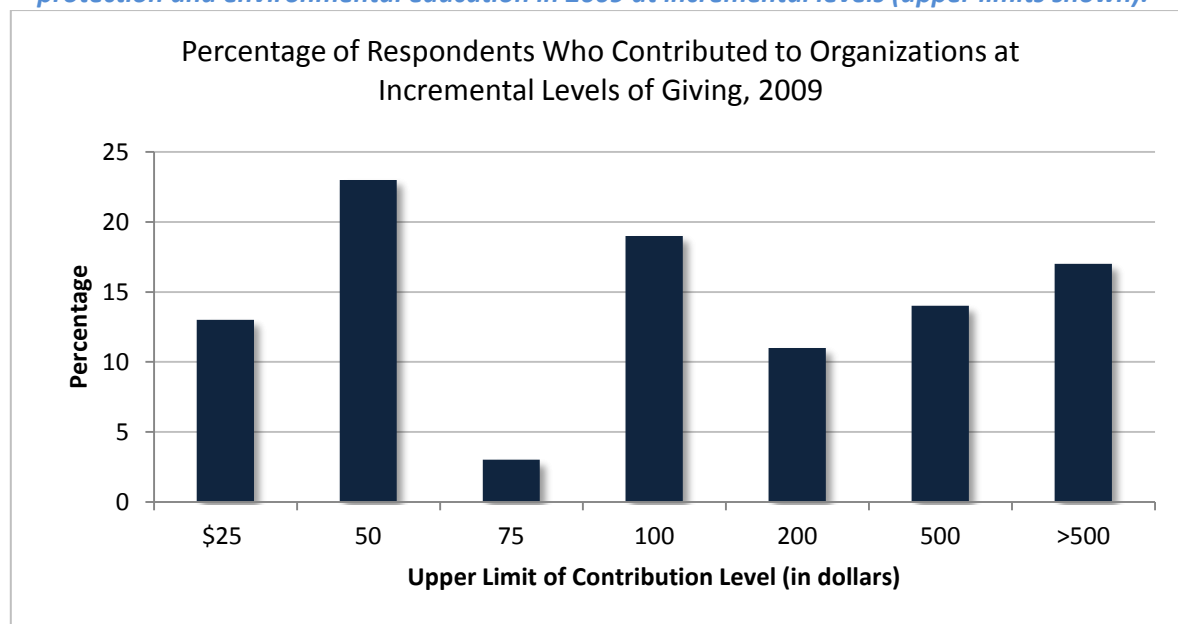


Figure 7-2

Percentage of respondents who contributed financial support to organizations involved in coastal protection and environmental education in 2009 at incremental levels (upper limits shown).



When asked, “Have you ever been involved in hands-on coastal community activities such as coastal cleanups, water quality monitoring, dune re-vegetation, etc.?” 39% of respondents said they participated in one or more activities, an increase of 22% from the response in 1999 (Figure 7-3). The results for the specific activities are given in Figure 7-4, with participation ranging from

3% - 25% in the various categories. Coastal cleanups were the activity with the most participation; public demonstrations, the least. Increases were seen in every category of stewardship activity measured, with 2-4 fold greater participation in 2009 for “field” and advocacy activities than in 1999 (Figure 7-4a and Figure 7-4b).

Figure 7-3

Percentage of respondents who participated in hands-on coastal community activities in 1999 and in 2009.

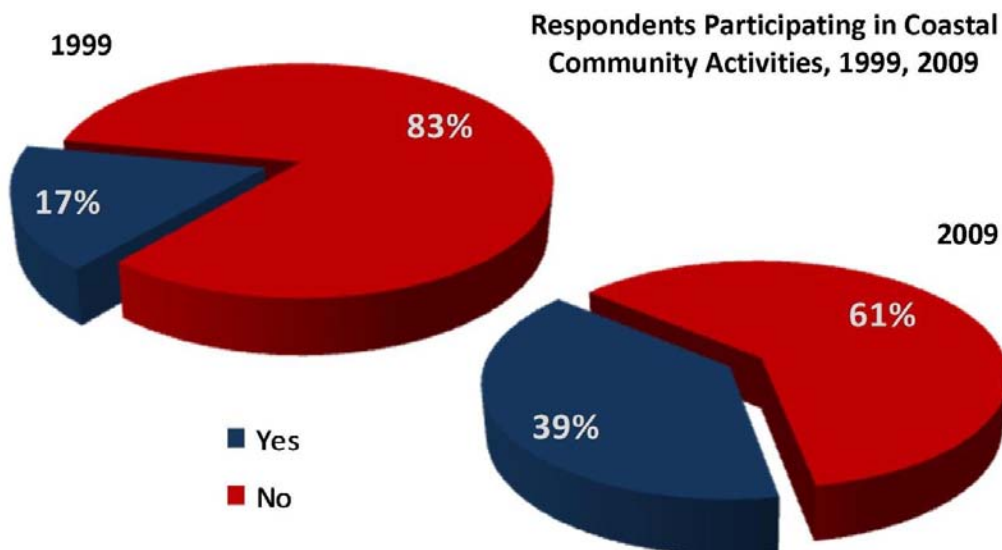


Figure 7-4a

Percentage of respondents who participated in specific hands-on coastal community stewardship, including “field” and advocacy activities in 1999 and in 2009.

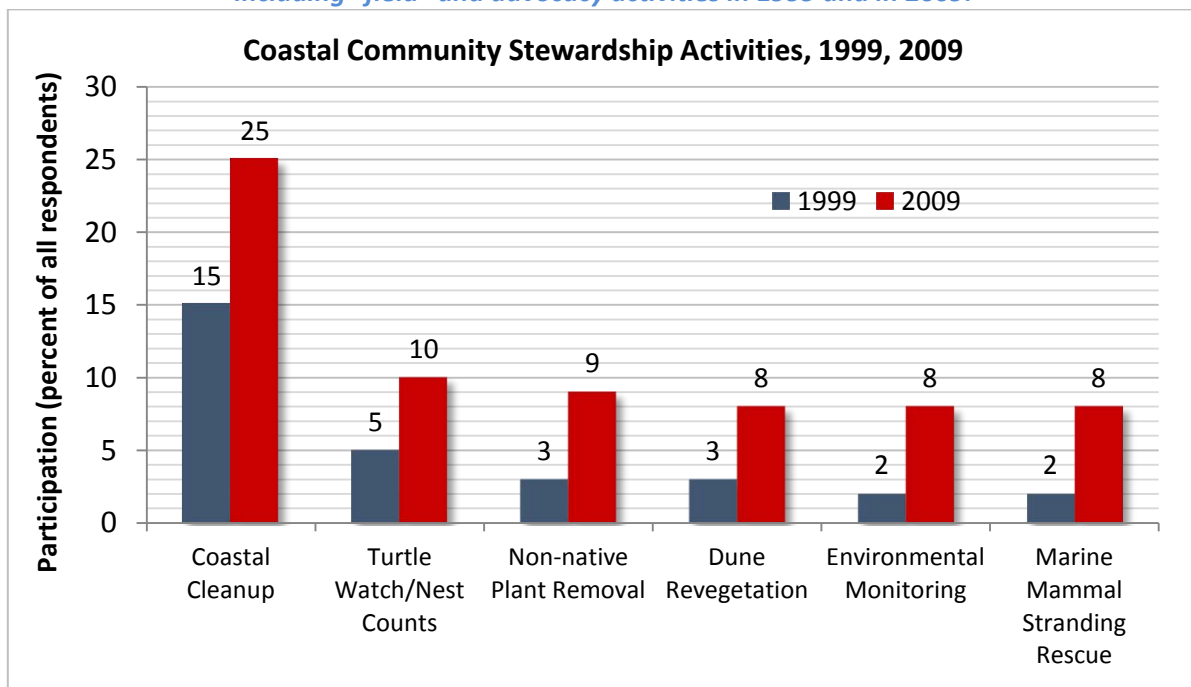
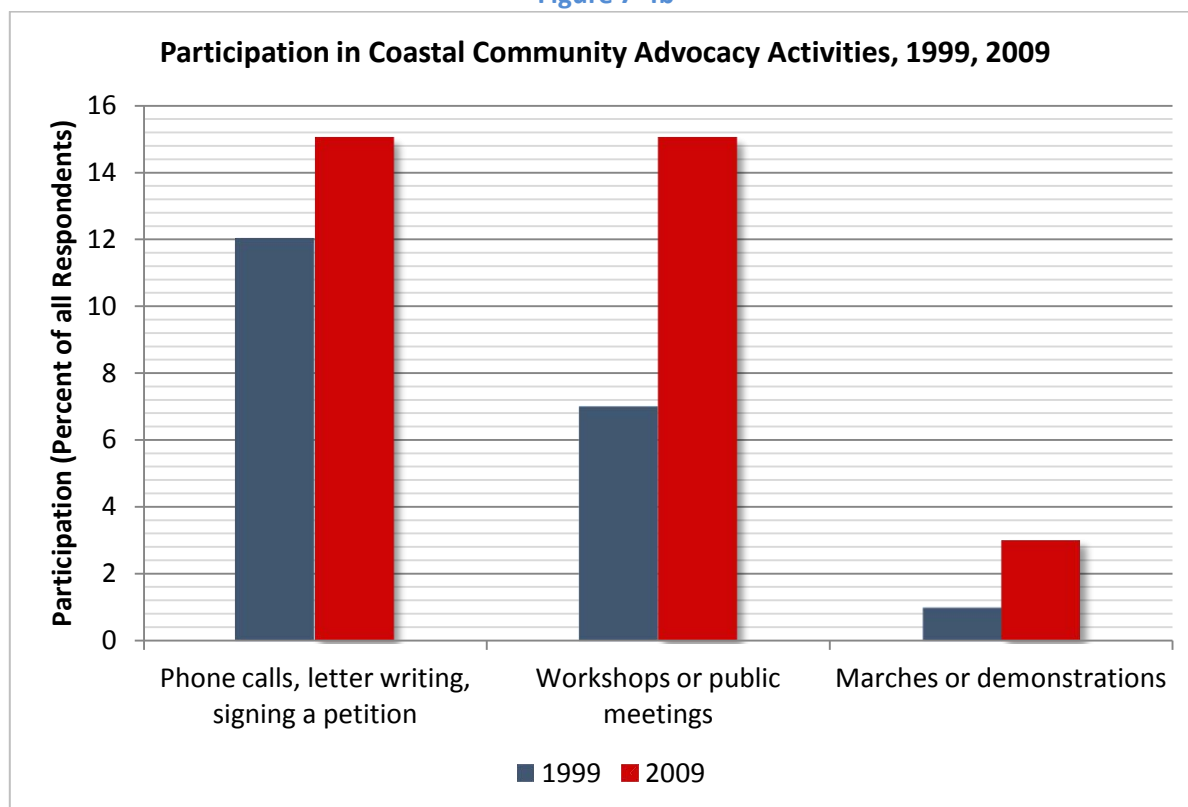


Figure 7-4b



Significant increases in participation were reported for hands-on coastal community activities, such as the coastal cleanup, sea turtle protection, invasive plant removal, dune re-vegetation, environmental monitoring, marine mammal stranding rescue, or advocacy activities (petitioning, workshops, public meetings or demonstrations). The increase represents more than twice as many participants in 2009 than in 1999, according to the survey. These data suggest that Floridians may be reluctant to contribute to environmental nonprofit organizations financially, but are becoming more willing to participate in local coastal environmental activities of interest to them. Those individuals who are members of environmental organizations appear strongly committed to the extent of substantial personal financial support.

The statewide, annual Coastal Cleanup event, sponsored by the Ocean Conservancy, is the activity most often cited by Florida respondents as a hands-on community stewardship activity in which they have taken part. This successful event has grown to include participation by 108 countries worldwide, and is currently in its 25th year. Data on Coastal Cleanup volunteerism and impact on the environment will be presented later in the stewardship activities section.

Detailed analysis using demographic information revealed additional trends concerning location of residence, age and gender of respondent, and education factors (Appendix A). Coastal county residents showed greater activism than non-coastal county residents for several coastal community activities (Table 7-2). Home-owners were more likely to be involved with coastal

community activities than renters (41% versus 36%, respectively). Overall, women reported greater involvement in coastal community activities than men (by 4%), while men were more likely to engage in certain activities at a much higher rate than women; *e.g.*, public workshops (42% to 36%), environmental monitoring (26% to 16%), rescuing stranded marine animals (23% to 16%), and non-native plant removal (29% to 18%). As age of respondents increased, greater participation in workshops and public meetings was seen.

Table 7-2
Percent of respondents indicating yes to specified activity categorized by location of residence: coastal versus non-coastal.

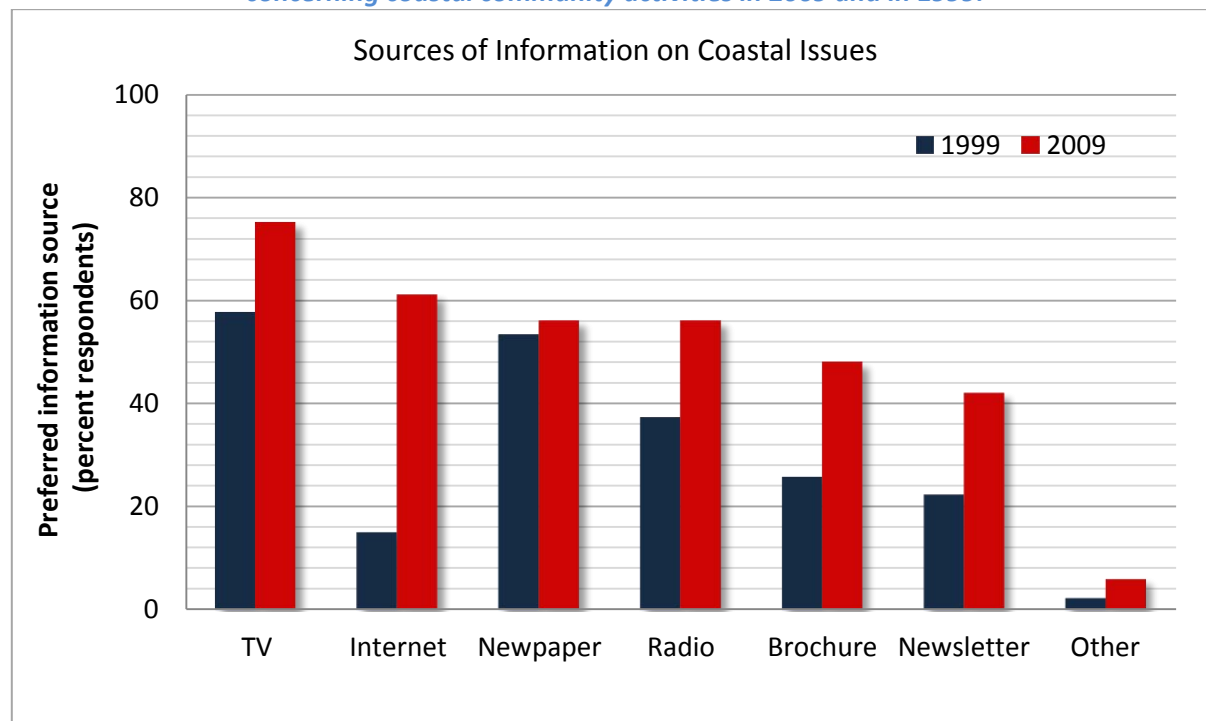
Activity	Percentage of Subgroup Indicating Yes	
	Coastal resident	Non-coastal resident
Involved in coastal community activities	44%	28%
Participated in coastal cleanup	64%	60%
Participated in workshop or public meeting	39%	32%
Participated in non-native plant removal	24%	14%

Younger respondents reported participating in coastal cleanups and rescuing stranded marine animals at higher rates than older respondents. Also, respondents with high school education were much less likely to participate in the following activities than respondents with higher levels of education: advocacy activities, turtle watches and nest counts, and non-native plant removal. Respondents with graduate education were found to be much more likely to participate in native species plantings and dune re-vegetation than those with high school or college education. These results suggest demographic variables, such as age, gender, and education influence ability or desire to participate in environmental stewardship activities.

When asked about preference in receiving information on coastal community activities, such as beach cleanups, media choices were selected (YES) by respondents in the following order (Figure 7-5): television (75%), internet (61%), newspapers (56%), radio (56%), brochures (48%), and newsletters (42%). The results suggest a greater interest in receiving information in all forms compared with 1999 survey results; although, TV remains the predominant medium for information. The large increase in the use of the internet for information dissemination was revealed by a change in preference from 15% to 61% of respondents.

Figure 7-5

Percentage of respondents showing preference for a given form of media for informational exchange concerning coastal community activities in 2009 and in 1999.



The results from the Florida Coastal Issues Surveys provide information on the level of engagement of Floridians in environmental coastal issues and feedback on citizen interest and participation in projects that foster stewardship. The data on participation and demographic characteristics can help focus outreach efforts for more effective education and more efficient management of financial resources. No significant change in attitudes toward sustained involvement in coastal conservation issues, inferred from environmental organization membership, was seen between the two surveys taken 10 years apart. Some caution must be used in this conclusion, as the surveys represent snapshot sampling, and no data exists for the years between 1999-2009. The inference also assumes membership behavior reflects a high degree of commitment to stewardship; however, lack of membership does not necessarily negate commitment. The questions of the survey did not encompass respondent history of involvement. Further questioning and analysis are needed to substantiate causes of low environmental organization membership.

A number of barriers to volunteerism and group membership exist (Wahl, 2003), and may be contributing factors to the lack of growth in membership in environmental organizations. Disorganized or sporadic programs tend to discourage volunteers and stewardship efforts. The public perception and internal organization of stewardship programs have direct effects on the involvement and long-term commitment of citizens toward stewardship activities. Self-perception of being valued as a member or volunteer and enjoyment of the activity are primary indicators of longevity in environmental groups.

Participation in stewardship events and activities has increased substantially over the last decade. Reasons for stewardship participation by the respondents were not assessed by the survey instrument. Intrinsic motivations, such as feelings of doing something worthwhile, increasing personal competence, and social motivations are significant factors in decision-making for involvement in environmental activities (Ryan *et al.*, 2001). Nevertheless, an additional motivation was suggested by the data in the *2009 Survey*. The consistent difference in level of stewardship activities revealed by the greater participation by coastal county residents than non-coastal county residents suggests that one component of involvement is based on the recognition of the personal benefit of improved local conditions of coastal communities by active involvement.

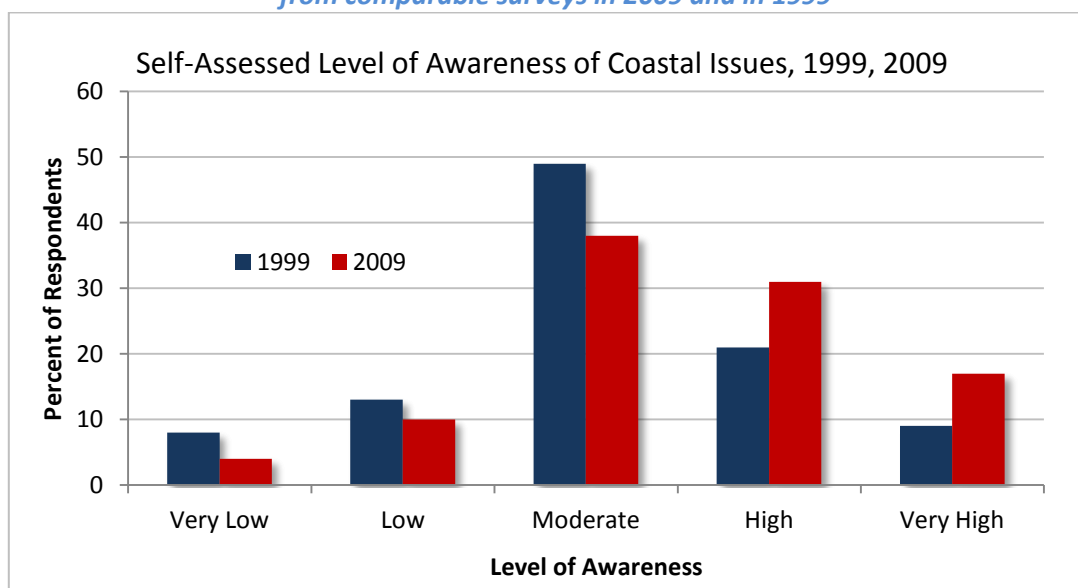
Indicator 7.2 - Level of Awareness of Coastal Issues

Extensive surveys with large sample sizes of two very different target participants (2009 *Florida Coastal Issues* and 2008 *Sea Grant Coastal & Marine Issues*) were analyzed to assess the general level of awareness and perception of importance of several coastal issues to Florida citizens. The results of the 2009 *Florida Coastal Issues Survey* were compared with similar survey results from 1999 to look at differences in coastal issues awareness in the last decade. The 2008 *Sea Grant* and 2009 *Coastal Issues* surveys can be used to assess the perception of priority coastal issues of the general population and of environmentally active professionals in Florida.

1. Florida Coastal Issues 2009 Survey

One section of the 2009 Survey asked respondents to rate their level of awareness of coastal issues, and to rate the level of importance of eight coastal issues provided to them. Results of the respondents' self-assessments concerning awareness of coastal issues are given in Figure 7-6. The five levels for which the respondents could rate their awareness were: Very High, High, Moderate, Low, and Very Low. Seventy percent of respondents in 1999 rated their level of awareness as moderate to very low. A significant shift in self-perception of level of awareness of coastal issues can be seen between the 1999 and 2009 surveys. In 1999, 30% of respondents rated their awareness as high to very high awareness of coastal issues. In 2009, 48% of respondents rated their awareness as high to very high. The shift came primarily from those in the moderate group, which decreased by 11%, although the number of self-assessed respondents in the low and very low categories also decreased. Overall, Floridians assessed themselves with considerably greater confidence concerning their level of awareness of coastal issues in 2009, compared to 1999.

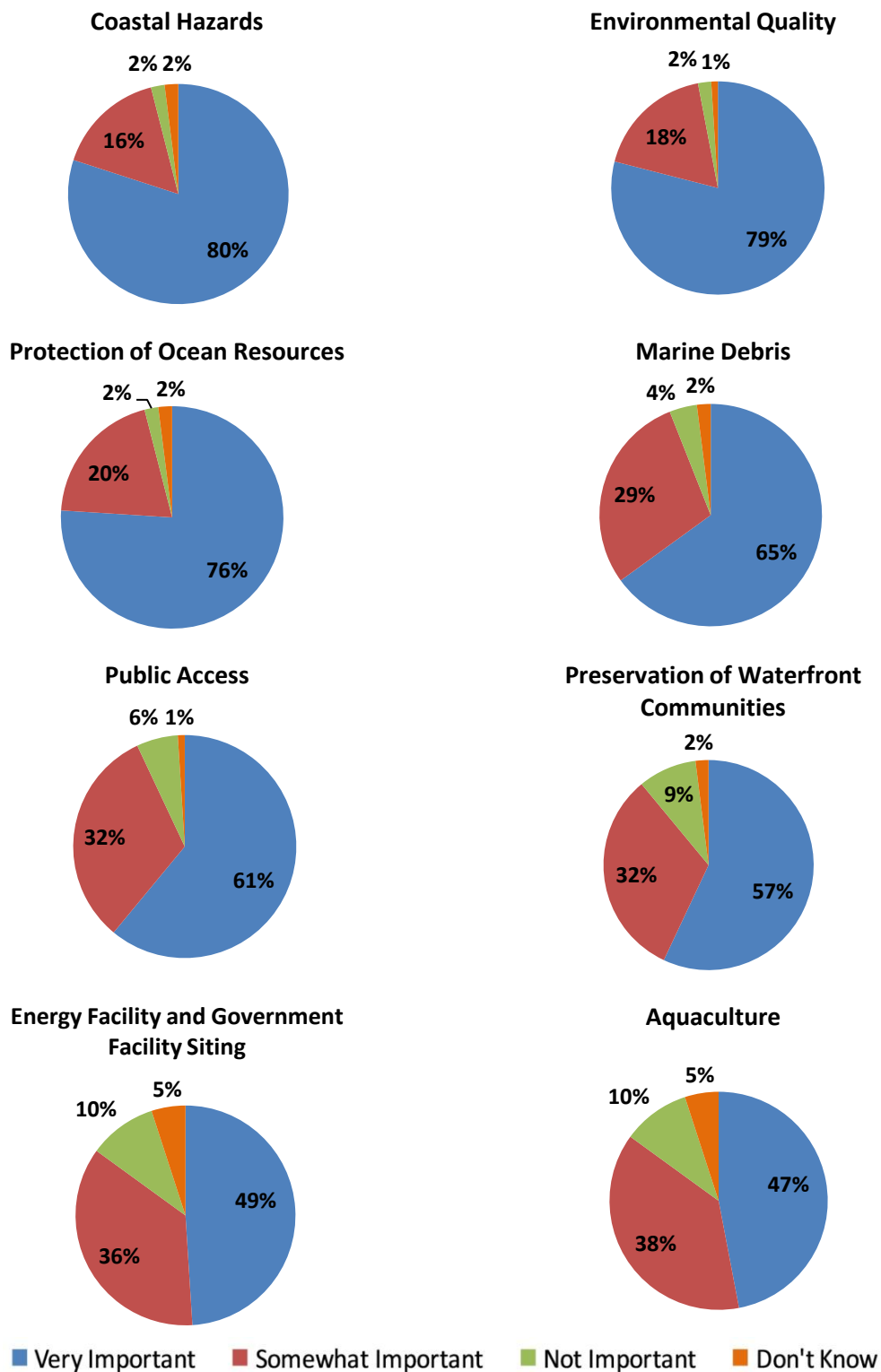
Figure 7-6
Percentage of respondents in five levels of self-assessed awareness of coastal issues
from comparable surveys in 2009 and in 1999



Survey respondents were provided with a list of eight coastal issues and asked to rate the level of importance of each issue given the rating scale: Very Important, Somewhat Important, Not Important, and Don't Know (Figure 7-7). The eight coastal issues listed in order of importance, as determined by the highest percentage of respondents rating the issue as Very Important were: Coastal Hazards (80%), Environmental Quality (79%), Protection of Ocean Resources (76%), Marine Debris (65%), Public Access (61%), Coastal Land Use and Preservation of Waterfront Communities and Businesses (57%), Energy Facility and Government Facility Siting (50%), and Aquaculture (47%). Coastal hazard issues primarily refer to natural hazards, such as hurricanes and flooding. Environmental quality issues, include water quality, habitat protection and conservation of natural resources. Protection of ocean resources was also a priority, and refers to fisheries, coral reefs, and estuaries. Marine debris, public access, and coastal land use (including preservation of working waterfront communities) were selected with slightly lower priority, with 57% to 65% of respondents identifying these coastal issues as very important. Facility siting (energy and government) and aquaculture were identified as very important issues by 50% or less of the respondents. The facilities refer to natural gas pipelines, transmission lines, deepwater ports, power plants, and military facilities. The coastal issue aquaculture included shellfish farming and fish farming.

Figure 7-7

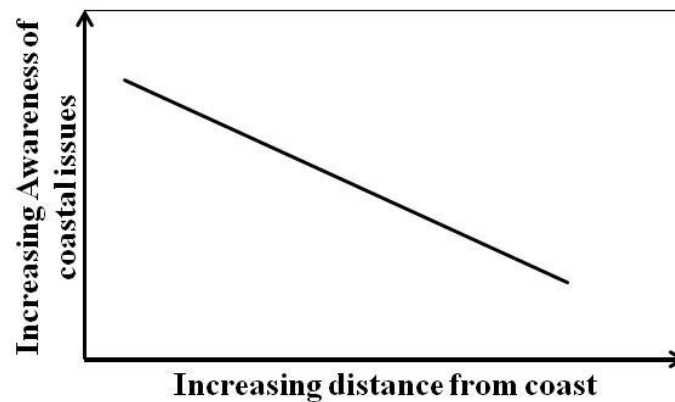
Percentage of respondents selecting one of four categories ranking eight coastal issues as Very Important, Somewhat Important, Not Important, or Don't Know in the 2009 Survey.



Analyzing the results of self-assessments of the level of awareness of coastal issues in conjunction with demographic information provided several interesting results. No difference among educational level was seen among respondents rating their level of awareness as “Very High.” Men were more likely than women to say their level of awareness was Very High (20% versus 15%). A direct positive relationship was found between the frequency of visits to the coast for recreation and the occurrence of very high awareness of coastal issues; the greater the visitation the higher the awareness. Residents living in coastal counties were more likely to rate their level of awareness as “Very High” than non-coastal county residents (19% versus 12%). The analysis of data revealed a strong negative correlation between awareness of coastal issues and distance of residence from the coast. The further respondents travelled to access the coast, the lower the incidence of a “Very High” awareness of coastal issues (see the representation in Figure 7-8).

Figure 7-8

Relationship of awareness of coastal issues to distance travelled to access the coast. A negative correlation exists between awareness of coastal issues and distance of residence from the coast.



When rating the eight coastal issues as “Very Important,” certain demographic groups placed higher importance on specific issues than other groups. For example, a much higher percentage of women rated seven of the eight issues as “Very Important” (see Table 7-3); however, the rank order of the issues was the same. It is interesting that few differences were found between coastal and non-coastal county respondents in percentage of respondents that rated each issue as “Very Important.” Differences did occur for the issues of Coastal Hazards, Public Access, and Preservation of Waterfront Communities, which understandably would have greater value to coastal residents. The differential was 9%, 7%, and 4%, respectively, with coastal county respondent’s ratings higher in all three cases. Respondents in the age group 35 to 64 showed a pattern of higher percentages than other age groups when rating coastal issues as “Very Important.” The percentage difference ranged from 10% to 14% higher for the 35 to 64 age group than the “Very Important” rating of younger and older groups.

Table 7-3

Eight coastal issues ranked by men and women as “Very Important.” On average, women rated issues “Very Important” 7 % more frequently than men in all cases, except for Public Access, which was rated similarly.

Coastal Issue Rated Very Important	Women	Men
Coastal Hazards	86	75
Environmental Quality	84	74
Protection of Ocean Resources (fisheries, coral)	79	75
Marine Debris	69	64
Public Access	-	-
Preservation of Waterfront Communities	63	56
Energy Facility and Government Facility Siting	56	45
Aquaculture	52	45

2. Florida Sea Grant Coastal & Marine Issues Survey 2008

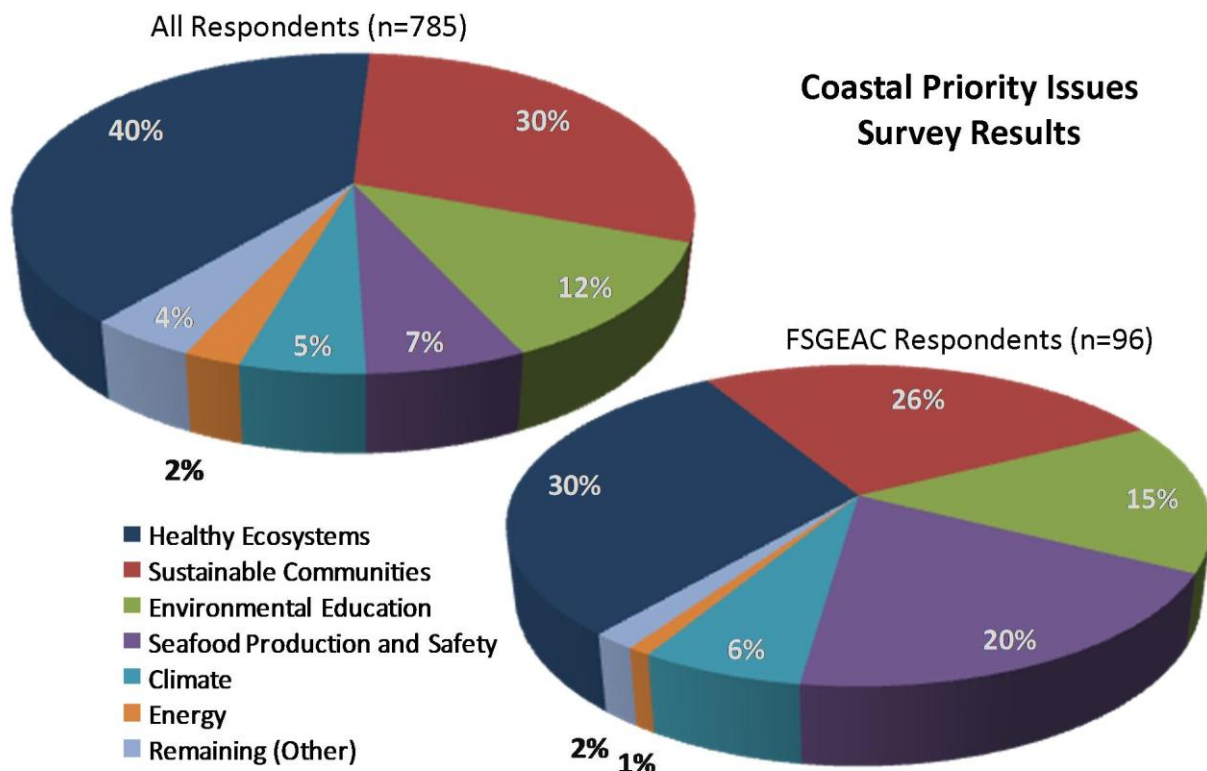
The Florida Sea Grant uses a mail survey of stakeholders in the process of updating its 5-year strategic plan. The results of the 2008 Sea Grant survey are included for comparison and integration with the *Florida Coastal Issues 2009 Survey* results in assessing coastal trends and environmental stewardship in Florida. *The Florida Sea Grant Coastal & Marine Issues Survey* identified and prioritized coastal issues from the input of 785 stakeholders and citizens that had knowledge of Florida coastal issues (Sidman *et al.*, 2008). The members of the survey sample were from three groups: (1) Florida Sea Grant extension agent advisory committee members (FSGEAC, n = 96), (2) graduates of the University of Florida Institute of Food and Agricultural Sciences *Florida Natural Resources Leadership Institute* program (FNRLI, n = 67), and (3) graduates of the University of Florida Institute of Food and Agricultural Sciences *Florida Master Naturalist Program* coastal module (FMNP, n = 622). The survey recipients represent a cross-section of citizens with diverse employment backgrounds and affiliations with the coast, but were identified specifically as stakeholders having knowledge of coastal and marine issues. The top three employment categories of the respondents were retired (29%), government agency (14%), and higher education (11%), representing over half of the respondents. The remaining respondents identified themselves in the following employment categories: non-profit organization, K-12 education, self-employed, private consulting, marine or coastal industry, business owner, service organization, and other. Respondents described themselves as: 22% participating in ecosystem preservation, 19% bird watchers and wildlife observers, 15% recreational users of beaches, 9% marine educators, 7% recreational fisherman, 6% recreational boaters, and several other categories with lower percentages.

Survey respondents were asked to rate 34 coastal issues by importance using a 5-point scale. Descriptive statistics of mean and standard deviation were generated for each of the issues. Cluster analysis was performed to group results from the 34 specific coastal issues into rankings of Highest Importance, High Importance, and Lowest Importance. The coastal issues were categorized into six broad topical themes, which were ranked by analysis of survey responses in the following order: (1) Healthy ecosystems, (2) Sustainable communities, (3) Environmental

education, (4) Seafood production and safety, (5) Climate, and (6) Energy. When results from only the subgroup of FSGEAC members were ranked, the order remained the same except that the priority of seafood production and safety and environmental education was reversed (see Figure 7-9).

Figure 7-9

Percentage of respondents rating 34 coastal issues categorized into six topics using a scale of 1 to 5 in level of importance, lowest to highest in the Florida Sea Grant Coastal & Marine Issues Survey instrument. Of the 785 respondents, 96 were members of the Florida Sea Grant advisory committee, whose results are shown for comparison.



The Sea Grant coastal issue categories included multiple subtopics.

The topic *healthy ecosystems* consisted of the following subtopics:

- 1) water resources quality (which was comprised of subcategories including nutrient loading and pollution, watersheds and water quality, and overconsumption of water resources)
- 2) protection of ocean and coastal resources and shorelines
- 3) habitat restoration including beaches, dunes, estuaries, and reefs
- 4) species protection
- 5) aquatic invasive species management

The topic *sustainable communities* included:

- 1) providing more public access to waterways and moorings
- 2) preserving historic sites and working waterfronts
- 3) restricting shoreline development
- 4) land acquisition and preservation
- 5) reducing boater impacts
- 6) removing derelict vessels and derelict crab traps
- 7) minimizing population growth impacts
- 8) improving hazard resilience

The topic *seafood production & safety* included:

- 1) fisheries management and stock enhancement by protecting essential fish habitat and providing more artificial reefs
- 2) offshore aquaculture
- 3) mariculture pollution
- 4) seafood safety and awareness

The topic *climate* refers to climate change impacts, sea level rise, and the changing salinity of coastal waters. The topic *energy* refers to exploring new energy technologies and studying impacts of new oil drilling in coastal waters.

The priority rankings of the top eight individual coastal issues for all respondents and the subgroup of FSGEAC are shown in Table 7-4. The issues within the topics of climate and energy did not receive high enough percentages to rank in the top eight. The summary findings of Table 7-4 identify focus area outcomes of highest importance for Florida coastal environmental action and stewardship, as rated by environmentally-educated survey respondents and the FSG advisory committee members. Most respondents identified the priority need for environmental and marine education and awareness as a means of generating sustainable behaviors and instilling a greater respect of the natural environment and awareness of human caused impacts to coastal and marine environments. Public perception of Florida coastal issues of high priority was found to be in generally good agreement with coastal issues identified by Florida environmental professionals in separate surveys performed in 2008 and 2009.

Table 7-4

List of the top eight ranked of the 34 specific coastal issues rated by all respondents and by Florida Sea Grant advisory committee members.

Specific Issues – Sub-Categories	All Resources	FSGEAS Only
Water Resources	1	1
Environmental Human Impacts Awareness	2	2
Restrict Shorefront Development	3	8 (tie)
Identify/Protect Essential Marine Habitats	4	7
Protect Beaches/Shorefront Ecosystems	5	6
Species Protection (Manatees, Dolphins, Turtles, Birds)	6	
Habitat Restoration (Dunes, Mangrove, Seagrass, Reefs)	7	8 (tie)

Fisheries Management Stock Enhancement/Limits/Zones	8	3
Public Access		4
Protect EFH/Establish and Monitor Artificial Reefs		5
Aquatic Invasive Species		8 (tie)
More Clean Offshore Aquaculture/Mariculture		8 (tie)
Preserve Historic Sites and Working Waterfronts		8 (tie)

Indicator 7.3 - Environmental Stewardship Money Derived from Specialty License Plate Sales

Specialty license plates for vehicles were initiated in Florida with the Challenger disaster memorial plate in 1987. The number of different specialty plates has increased to 114 plates as of December 2009. One popular topic of license plate design is environmental conservation and awareness. In 1999, there were a total of nine plates in this category. Eight more environmental plates have been added over the last decade, and three new environmental plates were signed into law in 2010; “Catch Me, Release Me,” “Save Wild Florida,” and “St. Johns River.” Three other non-environmental plates were also approved, bringing the total to 120 license plates in 2010.

The motivation for purchasing specialty license plates is most likely a combination of an individual’s desire to make a public statement concerning issues they feel strongly about and to contribute to a worthwhile cause or organization. Whatever the personal motivations are, specialty license plates on vehicles generate significant revenue for the purposes of the sponsors. The outreach and education that is supported through the trust funds and organizations receiving proceeds of environmental stewardship specialty license plates has greatly benefitted from the investment of interested citizens in Florida. For the period of 2000 to 2009, an excess of \$101 million was collected in total for the 17 environmental specialty plates. The total revenue contributed to various trust foundations and organizations supporting research, conservation, and stewardship of environmental, coastal, and ocean natural resources since the inception of the specialty plate program exceeds \$160 million. From 2005 through 2009, over 500,000 environmental stewardship license plates were issued annually, yielding an average of \$11.3 million in revenue each year, or approximately one third of all specialty plate revenue. The standard fee for a specialty plate has increased to \$25 for most plates, although several still cost \$15 or \$20. The fee is required annually for as long as the specialty plate is registered to a vehicle. This means that the licensee is willing to pay this fee in addition to all standard annual registration fees, and indicates a level of commitment to the cause represented by the plate. Table 7-5 presents annual revenue for individual plate transactions from FY 2000 to FY 2009. Overall, a trend of increasing environmental specialty plate revenues from \$8 million to \$12 million annually occurred from FY 2000 to FY 2008, with a decline seen in FY 2009. The increase in revenue seen annually through most of the decade was due to a combination of an increase in the total number of plates available and an increase in the number of sales of certain plates, primarily the newer plates and “Sea Turtles.”

Table 7-5

Annual revenue generated by environmental conservation and coastal stewardship specialty license plates from fiscal years 2000 through 2009.

Stewardship Specialty Plates	FY00 Net Revenue (\$)	FY01 Net Revenue (\$)	FY02 Net Revenue (\$)	FY03 Net Revenue (\$)	FY04 Net Revenue (\$)	FY05 Net Revenue (\$)	FY06 Net Revenue (\$)	FY07 Net Revenue (\$)	FY08 Net Revenue (\$)	FY09 Net Revenue (\$)	FY00-09 Total Net Revenue (\$)
Protect the Panther	2,924,863	2,973,156	2,771,200	2,657,375	2,504,702	2,410,875	2,266,200	2,119,225	2,035,300	1,822,450	24,485,346
Save the Manatee	2,359,805	2,285,182	1,988,960	1,826,440	1,675,285	1,563,040	1,424,540	1,319,120	1,293,860	1,216,140	16,952,372
Indian River Lagoon	430,215	440,638	413,310	406,337	397,560	388,800	367,185	346,470	333,855	305,475	3,829,845
Largemouth Bass	502,156	571,078	559,775	547,527	543,325	529,400	502,375	472,292	440,875	387,150	5,055,953
Conserve Wildlife	199,586	333,601	417,870	462,210	485,430	489,900	459,465	434,310	422,190	381,465	4,086,027
Everglades River of Grass	93,654	161,342	210,860	243,820	270,900	282,300	284,640	283,140	288,265	270,340	2,389,261
Helping Sea Turtles Survive	661,414	918,721	1,061,159	1,183,945	1,264,165	1,347,185	1,362,428	1,368,518	1,800,040	1,696,631	12,664,206
Protect Wild Dolphins	726,382	1,264,630	1,497,250	1,654,460	1,746,640	1,771,680	1,723,940	1,674,980	1,630,220	1,482,920	15,173,102
Tampa Bay Estuary	15,211	73,992	114,615	139,875	154,050	160,395	159,510	153,105	149,153	138,600	1,258,506
Protect Florida Whales	-	-	-	70,275	303,125	458,400	487,325	527,350	524,725	475,675	2,846,875
Fish Florida	-	-	-	-	40,810	252,054	366,960	440,176	493,636	499,620	2,093,256
Protect Our Reefs	-	-	-	-	273,025	696,900	954,500	1,025,825	1,079,086	1,011,475	5,040,811
Aquaculture	-	-	-	-	-	10,355	196,860	342,135	399,750	403,160	1,352,260
Discover Florida Oceans	-	-	-	-	-	45,900	276,400	346,850	397,275	392,250	1,458,675
Save Our Seas	-	-	-	-	-	16,530	379,845	643,325	774,585	797,485	2,611,770
Protect Florida Springs	-	-	-	-	-	-	-	-	15,250	59,625	74,875
Visit Our Lights	-	-	-	-	-	-	-	-	-	24,500	24,500
Conservation & Coastal Stewardship Plates Total (\$)	7,913,286	9,022,340	9,034,999	9,192,264	9,659,017	10,423,714	11,212,173	11,496,821	12,078,065	11,364,961	101,397,640
Specialty Plates Total (\$)	19,758,455	22,978,332	23,280,276	24,591,289	26,168,581	29,049,473	31,777,561	33,475,198	35,436,025	34,413,900	280,929,090
Total Number of Specialty Plates			51	58	91	102	103	107	112	116	
Total Number of Stewardship Plates			9	10	12	15	15	15	16	17	

The environmental stewardship license plates can be divided into two categories by date of inception: those established prior to 2000 and newer license plates added since 2000. The nine older environmental specialty plates account for nearly 85% of revenues over the last decade, with four plates representing the majority of sales: Protect the Panther, Save the Manatee, Helping Sea Turtles Survive, and Protect Wild Dolphins. The two leading environmental stewardship plates “Panther” and “Manatee” have shown declining year to year sales from FY 2001 to present (Table 7-6), with a reduction from 67% to 27% in the proportion of sales from these two plates toward total environmental stewardship plate sales. In FY 2000, combined revenue from “Panther” and “Manatee” plates was over \$5.2 million. Despite decreasing sales over time, support for conservation of these two Florida species is still high, and combined the plates produced over \$3 million in revenue annually from FY 2005 to FY 2009. The decline seen in “Panther” and “Manatee” plates has been offset in part by increasing “Sea Turtle” plate sales, and rapid increases in sales of several newer plates, notably “Protect our Reefs” and “Save our Seas.” Protect Wild Dolphin plate sales have been declining slightly from 2005 to present, but still produced nearly \$1.5 million annual revenue in FY 2009. Sea Turtle plate revenue increased each year from FY 2000 to FY 2008 for a change of over 170%, and a peak of \$1.8 million in FY 2008. Sea Turtle specialty plates revenue decreased by 6% in FY 2009.

The increased number of choices and shifts of popularity of specific specialty plates had additional consequences on support for specific environmental concerns. Declining public support for protection of Florida’s panthers, for the period 2000 to 2009 resulted in a cumulative loss of \$1.1 million (if sales remained constant over that period). This decrease has broader impacts on conservation efforts in Florida (15% of “Protect the Panther” revenue is dedicated to the Florida Communities Trust, which funds land acquisition for habitat conservation). Manatee plate sales have seen even greater losses (\$1.14 million, over the same period). Similarly, projects that enhance or restore local coastal habitats, and are funded by entities receiving specialty plate revenue, for example the Indian River Lagoon and Tampa Bay Estuary plates, also suffered from declining sales.

Figure 7-10 shows the number of environmental stewardship plates issued for calendar years 2005 to 2009, ranging from 515,000 to 550,000 for the seventeen plates combined. The overall decrease in number of specialty plates issued starting in calendar year 2009 coincides with the continued troubled economic condition of Florida linked to nationwide economic recession. Sales continued this downward trend into 2010, and were exacerbated by large increases in base fee rates on all vehicle registrations and increases of other fees associated with specialty plates (Smith, 2010). Average cost to register a new car increased from \$100 to \$225. Administrative fees to buy a new specialty plate increased from \$14 to \$33. The administrative fees to renew a specialty plate increased from \$2 to \$5. These fees are in addition to the \$25 that goes to the sponsor of the plate. Sales of all specialty plates were down 64% in the first two months of 2010 compared to 2009. A decrease in plate sales of 25,000 represents an approximate loss in \$625,000 revenue. Assuming that rate remains unchanged throughout the year, the projected number of specialty plates issued for 2010* will decrease to less than 200,000, for a total loss of more than \$7.5 million in revenue.

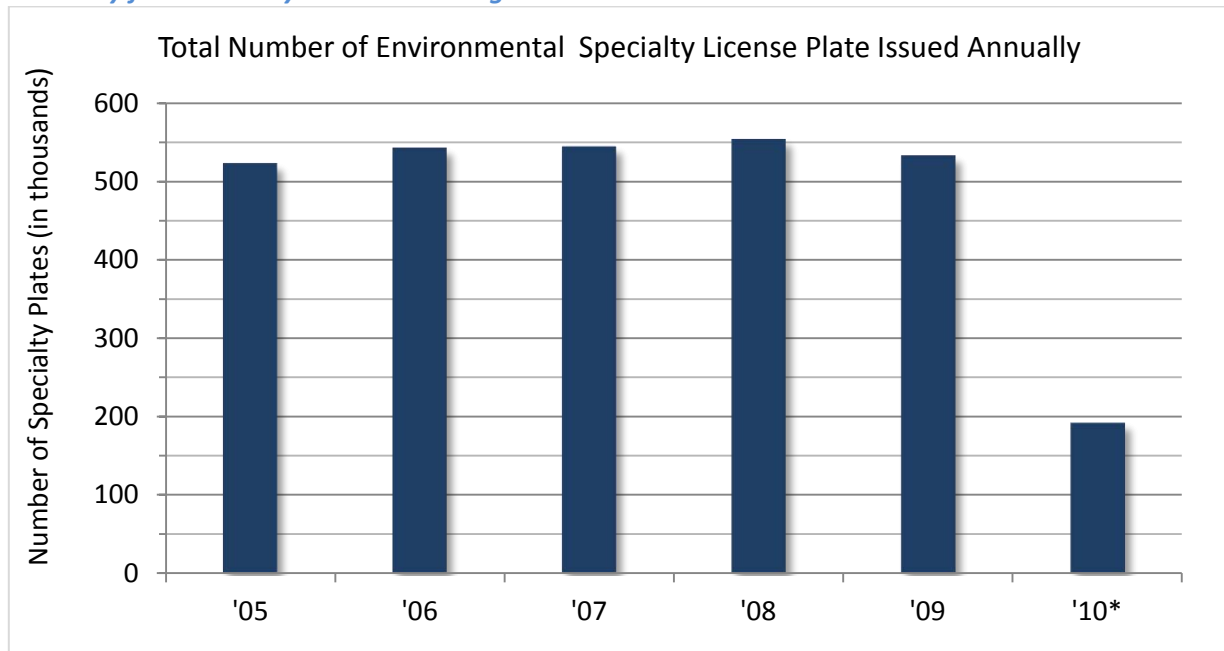
Table 7-6

Annual Change in net revenue generated from by environmental stewardship specialty license plates from fiscal years 2000 through 2009.

Environmental Conservation & Coastal Stewardship Specialty Plates	Annual Change in Revenue (in dollars)									Net Change in Revenue FY00-09
	FY00-01	FY01-02	FY02-03	FY03-04	FY04-05	FY05-06	FY06-07	FY07-08	FY08-09	
Protect the Panther	48,293	-201,956	-113,825	-152,673	-93,827	-144,675	-146,975	-83,925	-212,850	-1,102,413
Save the Manatee	-74,623	-296,222	-162,520	-151,155	-112,245	-138,500	-105,420	-25,260	-77,720	-1,143,665
Indian River Lagoon	10,423	-27,328	-6,973	-8,777	-8,760	-21,615	-20,715	-12,615	-28,380	-124,740
Largemouth Bass	68,922	-11,303	-12,248	-4,202	-13,925	-27,025	-30,083	-31,417	-53,725	-115,006
Conserve Wildlife	134,015	84,269	44,340	23,220	4,470	-30,435	-25,155	-12,120	-40,725	181,879
Everglades River of Grass	67,688	49,518	32,960	27,080	11,400	2,340	-1,500	5,125	-17,925	176,686
Helping Sea Turtles Survive	257,307	142,438	122,786	80,220	83,020	15,243	6,090	431,522	-103,409	1,035,217
Protect Wild Dolphins	538,248	232,620	157,210	92,180	25,040	-47,740	-48,960	-44,760	-147,300	756,538
Tampa Bay Estuary	58,781	40,623	25,260	14,175	6,345	-885	-6,405	-3,952	-10,553	123,389
Protect Florida Whales	-	-	70,275	232,850	155,275	28,925	40,025	-2,625	-49,050	475,675
Fish Florida	-	-	-	40,810	211,244	114,906	73,216	53,460	5,984	499,620
Protect Our Reefs	-	-	-	273,025	423,875	257,600	71,325	53,261	-67,611	1,011,475
Aquaculture	-	-	-	-	10,355	186,505	145,275	57,615	3,410	403,160
Discover Florida Oceans	-	-	-	-	45,900	230,500	70,450	50,425	-5,025	392,250
Save Our Seas	-	-	-	-	16,530	363,315	263,480	131,260	22,900	797,485
Protect Florida Springs	-	-	-	-	-	-	-	15,250	44,375	59,625
Visit Our Lights	-	-	-	-	-	-	-	-	24,500	24,500
Total Net Change in Revenue (in dollars)	1,109,054	12,659	157,265	466,753	764,697	788,459	284,648	581,244	-713,104	3,451,675

Figure 7-10

Number of environmental conservation and coastal stewardship specialty license plates issued annually for calendar years 2005 through 2009.



*Projected end of year number of plates to be issued based on sales from the first two months of 2010.

B. Participation

Stewardship consists of more than awareness of coastal resource issues. Educated awareness combined with active participation by members of the community is needed to enable sustainable living under the consequences of the rapidly increasing Florida population. Active community and individual participation is required to establish lifestyles, growth patterns and wise governance sufficient to produce a healthy environment for future generations. Many organizations in Florida develop and sponsor stewardship activities; such as, volunteer water quality monitoring, beach clean-ups, and exotic plant removal. Some stewardship programs are government initiatives, but many are generated by academic institutions, citizen groups, private businesses, and non-profit organizations. Some stewardship events are state-wide, *e.g.*, the annual Florida Coastal Clean-up sponsored by the Ocean Conservancy, but many are specific to environmental conditions or characteristics unique to a region or locality.

A sample of stewardship activities by government agencies and private entities was collected and presented as an example of citizen participation in environmental issues and management. The number of volunteers and the number of hours volunteered are presented as indicator 7.5. These data, reported by various public entities, non-profit groups, and private businesses, do not represent a scientific sampling of citizen stewardship, but rather a representation of citizen participation from all regions of the state.

Indicator 7.4 - Number of Volunteers and Amount of Debris Removed in the Annual Florida Coastal Cleanup

The Ocean Conservancy is an international nonprofit organization that works to protect ocean environments and marine biodiversity. The Ocean Conservancy's 25th International Coastal Cleanup occurred in September 2010, and volunteers by the tens of thousands cleaned Florida beaches and inland waterways in the thirty five coastal counties, and other locations, picking up the man-made trash and debris that becomes deposited along our rivers, estuaries, shorelines, and into our oceans. A significant amount of the mass of human waste material, including plastics, cigarette butts, glass bottles, metal cans, monofilament fishing line, fishnets, syringes, rubber items and even large appliances and automobile tires were recovered and removed from beaches, shorelines, and waterways. Much of this trash is harmful to marine life or will ultimately contaminate our ocean waters unless it is removed.

The Ocean Conservancy's International Coastal Cleanup was born of a series of events and interactions which underscore the power of an individual to effect change, and the strength of community action with a positive attitude toward societal behavioral change. During the period 1950-1980, awareness grew of an increasing problem with marine debris. Evidence of increases of entanglement in derelict fishing gear and ingestion of man-made debris by marine mammals, sea turtles, and seabirds suggested human trash, and plastic specifically, was accumulating in the ocean and silently killing large numbers of marine animals. This awareness produced a scientific workshop on the fate and impact of marine debris in November 1984. The workshop

revealed the extent of impact and trans-oceanic state of the problem through the sharing of experiences and reports from New England to Alaska. The results of the grass roots effort of Oregon's first volunteer beach cleanup in October 1984 were also reported at the meeting.

Each year The Ocean Conservancy organizes and coordinates the coastal cleanup. The Florida Coastal Cleanup is perhaps the most well-known Florida environmental stewardship event held to protect the ocean. In 1988, 10,676 people participated in the cleanup in Florida. In 1999, the number of volunteers had increased to 36,937. In 2009, 22,347 volunteers picked up human trash on beaches in 34 counties, and another 456 people cleaned waters and waterways by vessel or SCUBA. Internationally, 498,818 volunteers in 108 countries and locations picked up 7,446,130 pounds of trash in the 2009 cleanup. This type of stewardship makes an obvious impact, and is an excellent example to educate people that individual participation makes a difference, and that the choice to be active in our community, the choice of each person, can have a positive influence on the lives of many.

Coordinators for the ICC record volunteer participation, miles of beaches cleaned, and the tonnage of trash collected for each site during each cleanup event. The trash collected is sorted and each item classified. Results for number of volunteers, miles of shoreline and pounds of trash for Florida cleanups from 2000 to 2009 are presented in Figure 7-11.

The number of persons volunteering to pick up trash on the annual Florida Coastal Cleanup day has fluctuated between a low of 15,121 in 2004 to a high of over 32,000 (in 2000, 2001, and 2008). The number of miles of beaches, shoreline, and waterways cleaned dropped below 1,000 only twice in the last decade (2004 and 2009). The cleanup in 2002 was exceptional in that over 2,000 miles of Florida shoreline and waterways were cleaned in a single day. Otherwise, miles of cleanup fluctuated between 1,200 and 1,900 miles each year. The amount of collected trash exceeded one million pounds each year in 2000 and 2001. In 2004, both volunteer turnout (15,121) and the amount of trash collected (less than 285,000 pounds) dropped to what would be their lowest levels of the decade. Such low turnout in 2004 was likely the result of four hurricanes that struck the state in August and September prior to the cleanup. The amount of trash collected in 2005 jumped to 585,000, but a consistent gradual decrease in pounds of trash collected has been seen since then, dropping to 312,122 pounds in 2009.

Figure 7-11a

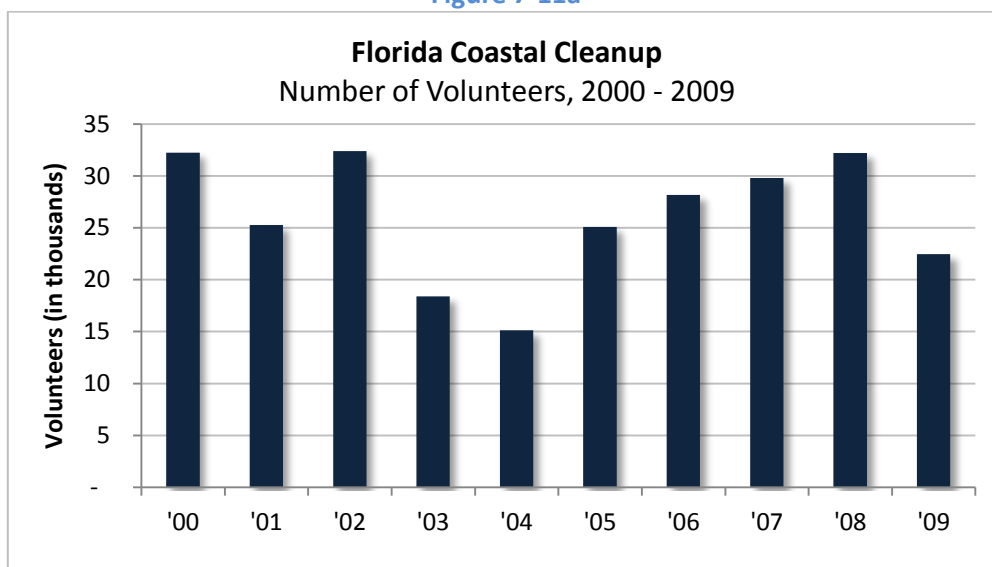


Figure 7-11b

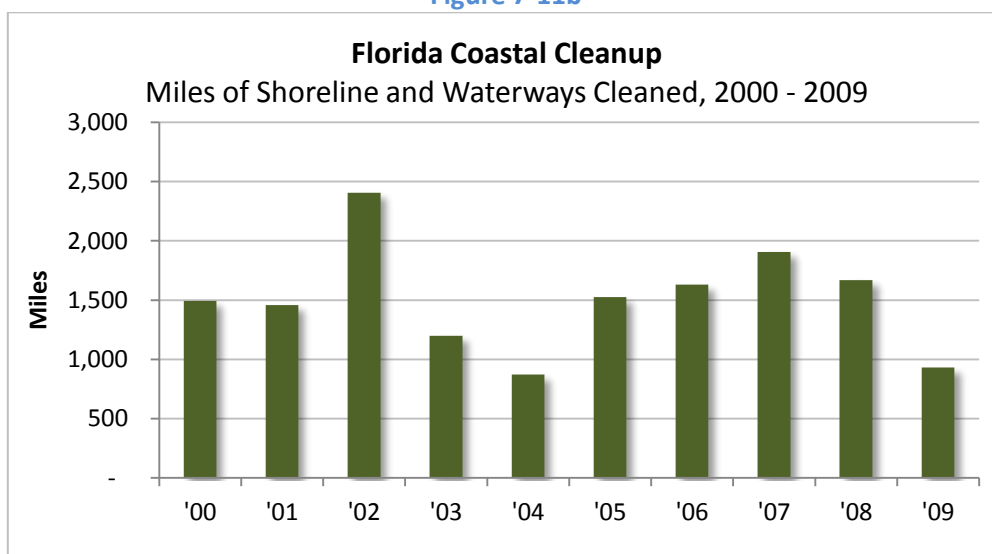
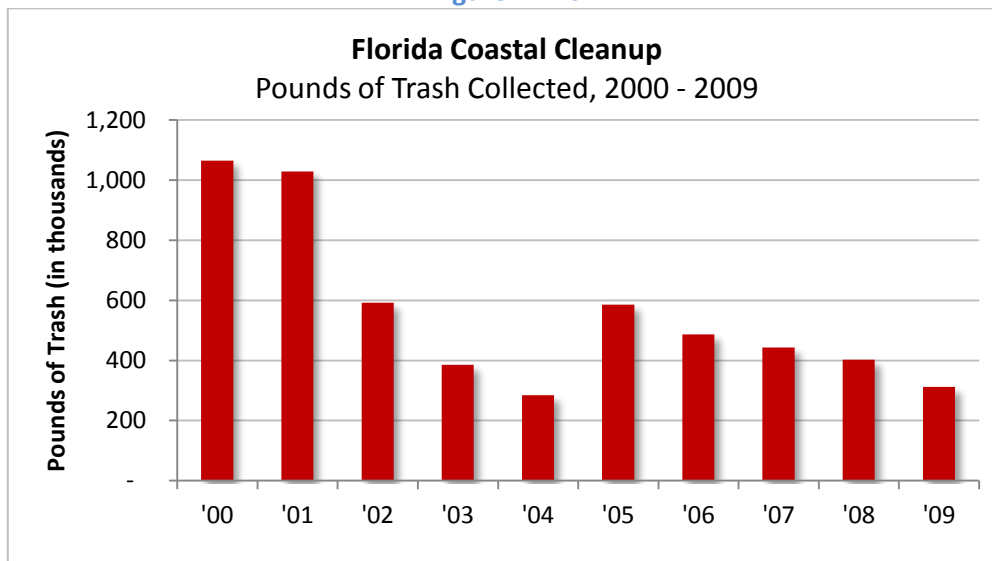


Figure 7-11c



Regression analyses of the variables volunteers, miles, and trash were performed, and linear correlations were found among all three variables (Figure 7-12). The data for the years 2000 and 2001 were not included in the analysis due to the anomalously high values for pounds of trash collected those years. The 2000 and 2001 data points were included in the scatter plots (open symbols), and interestingly, fit the regression of number of volunteers to miles of beaches very well. This suggests that only the amount (in pounds) of trash collected was unusually high in those years. A strong direct relationship exists (86% association) between the number of volunteers present and the amount of shoreline and waterways that are cleaned in a given year ($r^2 = 0.74$; 74% of the variability in miles is dependent upon the number of volunteers). This may not be a surprising result, but it is confirmed by the data analysis. The relationship between number of volunteers and the amount of trash collected is not well established, $r^2 = 0.37$; however, the linear regression suggests that each volunteer collects, on average, 17 pounds of trash. Therefore, according to the regression equation, to collect 7.5 million tons of trash, as was done internationally in 2009, it would require 441,000 volunteers, which is within 12% of the actual number (499,000 people). A moderately strong association was seen between the number of miles traveled by volunteers that picked up trash and the amount of trash collected ($r = 0.65$). The regression equation predicts that for each mile of shoreline cleaned, 273 pounds of trash are picked up. The associated error with the prediction is approximately +/-18%.

Over the years, the ICC has developed a protocol for data collection and categorizing information concerning the trash collected during coastal cleanups. Five primary categories of trash are recognized based upon the source activity: Shoreline and Recreational Activities, Ocean and Waterway Activities, Smoking-related Activities, Dumping Activities, Medical and Personal Hygiene (see Figure 7-13 for an example from 2007 cleanup data). Figure 7-14 shows the top ten trash types recovered in 2007 as a percentage of the 1,468,582 items collected.

Most items come from shoreline and recreational activities. Cigarettes and cigarette butts remain the single most common trash article found during cleanups in Florida, the United States, and the world. Plastic items are also prevalent: bags, caps, bottles, cups, utensils; presenting an especially difficult problem in the marine environment. Underwater the commonly recovered items are fishing nets, monofilament fishing line, rope, and derelict fish, crab, and lobster traps. These ten items represented in Figure 7-14 comprise 87.4% of all items picked up during the 2007 Florida Coastal Cleanup.

Figure 7-12a
Linear regressions of the Florida Coastal Cleanups from 2000 to 2009 showing correlation of number of miles cleaned to the number of volunteers. Data points included in the regression analyses are represented by filled symbols.

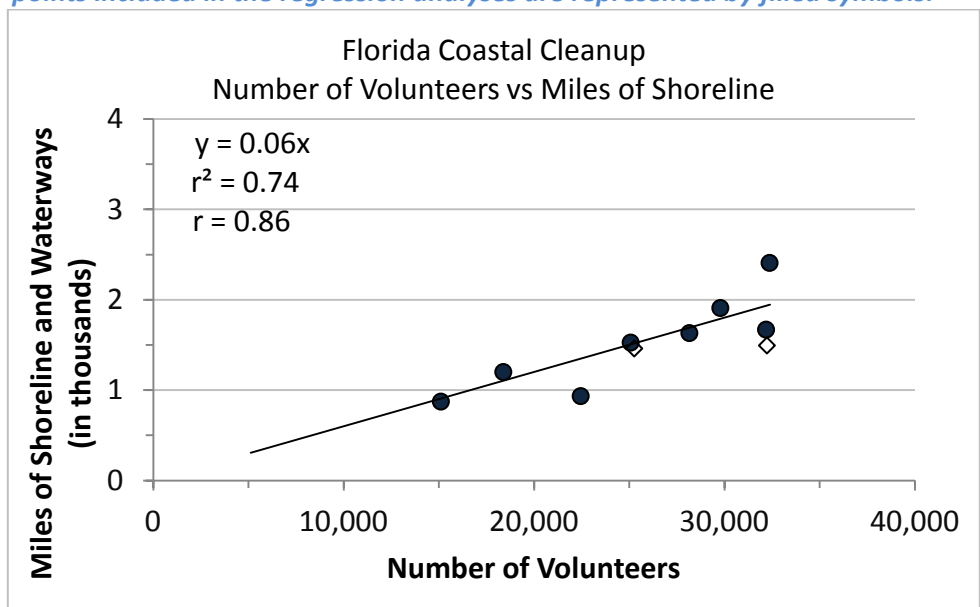


Figure 7-12b

Linear regressions of the Florida Coastal Cleanups from 2000 to 2009 showing correlation of pounds of trash collected to the number of volunteers. Data points included in the regression analyses are represented by filled symbols.

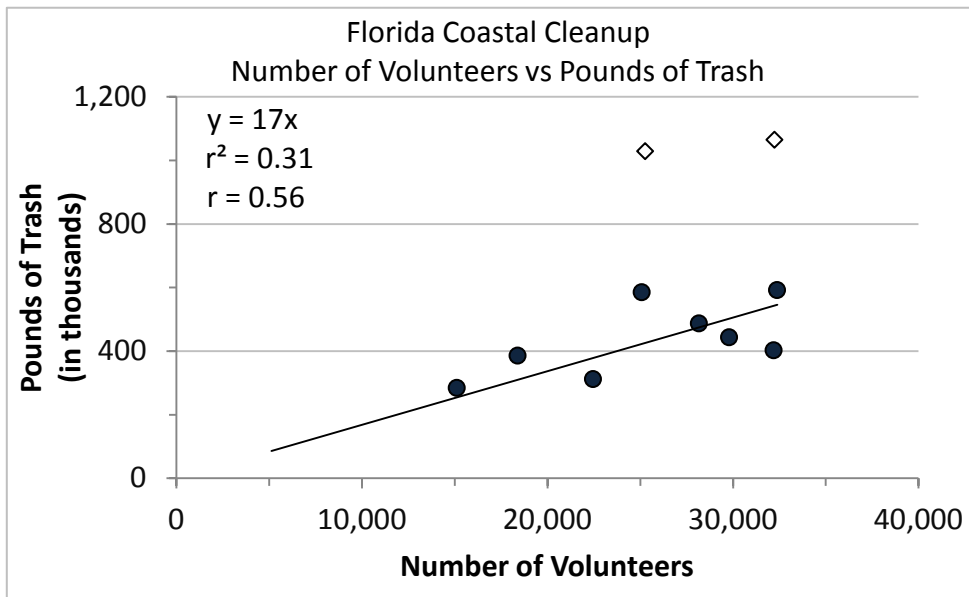


Figure 7-12c

Linear regressions of the Florida Coastal Cleanups from 2000 to 2009 showing correlation of pounds of trash collected to the miles of shoreline cleaned. Data points included in the regression analyses are represented by filled symbols.

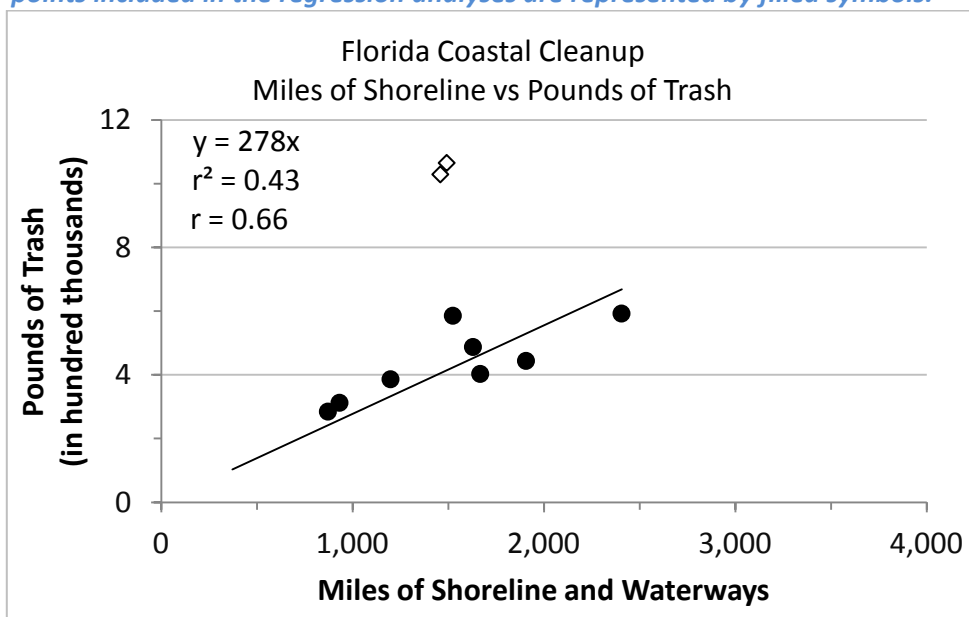


Figure 7-13

Percentage of total items recovered (1,468,582) during the 2007 Florida Coastal Cleanup in the five categories of trash based on source.

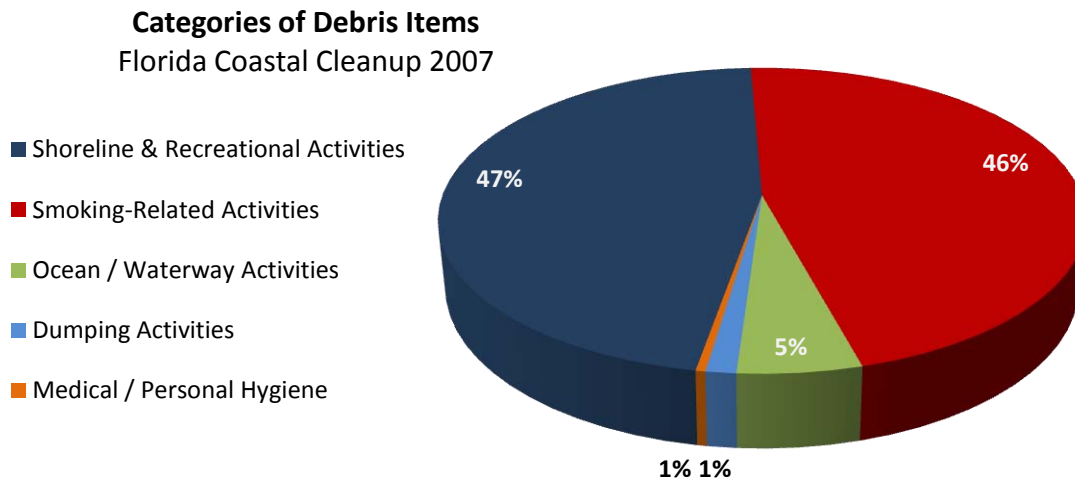
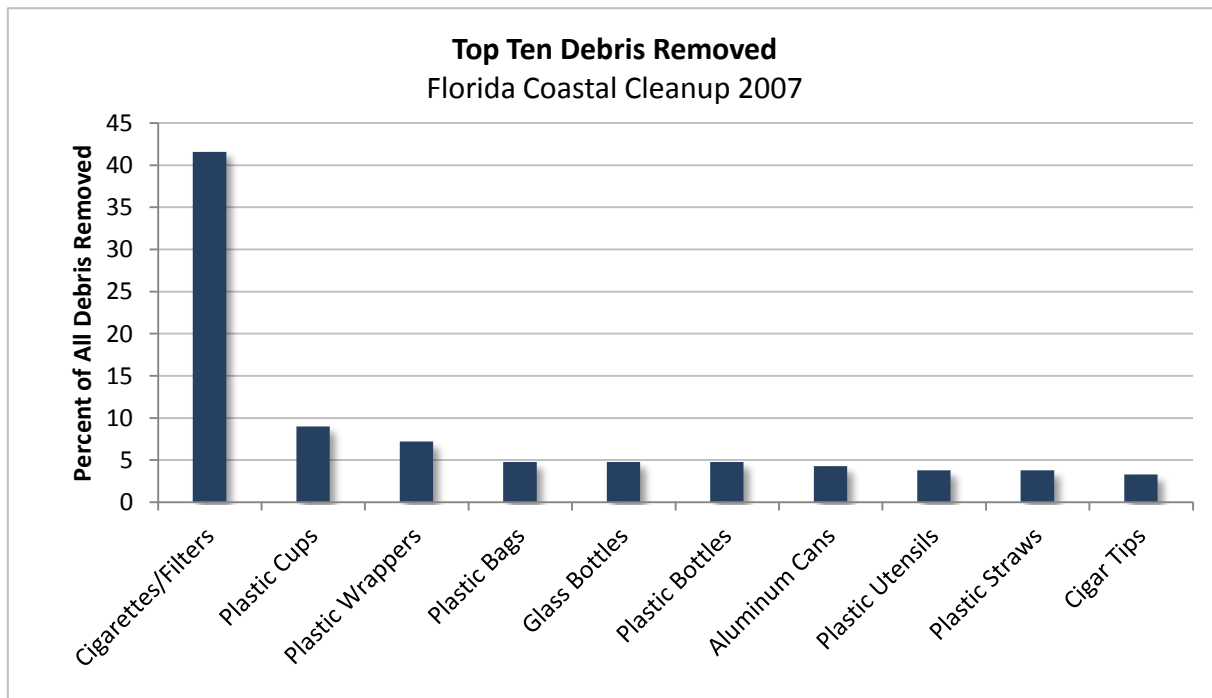


Figure 7-14

Percentage of total items recovered (1,468,582) during the 2007 Florida Coastal Cleanup listed by trash type: cigarettes/filters, plastic caps, food wrappers, plastic bags, glass bottles, plastic bottles, beverage cans, utensils, straws, cigar tips.



Indicator 7.5 - Number of Volunteers Participating in Selected Florida Stewardship Programs that Protect and Restore Coastal Resources

The importance of volunteer programs and citizen participation in activities should not be under-estimated. One of the strongest determinants of full understanding of the impact of human activities on the environment is personal experience. For example, a person who positively participates in the restoration of a polluted wetland gains the understanding of how humans can harm wetland habitat, what can be done to help restore the damage, the important functions this habitat provides and how communities can change to improve the future.

The availability and proximity of opportunities for participation in local community environmental projects and programs is necessary to facilitate education for environmental stewardship. Over the past decade, more opportunities have become available for the direct participation of citizens in a variety of stewardship projects. Many organizations involved in coastal resource issues throughout Florida have volunteer programs. The number of volunteers or number of hours of volunteer service in environmental programs indicate the willingness of individuals to give their time toward activities that improve the environment, conserve natural habitats, wildlife, and resources, and produce healthier conditions for the good of the whole community. The individual participation indicates awareness of the need to correct, restore, and maintain elements of our natural landscape that have been impacted by the development patterns of human population and society.

The establishment of programs promoting active participation in environmental stewardship and the amount of participation in those programs indicates the general level of concern and response within Florida for a healthy, sustainable environment. The indicator, “volunteerism in stewardship programs,” sampled organizations for which long-term data on the number of volunteers and number of volunteer hours have been maintained. Only data from a few organizations, representative of the different regions of the state, were collected and analyzed (Table 7-7). A full description of citizen involvement and level of participation in stewardship programs for the entire state would give a better indication of the environmental attitude and disposition of Florida communities, but would require a major data collection and coordination effort. In lieu of complete statewide tracking, select organizations were chosen that will be able to report volunteer efforts periodically. The data presented, while limited to select programs, reveal an extensive level of participation by Floridians as environmental stewards. Even if the volunteer program of the State Park Service (which has an exceptional volunteer program) is not included, participation by Floridians in volunteer positions in the selected sample can still be counted in the tens of thousands of hours per year. This participation in stewardship roles that seek to protect, restore, and improve our natural coastal resources has continued to increase during very difficult economic conditions. The results from the “volunteerism” indicator suggest a strong desire among citizens to ensure the continued health and preservation of Florida’s natural environment.

Table 7-7

Select, regionally representative, organizations for which long-term data on the number of volunteers and number of volunteer hours have been maintained.

Agency Responsible for Volunteer Stewardship Program	
1	Florida Department of Environmental Protection, Coastal and Aquatic Managed Areas
2	Florida Keys National Marine Sanctuary, Key West
3	Guana Tolomato Matanzas National Estuarine Research Reserve, Ponte Vedra Beach
4	Sea Turtle Conservancy, Melbourne Beach
5	The Conservancy of Southwest Florida, Naples
6	Florida Oceanographic Society, Stuart
7	Florida Fish and Wildlife Commission, Florida Wildlife Research Institute, St. Petersburg
8	Florida State Parks

1. Florida Department of Environmental Protection, Coastal and Aquatic Managed Areas (CAMA)

CAMA oversees the management of Florida's 41 aquatic preserves, 3 National Estuarine Research Reserves (NERR), the Florida Keys National Marine Sanctuary (FKNMS), and the coral reef conservation program. Volunteers are an integral part of CAMA's effort to protect Florida's coastal resources. Examples of CAMA projects incorporating volunteer participation include:

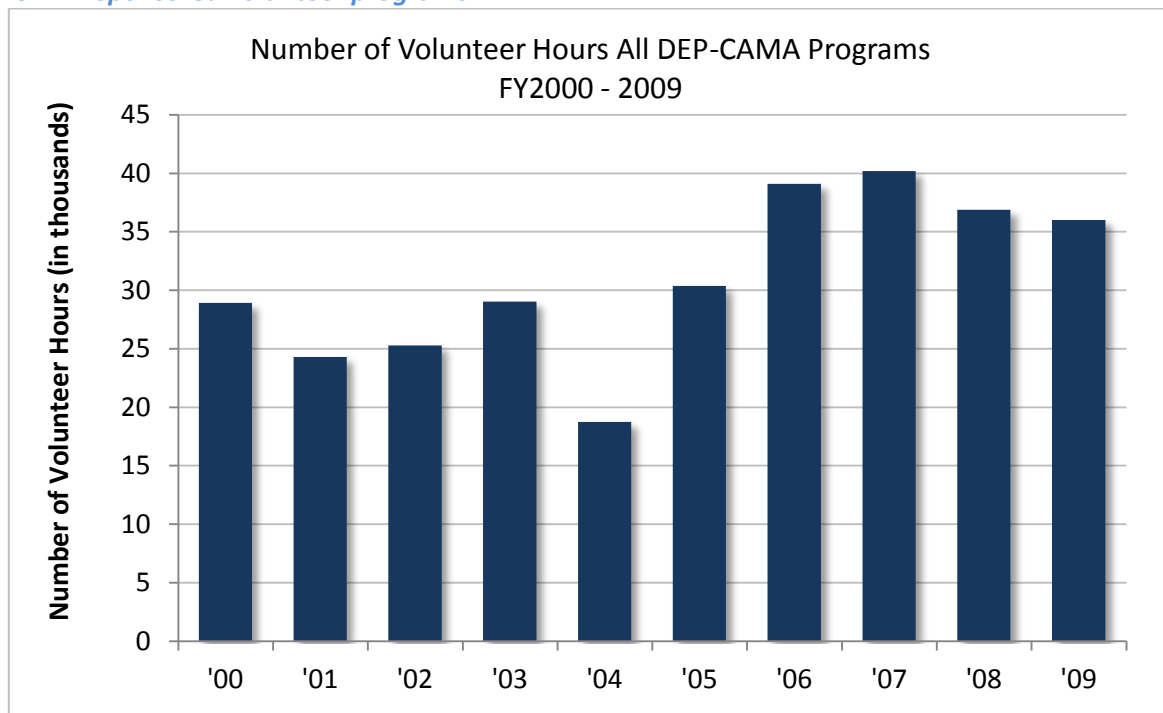
- Guana-Tolomato-Matanzas NERR stewardship, education, and research activities; support activities collecting biological inventories; and community education programs
- Rookery Bay NERR preservation, restoration, and management of mangrove estuaries through invasive plant removal; monofilament line recovery; and other special events in the Ten Thousand Island region in south Florida
- Apalachicola NERR stewardship, education, and research activities; support activities collecting biological inventories; and community education programs
- Team OCEAN in the FKNMS providing on-the-water education of boaters about coral reef habitat in the Florida Keys
- Charlotte Harbor Estuaries water quality monitoring of 14 physical parameters in six aquatic preserves in southwest Florida
- St. Joseph Bay aquatic preserve water quality monitoring and tracking harmful algal bloom occurrences; turtle patrol; sea turtle nest protection; and community education programs concerning lighting effects on sea turtles in northwest Florida
- Indian River Lagoon aquatic preserves spoil island enhancement integrating debris cleanup, exotic plant removal, and other habitat restoration; bird monitoring; and "eagle scout" projects for youth leadership, service, and outdoor skill training on the east central coast

The cumulative number of volunteer hours, participating in various aspects of environmental activities, in all the Department of Environmental Protection CAMA programs for the 10-year span from July 2000 through June 2009 was just under 310,000 hours. This is equivalent to 148

people working full time for a year, or in terms of the last decade, equal to 14 full time volunteer staff assistants each year. The total number of individuals involved in the 308,732 hours was not reported, but using available data from some of the programs that comprise CAMA, one can estimate several thousand participants. Figure 7-15 shows the annual number of volunteer hours reported for all DEP-CAMA programs. During the first half of the decade, the number of volunteer hours per year averaged 26,880 (FY00-FY03) and reached a low of 18,734 in 2004. Since 2005, volunteer hours have exceeded 30,000 per year with a peak of 40,176 in 2007.

Figure 7-15

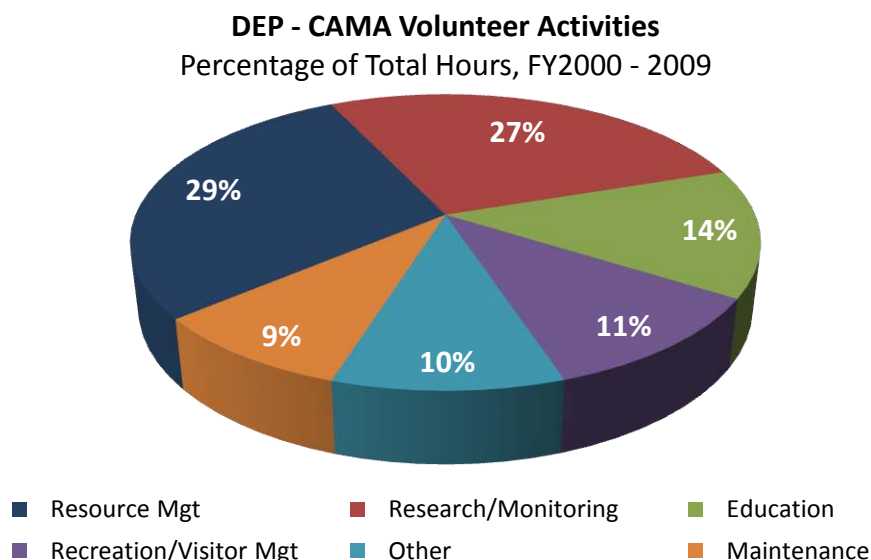
The number of volunteer hours reported annually for fiscal years 2000 to 2009 for all DEP-CAMA sponsored volunteer programs.



The majority of volunteer time was directed toward resource management (29%) and research and monitoring (27%). Resource management includes native vegetation restoration, invasive plant control, trail maintenance, biological surveys, shoreline restoration and stabilization, and resource management surveys. Twenty-five percent of volunteer time is dedicated to education and visitor management. The remaining 19% of volunteer time was split among maintenance and other activities (Figure 7-16).

Figure 7-16

Cumulative number of volunteer hours for each of six activity categories between FY 2000 to 2009 for all DEP-CAMA sponsored volunteer programs. Activity categories - hours and (% time) include: Resource management - 91,106 hours (29%), Recreation/Visitor Management – 34,829 (11%), Education – 42,684 (14%), Research/Monitoring – 84,714 (27%), Maintenance 24,346 (9%), and Other - 30,053 (10%)



2. Coastal and Aquatic Managed Areas: Florida Keys National Marine Sanctuary, Key West

One of the programs managed by CAMA is the Florida Keys National Marine Sanctuary (FKNMS). Volunteer opportunities within the FKNMS programs are diverse. Volunteers can choose to serve as environmental educators for middle school students in the hands-on Coral Reef Classroom, as scuba divers in the submerged Maritime Heritage Resources Inventory project, or as advisors on the Sanctuary Council, among many other activities.

The number of volunteers who participated in FKNMS projects has not been tracked over time; however, the annual number of volunteer hours was reported for the 2005-2009 time period. Formerly, the FKNMS volunteer program was a partnership between The Nature Conservancy and NOAA (from 1992 to 2004). Starting in 2004, the FKNMS took over the management of the volunteer program. Partner volunteer programs established within numerous organizations in the community are no longer reported in the FKNMS volunteer hours.

Volunteers form an integral part of action plans in research and monitoring, water quality, damage assessment and restoration, education outreach, maritime heritage resources, and administration. According to the FKNMS Revised Management Plan (2005), the estimated cost of maintaining and supporting volunteer activities is approximately \$82,000 per year, or \$410,000 for the 5-year action plan. Statistics from the 1996-2000 time period, suggest an

equivalent benefit of \$1.8 million from the 120,000 hours contributed by volunteers during that time period.

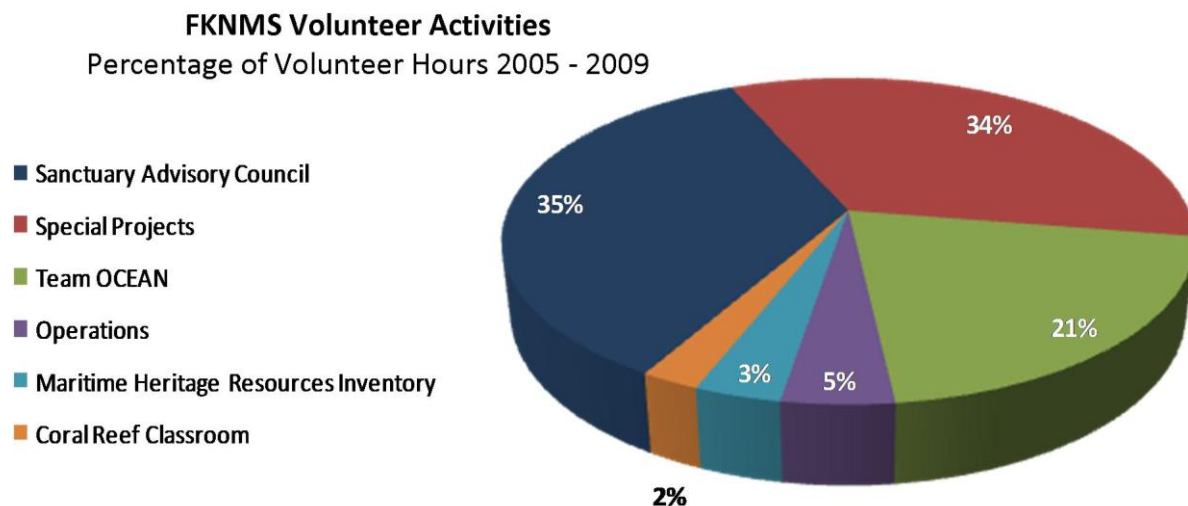
The FKNMS volunteer program works closely in partnership with other Sanctuary programs, outside organizations, and other agencies. Some of these partner programs are listed below:

- *Florida Keys Watch* by The Nature Conservancy and Florida International University for water quality monitoring
- Reef Environmental Education Foundation (*REEF*) fish biodiversity and abundance surveys
- Queen Conch Restoration activities at Keys Marine Lab in Long Key, Florida
- Dolphin Ecology Project photo-identification surveys of Atlantic bottlenose dolphin populations
- Marine Ecosystem Event Response and Assessment (*MEERA*) at Mote Marine Lab's Tropical Research Center monitoring for coral bleaching, fish kills, and harmful algal blooms
- Reef Ecosystem Condition (*RECON*) researching reef health and organism distribution and abundance

Six specific project areas supporting volunteer activities in the FKNMS management plan were tracked consistently over the time period 2005-2009. The project areas included: Coral Reef Classroom, Maritime Heritage Resources Inventory, Team OCEAN, special projects, operations, and the Sanctuary Advisory Council. Figure 7-17 shows the percentage of volunteer hours for each of the six categories. The advisory council and special projects accounted for nearly 70% of FKNMS volunteer time. Team OCEAN, which maintains on-the-water presence of volunteers in boats at heavily visited reef sites to educate, inform, and encourage proper use of Sanctuary resources and safety precautions, accounted for over 20% of the balance of volunteer time.

Figure 7-17

The percentage of volunteer hours for the six volunteer project areas for the period 2005 to 2009 for FKNMS sponsored volunteer programs.



Environmental Stewardship

The six volunteer project areas represent 28,099 hours contributed in the years 2005 to 2009 (see Table 7-8). The number of volunteer hours varied greatly over the time period, with a low of 2,484 hours in 2006, and a high of 8,845 in 2007 (Figure 7-18). Figure 7-18 also shows the increase in volunteer hours at the Florida Keys Eco-Discovery Center, which opened in 2007. The number of volunteer hours has tripled at the Center in the three years reported from 330 to 990 hours. The Eco-Discovery Center is a 6,400 ft² exhibit of the natural environment of the Keys located in Key West, Florida.

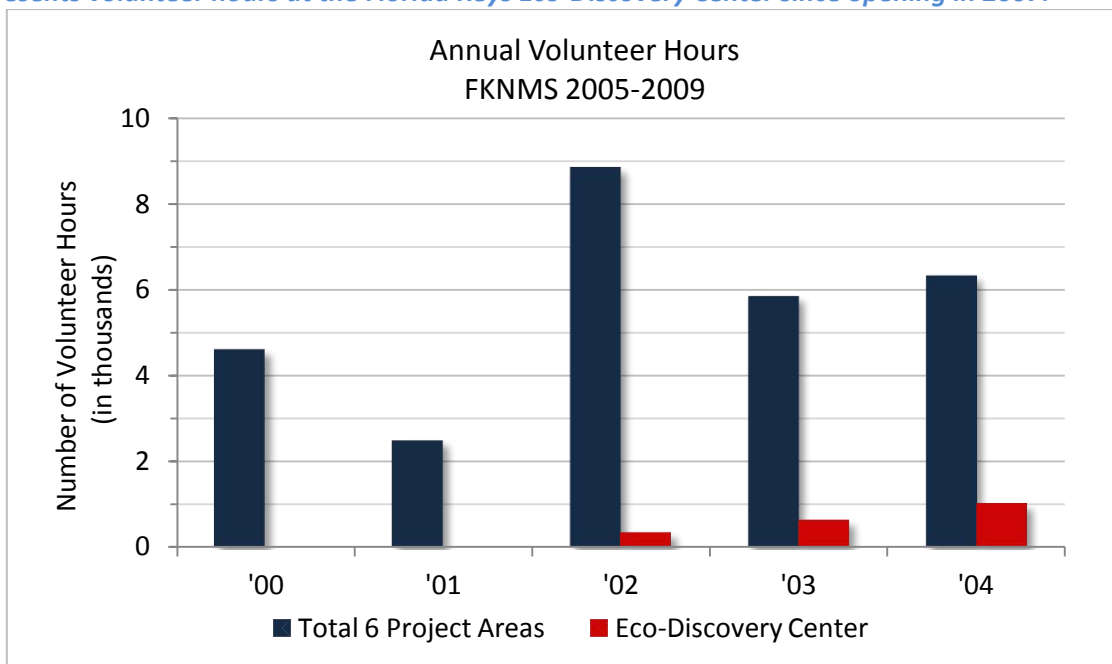
Table 7-8

Number of volunteer hours annually in six project areas at the Florida Keys National Marine Sanctuary from 2005 to 2009

Project	'05	'06	'07	'08	'09	Total
Coral Reef Classroom	454	24	138	12	24	652
Maritime Heritage Resources Inventory	610	55	180	55	57	957
Team OCEAN	1,039	992	1,607	1,115	1,056	5,809
Special Projects	1,123	174	4,207	1,544	2,536	9,584
Operations	235	193	400	355	59	1,242
Sanctuary Advisory	1,142	1,046	2,313	2,766	2,590	9,857
Total	4,603	2,484	8,845	5,846	6,321	28,099

Figure 7-18

The annual number of volunteer hours for the period 2005 to 2009 for FKNMS sponsored volunteer programs. Series one consists of the combined volunteer hours for six project areas. Series two represents volunteer hours at the Florida Keys Eco-Discovery Center since opening in 2007.



3. Coastal and Aquatic Managed Areas: Guana Tolomato Matanzas National Estuarine Research Reserve, Ponte Vedra Beach

The Guana Tolomato Matanzas National Estuarine Research Reserve (GTM-NERR) is one of three national research reserves in Florida managed by CAMA (Apalachicola National Estuarine Research Reserve and Rookery Bay National Estuarine Research Reserve are the others). The GTM-NERR is dedicated to the conservation of natural biodiversity and cultural resources through research and monitoring to guide science-based stewardship and education strategies. Numerous opportunities for volunteer participation exist in a broad array of activities within the GTM-NERR. Stewardship activities are abundant, including; invasive plant control, reserve restoration, trail maintenance, ranger assistants, biological surveys, and archeological assistants. Opportunities to participate in research activities are also available, for example, water quality monitoring, fisheries inventory collections and identification, and sea turtle monitoring to count and record nesting activity along the coastline. Numerous education activities are performed by volunteers as assistants, instructors, and docents to the public visiting the Environmental Education Center at the GTM-NERR. The Education Center is a 21,000 ft² facility that includes interpretive exhibits, aquaria, classrooms, laboratories, an auditorium, and an outdoor amphitheater. Education volunteers develop exhibit and educational program information, provide topical exhibit presentations, lead field trips and guide tours, represent the reserve at public events, and assist operations with administrative support.

Education and outreach at the GTM-NERR emphasize the appreciation of natural resources through activities including lectures, craft sessions, nature walks, seining, laboratory and exhibit experiences, nature movies about the local environment, and presentations on the ocean, estuary, beach, dunes, and marsh, and the creatures that live in these habitats. Training programs for sustainable living for the public, K-12 students, teachers, and professionals are staffed and supported by numerous volunteers. A total of 1,644 volunteers were active in the GTM-NERR volunteer program between 2005 and June 30, 2010. The combined number of volunteer hours exceeded 50,000 for that time period (see Table 7-9). The number of volunteer hours was nearly 5,000 in 2005 (the Environmental Education Center opened September 24th, 2005), and increased to 10,659 in 2006, for an average of approximately 888 volunteer hours per month. Since 2006, average monthly volunteer hours have ranged from 871 to 735. Average monthly volunteer hours for the first half of 2010 exceeded 900 per month. This can be seen as the equivalent of 4 or 5 full time, year-round volunteer staff assistants from 2005 to 2010 involved in the programming at GTM-NERR.

Table 7-9

The number of volunteers and total volunteer hours annually, and the annual average number of volunteer hours/month at the Guana Tolomato Matanzas National Estuarine Research Reserve from 2005 to June 30, 2010.*

Year	Number of Volunteers	Number of Volunteer Hours	Annual Average Number of Volunteer Hours/Month
2005	192	4,945	412
'06	295	10,659	888
'07	209	10,454	871
'08	265	9,693	808
'09	316	8,819	735
'10*	367	5,444	907
Total	1,644	50,014	770

Figure 7-19a shows the annual trend in total number of volunteers from 2005 to June 30, 2010. The annual number of volunteers dropped to 209 in 2007 from the preceding year total of 295, but has increased steadily each year since, reaching 367 at mid-year 2010. At the same time, annual number of volunteer hours has decreased from 10,659 to 8,819 (Figure 7-19b). These trends suggest that more people are involved as volunteers for shorter periods of time. Projecting from the mid-year number, 2010 volunteer hours may exceed all previous years.

Figure 7-19a

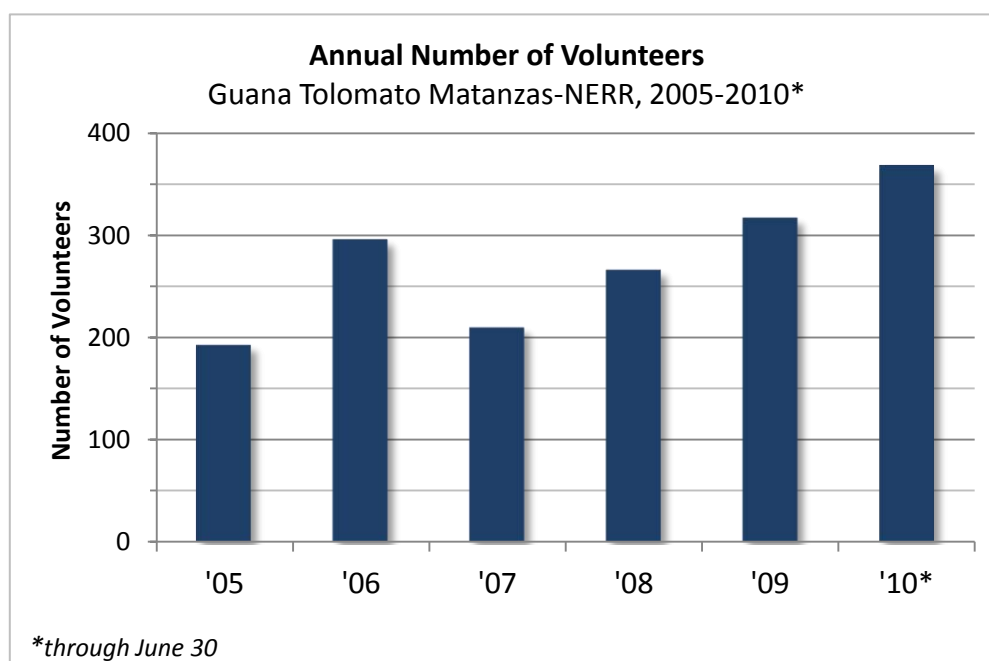
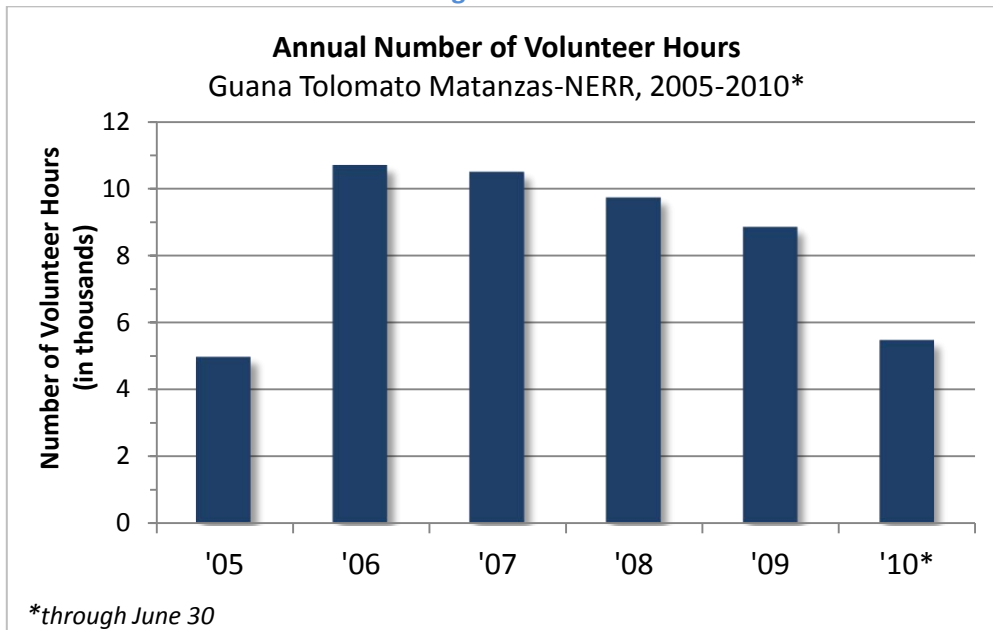


Figure 7-19b



4. Sea Turtle Conservancy (formerly the Caribbean Conservation Corporation), Melbourne Beach

Several opportunities exist for people to support and participate in the conservation and research programs managed by the Sea Turtle Conservancy (STC). Volunteer programs at the field research sites in Tortuguero, Costa Rica and Melbourne Beach, Florida are active in public education and seasonal nest monitoring. The Eco-volunteer program includes hands-on participation in sea turtle research projects for one to three week periods at Tortuguero, Costa Rica. Eco-volunteers also contribute substantial amounts financially to the operations and research at the John H. Phipps Biological Field Station. In 2008, 147 eco-volunteers participated in sea turtle and nesting data collection between March and October.

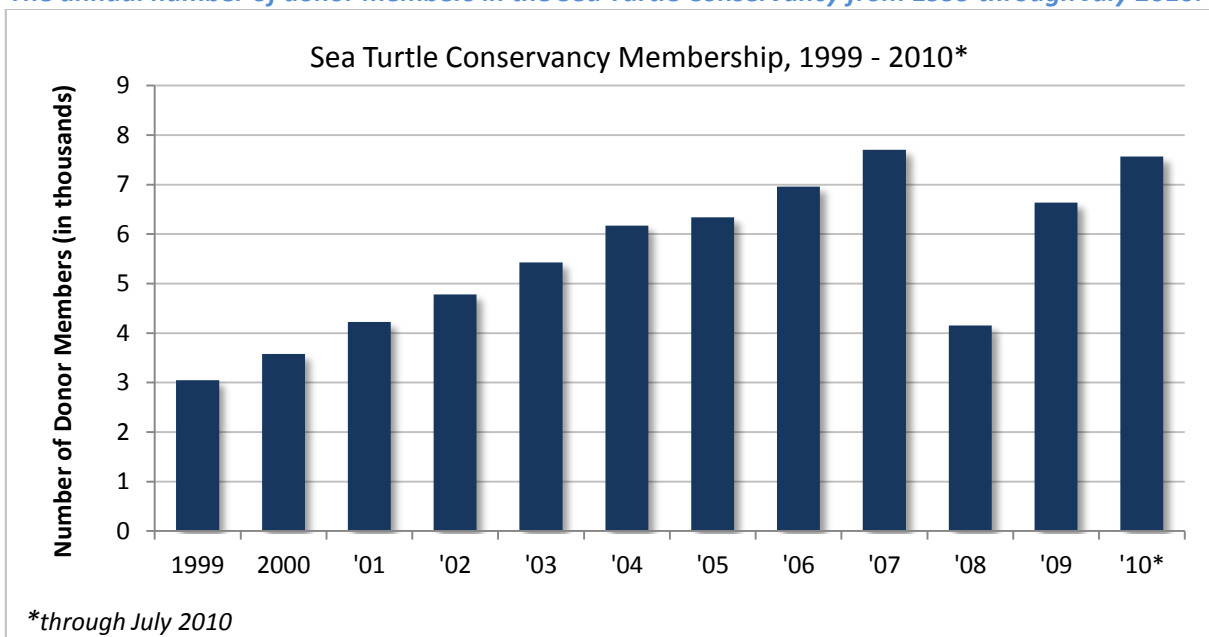
The Brevard County Barrier Island Sanctuary Management and Education Center at Melbourne Beach, in the Archie Carr Refuge along the central east coast of Florida, opened in May 2008. The Center consists of a 5,600 ft² building with an exhibit hall, 30-person classroom, 30-person auditorium, offices, and direct access to the beach. The Archie Carr Refuge is one of the most important sea turtle nesting areas in the world. The Sea Turtle Conservancy maintains a working presence at the Barrier Island Center, and manages the volunteer and education programs. In 2008, the Barrier Island Center saw over 12,000 visitors and had 720 “turtle walk” participants. Volunteer hours at the Center totaled 1,600.

Each year the STC receives money from the sales of the specialty license plate “Save our Sea Turtles.” Conservation efforts and research are funded from this revenue through the Sea Turtle Grants Program, which in 2008 was \$352,632 supporting ten education grants, eight research grants, and seven conservation grants. Another significant source of support comes from annual memberships and donations. STC membership size can be used as an indicator of the interest,

support, and participation of people in the conservation of this endangered species. Total annual membership is reported for the period of 1999 to 2010* (Figure 7-20). During the time period 1999 to 2007, total annual membership-related income increased by \$54,000 from \$167,994 to \$221,917. The total number of members each year more than doubled during that time, including new members and renewals. Membership in 1999 was 3,049, and increased steadily for eight years until 2007, when membership was reported at 7,700, a 120% rise. Membership decreased sharply in 2008 to 4,155 but increased in 2009 and again in 2010 to 7,565 (at the end of July 2010). The drop in membership in 2008 may have been due to the economic recession occurring in the United States.

Figure 7-20

*The annual number of donor members in the Sea Turtle Conservancy from 1999 through July 2010.**



5. The Conservancy of Southwest Florida, Naples

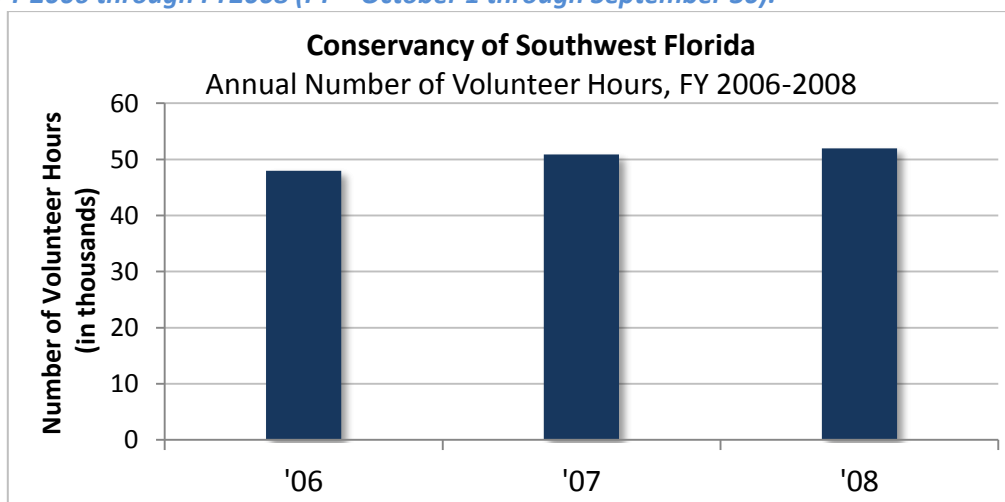
The Conservancy of Southwest Florida (CSF) is engaged in conservation efforts in several priority areas in Collier County and Lee County including: Everglades restoration, wildlife rehabilitation and protection, protecting water resources, and initiatives to support sustainable comprehensive growth plans. The CSF has been an important partner in the reclamation of Picayune Strand State Forest to re-establish 55,000 acres of wetland. Picayune Strand is the site of the failed real estate project known as Southern Golden Gate Estates, developed by The Gulf American Corporation, which constructed 290 miles of road and 48 miles of canals with no infrastructure in the western Everglades in the 1960s. CSF has also been actively involved in trying to preserve habitat for the Florida panther. Other activities in which CSF is involved include monitoring sea turtle nesting, recovering injured wildlife, water quality monitoring and research of estuarine health, advocating for storm-water runoff regulation, negotiating with stakeholders and county officials for the protection of environmentally sensitive lands, and the implementation of sustainable growth strategies in southwest Florida.

Volunteers for the CSF have opportunities to work at the Nature Discovery Center in Naples, Florida; lead guided nature tours to the western Everglades, the Ten Thousand Islands, and Rookery Bay; assist with recovery, care, and public education of injured wildlife (as many as 2,400 per year, including; bobcats, deer, pelicans, herons, gopher tortoises, and many other native species) at the Wildlife Rehabilitation Center; and assist the environmental policy department in monitoring and responding to public hearings and legislative issues.

Data concerning the number of volunteer hours were available for several recent years (Figure 7-21), and show increasing hours between FY 2006 and FY 2008. The number of volunteer hours increased from 48,000 to nearly 52,000 during the three years reported. This is equivalent to 23 to 25 year-round, full time workers.

Figure 7-21

The number of volunteer members in the Conservancy of Southwest Florida from FY 2006 through FY2008 (FY = October 1 through September 30).



6. Florida Oceanographic Society, Stuart

The Florida Oceanographic Society is a non-profit organization founded in 1964. The organization's Florida Oceanographic Coastal Center is a marine environmental education and research center which opened to the public in 1994 and is located on 57 acres between the Atlantic Ocean and the Indian River Lagoon on Hutchinson Island, Stuart, Florida. The site contains coastal hardwood hammock and mangrove swamp communities. The center consists of nature trails, an activity pavilion for children, touch tanks for sea stars and sea rays, and a visitor center. The Florida Oceanographic Society depends on volunteers to achieve its mission of researching and educating on the health of the coastal environment and its fragile ecosystems.

Coastal center research focuses on St. Lucie estuary water quality and sea grass health, oyster reef restoration in the Indian River Lagoon, aquaculture research including oyster larvae culturing, plankton studies, queen conch research, ocean artificial reef monitoring, beach profiling, and local native plant restoration. The volunteers have the opportunity to work in the research, aquarium, or education departments, or with the summer camp or exhibit programs. Data provided by the Florida Oceanographic Society on their volunteer program consists of the number of volunteer hours and number of volunteers for the period 2000 through 2010* (Table 7-10).

Table 7-10

The number of volunteers and total volunteer hours annually, average volunteer hours per volunteer per month, calculated average volunteer hours per month, difference in annual volunteer hours from one year to the next, and equivalent number of workers on full time hours for the year at the Florida Oceanographic Society from 2000 to August 10, 2010.*

Year	Number of Volunteers	Annual Volunteer Hours	Hours per Volunteer per Year	Volunteer Hours per Month	Annual Difference in Volunteer Hours	Equivalent Number of Year-Round Full Time Workers
'00	155	11,452	74	954	-	5.5
'01	273	16,172	59	1,348	4,720	7.8
'02	274	18,645	68	1,554	2,473	9.0
'03	284	19,687	69	1,641	1,042	9.5
'04	225	18,476	82	1,540	-1,211	8.9
'05	206	16,479	80	1,373	-1,997	7.9
'06	294	20,967	71	1,747	4,488	10.1
'07	338	22,893	68	1,908	1,926	11.0
'08	410	19,556	48	1,630	-3,337	9.4
'09	276	17,502	63	1,459	-2,054	8.4
'10	206	15,040*	73	1,253*	-2,462	7.2
Total or Average	2,941	196,869	67	1,491		8.6

* Estimated year end value on the 206 volunteers and 10,403 hours reported on August 10, 2010.

The overall trend in volunteer hours for this period was bimodal with peak high numbers in 2003 and 2007, and an intermediate low in 2005 (Figure 7-22a). Total annual volunteer hours have decreased steadily for the three years since the peak of 22,893 in 2007. Total annual volunteer hours were normalized by division into average calculated volunteer hours per month in order to include partial 2010 data. The decline in volunteer hours from 2007 to 2010 averaged an estimated 218 hours per month amounting to a decrease of 7,853 combined volunteer hours for the last three years. The number of volunteers fluctuated between a low of 155 in 2000 and a high of 410 in 2008 (Figure 7-22b). A strong correlation coefficient ($r = 0.77$) indicates a positive association between number of volunteers and the number of volunteer hours (Figure 7-23). The slope of the best-fit, zero intersection linear regression equation, $y=65x$, estimates of the average annual number of hours per volunteer based on all data from the decade.

Figure 7-22a

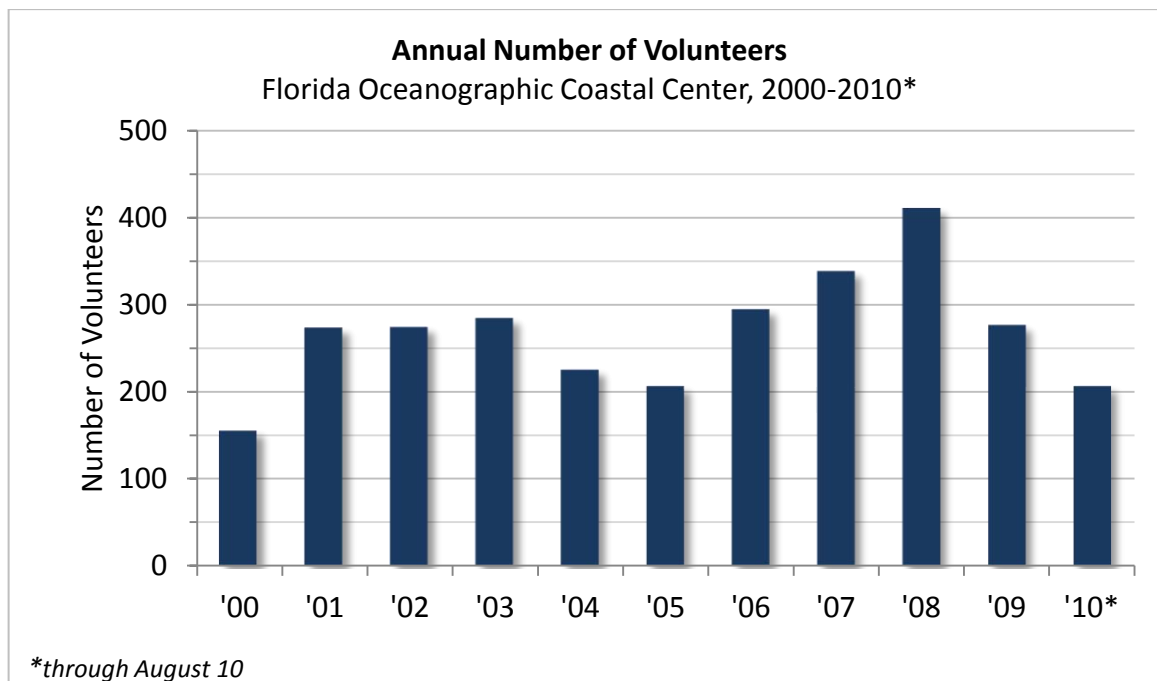


Figure 7-22b

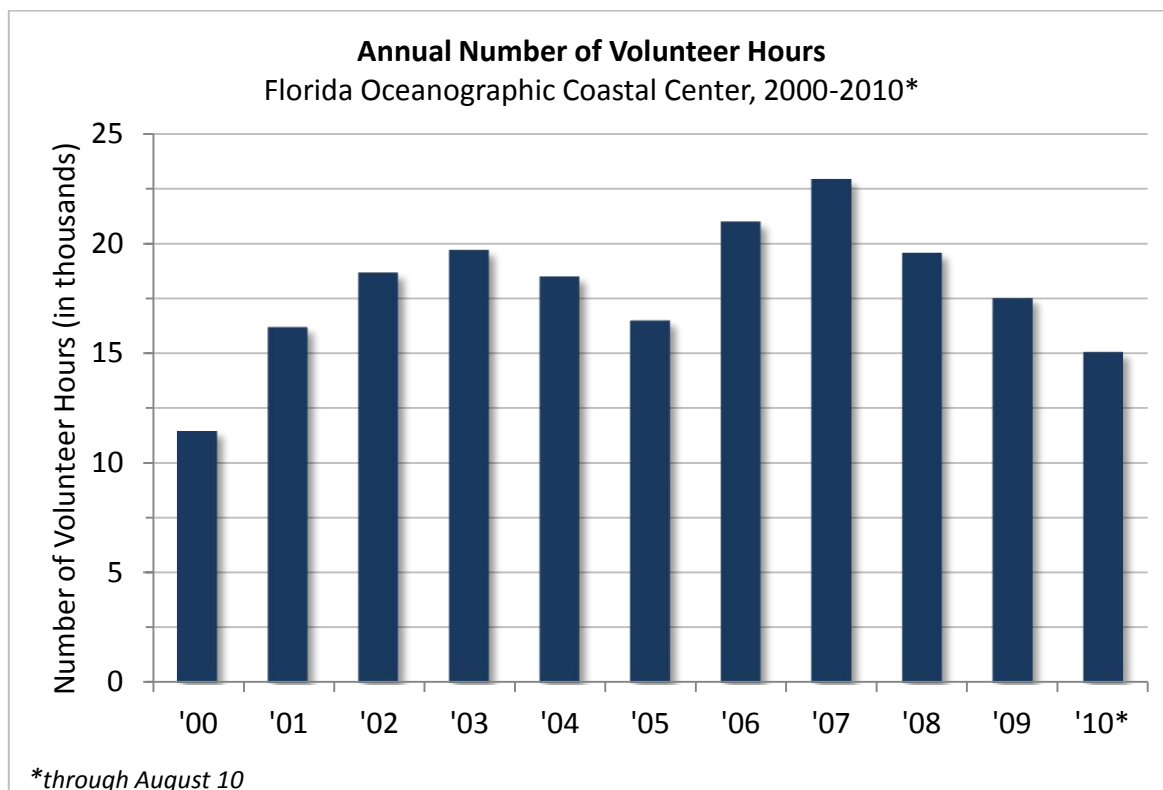
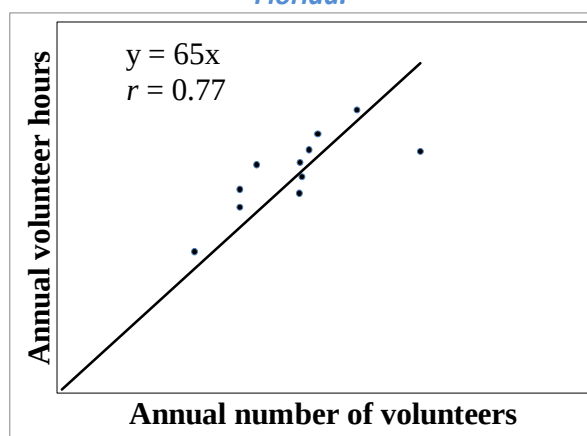


Figure 7-23

Correlation of the annual number of volunteer hours with the annual number of volunteers for ten years data at the Florida Oceanographic Society, Hutchinson Island, Florida.



A total of 196,869 hours were contributed by 2,941 volunteers for an average monthly 1,491 hours of work at the Florida Oceanographic Coastal Center on Hutchinson Island, Stuart, Florida during the period 2000 to 2010. The volunteer effort produced a significant impact on local

ecosystem research and education of the public concerning environmental issues of water quality, biological health, aquaculture, and habitat restoration. Converting the hours of volunteer assistance to full time work equivalence revealed the effort amounted to having, on average, 8 or 9 additional year-round employees each year over the past decade. The trend over the most recent three years, 2007-2010, indicated decreased volunteer participation by more than 35% coinciding with the national economic recession in the United States.

7. Florida Fish and Wildlife Conservation Commission, Statewide

The Florida Fish & Wildlife Conservation Commission (FWC) is headquartered in Tallahassee, Florida, with offices and field sites throughout the state. The agency has volunteer program opportunities in over two dozen activities supporting their mission to manage fish and wildlife resources for the long-term well-being and benefit of the people of Florida. Table 7-11 lists some of the programs available to interested citizens for volunteer participation. The FWC has the active participation of volunteers involved in research, monitoring, education, resource management, and administrative functions.

Table 7-11
Volunteer program activities and their locations in the FWC

Fish & Wildlife Sponsored Volunteer Programs	Location
Bear Management Volunteer Program	NW Region
Beau Turner Youth Conservation Center Volunteer Program	Tallahassee
Chinsegut Nature Center	Hernando Co.
Derelict Trap and Trap Debris Removal Program	Statewide
Florida Bass Conservation Center	Sumter Co.
Freshwater Fisheries	Statewide
Hunter Safety	Statewide
Kids' Fishing Clinics	Statewide
Marine Fisheries Stock Enhancement Research	Port Manatee
North American Amphibian Monitoring Program	Statewide
Project WILD - K-12 Education Programs	Statewide
Red Tide Offshore Monitoring Volunteer Program	Gulf Coast
Reserve Officer	Statewide
Ridge Rangers	Highlands & Polk Co.
Sport Fishing Education	Statewide
Youth Hunting Program of Florida	Statewide

A recent study performed by Stuart Carlton, a doctoral student at the University of Florida, indicated that the value of the volunteer services for FWC amounted to \$1.9 million annually (Jacobson, 2009). A survey conducted as part of the study revealed that the motivations for volunteers included; helping with the environment, supporting resources they use recreationally, and learning opportunities. The volunteers indicated a preference for work related to improving habitats, surveying wildlife populations, and public outreach activities. Thirty five percent of those surveyed were volunteers for more than five years, and an

important factor of long-term retention was that the volunteer felt that their hard work was appreciated.

A total number of more than 52,000 volunteer hours in FWC programs were performed by 2,612 volunteers during fiscal years 2006 through 2009 (Figure 7-24). Half of those hours were directly involved in research and monitoring activities. Education accounted for 14% of volunteer time and resource management represented 8% of volunteer time. Nearly 90% of all volunteer effort within FWC was directed toward the Fish and Wildlife Research Institute (FWRI). Slightly less than 9% of volunteer hours were within the Division of Marine Fisheries, with minor representation in other programs. The accumulated volunteer work hours for the four years reported, represents the time equivalent of 25 full time employees, or 6 additional full time staff members per year.

Figure 7-24a

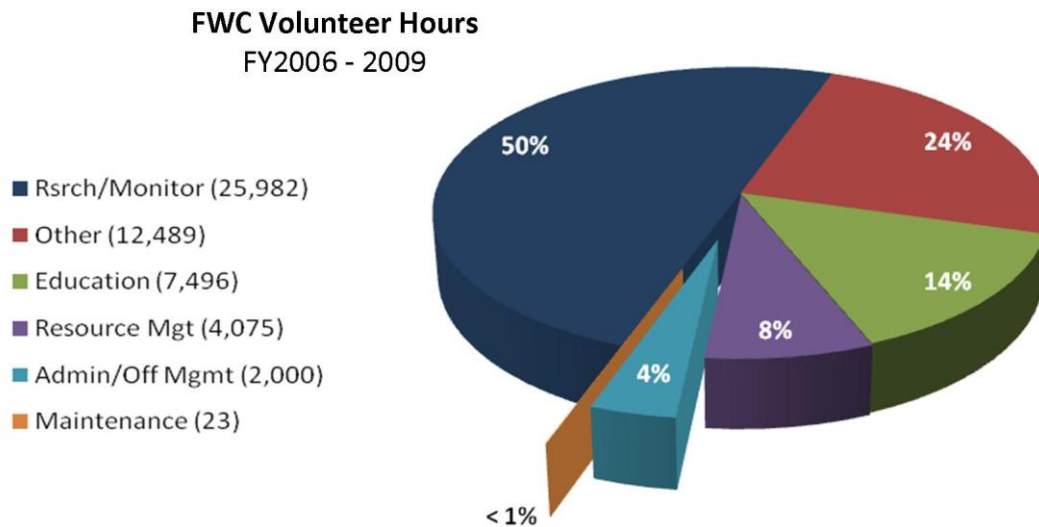
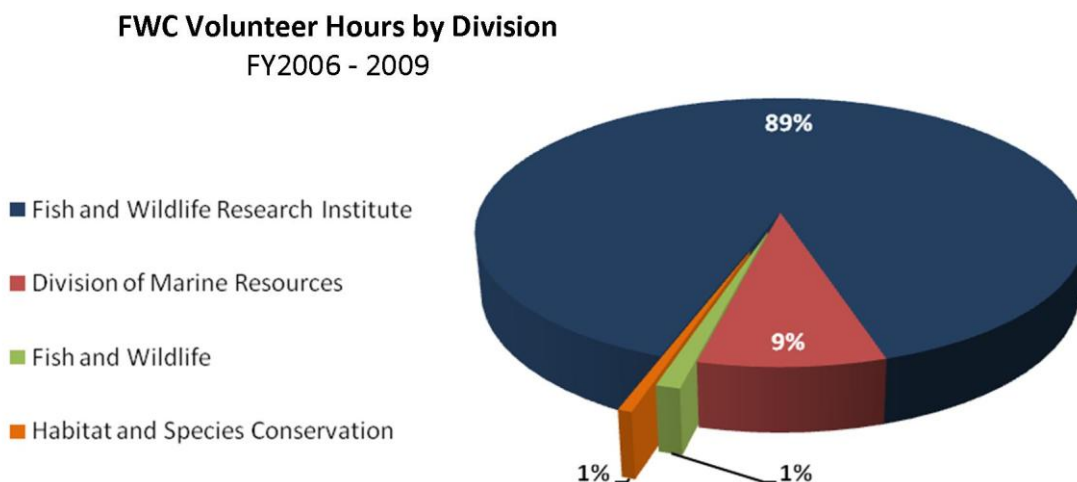


Figure 7-24b



8. Florida State Parks

The Florida State Park system has numerous opportunities available to volunteers, and represents an unmatched concentration of citizen environmental participation. The combined volunteer effort for all 160 Florida State Parks over the last decade exceeded ten million hours. While not all are coastal parks, approximately 75% are located in the coastal counties. The volunteer opportunities are diverse and include individual, group, youth, and host positions, as well as, Americorps members. Volunteers may greet visitors, conduct educational tours, help maintain beaches, waterways, or trails, and help remove exotic plants. Americorps volunteers provide service in habitat restoration, prescribed burning, trail maintenance, cultural and historical restoration, and environmental education.

Florida parks are distributed throughout the state, and managed regionally in five districts, shown in Figure 7-25. The annual number of hours of volunteer participation for all Florida State Parks rose steadily from about 800,000 hours per year in FY 2001 to nearly 1.29 million hours per year in FY 2010 for a cumulative 10,330,330 service hours over the last ten years (Figure 7-26). This represents a 60% increase in annual volunteer hours between FY 2001 and FY 2010.

Figure 7-25

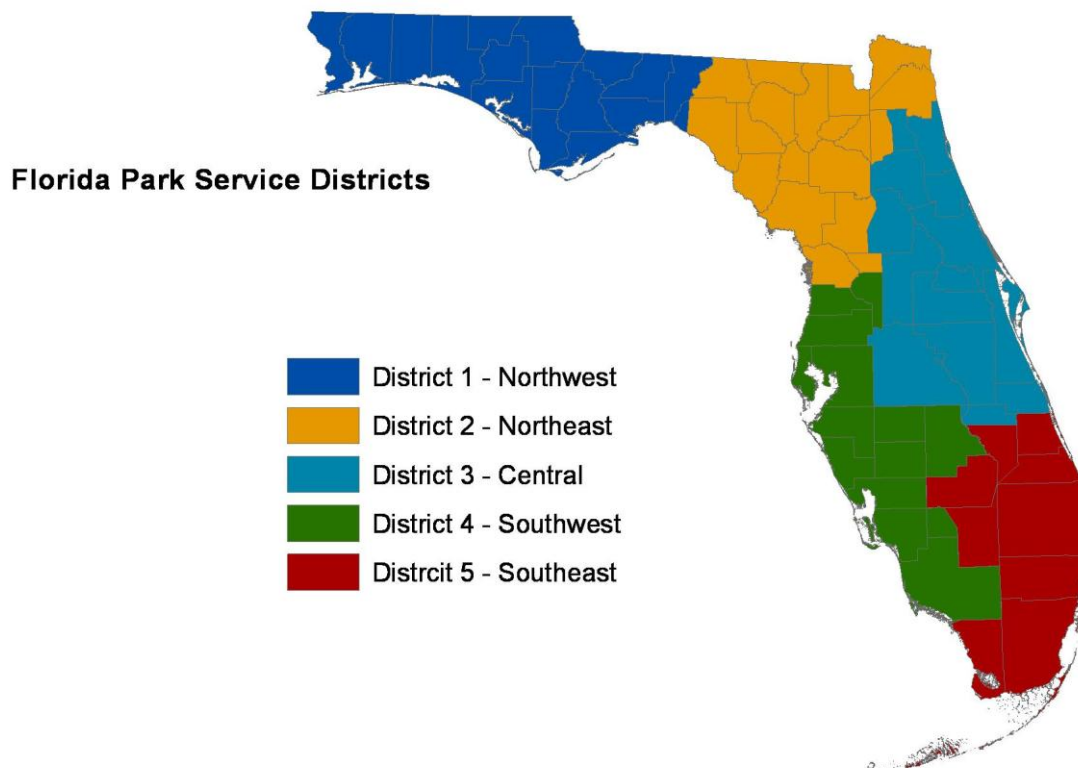


Figure 7-26

Volunteer hours for all parks in the Florida Park Service for the fiscal years 2001 to 2010

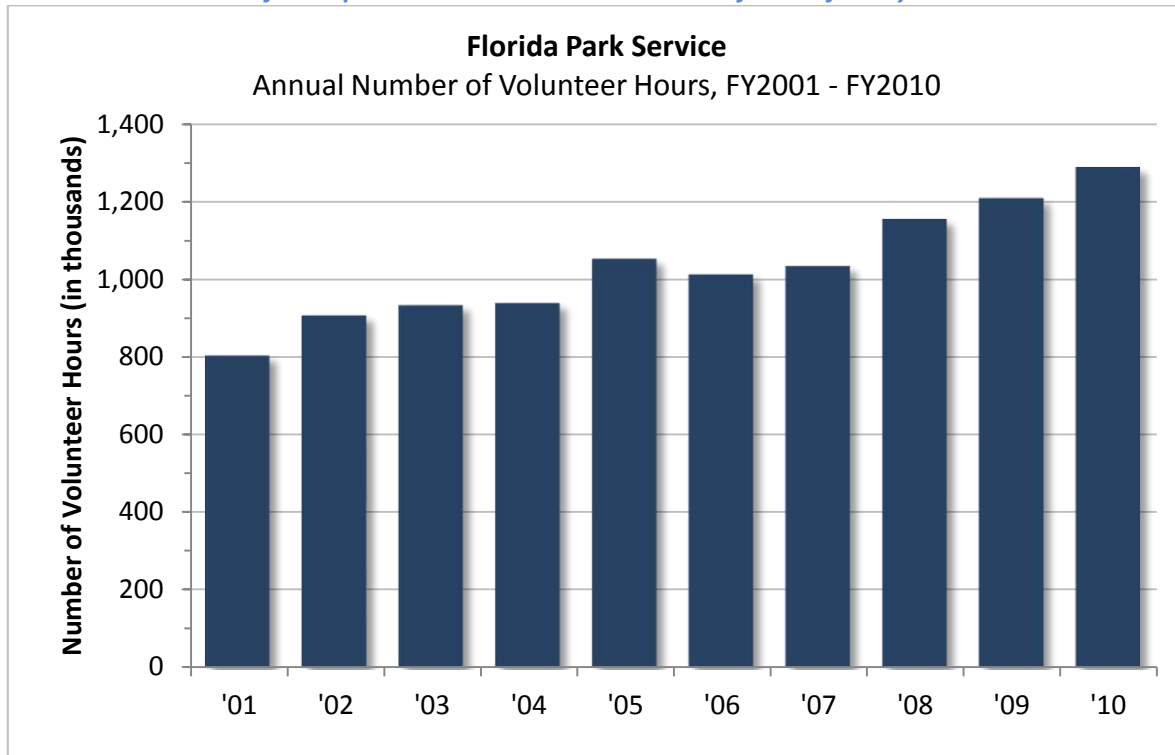
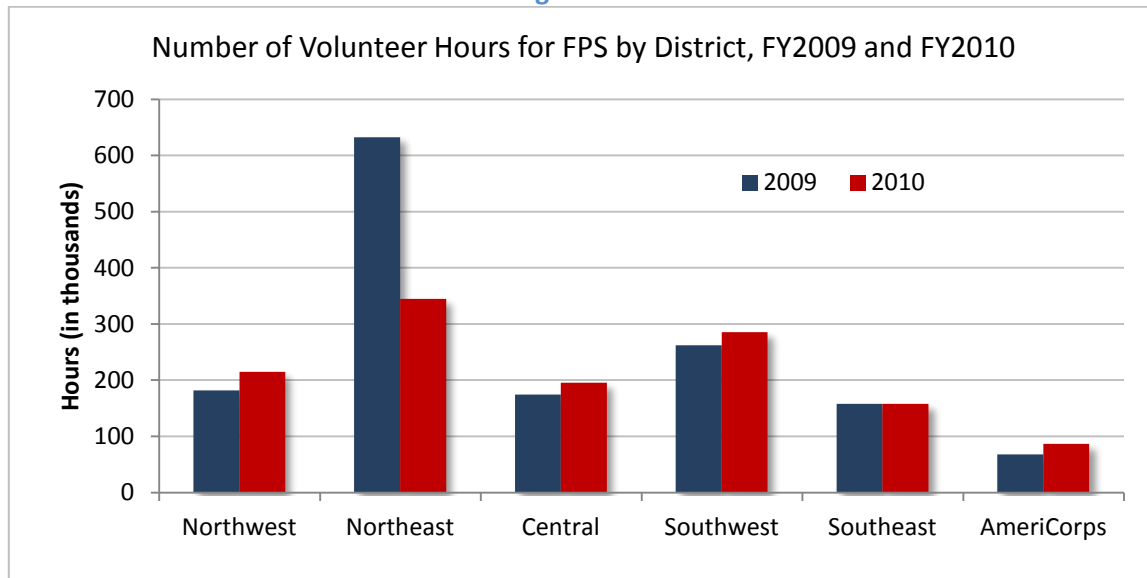


Figure 7-27

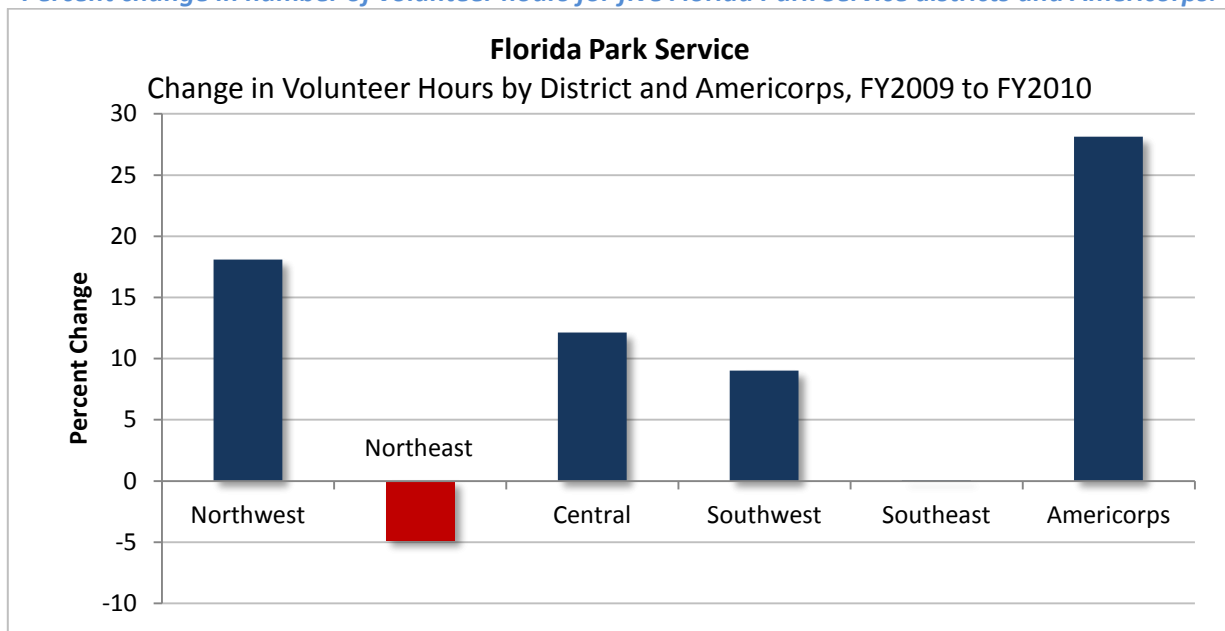


Data for the five districts from FY 2009 and FY 2010 reveal that the number of volunteer hours remains relatively stable regionally, with similar proportions of volunteer effort in the districts year to year (Figure 7-27). Shifts in the total volunteer hours in each district were positive in three districts (NW, Central, and Southwest), negative in the Northeast, and showed no change

in the Southeast. The differential in any given region was less than 0.5%, and the increase in AmeriCorps participation was about $\frac{1}{4}$ of 1% between FY 2009 and FY 2010 (Figure 7-28). The total annual number of volunteer hours increased from 2009 to 2010 by 79,105 hours (0.65%). The number of volunteer service hours performed in the Florida State Parks is remarkable, and represents on average, over the past decade, the equivalent hours of three additional full time staff at each of the 160 parks annually. In other words, the equivalent of nearly 500 full time volunteers every year. The trend of steadily increasing volunteer hours each year from 2001 to 2010 means current participation is much higher than the decadal average, and actually exceeded an equivalent staff of 619 full time volunteer staff in FY 2010.

Figure 7-28

Percent change in number of volunteer hours for five Florida Park Service districts and AmeriCorps.



Indicator 7.6 - Number of Marinas, Businesses, and Boaters Participating in Florida Clean Waterways Programs

The Florida Clean Marina program is a management approach to engage businesses in actions that promote environmental stewardship. It is a voluntary program in which participants receive education and technical assistance implementing Best Management Practices (BMPs) to protect Florida's waterways. Businesses that implement a set of environmental measures can become designated as a clean facility (Clean Marina, Clean Boatyard, and Clean Marine Retailer). The environmental measures address issues such as sensitive habitats, waste management, storm-water control, spill prevention, and emergency preparedness.



Clean Marina Program

Several steps must be taken for a business to be designated as a Clean Marina. The business must submit an application to the Florida Department of Environmental Protection. The business then performs a self assessment of the facility using the Clean Marina Action Plan checklist. The action plan is an extensive checklist of criteria that rate a facility producing a score of required and optional practices that are categorized on two levels. A minimal number of points must be attained in the various practices and certain environmental management, quality, and services must be met to become designated.

Once the Clean Marina criteria have been met, a facility inspection verifies the action plan. A facility that becomes designated in the Clean Marina program is authorized to use the Clean Marina logo for advertisement purposes. The facility is also included in Florida Clean Marina outreach publications and web site, and is recognized in a press release as a facility that has demonstrated commitment to environmental stewardship. The business representative signs a pledge that the facility will strive to implement the Florida Clean Marina Program BMPs as standard practices for facility operations.

Table 7-12 provides regional data for designated Florida Clean Marinas, as of September 3, 2010. Regional data are grouped according to Florida Department of Environmental Protection administrative districts (Figure 7-29). The database is updated on a continuous basis as new designations are added and others renewed or dropped based upon action plan criteria. As of September 2010, a total of 215 marinas were designated as Clean Marinas, which represents 18% of the 1176 marinas listed in the Florida coastal counties. Twenty-one marinas were newly pledged to the Clean Marina Program between July 1, 2009 and June 30, 2010. Twenty-five marinas completed the process and were newly designated during the same time period.

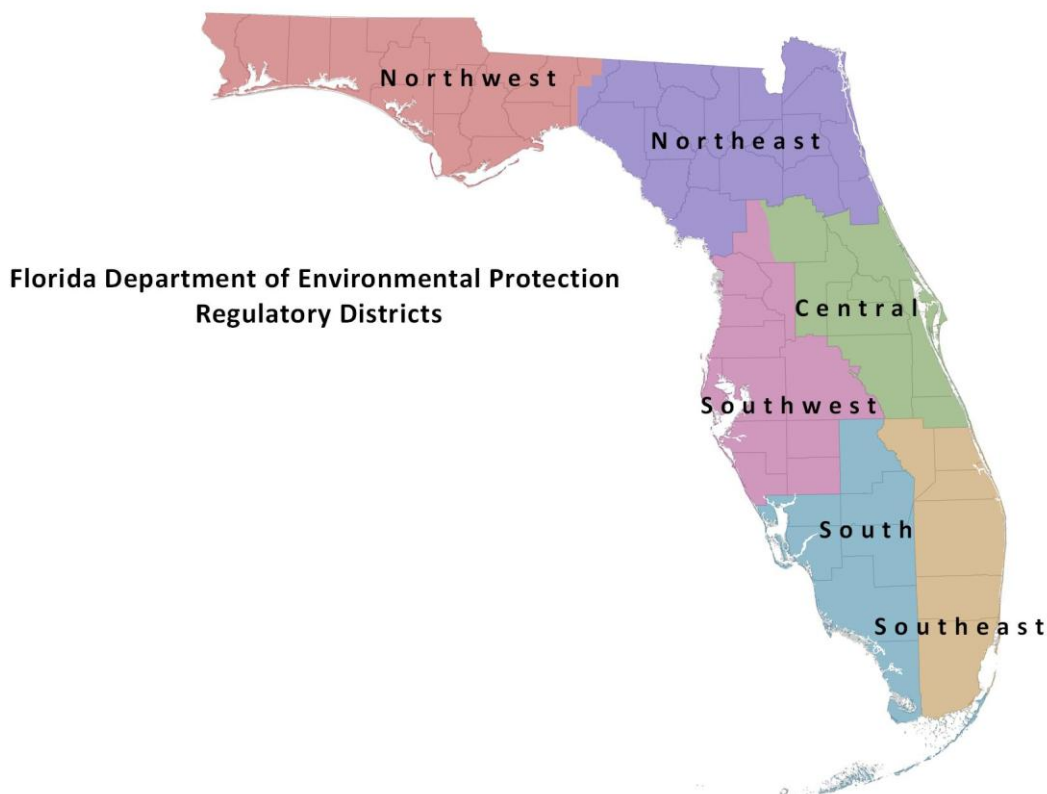
Several additional marine stewardship programs address operations and practices in boatyards, marine retail stores, and individual boaters.

Table 7-12

Number of designated Clean Marinas, Clean Boatyards, Clean Retailers, and Pump-out facilities by district. Data were retrieved from the online database on September 03, 2010.

Regional District	Clean Marinas	Clean Boatyard	Clean Retailers	Pump-out Facilities
Northwest	22	1	1	9
Northeast	20	6	0	13
Central	37	8	4	19
Southwest	36	2	0	17
Southeast	57	10	0	24
South	43	3	3	15
Total	215	30	8	97

Figure 7-29



The Florida Clean Boatyard Program was developed along precepts similar to the Clean Marina Program, and encourages boatyards to implement environmentally conscious practices. Some examples of BMPs include: using dustless sanders, oil and solvent recycling, and re-circulating pressure wash systems. The Florida Clean Marine Retailer Program is a voluntary designation program that encourages marine retailers to educate boaters on clean boating practices. A

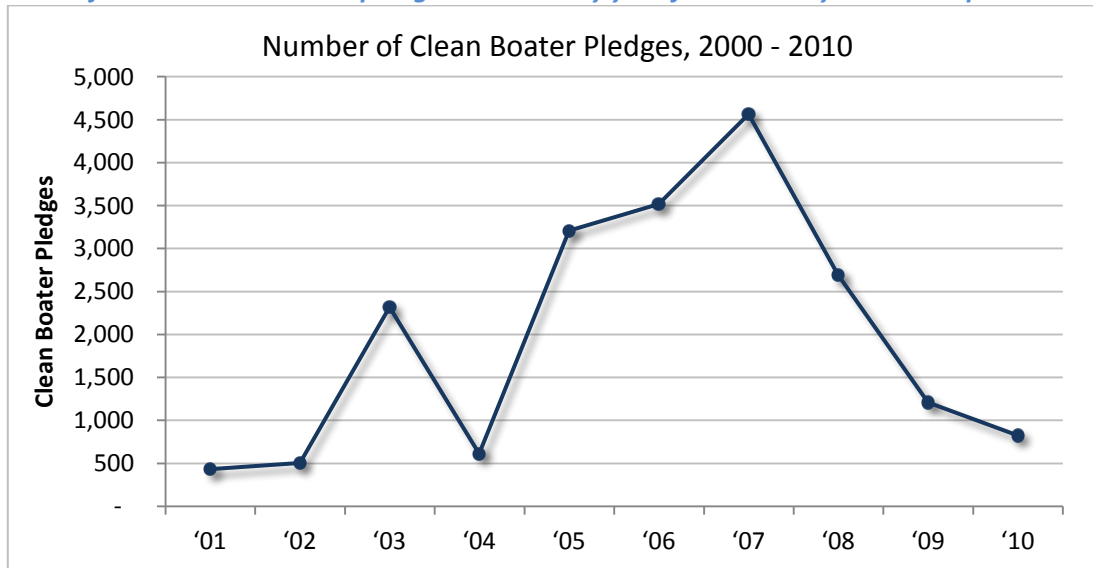
clean retailer employs environmental BMPs in its boat and engine service operations and facilities. The clean boatyards and clean retailer programs show much less participation by businesses, and the NW and SW regions of Florida have little to no participation in the programs. An initiative for installation and operation of marine pump-out facilities also exists.

The Office of Sustainable Initiatives of the Florida Department of Environmental Protection manages the pump-out station initiative, which supports the construction of sewage pump-out facilities to reduce pollution from vessel discharges. The program is in response to the Clean Vessel Act of 1992, which prohibits the discharge of raw sewage into fresh water or within coastal salt-water limits. Since inception of the Clean Vessel Act, \$150 million has been granted to states to install thousands of pump-out stations. Ninety-seven pump-out facilities are operational in Florida for boaters to use for a fee.

Florida boaters also have the opportunity to participate directly in keeping coastal waters pollution-free through the Clean Boater Program, which was started in 2001. The program seeks to educate boaters concerning proper trash management, use of bilge socks and fueling collars, and recycling habits. Boaters take a pledge to follow best practices and educate others on the importance of protecting the environment. Figure 7-30 shows the numbers of clean boater pledge cards collected by the Clean Boater Program between 2001 and September 2010.

Figure 7-30

Number of Florida Clean Boater pledges collected by year from January 2001 to September 2010.



C. Contribution

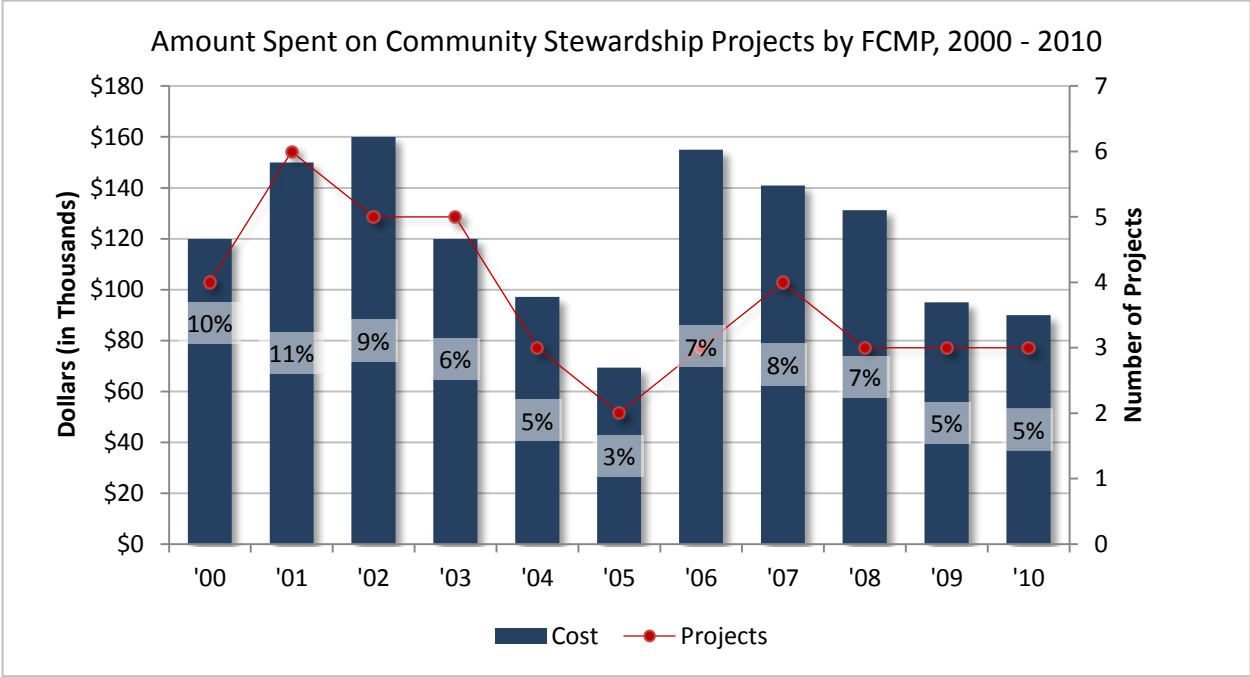
Indicator 7.7 - FCMP Grants for Environmental Awareness and Community Stewardship

The FCMP administers the Coastal Partnership Initiative grant program and the State Agency and Water Management District grant program (<http://www.dep.state.fl.us/cmp/grants/index.htm>); competitive grant programs to support the protection, management and enhancement of Florida's ocean and coastal resources. The annual allocation of funds for environmental stewardship projects statewide was variable over time during the period FY 2000 through FY 2010, for a total of \$1.3 million (Table 7-13). The annual allocation has ranged between \$69,440 to \$160,000. Between 2000 and 2010 forty-one environmental stewardship projects have been funded for an average of 3.7 per year. Figure 7-31 illustrates the number of projects funded by year plus the amount of funding and percent of the total funding that was granted to Environmental Stewardship projects each year.

Table 7-13

Fiscal Year	Year	Funding	Total Funding	Percent of Funding	Projects	Total All Projects	Percent of All Projects
FY 00-01	'00	120,000	\$1,239,593	10	4	27	15
FY 01-02	'01	150,000	\$1,320,000	11	6	30	20
FY 02-03	'02	160,000	\$1,687,782	9	5	27	19
FY 03-04	'03	120,000	\$1,990,240	6	5	26	19
FY 04-05	'04	97,154	\$2,125,623	5	3	28	11
FY 05-06	'05	69,440	\$2,037,309	3	2	30	7
FY 06-07	'06	155,000	\$2,126,881	7	3	32	9
FY 07-08	'07	140,999	\$1,730,751	8	4	22	18
FY 08-09	'08	131,285	\$1,955,629	7	3	27	11
FY 09-10	'09	95,000	\$1,900,218	5	3	29	10
FY 10-11	'10	90,000	\$1,727,081	5	3	24	13
Total		1,328,878	\$19,841,107		41	302	

Figure 7-31



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Waterfront Revitalization



Executive Summary

Sunshine and sandy beaches top the list of Florida’s most popular assets, followed by globally recognized natural resources including 1,200 miles of coast lined with wetlands, marshes, inlets, and rivers. The waterfronts – those edge places and spaces used historically by people for commerce, leisure, and community – are critical to Florida’s identity, culture, and economy.

Florida’s waterfront areas face a variety of challenges including vulnerability to hazards, environmental degradation, and increasing demand for scarce public access opportunities. Florida’s citizens and state leaders have put tremendous energy into protecting and revitalizing the state’s unique coastal resources. Legislation and state-level program changes have been adopted to spur waterfront protection and revitalization.

Table 8-1
Waterfronts Revitalization Indicators

8.1	Legislative and State-Level Program Changes
8.2	Citizen Support in Waterfront Revitalization Efforts
8.3	Public and Private Sector Support
8.4	Achievement of Community Goals
8.5	FCMP Grants and Programs for Waterfront Revitalization

This chapter outlines the importance of working waterfronts and their changing conditions through the state of Florida’s ocean and coastal economy and changes in waterfront land uses between 2000-2010 as context for the evolving waterfront revitalization in Florida. This focus area consists of two sections. The first section describes Florida’s ocean and coastal economy and changes in waterfront land uses over the last decade in order to demonstrate the importance and context for waterfront revitalization. This section includes one indicator that outlines legislation and state-level changes to support waterfront revitalization including taxation policy, growth management policy and land acquisition. The second section provides an overview of how the Department of Economic Opportunity’s (DEO) Waterfronts Florida Program (WFP) works to revitalize working waterfronts through community-driven planning efforts. The section includes four indicators and addresses participation and support for the WFP and contribution from the Florida Coastal Management Program.

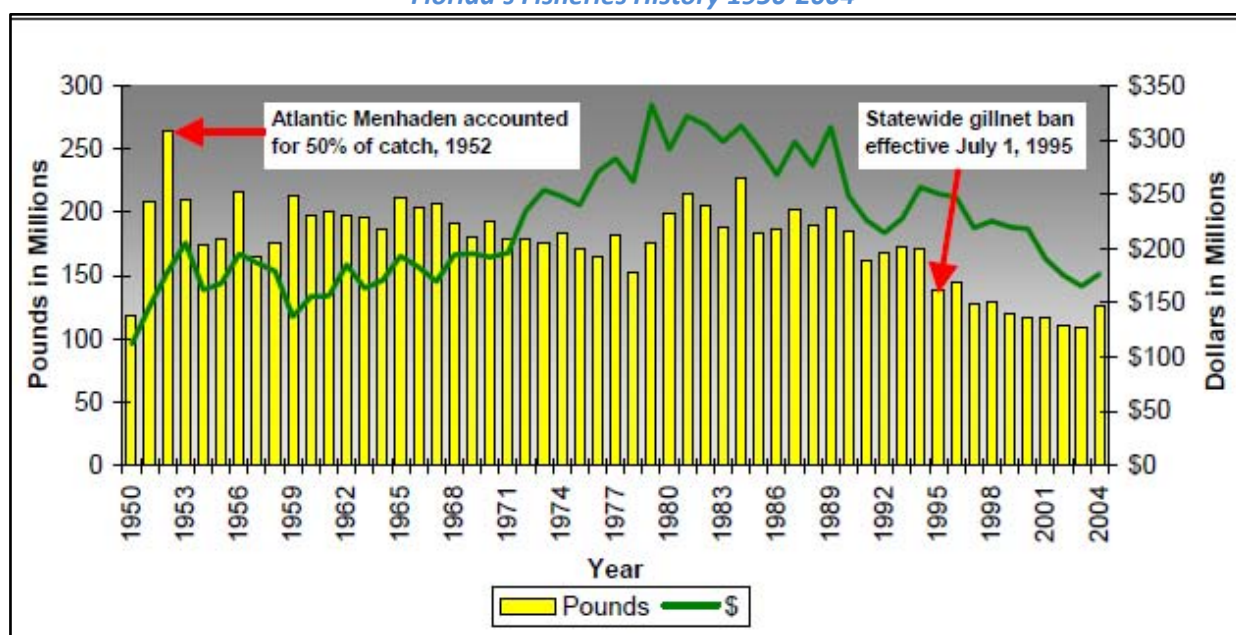
A. Importance of Working Waterfronts and Their Changing Conditions

For thousands of years, Floridians have lived and worked on the coast. Along the border between land and sea there are abundant natural resources for food, shelter, and transportation; and many opportunities for trade, communication, and recreation (Florida Department of State, 2012). Over time, a complex cultural and economic web of human coastal activities developed with various customs and traditions, and today, Florida’s coastal communities exist at the crossroads of the global marketplace.

Florida's Ocean and Coastal Economy

Florida's ocean and coastal resources have major economic significance. Florida's coastal economy is the sum of all economic activity occurring in counties as part of their coastal zone management program or part of a coastal watershed as defined by the U.S. Geological Survey (Kildow, 2006). The state's ocean economy is comprised of economic activities which rely on the ocean and its resources as direct or indirect inputs to goods and/or services. In 2003, Florida's total Ocean Economy (including multipliers) was an estimated \$23.2 billion. Florida, which comprises only 4.6% of the nation's coastal land area, contributed 9.7% of the national Coastal Economy Gross State Product in 2003. During this same year, shoreline counties contributed more than 70% of all employment, population and housing in the state with only 56% of the land area. Furthermore, Florida's Coastal Economy (shoreline counties) contributed an estimated \$402 billion, or 77% of the state's total economy. While Florida's ocean and coastal economy is robust, some components experienced decline as described in Figure 8-1.

Figure 8-1
Florida's Fisheries History 1950-2004



Source: Kildow, 2006

Florida ranks number one among the nation's destinations for swimming, fishing, diving, and otherwise enjoying the state's many beaches, coastal wetlands, and shores (Kildow, 2006). Recreational boating has unique significance as an economic engine for the state that has grown markedly in recent decades. The Fish and Wildlife Conservation issued a report in 2009 on recreational boating in Florida describing the economic impact and projected future demand for boating facilities including boat ramps, marinas, dry storage facilities, moorings, commercial establishments, and dockage associated with large-scale residential developments (Harding, 2009). The study estimates that 21.7 million boating trips were made in 2007, with the total expenses for trips, statewide, at approximately \$3.4 billion. The direct effect of this total spending

was estimated at \$697 million in labor income, and approximately 26,000 jobs. The study also used population projections to estimate future boating demand at the county level through the year 2025. The study projected that state-wide demand for recreational boating is likely to remain the same overall, with some counties experiencing a negative percent change in access (Broward negative 18% change in saltwater), while others experience a positive percent change (St. Johns positive 17% change in freshwater)(Harding, 2009).

Trends in Waterfront Land Use

Florida's population is concentrated in the state's 35 coastal counties. According to reports from the Florida Oceans Council, 77% of Florida's population lives in coastal counties, with 46% living on the Atlantic and 31% on the Gulf Coast (Kildow 2006). More specifically, population density in coastal counties measured approximately 444 people per square mile, while inland density was an estimated 170 people per square mile, a reflection of the significant number of large cities located along the coast. Between 2000 and 2010, the population of Florida's coastal counties grew over 15% (U.S. Census 2000, U.S. Census 2010). The increase in population has brought increased demand for waterfront access and competition among diverse user groups of waterfront resources.

According to the Florida Tax and Budget Reform Commission analysis from 2008, recent changes in Florida's economy and land use may be affecting the economic viability of commercial fishing and recreational working waterfronts (Committee on Finance and Tax, 2009). In a number of cases, development interests are buying traditional working waterfronts and converting the property to private and residential use. "Water-related" uses and "water-enhanced" uses, including residential uses activities, are replacing traditional or "water-dependent" land uses, including docks, wharfs, lifts, wet and dry marinas, boat ramps, boat hauling, and repair facilities. This conversion has had the effect of both decreasing the availability of waterfront property necessary to sustain commercial fishing and recreational boating activities, and increasing the value of nearby working waterfront property. The increase in property value may result in higher property taxes for traditional uses which may compound the pressure to convert the property to a higher-valued use (Committee on Finance and Tax, 2009).

Indicator 8.1 - Legislation and State-Level Program Changes

The past ten years have seen a significant amount of legislation, community involvement, and private and public cooperation to support waterfronts revitalization. In the past decade, the Florida Legislature and Florida voters have advanced working waterfront protection and revitalization through 1) tax reform, 2) growth management or land use planning requirements related to working waterfronts, 3) land acquisition and 4) technical assistance programs. Each of these changes are described in greater detail below.

Tax Reform

Florida's recent period of increased real-estate values brought greater public awareness to the disproportionately high property tax burdens carried by traditional working waterfront property as it is taxed according to its highest and best use versus its current use. During this period, a number of traditional working waterfront owners sold or otherwise converted their properties to more profitable uses such as hotels, condominium towers, and other ventures. Working waterfront uses that remained in operation saw their property taxes soar (Committee on Finance and Tax, 2009).

As a response to the financial challenges facing traditional working waterfronts, Florida voters in 2008 overwhelmingly approved an amendment proposed by the Florida Tax and Budget Reform Commission, to provide for the assessment of working waterfront property based on current use rather than the highest-and-best-use standard. A new subsection provides that tax assessments will be based on current use for certain categories of working waterfront property. The categories include land used predominantly for commercial fishing purposes; land that is accessible to the public and used for vessel launches into waters that are navigable; marinas and drystacks that are open to the public; and water-dependent marine manufacturing facilities, commercial fishing facilities, and marine vessel construction and repair facilities and their support activities (Art. VII, § 4(j), Fla. Const.). The policy language to implement these tax reforms is in the process of being developed and has yet to be finalized.

Growth Management

In 2005 and 2006 the Florida Legislature also encouraged local stewardship of waterfront communities by requiring local governments to address working waterfront preservation in the coastal elements of the local comprehensive plan. Section 163.3178(2)(g) Florida Statutes (F.S.) requires that coastal local governments include a shoreline use component in the coastal management element of the comprehensive plan that does the following:

“identifies public access to beach and shoreline areas and addresses the need for water-dependent and water-related facilities, including marinas, along shoreline areas. Such component must include the strategies that will be used to preserve recreational and commercial working waterfronts as defined in s. 342.07”
(Section 163.3178, F.S.).

Land Acquisition

The Stan Mayfield Working Waterfronts *Florida Forever* grant program was created by the 2008 Legislature for the purpose of preserving traditional working waterfronts. Grant funds associated with the program are available for the acquisition of land used directly for the commercial harvest of marine organisms or saltwater products by state-licensed commercial fishermen, aquaculturists, or business entities. The funds may also be used for the acquisition of land for exhibitions, demonstrations, educational venues, civic events, and other purposes that promote and educate the public about economic, cultural, and historic heritage of Florida's traditional working waterfronts, including marketing of the seafood and aquaculture industries. The program is administered by Florida Communities Trust and receives 2.5% of the total *Florida Forever* program appropriation pursuant to Section 259.105(3)(j), F.S..

To date, there are three funded projects under the Stan Mayfield Working Waterfronts Program. The first is the Sebastian Working Waterfront Collaborative, a two-acre piece of property in the City of Sebastian (Florida Communities Trust, 2010). The acquisition will link several parcels together in an effort to educate the public about the commercial fishing heritage of the community through a retail/wholesale seafood house, exhibitions, educational venues and events. The second funded project is the Brevard County Blue Crab Cove project, a three-acre piece of property in Merritt Island (Florida Communities Trust, 2010). Brevard County is acquiring the property to ensure its continued use for the commercial harvest of marine organisms, particularly blue crab and mullet. The third project is the Apalachicola Boat Works project in the City of Apalachicola. The project features the restoration and conversion of a building constructed during the early 20th century into a facility that provides instruction in the building and maintenance of vessels utilized in the commercial seafood industry (Florida Communities Trust, 2010).

Technical Assistance

The Legislature has also sought to protect and enhance working waterfronts by directing the Waterfronts Florida Program (WFP) to provide technical assistance to communities committed to working waterfront revitalization. Section 342.201, F.S., directs the program to provide technical assistance to communities that will advance the following priorities: 1) protecting environmental and cultural resources; 2) providing public access; 3) mitigating hazards; and 4) enhancing the viable traditional economy. The Department of Economic Opportunity is charged with implementing the program, providing technical assistance and funding assistance, as available, to support working waterfront revitalization, in coordination with the Department of Environmental Protection, and is directed to develop procedures and requirements governing program eligibility, application procedures, and application review.

The second section of this chapter is devoted to describing the accomplishments of the WFP and its network of communities over the past ten years as well as the future direction of the program.

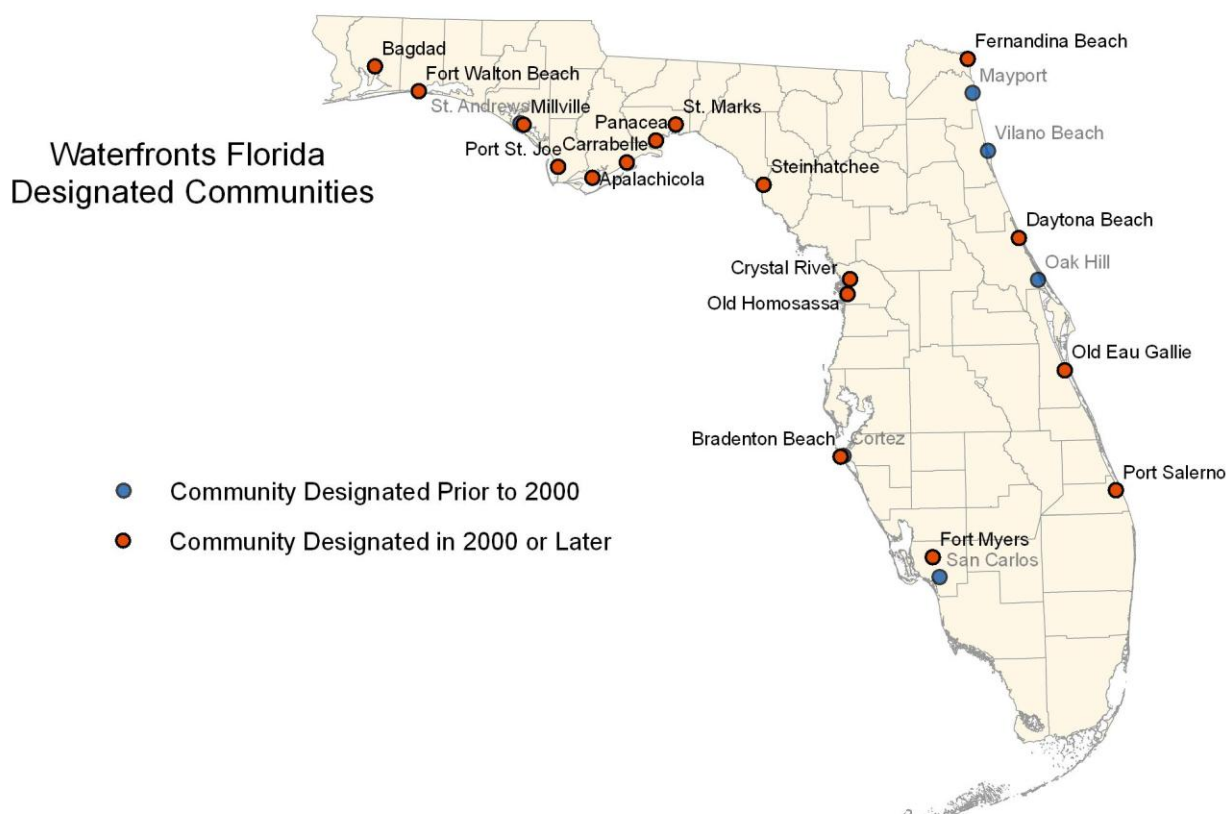
B. Waterfronts Florida Program

The WFP was created by the Florida Coastal Management Program in 1997 to address the physical and economic decline of traditional working waterfront areas. Since 1997, a total of 67 communities have applied to WFP through a competitive biennial process for designation as Waterfronts Florida Partnership Communities. Of these applicant communities, some of which have applied multiple times, 23 have received designation (Figure 8-2), with the most recent communities designated in 2009 (Department of Economic Opportunity). Some partnership communities are still actively working toward their revitalization goals and participating in Waterfronts Florida events more than a decade after their original designation; others are no longer active; and a number of communities have incorporated their original partnership into offices of local governments with broader missions. Regardless of their current status, all of the communities have benefitted from the guidance and technical assistance of the state program.

Program Mission

The WFP leverages state and local partnerships with strategic technical assistance to help local governments revitalize their working waterfronts. When it began, WFP focused on the revitalization of traditional commercial working waterfronts. The WFP was originally created, in part, to address the community impacts of a constitutional ban on certain types of fishing nets passed by voter referendum in November 1994 (Adams, Jacob & Smith, 2009). This amendment weakened commercial fishing by banning the use of entangling nets in state waters, a common tool of commercial fishing. In the years since its creation, the program has expanded its focus to include recreational as well as commercial working waterfronts. The program now encompasses both the original designation WFP, as well as the supportive technical assistance and activities available to all non-designated coastal local governments in the state.

Figure 8-2



Designated Waterfronts Florida Partnership Communities are scattered throughout Florida and have a diverse range of histories and characteristics. Eight of the communities are located in unincorporated parts of the county; all others are positioned in incorporated cities (Florida Department of Community Affairs, 2009). Some communities share a heritage based on commercial fishing; others are linked more to the developed Florida environment and tourism, while still others grew up as timber and mill towns. Today, more of these communities are developing recreational fishing and boating to attract tourists while others are focusing on eco-tourism through kayaking, bicycling, and hiking. Still others are encouraging development such as piers for fishing or promenades and retail tourist shops.

Technical Assistance

To respond to the diverse and evolving revitalization needs of its network of community partners, the WFP provides a range of technical assistance resources. These include biannual live meetings of its statewide network and regular webinars to provide information on revitalization best practices as well as to provide opportunities for communities to network and share lessons learned on how to effectively protect and enhance waterfront resources.

Waterfront Revitalization

The WFP also conducts research and other “enhancement” projects to identify revitalization best practices or to otherwise develop work products that may help communities in their efforts. In the past, the program has helped individual communities by funding projects such as parking studies, marketing studies, or the creation of design guidelines. Recently, the program has sought to initiate projects that provide learning resources for the full network of communities. Some notable WFP enhancement projects include:

- **Waterfront preservation through planning project:** One of the WFP’s goals is to serve as a clearinghouse and resource for information on how to protect working waterfronts through land use planning, especially in response to the additional 2005 and 2006 legislative requirements. A key partner in the effort to develop guidance on this subject has been the Conservation Clinic at the University of Florida Levin School of Law. In concert with the clinic, the WFP has contributed to and shared guidelines on waterfront preservation planning which may be found on the program’s website (<http://www.law.ufl.edu/conservation/waterways/index.shtml>). The program and the clinic also conducted a project to look at each designated community’s comprehensive plan and develop recommendations for incorporating the vision plan into the comprehensive plan and addressing state requirements related to working waterfront preservation.
- **Maritime infrastructure planning project:** The purpose of this project was to develop a tool to facilitate regional coordination for maritime infrastructure. Working in partnership with the Conservation Clinic at the University of Florida Levin School of Law, the DEO developed a planning tool that measures the value of a county’s maritime infrastructure from a scarcity and interconnectedness perspective. The tool will evaluate how new infrastructure or the conversion of public use facilities into private uses can impact public access. The tool is available on the WFP website and staff can help communities apply it to local conditions.
- **Cost –Benefit Analysis of Planning Strategies to Promote Resiliency in Martin County and Okaloosa County:** In 2011, the WFP launched a project to examine the economic costs and benefits of applying different planning strategies to promote the resiliency of the coastal high hazard area of Martin County and Okaloosa County. One used a future scenario of no significant sea level change while another assumed a meter-high sea level rise. The WFP and its consultant team prepared a final report and narrated presentation describing key project findings. Local governments can take lessons learned from the Martin and Okaloosa County Pilot Project as they consider the cost consequences of planning strategies to promote resiliency in their communities. These resources are available on DEO’s Coastal High Hazard Area website.

Traditional Designation Process

The WFP has traditionally delivered technical assistance through a 2-year designation cycle. Under the traditional cycle, during the first phase of designation, a community builds local interest in waterfront revitalization and develops a partnership organization to guide revitalization over the long-term. Once communities create a public participatory process for waterfront revitalization,

they develop a community vision plan and begin implementation of the vision plan. The visioning process and resulting document identify the community's revitalization needs and provide action-oriented strategies to implement revitalization projects and programs. During the second phase, the community continues to implement its vision plan, focusing on incorporating its vision into the comprehensive plan and undertaking priority projects that will further its efforts to revitalize and preserve the working waterfront.

The vision plan is the official record for what the community wants the waterfront to be in the future and the steps necessary for achieving this desired future. The plan should guide the partnership's day-to-day activities and should be updated as the local revitalization priorities evolve. WFP requires vision plans for each of its designated partnership programs. The vision plans are developed out of a series for interactive workshops where input is gathered from a wide range of stakeholders in the community. The visioning process can include a design charrette, focus-group style break-out sessions and community mapping exercises. The visioning process and resulting document identify the community's issues and plans for addressing the four WFP priority areas.

Pilot Designation Process

The WFP has developed an alternative designation process in order to provide opportunities for new community designations amid staff and resource constraints. The program is currently partnering with the City of Freeport and Walton County to pilot and evaluate the new process. Following the new process, communities will receive designation as a Waterfronts Florida Partnership Community after they complete three main steps on a voluntary basis. The first step is to get buy-in and support from the community; next, build their WFP partnership organization; and finally, a community must complete a vision and implementation plan that details future work efforts. Under this concept, WFP staff will provide technical assistance to local communities with the visioning process and partnership-building efforts. Funding sources for the visioning effort will be identified and timelines for completion will be established. The goal of the alternative process is to give communities greater flexibility in managing their revitalization effort.

Working Waterfronts - Community Highlights

Twenty three communities have taken part in the working waterfronts revitalization effort. This section gives an overview of the accomplishments of the program's community partners by describing three quantitative indicators of their achievements and by providing more-in-depth profiles of two of the communities, Apalachicola and Steinhatchee. The WFP publication, *Community Case Studies*, profiles each of the initial 21 Waterfronts Florida Partnership Communities designated from 1997 to 2007 in greater detail. The guidebook describes the experiences of local partnership communities in building a local WFP, developing a community-driven vision for the local waterfront, implementing projects from the vision, and fostering community capacity for sustained stewardship of waterfront resources.

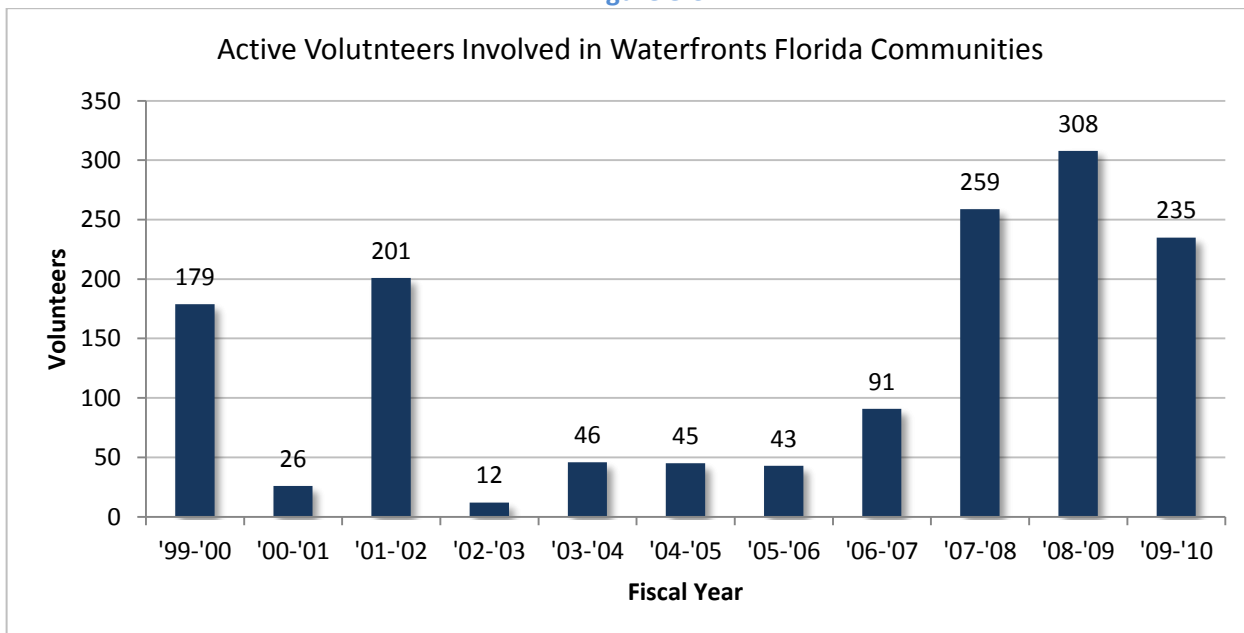
Quantitative Indicator - Data Concerns

Waterfronts Florida Partnership Communities are asked to track their performance using three main indicators: citizen support of revitalization efforts (number of volunteers and donations of goods, services, and money for revitalization activities); public and private sector support (including investments through grants or donations of time, supplies, of funds); and achievement of community goals (such as capital projects, organization building efforts, or waterfront stewardship projects). There is significant variation in data between communities which in part may reflect differences in the communities' interpretation of indicators and their methods of data collection. Not all communities collect indicator data and the communities that do vary greatly in size, population, and revitalization needs which makes comparison difficult. However, despite these concerns, community involvement in coastal waterfronts revitalization is an important indicator of commitment from Florida residents to working waterfront revitalization. These data highlight waterfront communities' significant commitment to preserving the invaluable social and natural resources associated with their waterfronts.

Indicator 8.2 - Citizen Support in WFP Revitalization Efforts

Tracking the number of volunteers who are involved in local partnership activities, the amount of time that volunteers devote to the partnership, and the citizen donation of goods, services, and money to revitalization activities helps communities monitor their progress with building local interest and involvement in the revitalization effort—an important measurement/indicator of the likelihood of a communities success in the WFP. Data for each indicator may also help communities assess whether they make effective use of volunteer support and citizen donations. Figure 8-3 shows a recent increase in volunteers since 2007.

Figure 8-3



The number of active volunteers has similarly increased in recent years, following the induction of new coastal areas, for a total of 1,445 active volunteers from 1999-2010. Table 8-2 shows the number of volunteers per year in each community from 2002 to 2010, as well as the gaps in information reported from these communities. The increased number of hours citizens have donated, as well as the increased number of volunteers, is a testament to the relatively high activity level of these coastal communities and their commitment to the revitalization efforts. Many of these communities rely heavily on a core group of citizens who volunteer extensively both in the field and administratively.

Table 8-2
Active Volunteers Involved in Waterfronts Florida Communities

Community	Fiscal Year								Total Recorded
	02-03	03-04	04-05	05-06	06-07	07-08	08-09	09-10	
<i>Apalachicola</i>	-	6	6	-	-	-	-	-	12
<i>Bagdad</i>	-	-	-	20	30	25	50	15	140
<i>Bradenton Beach</i>	-	-	-	-	12	15	15	17	59
<i>Carrabelle</i>	-	-	-	-	-	13	61	-	74
<i>Cortez</i>	-	-	-	-	-	45	65	-	110
<i>Daytona Beach</i>	-	20	19	-	-	-	-	-	39
<i>Fernandina Beach</i>	-	-	-	-	11	17	12	13	53
<i>Fort Myers</i>	-	-	-	-	-	-	-	25	25
<i>Fort Walton Beach</i>	-	-	-	-	16	3	5	-	24
<i>Millville</i>	-	-	-	-	-	-	-	35	35
<i>Old Homosassa</i>	-	-	-	-	-	6	6	-	12
<i>Olde Eau Gallie</i>	-	20	20	-	-	11	-	-	51
<i>Panacea</i>	-	-	-	-	-	25	-	18	43
<i>Port Salerno</i>	12	-	-	-	-	-	-	-	12
<i>Port St. Joe</i>	-	-	-	23	22	7	-	-	52
<i>Steinhatchee</i>	-	-	-	-	-	43	38	31	112
<i>St. Marks</i>	-	-	-	-	-	29	44	44	117
<i>St. Andrews</i>	-	-	-	-	-	-	-	37	37
<i>Mayport</i>	-	-	-	-	-	20	-	-	20
<i>San Carlos</i>	-	-	-	-	-	-	12	-	12

In general, volunteer hours associated with revitalization efforts are initially recorded when a community begins the two-year designation cycle and generally decline in the years following the conclusion of the cycle as communities make greater progress toward achieving their goals or as the responsibility for implementing projects falls to local government offices. The number of citizen hours has jumped significantly in the past six years with the designation of new communities into the program. A total of 55,725 volunteer hours were recorded in support of waterfront revitalization efforts from 1999-2010 (Figure 8-4). Eighty-five percent (47,211) of the total volunteer hours occurred between 2005 and 2010. Table 8-3 shows each community's volunteer hours reported.

Figure 8-4

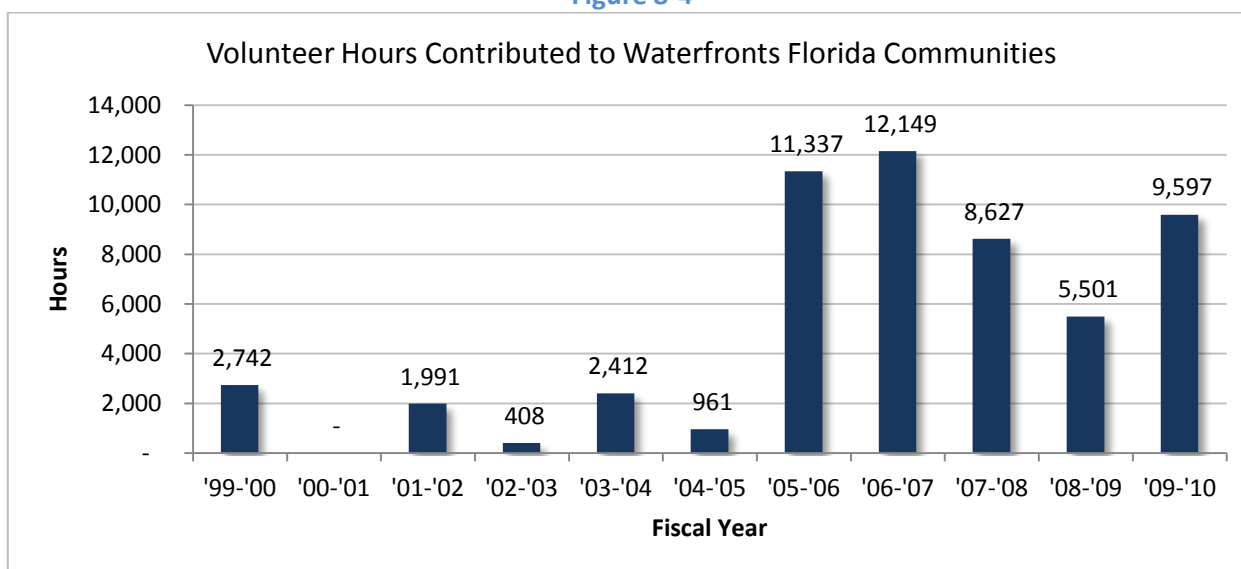


Table 8-3

Volunteer Hours Contributed to Waterfronts Florida Communities

Community	Fiscal Year								Total Recorded
	02-03	03-04	04-05	05-06	06-07	07-08	08-09	09-10	
Apalachicola	-	278	227	-	-	-	-	-	505
Bagdad	-	-	-	11,035	8,600	550	550	400	21,135
Bradenton Beach	-	-	-	-	150	368	180	150	848
Carrabelle	-	-	-	-	-	2,281	1,077	-	3,358
Cortez	-	-	-	-	-	1,098	1,200	-	2,298
Daytona Beach	-	1614	214	-	-	-	-	-	1,828
Fernandina Beach	-	-	-	-	318	102	24	117	561
Fort Myers	-	-	-	-	-	-	-	2,154	2,154
Fort Walton Beach	-	-	-	-	2,181	30	34	-	2,245
Millville	-	-	-	-	-	-	-	745	745
Old Homosassa	-	-	-	-	-	240	120	-	360
Olde Eau Gallie	-	520	520	-	-	125	-	-	1,165
Panacea	-	-	-	-	-	800	-	4,680	5,480
Port Salerno	408	-	-	-	-	-	-	-	408
Port St. Joe	-	-	-	302	900	560	-	-	1,762
Steinhatchee	-	-	-	-	-	708	648	384	1,740
St. Marks	-	-	-	-	-	1,565	1,368	700	3,633
St. Andrews	-	-	-	-	-	-	-	267	267
Mayport	-	-	-	-	-	200	-	-	200
San Carlos	-	-	-	-	-	-	300	-	300

Citizen donations to the WFP have increased in the past five years following a slump in the early-mid 2000s. From 1999-2010, citizen contributions totaled \$463,667, with \$355,009 donated from

Waterfront Revitalization

2007-2010, as shown in Figure 8-5. Each community's citizen donations is depicted in Table 8-4. These numbers demonstrate that the communities have been successful in getting citizens to donate their time, money, and/or supplies to the revitalization efforts.

Figure 8-5

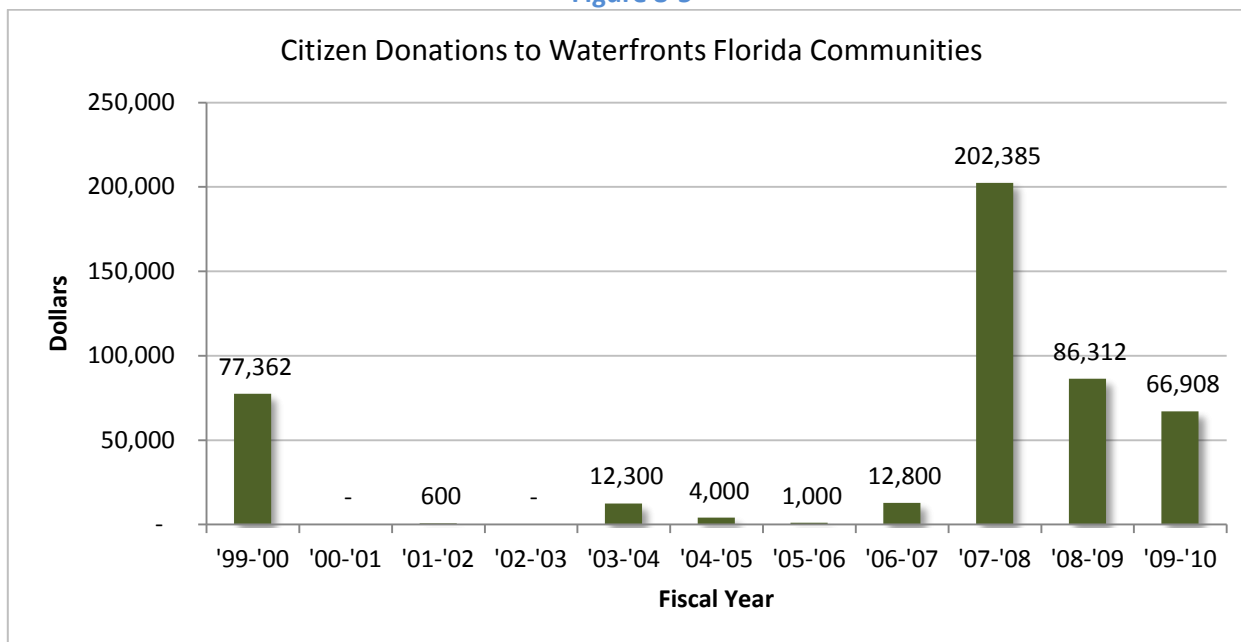


Table 8-4

Citizen Donations (in dollars) Contributed to Waterfronts Florida Communities

Community	Fiscal Year								Total Recorded
	02-03	03-04	04-05	05-06	06-07	07-08	08-09	09-10	
Bagdad	-	-	-	1,000	3,000	2,000	-	6,000	\$12,000
Bradenton Beach	-	-	-	-	800	700	1,800	15,000	\$18,300
Carrabelle	-	-	-	-	-	46,555	11,762	-	\$58,317
Cortez	-	-	-	-	-	116,000	65,000	-	\$181,000
Daytona Beach	-	12,300	-	-	-	-	-	-	\$12,300
Fernandina Beach	-	-	-	-	9,000	-	-	-	\$9,000
Fort Myers	-	-	-	-	-	-	-	42,958	\$42,958
Millville	-	-	-	-	-	-	-	1,250	\$1,250
Olde Eau Gallie	-	-	4,000	-	-	-	-	-	\$4,000
Port St. Joe	-	-	-	-	-	680	-	-	\$680
Steinhatchee	-	-	-	-	-	34,000	3,150	1,700	\$38,850
St. Marks	-	-	-	-	-	1,450	1,100	-	\$2,550
Mayport	-	-	-	-	-	1,000	-	-	\$1,000
San Carlos	-	-	-	-	-	-	3,500	-	\$3,500

While this data shows a general trend towards increased citizen involvement, both in time and money, the limitations on data collection methods leave many gaps making interpretation difficult.

Indicator 8.3 - Public and Private Sector Support

Public Investment

One of the goals for of the WFP is to provide communities with information resources to leverage funds and technical assistance from a variety of sources. The program requires that partnerships track public and private sector investment in the waterfront planning area in order to gauge the degree of backing and community buy-in for the local revitalization effort. The amount of public dollars contributed to the communities has fluctuated dramatically since 1999. A total of \$5.8 million has been contributed from 1999-2010 with a peak in contributions from 2007-2008 (Figure 8-6). There are numerous variables that influence the availability of public and private investment in waterfront revitalization. The amount of effort contributed by the communities is not reflected in these numbers. Table 8-5 shows the amount of public funds awarded per year to each Waterfront Community.

Figure 8-6

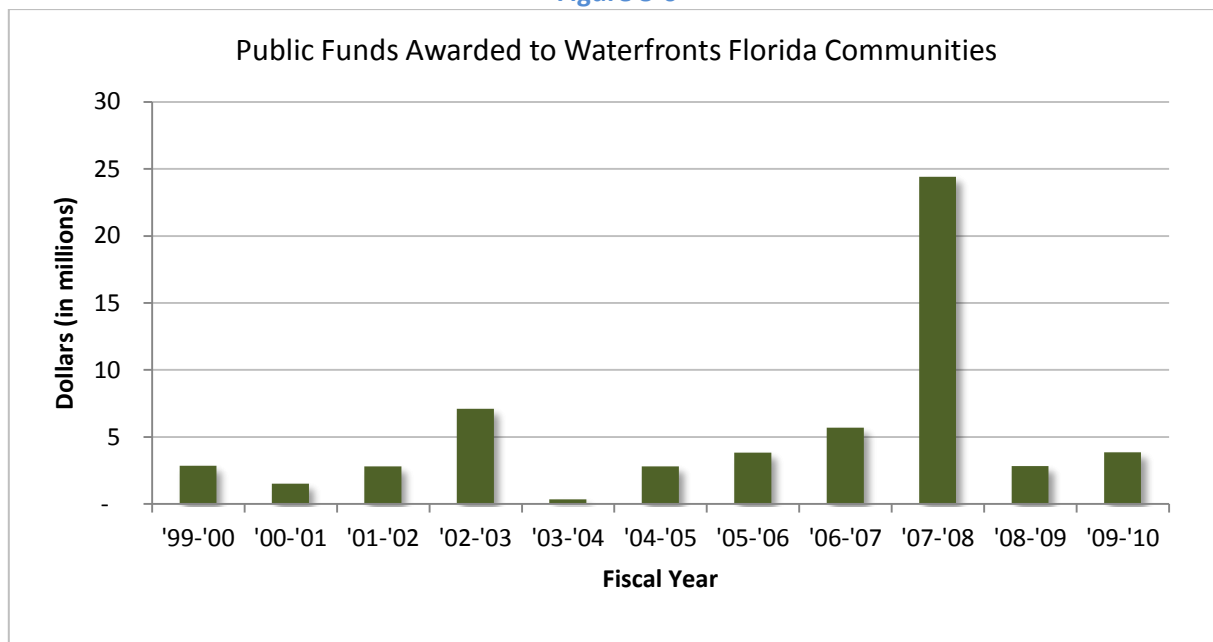


Table 8-5

Public Funds (in dollars) Awarded to Waterfronts Florida Communities

Community	Fiscal Year								Total Recorded
	02-03	03-04	04-05	05-06	06-07	07-08	08-09	09-10	
<i>Apalachicola</i>	-	50,000	1,298,718	-	3,346,948	6,733,109	1,100,000	2,515,000	\$15,043,775
<i>Bagdad</i>	-	-	-	3,500,000	1,688,738	25,000	30,000	14,000	\$5,257,738
<i>Bradenton Beach</i>	-	-	-	50,000	73,162	5,158	2,300	22,800	\$153,420
<i>Carrabelle</i>	-	-	-	-	-	434,943	104,559	-	\$539,502
<i>Crystal River</i>	-	50,000	1,239,410	-	-	-	181,000	-	\$1,470,410
<i>Cortez</i>	-	-	-	-	-	200,000	750,000	100,000	\$1,050,000
<i>Daytona Beach</i>	-	475,000	100,000	100,000	-	-	-	-	\$275,000

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<i>Fernandina Beach</i>	-	-	-	50,000	300,000	-	-	-	\$350,000
<i>Fort Myers</i>	-	-	-	-	-	-	-	338,735	\$338,735
<i>Fort Walton Beach</i>	-	-	-	-	103,146	-	353,500	-	\$456,646
<i>Millville</i>	-	-	-	-	-	-	-	264,220	\$264,220
<i>Old Homosassa</i>	50,000	-	-	-	-	1,900	1,900	50,000	\$103,800
<i>Olde Eau Gallie</i>	-	70,000	118,308	-	-	-	-	-	\$188,308
<i>Panacea</i>	200,000	100,000	50,000	50,000	100,000	4,000,450	100,000	528,000	\$5,128,450
<i>Port Salerno</i>	6,842,185	-	-	-	-	-	-	-	\$6,842,185
<i>Port St. Joe</i>	-	-	-	69,884	75,693	200,000	47,000	-	\$392,577
<i>Steinhatchee</i>	-	-	-	-	-	248,700	87,070	8,000	\$343,770
<i>St. Marks</i>	-	-	-	-	-	50,000	53,000	300	\$103,300
<i>St. Andrews</i>	-	-	-	-	-	-	-	68	\$68
<i>Mayport</i>	-	-	-	-	-	1,000	-	-	\$1,000
<i>San Carlos</i>	-	-	-	-	-	-	3,500	-	\$3,500
<i>Vilano Beach</i>	-	-	-	-	-	12.5 mil.	-	-	\$12,500,000

Private Investment

While not all WFP communities wish to increase development of the local waterfront, all seek to promote economic revitalization and sustainability. As such, private funds invested in a waterfront community is a measure of success in achieving this goal. Figure 8-7 shows that \$2.8 million in private funds were invested in the WFP communities between 2005 and 2010. The investments include land purchases and other community projects. These investments have recently been documented and the data set is still incomplete (Table 8-6). Also, data for private business investment in WFP communities is not as readily available as is public investment data.

Figure 8-7

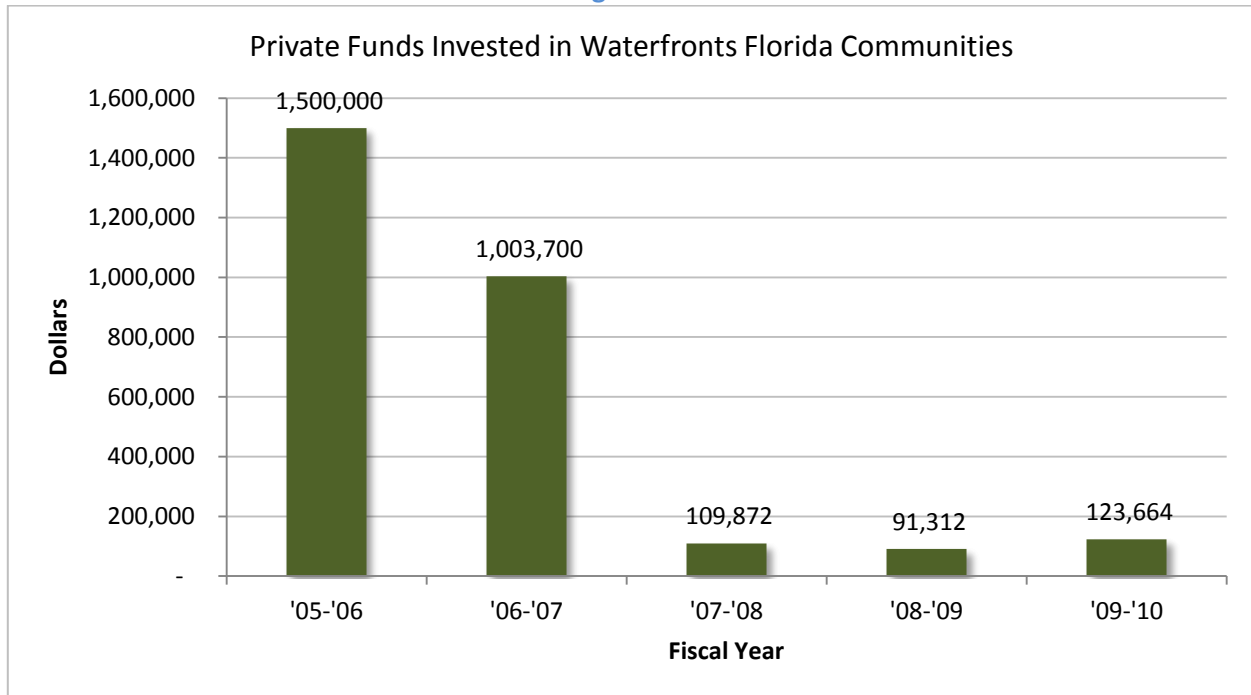


Table 8-6

Private Funds (in dollars) Invested in Waterfronts Florida Communities

Community	Fiscal Year					Total Funds Recorded
	05-06	06-07	07-08	08-09	09-10	
Bagdad	1,500,000	1,000,000	1,000	-	5,000	\$2,506,000
Bradenton Beach	-	3,700	1,700	-	42,200	\$47,600
Carrabelle	-	-	42,972	21,312	-	\$64,284
Cortez	-	-	62,000	50,000	-	\$112,000
Fort Myers	-	-	-	-	31,629	\$31,629
Millville	-	-	-	-	27,500	\$27,500
St. Marks	-	-	1,200	20,000	-	\$21,200
St. Andrews	-	-	-	-	17,335	\$17,335
Mayport	-	-	1,000	-	-	\$1,000

Indicator 8.4 - Achievement of Community Goals

The WFP is predicated on the idea that a community must establish a vision plan with a clear implementation component for its waterfront revitalization effort. Such a plan should clearly articulate short- and long-term objectives, and order projects in such a way as to build momentum and community involvement over time. This indicator focuses on the community's progress in accomplishing the goals in its vision plan and the degree to which its plan functions as a true guide for promoting revitalization. Table 8-7 lists some of the key projects completed by Waterfronts Communities since 2000.

The projects that communities may undertake are diverse. They include capital projects to alter the waterfront's physical conditions, capacity building efforts as well as planning actions to inform or refine the local vision for revitalizing the waterfront, and programs that address human impacts and stewardship of the waterfront area. For example, a community may identify the need to establish a fundraising subcommittee for specific tasks in its strategic plan. When a community can identify and implement specific initiatives, it shows that the group is well organized and successfully moving toward the ultimate goal of revitalization. Effectively completing these plan elements is just as important as obtaining funding.

Table 8-7
Projects Completed in Waterfronts Florida Communities

Project Name	Waterfronts Community	Year
Completion of historic design guidelines	Apalachicola	'06
Acquisition of Two Mile Preserve	Apalachicola	'08
Development of the "Pan Handle Peers" brochure	Apalachicola	'08
Battery Park Marine Renovations	Apalachicola	'08
Design and Completion of improvements to Riverfront Park (including boardwalk/pier construction)	Apalachicola	'09
Carrabelle Wharf Improvements	Carrabelle	'09
Held Bayfest Festival	Crystal River	'04-'05
Acquisition of Three Sisters' Land	Crystal River	'10
Purchase of 98 acres for FISH Preserve	Cortez	'00
FISH creates new home for FISH Boatworks	Cortez	'00
Manatee County adopts vision plan and overlay district into Land Development Code	Cortez	'05
Florida Maritime Museum opens to public	Cortez	'07
Relocation and Restoration of 1910 Pillsbury Boatshop	Cortez	'07
Manatee Island Environmental Learning Center	Daytona Beach	'06
Completion of Design Guidelines	Fernandina Beach	'08
Completion of Phase 1A of Park	Fernandina Beach	'09
Wharf Improvements	Millville	'09
Gateway Sign Installed	Old Homosassa	'02
International Kiosk Completed	Old Homosassa	'03

Upgraded Old Homosassa Boat Ramp	Old Homosassa	'09
Installation of Historic Markers	Old Homosassa	'09
Restoration of Historic Pineapple Pier	Olde Eau Gallie	'07
Big Bend Maritime Center	Panacea	'07
Create the Living Museum	Panacea	'09
Manatee Pocket Walk Phase 1	Port Salerno	'03
Port St. Joe Waterfront Park	Port St. Joe	'06
Creation of Salt Air Farmer's Market	Port St. Joe	'07
Steinhatchee Fish Market	Steinhatchee	'09
Fort Steinhatchee Pier	Steinhatchee	'09

Analyzing this indicator strictly by the numbers may not be meaningful. Nor is it meaningful to compare the communities against one another; the communities and the scales or complexity of their projects are too dissimilar for easy comparison. A more qualitative look at each community's activities may provide a more nuanced and sophisticated view of the overall effectiveness of their effort. For example, Apalachicola has completed five projects in four years between 2006 and 2009. These projects include the acquisition of Two Mile Preserve, renovations to Battery Park Marine, and the design and completion of improvements to Riverfront Park (including boardwalk/pier construction). Crystal River has also successfully implemented a variety of projects. The community contributed to the success of the Bayfest Festival, raised over \$2 million to acquire the Three Sisters property from a residential developer, and the City was awarded over \$6 million through a Florida Communities Trust grant to create a passive park.

These two communities are just examples of the many successes the Waterfronts Florida communities have enjoyed since designation. Regardless of size, each accomplishment in coastal planning, social infrastructure, or land acquisition demonstrates success for WFP and each community's perseverance. The following section gives a more detailed profile of two WFP partnership communities, Apalachicola and Steinhatchee. While these two communities may not represent the full network of WFP communities, both provide a good view of how each community, facing different revitalization needs, accomplish their goals.

Apalachicola

Apalachicola, part of the "Forgotten Coast" is located in Franklin County on the northern Gulf of Mexico. Apalachicola's most recent economic success focused on its well established resources—fish and shellfish. Oysters, which made Apalachicola famous around the world, have been commercially marketed as early as 1837 (Florida Department of Agriculture and Consumer Services, 2010). Today, Apalachicola Bay produces 90 percent of Florida's oysters and 10 percent of the nationwide supply, supporting a large percentage of Apalachicola's economy. Recent developments in fishing regulations have changed the industry for Apalachicola, cutting the output of commercial fishing by more than half. In response, Apalachicola developed economic opportunities in tourism as people from around the country visit to experience the ecological and cultural uniqueness of the area.

Waterfront Revitalization

Designated as a Florida Waterfronts Community in 2003, Apalachicola focused their activities on increasing public access to the waterfront, developing tourism, and improving fishing resources. Key accomplishments for the City include: waterfront property acquisition for public spaces and parks; improvement of Veteran's Park with upgraded walkways and parking lots; dock and pier repair; renovated Battery Park marina; marketing brochures; and development design guidelines. In 2008, Apalachicola was named one of the National Trust for Historic Preservation's Dozen Distinctive Destinations. The City has also worked to develop disaster planning for the City's historic homes as well as update their Comprehensive Plan to incorporate elements from the land development code as applied to the waterfront area. While Apalachicola has experienced great success, the community has also experienced some difficulties in identifying funding for other projects including derelict vessel removal. Despite these struggles, the Community remains focused on their vision to "maintain the unique character, scale, and small-town feel of Apalachicola through support of the local seafood industry."

Steinhatchee

Steinhatchee sits atop an ancient dune ridge on the north bank of the Steinhatchee River near the Gulf of Mexico in an unincorporated part of Taylor County. Like other coastal settlements in North Florida, Steinhatchee's past is linked to commercial fishing and the timber industry. The local economy depends heavily on real estate and sport fishing, both sectors weakened in recent years by the economic downturn. The Steinhatchee Community has experience with tough times and the recovery process; surviving a devastating storm in 1993, the ban on nets in state waters in 1994, and the construction industry collapse during the nationwide recession. In response, Steinhatchee saw an opportunity in the Waterfronts Florida Partnership Program and the ability to capitalize on their best asset, the waterfront.

Designated as a Waterfronts community in 2007, Steinhatchee is focusing on historic preservation, increasing tourism opportunities, and improving public access to the waterfront. Key accomplishments include: grant to buy the former waterfront Steinhatchee Fish Market; disaster recovery guide; Fort Steinhatchee project; and a flushing model feasibility study. Difficulties encountered are tied to the national economic downturn, including increased fuel prices for boating, as well as organizational arrangements to sustain their Waterfronts Partnership after the conclusion of the two-year designation cycle. Despite these struggles, Steinhatchee has demonstrated their independent nature and commitment through a variety of fundraising events focused on developing their future goals for the community. With the economic relationships established through the Waterfronts Partnership, Steinhatchee hopes to realize their ultimate goal of increased access for locals and visitors to enjoy the waterfront.

Future Directions for the WFP

In recent years, the Waterfronts Florida Program has become more involved with the state land planning agency's other coastal programs which help communities understand their vulnerability to coastal hazards and provide opportunities for mitigating or otherwise addressing those vulnerabilities. The program has recently conducted enhancement projects to better understand the process that communities can employ to develop planning strategies to integrate sea level rise

adaptation into their local comprehensive plan as well as to better understand the costs and benefits of applying different planning strategies to promote resiliency. The program has also coordinated training opportunities and planning exercises to address hazard vulnerability at the local level.

Moving forward, the WFP will be coordinated with the DEO's recently launched Community Resiliency Initiative—an initiative aimed at developing guidance for incorporating adaptation to current and future hazards into all levels of planning in Florida. While the WFP will maintain its emphasis on providing assistance to protect working waterfronts, it will also seek to promote working waterfront sustainability and resiliency in a more broad sense through coordinating with the Community Resiliency Initiative.

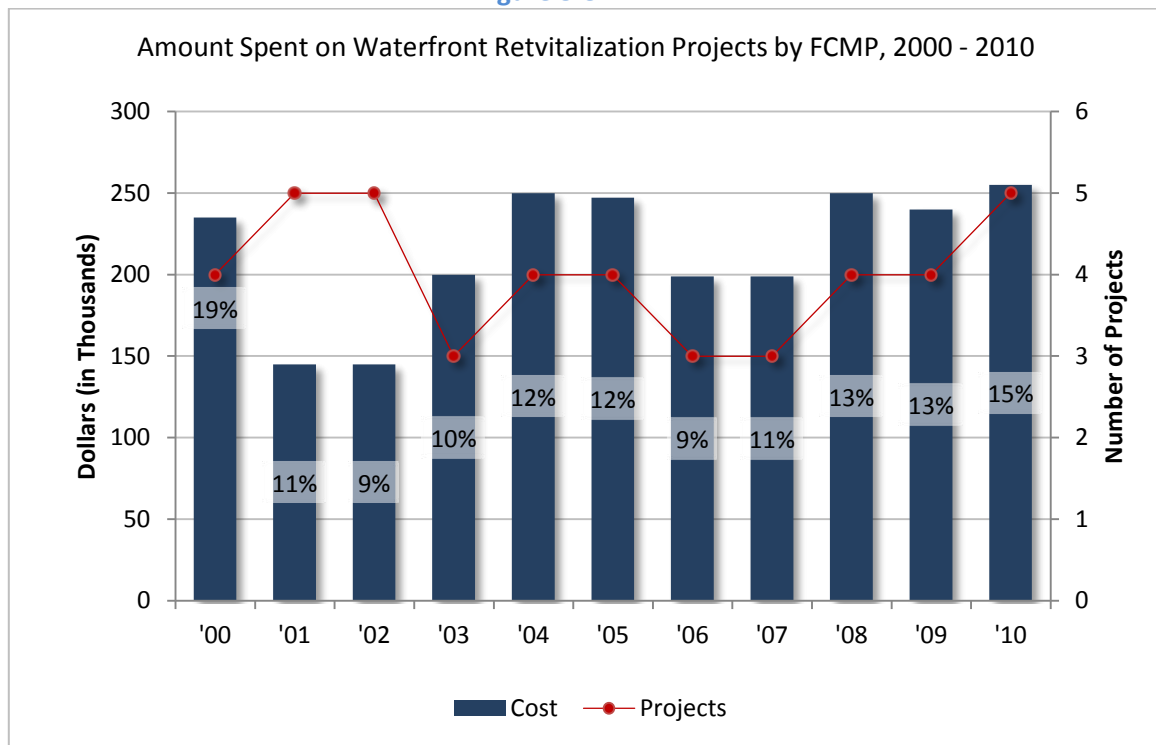
Indicator 8.5 - FCMP Grants for Waterfront Revitalization

The FCMP administers the Coastal Partnership Initiative and the State Agency) competitive grant programs (<http://www.dep.state.fl.us/cmp/grants/index.htm>) to support the protection, management and enhancement of Florida's ocean and coastal resources. The annual allocation of funds for Waterfront Revitalization projects statewide was variable over time during the period FY 2000 through FY 2010, for a total of \$2.4 million (Table 8-8). The WFP is funded, in part, from FCMP funds. The annual allocation has ranged between \$145,000 to \$255,000. Between 2000 and 2010 forty-four waterfront revitalization projects were funded for an average of 4.4 per year. Figure 8-7 illustrates the number of projects funded by year, the amount of funding and percent of the total funding that was granted to Waterfront Revitalization projects. Waterfront Revitalization projects received the fourth highest number of projects funded as well as the fourth highest total funding during this time period among six categories.

Table 8-8

Fiscal Year	Year	Funding	Total Funding	Percent of Funding	Projects	Total All Projects	Percent of All Projects
FY 00-01	'00	235,000	\$1,239,593	19	4	27	15
FY 01-02	'01	145,000	\$1,320,000	11	5	30	17
FY 02-03	'02	145,000	\$1,687,782	9	5	27	19
FY 03-04	'03	200,000	\$1,990,240	10	3	26	12
FY 04-05	'04	250,000	\$2,125,623	12	4	28	14
FY 05-06	'05	247,300	\$2,037,309	12	4	30	13
FY 06-07	'06	199,000	\$2,126,881	9	3	32	9
FY 07-08	'07	199,000	\$1,730,751	11	3	22	14
FY 08-09	'08	250,000	\$1,955,629	13	4	27	15
FY 09-10	'09	240,000	\$1,900,218	13	4	29	14
FY 10-11	'10	255,000	\$1,727,081	15	5	24	21
Total		2,365,300	\$19,841,107		44	302	15

Figure 8-8



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Florida 2009 Coastal Issues Survey Telephone and Mail Survey

Public Coastal Access

1. On average, how many months in a year do you reside in Florida? (n= 1,235)
 - a. 6 months or less
 - b. 7 to 11 months
 - c. 12 months
2. How LONG does it take to get to the coast from your residence?
 - a. Walking distance
 - b. Driving time less than 30 minutes
 - c. Driving time 30 minutes to an hour
 - d. Driving time more than 1 hour
 - e. Don't Know
3. How OFTEN do you visit the coast for recreation?
 - a. Daily
 - b. Weekly
 - c. Monthly
 - d. 1 to 3 times per year
 - e. Never
4. Do you feel that you have ADEQUATE ACCESS to the coast for recreation?
 - a. Yes
 - b. No
5. Which of the following would ENCOURAGE YOU TO VISIT coastal areas more often?
 - a. More access points
 - b. Access points identified more clearly
 - c. Handicapped accessible points
 - d. Additional parking
 - e. More/better restrooms/bathhouses
 - f. Facilities such as observation towers, fishing piers, playgrounds, picnic tables/shelters, trash receptacles
 - g. More web-based information and maps
 - h. Other
6. Which of the following ACTIVITIES DO YOU ENGAGE IN when you are at the coast?
 - a. Swim or surf
 - b. Lounge on the beach
 - c. Use personal/individual watercraft
 - d. Boat and/or water ski
 - e. Fish
 - f. Bird watch, collect shells, take pictures, etc.
 - g. Picnic
 - h. Visit cultural or historic sites at the coast

Appendix A

- i. Drive on beach
- j. Other

Coastal Hazards

7. How would you describe your LEVEL OF AWARENESS of COASTAL HAZARDS such as hurricanes, tropical storms and floods?
 - a. Very high
 - b. High
 - c. Moderate
 - d. Low
 - e. Very low
8. Have you ever been ORDERED TO EVACUATE due to a hurricane, tropical storm, and related floods or storm surge?
 - a. Yes
 - i. DID YOU COMPLY WITH THESE ORDERS?
 1. Yes
 2. No
 3. Sometimes
 - b. No
9. Have you ever suffered property damage or loss due to a hurricane, tropical storm and related floods or storm surge?
 - a. No
 - b. Yes
 - i. How many times did you suffer property damage or loss?
 1. 1 time
 2. 2 times
 3. 3 times
 4. 4 times
 5. 5 times or more times
 - ii. What was the approximate dollar amount of the LARGEST LOSS you've experienced?
 1. Under \$ 500
 2. \$ 501 - \$1,000
 3. 1,001 - 2,000
 4. 2,001 - 5,000
 5. 5,000 - 10,000
 6. 10,001 - \$20,000
 7. 21,001 - \$ 50,000
 8. Over \$50,000
 - iii. Did your insurance cover any of the damage?
 1. Yes
 - a. 10 % or less
 - b. 11 % - 20%
 - c. 21 % - 30%
 - d. 31 % - 40 %

Appendix A

- e. 41 % - 50 %
- f. 51 % - 60 %
- g. 61% - 70 %
- h. 71 % - 80 %
- i. 81 % - 90 %
- j. 91 % - 99 %
- k. 100 %

- 2. No, Loss not covered by insurance
- 3. No, I don't have insurance
- 4. Don't Know

10. Did you, the previous owners, or the builder do any of the following to storm-proof your property?

- a. Elevate building
- b. Elevate critical components such as electrical or HVAC system (air conditioner) components
- c. Anchor fuel tanks
- d. Install storm shutters
- e. Install hurricane clips or straps
- f. Reinforce garage doors
- g. Roof improvements
- h. Replace sliding glass doors with impact resistant projects
- i. Other

11. Please tell us how you prefer to receive INFORMATION ON COASTAL HAZARDS such as hurricanes, tropical storms and floods.

- a. TV
- b. Radio
- c. Newspapers
- d. Friends, family or co-workers
- e. Information brochures from city/county
- f. Newsletters
- g. Internet
- h. Some other source

12. Do you feel that you need more information on coastal hazards?

- a. Yes
- b. No

Coastal Community Activities

13. Do you currently BELONG TO GROUPS that are involved in coastal protection and environmental education activities?

- a. No
- b. Yes
 - i. How many groups of this type do you belong to?
 - ii. Do you PAY MEMBERSHIP and/or DONATE MONEY to environmental groups or organizations?

Appendix A

1. No
2. Yes
 - a. What is the APPROXIMATE AMOUNT per year that you contribute to these groups?
 - i. \$0
 - ii. \$ 1 - \$ 25
 - iii. \$ 26 - \$ 50
 - iv. \$ 51 - \$ 75
 - v. \$ 76 - \$ 100
 - vi. \$ 101 - \$ 200
 - vii. \$ 201 - \$ 500
 - viii. over \$500

14. Have you ever been involved in COASTAL COMMUNITY ACTIVITIES?

- a. Phone calls, letter writing, signing a petition
- b. Marches or demonstrations
- c. Workshops or public meetings
- d. Coastal cleanups
- e. Environmental Monitoring
- f. Turtle watches, nest counts
- g. Rescuing stranded marine mammals
- h. Dune re-vegetation or other native species planting
- i. Non native plant removal
- j. Other activity

15. Please tell us how you would prefer to receive INFORMATION on COASTAL COMMUNITY ACTIVITIES such as beach cleanups.

- a. TV
- b. Radio
- c. Newspapers
- d. Friends, family or co-workers
- e. Information brochures from city/county
- f. Newsletters
- g. Internet
- h. Some other source

Priorities and Recommendations

16. How would you describe your LEVEL OF AWARENESS of COASTAL ISSUES?

- a. Very high
- b. High
- c. Moderate
- d. Low
- e. Very low

17. In your opinion, HOW IMPORTANT are the following coastal issues?

- a. Public Access
- b. Coastal Hazards

Appendix A

- c. Environmental Quality
- d. Protection of ocean resources
- e. Marine Debris
- f. Energy Facility and/or Government Facility Siting
- g. Aquaculture
- h. Coastal Land Use and Preservation of Waterfront Communities and Businesses

18. Do you have any recommendations for improving these coastal priorities?

Background Information

19. In what COUNTY do you live

- a. Coastal
- b. Non-Coastal

20. How long have you lived in Florida

- a. 5 years or less
- b. 6 - 10 yrs
- c. 11- 20 yrs
- d. 21 - 30 yrs
- e. 31 - 40 yrs
- f. Over 40 yrs

21. Do you own or rent your home?

- a. Own
- b. Rent

22. What type of home do you live in?

- a. Single family house
- b. Town house/apartment/condominium
- c. Mobile home/Manufactured Home
- d. Other

23. You are:

- a. Female
- b. Male

24. In what year were you BORN?

- a. 18-24
- b. 25-34
- c. 35-44
- d. 45-54
- e. 55-64
- f. 65-74
- g. 75-84
- h. 85-94

25. Do you have children?

- a. Yes
- b. No

Appendix A

- 26.** What is the PRIMARY LANGUAGE used in your household?
- a. English
 - b. Spanish
 - c. French/Creole
 - d. Something else
- 27.** What is the highest grade or year of school you have COMPLETED?
- a. 8 years or less
 - b. 9 to 11 years
 - c. High School
 - d. Business or technical school
 - e. Community college
 - f. Completed College
 - g. Graduate or professional school
- 28.** Which of the following best describes your TOTAL HOUSEHOLD INCOME in 2008?
- a. Under 5,000
 - b. 5,000 to 15,000
 - c. 15,001 to 25,000
 - d. 25,001 to 35,000
 - e. 35,001 to 45,000
 - f. 45,001 to 55,000
 - g. 55,001 to 65,000
 - h. 65,001 to 75,000
 - i. Over 75,000

Florida Local Government Coastal Trends Survey

Coastal Hazards

1. How much does «COMMUNITY» rely on or use the following actions to MITIGATE IMPACTS of coastal hazards such as hurricanes, tropical storms and floods?
 - a. Prevention
 - b. Property protection
 - c. Public education and awareness
 - d. Natural resource protection
 - e. Emergency services
 - f. Structural projects
2. Does «COMMUNITY» have an INVENTORY OF MAPPED AREAS affected by the following hazards?
 - a. Flooding
 - b. Storm Surge
 - c. Shoreline erosion
 - d. Sea level rise
 - e. Geological hazards
 - f. Land subsidence
 - g. Wildfires
3. Based on the recent regional evacuation study, does «COMMUNITY» have plans to increase its shelter capacity?
4. To qualify for pre and post disaster federal assistance, federal legislation requires that State, Tribal and local governments develop a multi-hazard mitigation plan. Local governments in the State of Florida are eligible for federal assistance if they prepare a Local Mitigation Strategy (LMS) for these 10 standard hazards:
 - a. Coastal and riverine erosion
 - b. Tsunamis
 - c. Earthquakes, landslides/subsidence/sinkholes
 - d. Hurricanes/coastal storms
 - e. Floods
 - f. Wildfires
 - g. Dam/levee failure
 - h. Dam/levee failure
 - i. Severe thunderstorms/tornadoes
 - j. Drought/heat wave
 - k. Winter storms/freezes

Is «COMMUNITY» planning or conducting strategies to reduce damage from ANY ADDITIONAL HAZARDS not already addressed in the LMS?

Appendix B

5. Is «COMMUNITY» DEVELOPING STRATEGIES for the following?
 - a. Long term Disaster Recovery
 - b. Climate Change adaptation
6. Does «COMMUNITY» have an appropriation for dollars spent to conduct HAZARD MITIGATION programs and activities?
7. Does «COMMUNITY» conduct EDUCATIONAL PROGRAMS OR CAMPAIGNS to increase public awareness of coastal hazards such as hurricanes, tropical storms and floods?
8. Does «COMMUNITY» have an appropriation for dollars spent to conduct COASTAL HAZARD EDUCATION programs?

Public Access

9. Does «COMMUNITY» have an INVENTORY of the following types of recreational features and/or access points?
 - a. Beach/shoreline access sites
 - b. Parks
 - c. Piers and docks (fishing and boating access)
 - d. Boat ramps
 - e. Marinas (public & private)
 - f. Nature trails (e.g. walking, hiking)
 - g. Paddling Trails (Blueways)
 - h. Boardwalks, dune crossovers & observation structures
 - i. Other
10. Please provide the following information on LANDS PURCHASED by «COMMUNITY» for conservation/recreational use, including all lands bought in collaboration with partners (e.g., federal, state, non-profit).
 - a. What is the TOTAL dollar amount budgeted by «COMMUNITY» for FY 2009 to acquire lands for conservation/recreational use?
 - b. For each of the following years, please provide the number of acres purchased and the total dollar amount spent by «COMMUNITY» to acquire lands for conservation/recreational use:
 - i. FY2008
 - ii. FY2007
 - iii. FY2006
 - iv. FY2005
 - v. FY2004
 - vi. FY2003
 - vii. FY2002
 - viii. FY2001
 - ix. FY2000
11. Please provide the following information on your efforts to IMPROVE FACILITIES at existing recreational access points?

Appendix B

- a. What is the TOTAL dollar amount budgeted by «COMMUNITY» for FY 2009 to improve existing recreational access point facilities?
- b. For each of the following years, please provide the total dollar amount spent by «COMMUNITY» to improve existing recreational access point facilities.
 - i. FY2008
 - ii. FY2007
 - iii. FY2006
 - iv. FY2005
 - v. FY2004
 - vi. FY2003
 - vii. FY2002
 - viii. FY2001
 - ix. FY2000

Community Stewardship

- 12. Did «COMMUNITY» conduct EDUCATIONAL TRAININGS AND/OR ACTIVITIES to increase public awareness of coastal issues such as marine debris, coastal habitats or water quality?

Waterfront Communities

- 13. Is «COMMUNITY» experiencing DECLINE AND/OR LOSS of PUBLIC RECREATIONAL ACCESS in the waterfront area such as:
 - a. Walkways/observation area
 - b. Boat docks
 - c. Boat launches
 - d. Waterfront
 - e. Waterfront restaurants
 - f. Something else
- 14. How is «COMMUNITY» addressing the decline in public recreational access in the waterfront area, if applicable?
- 15. Is «COMMUNITY» experiencing DECLINE AND/OR LOSS in any of the following COMMERCIAL waterfront businesses and related facilities as defined in Section 342.201 F.S.:
 - a. Docks
 - b. Wharfs
 - c. Boat Lifts
 - d. Wet and dry marinas
 - e. Boat ramps
 - f. Boat hauling and repair facilities
 - g. Commercial fishing facilities
 - h. Boat construction facilities
 - i. Something else

Appendix B

16. Is «COMMUNITY» using any of the following to address the DECLINE OF COMMERCIALWATERFRONT BUSINESS?
- a. Community Redevelopment Area (CRA)
 - b. Zoning
 - c. Acquisition of property
 - d. Comprehensive plan amendments
 - e. Special district overlay
 - f. Post disaster redevelopment planning
 - g. Something else

Priorities and Recommendations

17. How important are the following COASTAL ISSUES in «COMMUNITY»?
- a. Public access
 - b. Coastal Hazards
 - c. Environmental Quality
 - d. Protection of ocean resources
 - e. Marine Debris
 - f. Energy facility and/or government facility siting
 - g. Aquaculture
 - h. Coastal land use and preservation of waterfront communities and businesses
18. Which of these coastal issues [listed in Question 17] is the TOP PRIORITY in «COMMUNITY»?
19. Is there any additional information you would like to add regarding the topics covered in this survey?

Appendix C

GIS Data Layers

Coastal Society

Figure Title	Figure	Source/Credits	Citation (Title)	Year
Numeric Change in Population	1-1	U.S. Census	n/a	2010
Total Population Growth by County	1-5	U.S. Census	n/a	2010
Percent Change in Florida Counties	1-6	U.S. Census	n/a	2010
Ten Most Populated Cities in Florida, 2010	1-7	U.S. Census	n/a	2010
Numeric and Percent Change in Population in the Coastal Zone, 2000 - 2010	1-8	U.S. Census	n/a	2010
Developed Land in Florida, 2006 with Coastal Areas of the Regional Planning Councils	1-12	Coastal Change Analysis Program (from NOAA) http://www.csc.noaa.gov/digitalcoast/data/ccapregional	2006 C-CAP Land Cover	2006
Numeric and Percent Change in Agricultural Withdrawals in the Coastal Zone, 2000 -2005	1-22	Marella, Richard, 2000, "Water Withdrawals, Use, Discharge, and Trends in Florida" Marella, Richard, 2005, "Water Withdrawals, Use, and Trends in Florida"	n/a	2000, 2005
Numeric and Percent Change in Public Supply Withdrawals in the Coastal Zone, 2000 -2005	1-23	Marella, Richard, 2000, "Water Withdrawals, Use, Discharge, and Trends in Florida" Marella, Richard, 2005, "Water Withdrawals, Use, and Trends in Florida"	n/a	2000, 2005

Appendix C

Coastal Habitats

Figure Title	Figure	Source/Credits	Citation (Title)	Year
Conservation Lands	2-1	Florida Natural Areas Inventory	Florida Conservation Lands (FNAI Managed Areas)	2012
Water Management Districts	2-8	FDEP	Water Management Districts (areas)	2012
Seagrass	2-12	Florida Fish and Wildlife Conservation Commission-Fish and Wildlife Research Institute	Sea Grasses	2010
Wetlands	2-22	Florida Fish and Wildlife Conservation Commission (FWC) and the originator of the data must be credited.	fl_veg03	2004
Mangroves	2-27	FWC-FWRI (Florida Fish and Wildlife Conservation Commission-Fish and Wildlife Research Institute)	Florida Mangroves	2012
Saltwater Marshes	2-28	FWC, FWRI, Florida Water Management Districts, FDEP	Salt Marshes	2012
Oyster Reefs	2-30	FFWCC, FWRI	oysters_fl_poly	2010
Miles of Sandy Beaches by County	2-31	Clark, Ralph, R. Beach Conditions in Florida: a Statewide Inventory and Identification of the Beach Erosion Problem Areas in Florida	n/a	1993
Coral Reefs in South Florida	2-33	selected from data provided by FMRI and Nova Southeastern University Oceanographic Center	PalmBeachBenthicHabitats_9_12_07	2007
Coral Reefs in South Florida	2-33	selected from data provided by Brian Walker, NOVA	MartinCountyBenthicHabitats_draft	2012
Coral Reefs in South Florida	2-33	selected from data provided by Brian Walker	DadeHabitats_final_v12	2009
Coral Reefs in South Florida	2-33	selected from data provided by FMRI and Nova Southeastern University Oceanographic Center	BrowardCountyBenthicHabitats_11_24_04_2006_BorrowArea Update	2004
Coral Reefs in South Florida	2-33	selected from data provided by FMRI	fl_keys_coralplatform	2006
Coral Reefs in South Florida	2-33	selected from data provided by FMRI	fl_keys_coral_patches	1997
Artificial Reefs	2-35	FWC Division of Marine Fisheries Management, FWRI	Artificial Reefs	2012
Aquatic Preserves	2-38	Bureau of Survey & Mapping, Division of State Lands	Aquatic Preserves (areas)	2012
Springs	2-40	FDEP	Springs (2011)	2011

Appendix C

Living Resources

Figure Title	Figure	Source/Credits	Citation (Title)	Year
New Critical Habitat Areas	3-10	FWC,FWRI, IS&M,CSA	Johnson Seagrass Critical Habitat	2005
New Critical Habitat Areas	3-10	US Fish and Wildlife	choctawhatchee_beach_mouse	2006
New Critical Habitat Areas	3-10	South Florida Ecological Service Office (SFESO), U.S. Fish & Wildlife Service	cape_sable_seaside_sparrow	2003
New Critical Habitat Areas	3-10	U.S. Fish and Wildlife Service	chiploa_slabshell	2007
New Critical Habitat Areas	3-10	NOAA National Marine Fisheries Service	elkhorn	*
New Critical Habitat Areas	3-10	U.S. Fish and Wildlife Service	fat_three_ridge	2007
New Critical Habitat Areas	3-10	U.S. Fish and Wildlife Service	frosted_flatwoods_salamander	2009
New Critical Habitat Areas	3-10	U.S. Fish and Wildlife Service	gulf_moccansinshell	2007
New Critical Habitat Areas	3-10		gulf_sturgeon_lines	
New Critical Habitat Areas	3-10	U.S. Fish and Wildlife Service	ochlockonee_moccansinshell	2007
New Critical Habitat Areas	3-10	U.S. Fish and Wildlife Service	oval_pigtoe	2007
New Critical Habitat Areas	3-10	U.S. Fish and Wildlife Service	pipin_plover	2001
New Critical Habitat Areas	3-10	U.S. Fish and Wildlife Service	perdido_key_beach_mouse	2006
New Critical Habitat Areas	3-10	U.S. Fish and Wildlife Service	purple_bankclimber	2007
New Critical Habitat Areas	3-10	U.S. Fish and Wildlife Service	reticulated_flatwoods_salaman der	2009
New Critical Habitat Areas	3-10	U.S. Fish and Wildlife Service	shinyrayed_pocketbook	2007
New Critical Habitat Areas	3-10	U.S. Fish and Wildlife Service	st_andrews_beach_mouse	2006
New Critical Habitat Areas	3-10	NOAA National Marine Fisheries Service	staghorn	*
New Critical Habitat Areas	3-10	Fish Wildlife Commission Florida Wildlife Research Institute	right_whale	*
New Critical Habitat Areas	3-10	NOAA National Marine Fisheries Service	acropora_elkhorn_revised	*
New Critical Habitat Areas	3-10	NOAA National Marine Fisheries Service	smalltooth_sawfish	*
Lionfish Sightings	3-22	USGS	Lionfish Distribution Data	*

* *unpublished data*

Appendix C

Environmental Health

Figure Title	Figure	Source/Credits	Citation (Title)	Year
Watersheds	4-2	FDEP	TMDL Basin Groups	2006
Total Maximum Daily Load Basin Groups	4-3	FDEP	TMDL Basin Groups	2006
Status of Basin Management Action Plans (BMAP)	4-4	FDEP, WRM, Water Data Services Section	Statewide BMAP Areas	2011
Outstanding Florida Waters, 2010	4-5	DEP	outstanding_florida_waters	1996
Shellfish Harvesting Areas (Winter), 2005	4-6	Florida Department of Agriculture and Consumer Services, Division of Agriculture	Shellfish Harvesting Areas Florida Winter	2010

Coastal Access

Figure Title	Figure	Source/Credits	Citation (Title)	Year
Public Beach Access Sites	5-1	DEP/Florida Coastal Management Program	Public Beach Access Sites	2010
Florida State Parks	5-3	Florida Department of Environmental Protection/Division of Recreation and Parks/Office of Park Planning	Florida State Park Boundaries	2011
Greenways and Trails	5-5	University of Florida GeoPlan Center	Existing Trails	2008
Coastal and Aquatic Managed Areas	5-6	Bureau of Survey & Mapping, Division of State Lands	Aquatic Preserves (areas)	2012
Coastal and Aquatic Managed Areas	5-6	NOAA NERR Centralized Data Management Office	flnerr_jul10	2011
Coastal and Aquatic Managed Areas	5-6	NOAA / National Marine Sanctuaries Program	Florida National Marine Sanctuary	2004

Appendix C

Coastal Hazards

Figure Title	Figure	Source/Credits	Citation (Title)	Year
Major Hurricanes and Tropical Storms near Florida, 2004 - 2005	6-1	NOAA, National Climatic Data Center	Allstorms.ibtracs_all_lines.v03r03	2011
"At-Risk" Population in Coastal Counties as a Percent of Total Population in 2010	6-2	DEM, <i>Statewide Regional Evacuation Study</i>	n/a	2010
Change in Length of Critical Beach Erosion Areas by Coastal County, 2000 - 2010	6-15	Bureau of Beaches and Coastal Systems, <i>Critically Eroded Beaches in Florida</i>	n/a	2000, 2002, 2003, 2005, 2006, 2007, 2008, 2009, 2010

Environmental Stewardship

Figure Title	Figure	Source/Credits	Citation (Title)	Year
Florida Department of Environmental Protection Regulatory Districts	7-29	FDEP	FDEP Regulatory Districts (areas)	*

* *unpublished data*

Florida Coastal Zone

Legend

-  Florida Coastal Counties
-  Florida Interior Counties
-  Florida Territorial Waters



FACT 2010

The Florida Coastal Management Program is one of many entities, both public and private, involved in planning and implementing activities that affect the long-term health and vitality of Florida's rich coastal resources. An important part of planning for the future of these resources is maintaining a clear perspective on the how they are changing. The Florida Assessment of Coastal Trends (FACT) 2010 tracks the most recent changes in 65 indicators in order to help illustrate how resources have responded to policies and activities implemented by coastal resource managers. One of the primary goals of the FACT is to provide decision makers across the state with another tool to help them effectively plan for the future of Florida's coastal zone.

FACT 2010 covers the period from 2000 to 2010 and addresses eight focus areas:

- ▶ **Coastal Society**—major trends in population growth, land cover changes, water use, land use of the coastal environment, and employment trends in the coastal zone.
- ▶ **Coastal Habitats**— the trends in acreage and condition of natural coastal environments including seagrass, coral reefs, wetlands, springs, and shellfish, and trends in acres of submerged and uplands managed for conservation.
- ▶ **Living Resources**— trends in specific living creatures, rather than entire ecosystems, as indicators of coastal health. Indicators include fisheries, coral reef, threatened and endangered species, number of sea turtle nests, and manatee and right whale population and mortality.
- ▶ **Environmental Health**— the condition of coastal water quality, trends in the number and type of aquaculture facilities, fish and healthy beach advisories, harmful algae blooms, and red tide events.
- ▶ **Coastal Access**— trends in the level of public coastal access provided to residents and visitors to Florida through parks, greenways and recreational boating, the use of the public access, and the economic benefits of providing public access.
- ▶ **Coastal Hazards**— awareness of hazards that occur in coastal areas, community resiliency, preparedness, number of man-made hazard events such as hazardous material and vessel groundings.
- ▶ **Environmental Stewardship**— trends in community-based awareness and action involving citizens, volunteers, and local governments in coastal clean-ups, clean marinas, or environmental awareness programs.
- ▶ **Waterfront Revitalization**— analysis of the state of waterfront revitalization in Florida including trends in legislation, the Waterfronts Florida Program, and public and private support.

Florida Coastal Management Program
Florida Department of Environmental Protection
<http://www.dep.state.fl.us/cmp/>

