



Estero Bay Aquatic Preserve

Management Plan

Estero Bay Aquatic Preserve

700-1 Fisherman's Wharf

Fort Myers Beach, FL 33931

(239) 463-3240 • www.dep.state.fl.us/coastal/sites/estero

Florida Department of Environmental Protection

Florida Coastal Office

3900 Commonwealth Blvd., MS #235

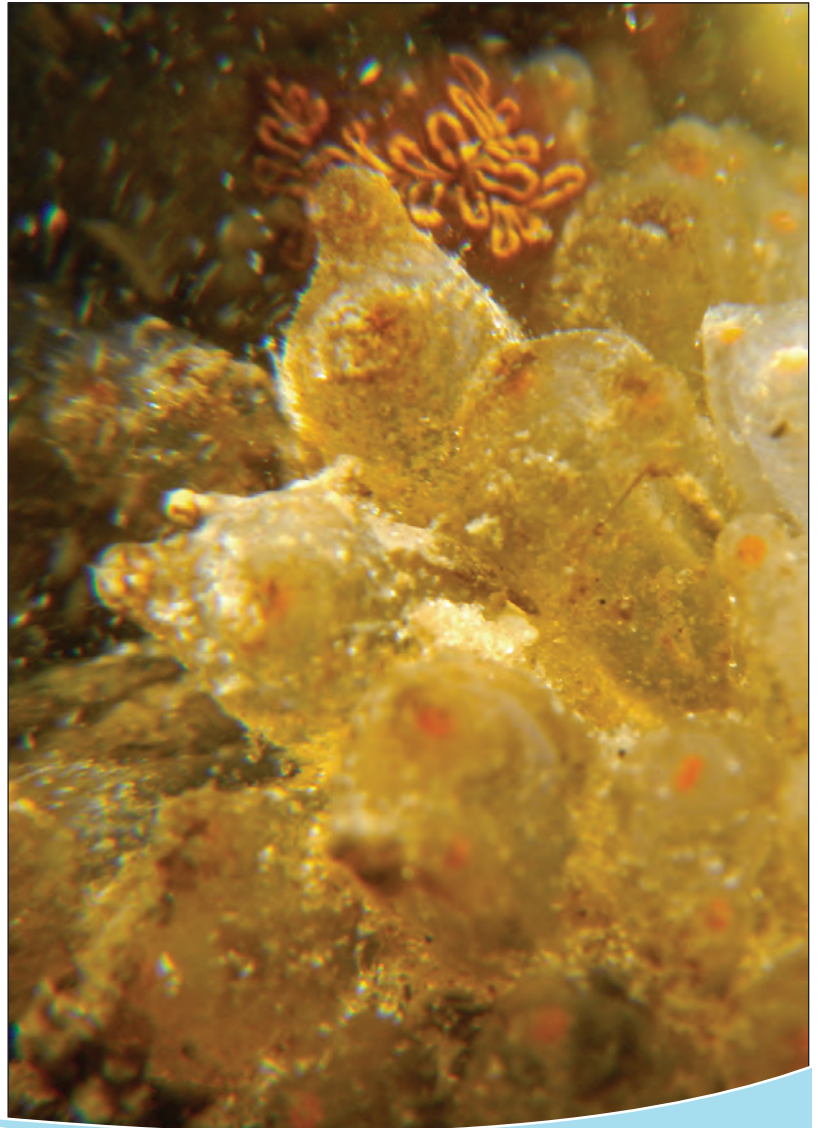
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October 2015



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*Above: Red mangrove prop roots reaching down into Estero Bay Aquatic Preserve.
Cover photo: Looking west across Estero Bay Aquatic Preserve to the Gulf of Mexico.
Title page photo: Colonial tunicates improve water clarity through their filtering ability.*

Mission Statement


The mission of the Florida Coastal Office in relation to Florida's 41 aquatic preserves, three National Estuarine Research Reserves, National Marine Sanctuary and Coral Reef Conservation Program is conserving and restoring Florida's coastal and aquatic resources for the benefit of people and the environment.

The four long-term goals of the Florida Coastal Office Aquatic Preserve Program are to:

1. protect and enhance the ecological integrity of the aquatic preserves;
2. restore areas to their natural condition;
3. encourage sustainable use and foster active stewardship by engaging local communities in the protection of aquatic preserves; and
4. improve management effectiveness through a process based on sound science, consistent evaluation, and continual reassessment.

Executive Summary

Estero Bay Aquatic Preserve Management Plan	
Lead Agency:	Florida Department of Environmental Protection's (DEP) Florida Coastal Office (FCO)
Common Name of Property:	Estero Bay Aquatic Preserve
Location:	Lee County, Florida
Acreage Total:	13,829 acres
<i>Acreage Breakdown for FCO Management Units According to Florida Natural Areas Inventory (FNAI) Natural Community Types</i>	
<i>FNAI Natural Communities</i>	<i>Acreage according to GIS</i>
Beach Dune:	<1 acre
Blackwater Stream:	207 acres
Mollusk Reef:	65 acres
Sponge Bed:	<1 acre
Algal Bed:	564 acres
Unconsolidated Substrate:	5,675 acres
Coastal Berm:	<1 acre
Seagrass Bed:	3,301 acres
Salt Marsh:	3 acres
Mangrove Swamp:	1,149 acres
Ruderal:	67 acres
Total Acreage:	11,031 (This number does not match the "Acreage Total" above due to 2011 GIS mapping. "Missing" acreage is either privately or publically-owned uplands.)
Management Agency:	DEP's FCO
Designation:	Aquatic Preserve
Unique Features:	Designated as Florida's first Aquatic Preserve in 1966. Estero Bay Aquatic Preserve is fed by five freshwater tributaries.
Archaeological/ Historical Sites:	The Department of State Division of Historical Resources Master Site File has identified thirteen archaeological and historical sites located within or adjacent to coastal areas of Estero Bay; prehistoric shell middens, terrestrial remains of building, historic boat refuse/hulls and a WWII aircraft wreckage/crash site.
Management Needs / See Management Issues and Goals	
Ecosystem Science:	Monitoring programs within the bay conducted by aquatic preserve staff include multiple water quality monitoring efforts, seagrass monitoring and colonial nesting wading and diving bird monitoring. The continuation of these monitoring programs is vital to maintaining an understanding of the health of the bay and recognizing long-term patterns.
Resource Management:	Continuation of habitat management initiatives such as the No Internal Combustion Motor Zones for passive seagrass bed restoration, Critical Wildlife Area designations for protection of rookery islands, and the Asian green mussel eradication program which addresses potential threats from the invasive exotic species are an important means to preserving the viability of the estuary's natural resources. As such, these efforts should continue to be initiated and supported.
Education & Outreach:	Long-term and seasonal residents and tourists create a continually fluctuating population. Constant resident turnover means education and outreach efforts must be ongoing.
Public Use:	As population within the area continues to increase, cumulative impacts from watershed development and sheer numbers of residents and tourists utilizing the bay will continue to rise. Consequently, pressure on the bay's resources will escalate. As such, smart growth initiatives, science-based sustainable land-use strategies and low-impact recreational opportunities need to be encouraged.
Public Involvement:	Public support is vital to the success of government conservation programs. The goal is to foster understanding of the problems facing these fragile ecosystems and the steps needed to adequately manage this important habitat. Estero Bay Aquatic Preserve held one public meeting and one advisory committee meeting locally to receive input on the draft management plan. In addition, the August 15, 2014 Acquisition and Restoration Council (ARC) meeting was a public meeting in which citizens could comment on the management plan.



Coastal Zone Management Issues: The State of Florida has more than 17 million residents and more than 76 million visitors annually. Florida also has the second longest coastline of any state. Nowhere else in the country are so many people so close to such an extensive and economically valuable coastline. Within these coastal communities, recreational activities such as boating, fishing and diving shape community culture and provide positive economic growth. However, rapid coastal development, increasing public access and changing land use patterns are complicating regulation and management efforts within valuable aquatic and coastal systems. To protect and enhance the unique coastal resources throughout Florida, a variety of issues that affect water quality, quantity and growth management must be addressed (DEP, 2006a). Current management issues and concerns facing the Estero Bay Aquatic Preserve include increased nutrient loading and subsequent declining water quality, altered timing and flow of freshwater input, impacts to aquatic resources and native species, and ineffective public awareness due to high resident turnover rates. These issues and concerns can be addressed through hands-on management and restoration of resources, resource protection, effective education and outreach efforts, and public use evaluations. Additionally, aquatic preserve goals will necessitate effective partnerships with a variety of private, local, regional, state and federal entities to protect the biodiversity and productivity of the bay system.

Goals: The management goals and associated strategies outlined in this document provide an action plan over the course of the next decade that will be used to address the challenges mentioned above. Due to limited resources and the overlap of jurisdictional boundaries, success will depend on partnerships formed with private, local, regional, state, and federal organizations and agencies. Partnerships will be formed to promote the maintenance or improvement of the quality of water reaching the aquatic preserve to meet the needs of the natural resources. Routine assessment of water quality status is required to document change over time. Resource management goals that will improve water quality include hydrologic restoration, muck removal and creation of oyster reef habitat. Documentation of natural resource location and extent will allow managers to evaluate the success of large-scale watershed restoration projects. Maintenance of a safe environment for fish, wildlife, and user groups, and the promotion of low-impact recreational opportunities and good stewardship are also important goals that will be addressed by aquatic preserve staff. Prioritizing issues, objectives and strategies will lead to a cohesive management program and the long-term conservation of the natural system.

FCO/Trustees Approval

FCO approval date: April 12, 2014

Trustees approval date: October 27, 2015

ARC approval date: August 15, 2014

Comments:

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A sea star and sponge anchor themselves to a clump of oysters.

Part I

Basis for Management

Chapter One

Introduction

The Florida aquatic preserves are administered on behalf of the state by the Florida Department of Environmental Protection's (DEP) Florida Coastal Office (FCO) as part of a network that includes 41 aquatic preserves, three National Estuarine Research Reserves (NERRs), a National Marine Sanctuary, the Coral Reef Conservation Program and the Florida Oceans and Coastal Council. This provides for a system of significant protections to ensure that our most popular and ecologically important underwater ecosystems are cared for in perpetuity. Each of these special places is managed with strategies based on local resources, issues and conditions.

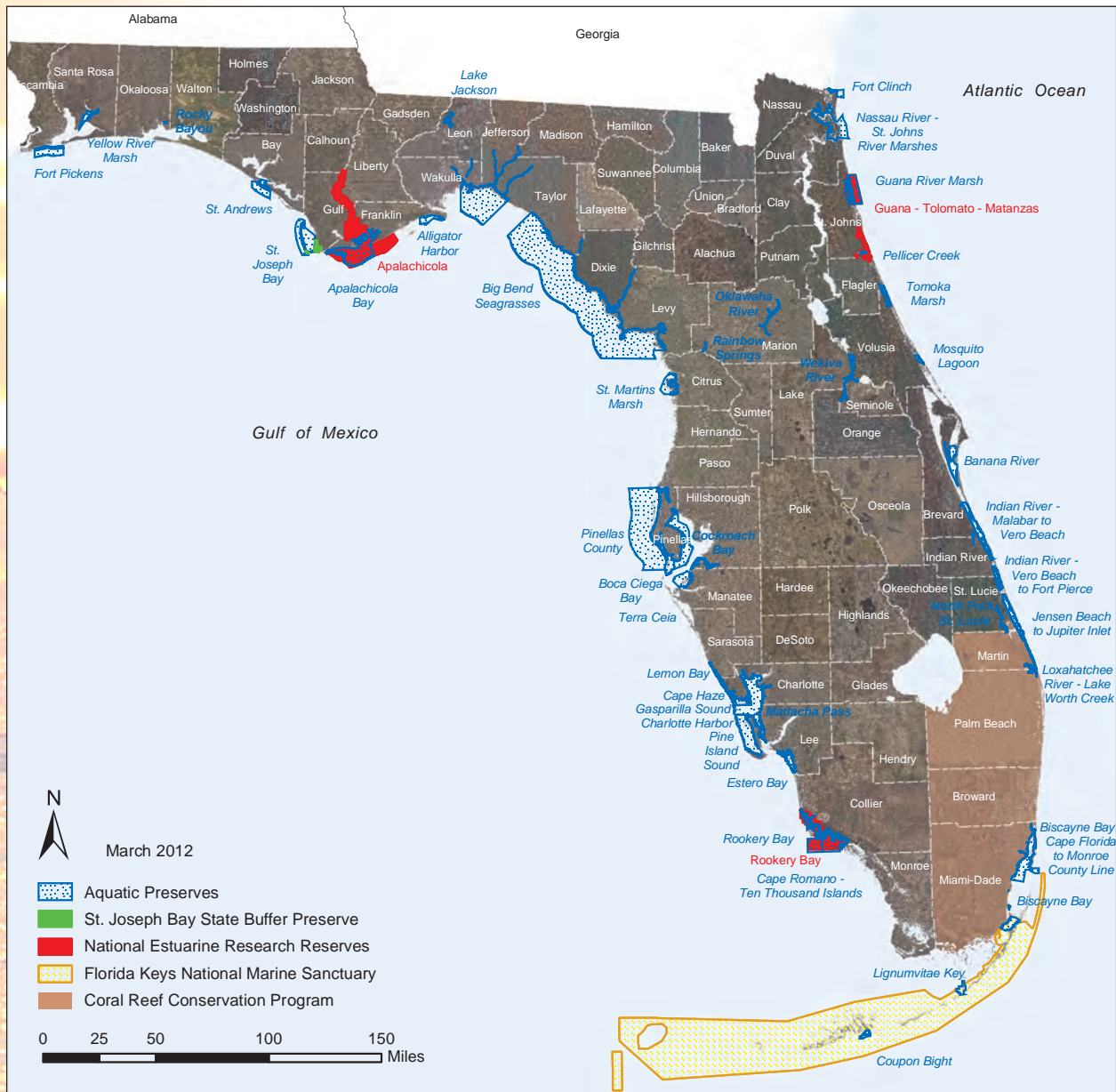
Our expansive coastline and wealth of aquatic resources have defined Florida as a subtropical oasis, attracting millions of residents and visitors, and the businesses that serve them. Florida's submerged lands play important roles in maintaining good water quality, hosting a diversity of wildlife and habitats (including economically and ecologically valuable nursery areas), and supporting a treasured quality of life for all. In the 1960s, it became apparent that the ecosystems that had attracted so many people to Florida could not support rapid growth without science-based resource protection and management. To this end, state legislators provided extra protection for certain exceptional aquatic areas by designating them as aquatic preserves.

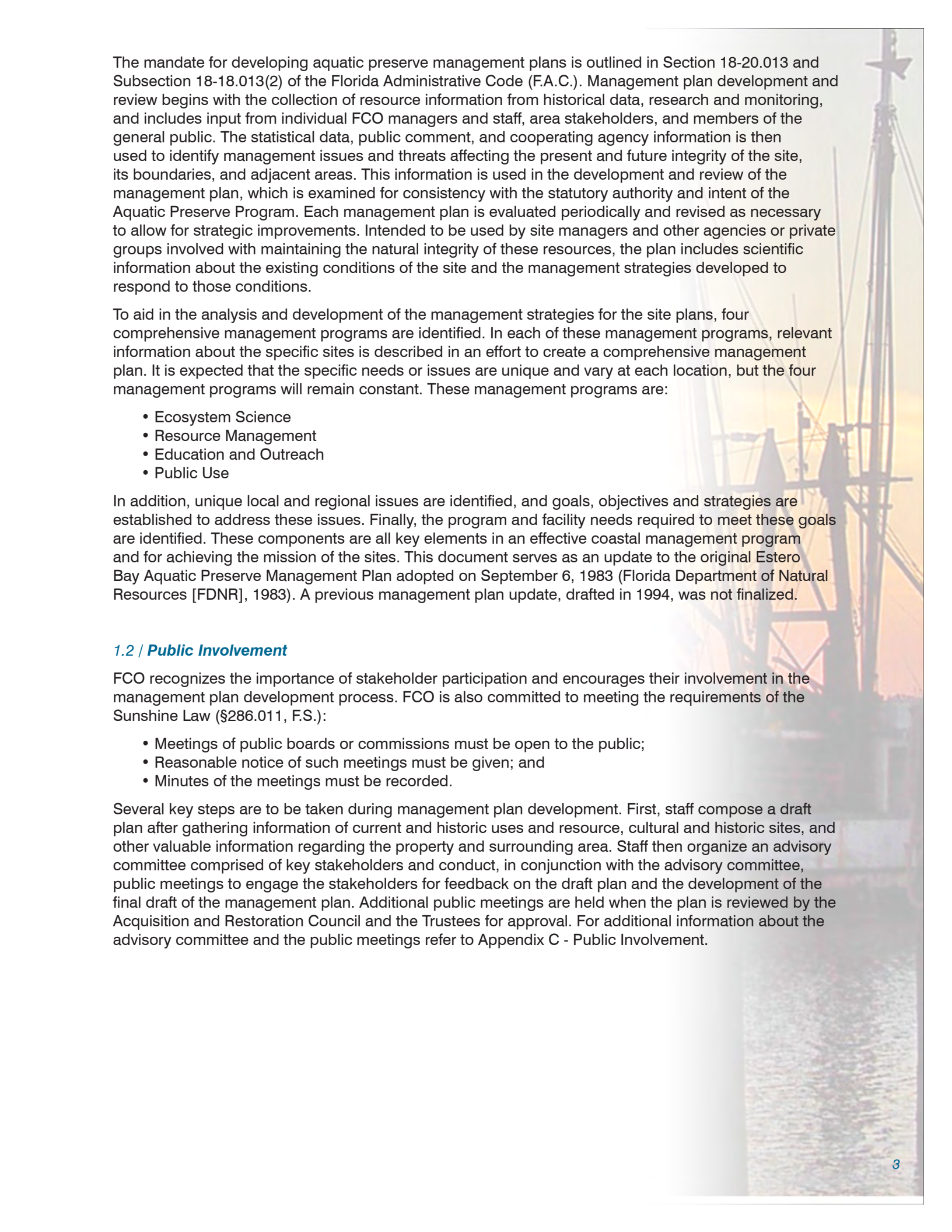
Title to submerged lands not conveyed to private landowners is held by the Board of Trustees of the Internal Improvement Trust Fund (the Trustees). The Governor and Cabinet, sitting as the Trustees, act as guardians for the people of the State of Florida (§253.03, Florida Statutes [F.S.]) and regulate the use of these public lands. Through statute, the Trustees have the authority to adopt rules related to the management of sovereignty submerged lands (Florida Aquatic Preserve Act of 1975, §258.36, F.S.). A higher layer of protection is afforded to aquatic preserves including areas of sovereignty lands that have been "set aside forever as aquatic preserves or sanctuaries for the benefit of future generations" due to "exceptional biological, aesthetic, and scientific value" (Florida Aquatic Preserve Act of 1975, §258.36, F.S.).

This tradition of concern and protection of these exceptional areas continues, and now includes: the Rookery Bay NERR in Southwest Florida, designated in 1978; the Apalachicola NERR in Northwest Florida, designated in 1979; and the Guana Tolomato Matanzas NERR in Northeast Florida, designated in 1999. In addition, the Florida Oceans and Coastal Council was created in 2005 to develop Florida's ocean and coastal research priorities, and establish a statewide ocean research plan. The group also coordinates public and private ocean research for more effective coastal management. This dedication to the conservation of coastal and ocean resources is an investment in Florida's future.

1.1 | Management Plan Purpose and Scope

With increasing development, recreation and economic pressures, our aquatic resources have the potential to be significantly impacted, either directly or indirectly. These potential impacts to resources can reduce the health and viability of the ecosystems that contain them, requiring active management to ensure the long-term health of the entire network. Effective management plans for the aquatic preserves are essential to address this goal and each site's own set of unique challenges. The purpose of these plans is to incorporate, evaluate and prioritize all relevant information about the site into a cohesive management strategy, allowing for appropriate access to the managed areas while protecting the long-term health of the ecosystems and their resources.





The mandate for developing aquatic preserve management plans is outlined in Section 18-20.013 and Subsection 18-18.013(2) of the Florida Administrative Code (F.A.C.). Management plan development and review begins with the collection of resource information from historical data, research and monitoring, and includes input from individual FCO managers and staff, area stakeholders, and members of the general public. The statistical data, public comment, and cooperating agency information is then used to identify management issues and threats affecting the present and future integrity of the site, its boundaries, and adjacent areas. This information is used in the development and review of the management plan, which is examined for consistency with the statutory authority and intent of the Aquatic Preserve Program. Each management plan is evaluated periodically and revised as necessary to allow for strategic improvements. Intended to be used by site managers and other agencies or private groups involved with maintaining the natural integrity of these resources, the plan includes scientific information about the existing conditions of the site and the management strategies developed to respond to those conditions.

To aid in the analysis and development of the management strategies for the site plans, four comprehensive management programs are identified. In each of these management programs, relevant information about the specific sites is described in an effort to create a comprehensive management plan. It is expected that the specific needs or issues are unique and vary at each location, but the four management programs will remain constant. These management programs are:

- Ecosystem Science
- Resource Management
- Education and Outreach
- Public Use

In addition, unique local and regional issues are identified, and goals, objectives and strategies are established to address these issues. Finally, the program and facility needs required to meet these goals are identified. These components are all key elements in an effective coastal management program and for achieving the mission of the sites. This document serves as an update to the original Estero Bay Aquatic Preserve Management Plan adopted on September 6, 1983 (Florida Department of Natural Resources [FDNR], 1983). A previous management plan update, drafted in 1994, was not finalized.

1.2 / Public Involvement

FCO recognizes the importance of stakeholder participation and encourages their involvement in the management plan development process. FCO is also committed to meeting the requirements of the Sunshine Law (§286.011, F.S.):

- Meetings of public boards or commissions must be open to the public;
- Reasonable notice of such meetings must be given; and
- Minutes of the meetings must be recorded.

Several key steps are to be taken during management plan development. First, staff compose a draft plan after gathering information of current and historic uses and resource, cultural and historic sites, and other valuable information regarding the property and surrounding area. Staff then organize an advisory committee comprised of key stakeholders and conduct, in conjunction with the advisory committee, public meetings to engage the stakeholders for feedback on the draft plan and the development of the final draft of the management plan. Additional public meetings are held when the plan is reviewed by the Acquisition and Restoration Council and the Trustees for approval. For additional information about the advisory committee and the public meetings refer to Appendix C - Public Involvement.



Sea nettle in Estero Bay.

Chapter Two

The Florida Department of Environmental Protection's Florida Coastal Office

2.1 / Introduction

The Florida Department of Environmental Protection (DEP) protects, conserves and manages Florida's natural resources and enforces the state's environmental laws. The DEP is the lead agency in state government for environmental management and stewardship and commands one of the broadest charges of all the state agencies, protecting Florida's air, water and land. The DEP is divided into three primary areas: Regulatory Programs, Land and Recreation, and Water Policy and Ecosystem Restoration. Florida's environmental priorities include restoring America's Everglades; improving air quality; restoring and protecting the water quality in our springs, lakes, rivers and coastal waters; conserving environmentally-sensitive lands; and providing citizens and visitors with recreational opportunities, now and in the future.

The Florida Coastal Office (FCO) is the unit within the DEP that manages more than four million acres of submerged lands and select coastal uplands. This includes 41 aquatic preserves, three National Estuarine Research Reserves (NERRs), the Florida Keys National Marine Sanctuary and the Coral Reef Conservation Program. The three NERRs, the Florida Keys National Marine Sanctuary and the Coral Reef Conservation Program are managed in cooperation with the National Oceanic and Atmospheric Administration (NOAA).

FCO manages sites in Florida for the conservation and protection of natural and historical resources and resource-based public use that is compatible with the conservation and protection of these lands. FCO is a strong supporter of the NERR system and its approach to coastal ecosystem management. The state of Florida has three designated NERR sites, each encompassing at least one aquatic preserve within its boundaries. Rookery Bay NERR includes Rookery Bay Aquatic Preserve and Cape Romano - Ten Thousand Islands Aquatic Preserve; Apalachicola NERR includes Apalachicola Bay Aquatic Preserve; and Guana Tolomato Matanzas NERR includes Guana River Marsh Aquatic Preserve and Pellicer Creek

Aquatic Preserve. These aquatic preserves provide discrete areas designated for additional protection beyond that of the surrounding NERR and may afford a foundation for additional protective zoning in the future.

Each of the Florida NERR managers serves as a regional manager overseeing multiple other aquatic preserves in their region. This management structure advances FCO's ability to manage its sites as part of the larger statewide system.

2.2 / *Management Authority*

Established by law, aquatic preserves are submerged lands of exceptional beauty that are to be maintained in their natural or existing conditions. The intent was to forever set aside submerged lands with exceptional biological, aesthetic, and scientific values as sanctuaries, called aquatic preserves, for the benefit of future generations.

The laws supporting aquatic preserve management are the direct result of the public's awareness of and interest in protecting Florida's aquatic environment. The extensive dredge and fill activities that occurred in the late 1960s spawned this widespread public concern. In 1966, the Board of Trustees of the Internal Improvement Trust Fund (the Trustees) created the first aquatic preserve, Estero Bay, in Lee County.

In 1967, the Florida Legislature passed the Randall Act (Chapter 67-393, Laws of Florida), which established procedures regulating previously unrestricted dredge and fill activities on state-owned submerged lands. That same year, the Legislature provided the statutory authority (§253.03, Florida Statutes [F.S.]) for the Trustees to exercise proprietary control over state-owned lands. Also in 1967, government focus on protecting Florida's productive water bodies from degradation due to development led the Trustees to establish a moratorium on the sale of submerged lands to private interests. An Interagency Advisory Committee was created to develop strategies for the protection and management of state-owned submerged lands.

In 1968, the Florida Constitution was revised to declare in Article II, Section 7, the state's policy of conserving and protecting natural resources and areas of scenic beauty. That constitutional provision also established the authority for the Legislature to enact measures for the abatement of air and water pollution. Later that same year, the Interagency Advisory Committee issued a report recommending the establishment of 26 aquatic preserves.

The Trustees acted on this recommendation in 1969 by establishing 16 aquatic preserves and adopting a resolution for a statewide system of such preserves. In 1975 the state Legislature passed the Florida Aquatic Preserve Act of 1975 (Act) that was enacted as Chapter 75-172, Laws of Florida, and later became Chapter 258, Part II, F.S. This Act codified the already existing aquatic preserves and established standards and criteria for activities within those preserves. Additional aquatic preserves were individually adopted at subsequent times up through 1989.

In 1980, the Trustees adopted the first aquatic preserve rule, Chapter 18-18, Florida Administrative Code (F.A.C.), for the administration of the Biscayne Bay Aquatic Preserve. All other aquatic preserves are administered under Chapter 18-20, F.A.C., which was originally adopted in 1981. These rules apply standards and criteria for activities in the aquatic preserves, such as dredging, filling, building docks and other structures that are stricter than those of Chapter 18-21, F.A.C., which apply to all sovereignty lands in the state.

This plan is in compliance with the Conceptual State Lands Management Plan, adopted March 17, 1981 by the Trustees and represents balanced public utilization, specific agency statutory authority, and other legislative or executive constraints. The Conceptual State Lands Management Plan also provides essential guidance concerning the management of sovereignty lands and aquatic preserves and their important resources, including unique natural features, seagrasses, endangered species, and archaeological and historical resources.

Through delegation of authority from the Trustees, the DEP and FCO have proprietary authority to manage the sovereignty lands, the water column, spoil islands (which are merely deposits of sovereignty lands), and some of the natural islands and select coastal uplands to which the Trustees hold title.

Enforcement of state statutes and rules relating to criminal violations and non-criminal infractions rests with the Florida Fish and Wildlife Conservation Commission (Appendix A.4.1) and local law enforcement agencies. Enforcement of administrative remedies rests with FCO, the DEP Districts, and Water Management Districts.

2.3 / Statutory Authority

The fundamental laws providing management authority for the aquatic preserves are contained in Chapters 258 and 253, F.S. These statutes establish the proprietary role of the Governor and Cabinet, sitting as the Board of Trustees of the Internal Improvement Trust Fund, as Trustees over all sovereignty lands. In addition, these statutes empower the Trustees to adopt and enforce rules and regulations for managing all sovereignty lands, including aquatic preserves. The Florida Aquatic Preserve Act was enacted by the Florida Legislature in 1975 and is codified in Chapter 258, F.S.

The legislative intent for establishing aquatic preserves is stated in Section 258.36, F.S.: “It is the intent of the Legislature that the state-owned submerged lands in areas which have exceptional biological, aesthetic, and scientific value, as hereinafter described, be set aside forever as aquatic preserves or sanctuaries for the benefit of future generations.” This statement, along with the other applicable laws, provides a foundation for the management of aquatic preserves. Management will emphasize the preservation of natural conditions and will include lands that are specifically authorized for inclusion as part of an aquatic preserve.

Management responsibilities for aquatic preserves may be fulfilled directly by the Trustees or by staff of the DEP through delegation of authority. Other governmental bodies may also participate in the management of aquatic preserves under appropriate instruments of authority issued by the Trustees. FCO staff serves as the primary managers who implement provisions of the management plans and rules applicable to the aquatic preserves. FCO does not “regulate” the lands per se; rather, that is done primarily by the DEP Districts (in addition to the Water Management Districts) which grant regulatory permits. The Florida Department of Agriculture and Consumer Services through delegated authority from the Trustees, may issue proprietary authorizations for marine aquaculture within the aquatic preserves and regulates all aquaculture activities as authorized by Chapter 597, Florida Aquaculture Policy Act, F.S. Staff evaluates proposed uses or activities in the aquatic preserve and assesses the possible impacts on the natural resources. Project reviews are primarily evaluated in accordance with the criteria in the Act, Chapter 18-20, F.A.C., and this management plan.

FCO staff comments, along with comments of other agencies and the public are submitted to the appropriate permitting staff for consideration in their issuance of any delegated authorizations in aquatic preserves or in developing recommendations to be presented to the Trustees. This mechanism provides a basis for the Trustees to evaluate public interest and the merits of any project while also considering potential environmental impacts to the aquatic preserves. Any activity located on sovereignty lands requires a letter of consent, a lease, an easement, or other approval from the Trustees.

Many provisions of the Florida Statutes that empower non-FCO programs within DEP or other agencies may be important to the management of FCO sites. For example, Chapter 403, F.S., authorizes rules concerning the designation of “Outstanding Florida Waters” (OFWs), a program that provides aquatic preserves with additional regulatory protection. Chapter 379, F.S., regulates saltwater fisheries, and provides enforcement authority and powers for law enforcement officers. Additionally, it provides similar powers relating to wildlife conservation and management. The sheer number of statutes that affect aquatic preserve management prevents an exhaustive list of all such laws from being provided here.

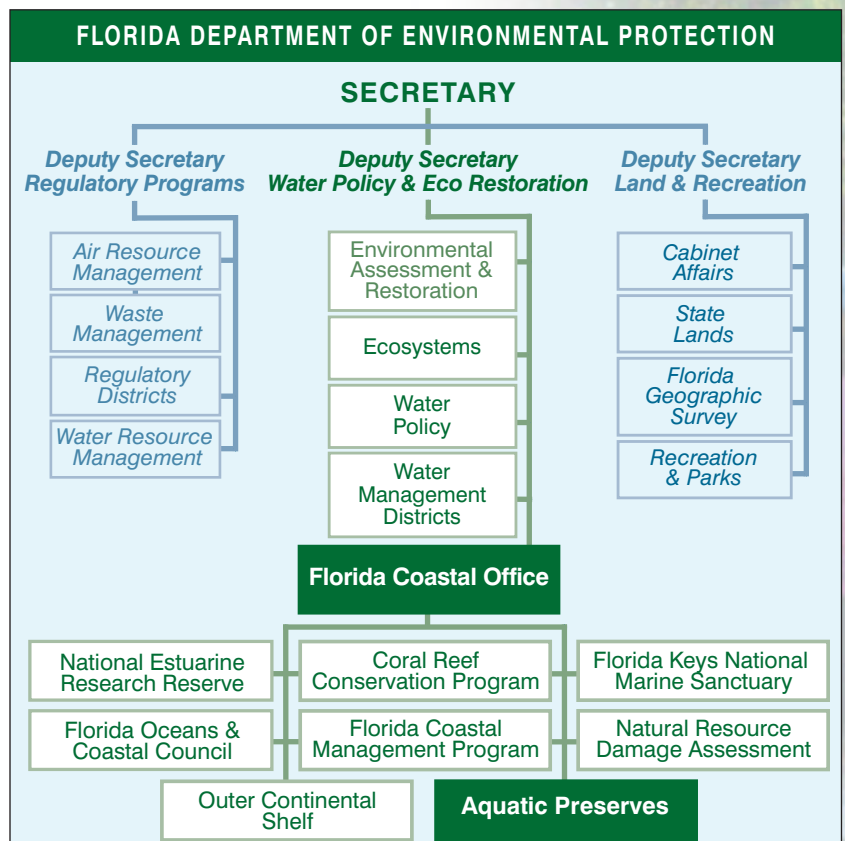


Figure 1 / State structure for managing Aquatic Preserves.

2.4 / Administrative Rules

Chapters 18-18, 18-20 and 18-21, F.A.C., are the three administrative rules directly applicable to the uses allowed in aquatic preserves specifically and sovereignty lands generally. These rules are intended to be cumulative, meaning that Chapter 18-21, F.A.C., should be read together with Chapter 18-18, F.A.C., or Chapter 18-20, F.A.C., to determine what activities are permissible within an aquatic preserve. If Chapter 18-18, F.A.C., or Chapter 18-20, F.A.C., are silent on an issue, Chapter 18-21, F.A.C., will control; if a conflict is perceived between the rules, the stricter standards of Chapter 18-18, F.A.C., or Chapter 18-20, F.A.C., supersede those of Chapter 18-21, F.A.C. Because Chapter 18-21, F.A.C. concerns all sovereignty lands, it is logical to discuss its provisions first.

Originally codified in 1982, Chapter 18-21, F.A.C., is meant “to aid in fulfilling the trust and fiduciary responsibilities of the Board of Trustees of the Internal Improvement Trust Fund for the administration, management and disposition of sovereignty lands; to insure maximum benefit and use of sovereignty lands for all the citizens of Florida; to manage, protect and enhance sovereignty lands so that the public may continue to enjoy traditional uses including, but not limited to, navigation, fishing and swimming; to manage and provide maximum protection for all sovereignty lands, especially those important to public drinking water supply, shellfish harvesting, public recreation, and fish and wildlife propagation and management; to insure that all public and private activities on sovereignty lands which generate revenues or exclude traditional public uses provide just compensation for such privileges; and to aid in the implementation of the State Lands Management Plan.”

To that end, Chapter 18-21, F.A.C., contains provisions on general management policies, forms of authorization for activities on sovereignty lands, and fees applicable for those activities. “Activity,” in the context of the rule, includes “construction of docks, piers, boat ramps, boardwalks, mooring pilings, dredging of channels, filling, removal of logs, sand, silt, clay, gravel or shell, and the removal or planting of vegetation” (Rule 18-21.003, F.A.C.). To be authorized on sovereignty lands, activities must be not contrary to the public interest (Rule 18-21.004, F.A.C.).

Chapter 18-21, F.A.C., also sets policies on aquaculture, geophysical testing (using gravity, shock wave and other geological techniques to obtain data on oil, gas or other mineral resources), and special events related to boat shows and boat displays. Of particular importance to FCO site management, it additionally addresses spoil islands, preventing their development in most cases.

Chapters 18-18 and 18-20, F.A.C., apply standards and criteria for activities in the aquatic preserves that are stricter than those of Chapter 18-21, F.A.C. Chapter 18-18, F.A.C., is specific to the Biscayne Bay Aquatic Preserve and is more extensively described in that site’s management plan. Chapter 18-20, F.A.C., is applicable to all other aquatic preserves. It further restricts the type of activities for which authorizations may be granted for use of sovereignty lands and requires that structures that are authorized be limited to those necessary to conduct water dependent activities. Moreover, for certain activities to be authorized, “it must be demonstrated that no other reasonable alternative exists which would allow the proposed activity to be constructed or undertaken outside the preserve” (Paragraph 18-20.004(1)(g), F.A.C.).

Chapter 18-20, F.A.C., expands on the definition of “public interest” by outlining a balancing test that is to be used to determine whether benefits exceed costs in the evaluation of requests for sale, lease, or transfer of interest of sovereignty lands within an aquatic preserve. The rule also provides for the analysis of the cumulative impacts of a request in the context of prior, existing, and pending uses within the aquatic preserve, including both direct and indirect effects.

Chapter 18-20, F.A.C., directs management plans and resource inventories to be developed for every aquatic preserve. Further, the rule provides provisions specific to certain aquatic preserves and indicates the means by which the Trustees can establish new or expand existing aquatic preserves.

As with statutes, aquatic preserve management relies on the application of many other DEP and outside agency rules. Perhaps most notably, Chapter 62-302, F.A.C., concerns the classification of surface waters, including criteria for OFW, a designation that provides for the state’s highest level of protection for water quality. All aquatic preserves contain OFW designations. No activity may be permitted within an OFW that degrades ambient water quality unless the activity is determined to be in the public interest. Once again, the list of other administrative rules that do not directly address FCO’s responsibilities but do affect FCO sites is so long as to be impractical to create within the context of this management plan.



Sunset over Estero Bay Aquatic Preserve.

Chapter Three

The Estero Bay Aquatic Preserve

3.1 / Description of Representative Ecosystem Region

3.1.1 / Historical Background

The history of human use of the aquatic preserve and habitation on its surrounding uplands extends back thousands of years. The Archaic Period, 6500 B.C. – 500 B.C., is possibly the earliest evidence of human habitation on the adjacent Estero Bay Preserve State Park (EBPSP). Archaeological sites dating to the Late Archaic have been identified on the Bonita Bay Development, which is just east of the aquatic preserve, although the majority of presently known archaeological sites within the immediate vicinity date from approximately 1550 A.D. to the 20th century. Estero Bay falls within the Caloosahatchee Culture Area, which lasted from 500 B.C. to the time of Spanish contact. Indications are that Native American populations occupied much of the area during this period (Florida Department of Environmental Protection [DEP], 2004).

Ponce de Leon explored areas along Florida's Gulf Coast in 1513 and 1521, and the barrier islands of Lee County are believed to be one of his many stops (Greater Fort Myers Chamber of Commerce, Inc., 2009). There he found the Calusa Indians, which inhabited the Charlotte Harbor and Estero Bay areas during the Caloosahatchee V period, A.D. 1513 – A.D. 1750. The Calusa capital city, Calos, was located on Mound Key, which is located within the aquatic preserve and is managed by DEP's Division of Recreation and Parks (DRP). "The Calusa Indian population significantly declined in the 1600s due to the introduction of European diseases and warfare. By the mid-18th century, coastal Lee County saw an influx of Cuban fisher folk. In the early 1700s, the Creek Indians from the southeastern United States came to Florida, following population pressures and conflict with Europeans. The Creek Indians became known as the Seminoles and occupied much of southwest Florida. Following the Indian Removal Act of

1830 and the Second Seminole War (1835-1842), significant Anglo-American settlement began in the area. Conflict and disease eventually led to the decimation and dispersal of the Seminole Indians from the area. In 1894, an Anglo-American settler named Cyrus Teed settled in Estero, establishing a religious sect known as the Koreshan Unity along the Estero River. Following Teed's death in 1908, membership began to decline and in 1961, remaining Koreshan members gave 305 acres to the state of Florida, most of which later became the Koreshan State Historic Site" (DEP, 2004).

Florida became a U.S. Territory in 1821. In 1845, Florida became the twenty-seventh state and Lee County, named after General Robert E. Lee, was established from Monroe County in 1823. As the county seat, Fort Myers became incorporated in 1886. Located on the south bank of the Caloosahatchee River, Fort Myers has been home to soldiers, ranchers, cowboys, snowbirds and inventors. Named after Colonel Abraham Myers, Fort Myers was founded in 1850 as a military outpost during the Seminole Wars. The fort saw service again as a Union outpost during the Civil War and was officially retired from military service in 1865. Almost immediately the abandoned Fort Myers became home to settler families, land speculators and Florida crackers (our cowboys and cowgirls) (City of Fort Myers [CFM], 2009).

By 1886, the Town of Fort Myers was established, the Fort Myers Press was printing and world famous inventor Thomas Alva Edison called Fort Myers his winter home. During this period Fort Myers became the county seat of the newly formed Lee County and tourism boomed as offshore tarpon fishing enticed sport fishermen and adventurers from around the world (CFM, 2009).

Fort Myers saw amazing growth through the 1920s until the combination of a failing real estate market and crashing stock market sent the town into depression. During this time Fort Myers was aided through federal works projects that changed the face of downtown. The new federal post office building, the Edison Bridge and the Yacht Basin all made significant improvements to the struggling downtown (CFM, 2009).

It was a return to Fort Myers' military heritage that would bring all of southwest Florida out of depression and into prosperity. The establishment of Buckingham Army Air Field and Page Field during World War II brought thousands of service men and women to Lee County and gave local business a much needed boost with government contracts and services for the two bases.

Since the 1950s, southwest Florida and Fort Myers have seen amazing growth and prosperity and have become premiere destinations for sun-seekers, investors and retirees. As we move forward to the future, Fort Myers will continue to hold "post" as the center of commerce, government and entertainment for the ever-growing southwest Florida community (CFM, 2009).

Estero Bay Aquatic Preserve, originally established as an Offshore Preserve in 1966, is Florida's first aquatic preserve, predating the agency that administers it, DEP. The motivation for the creation of the aquatic preserve was a growing awareness that coastal development was destroying the natural areas needed to maintain a healthy fishery. For some people this was primarily an esthetic and/or environmental issue. Others were concerned about the detrimental effect this was having on the commercial and recreational fishing industries, as well as other industries reliant on tourism, then as now a major economic engine of the region.

Just two hours north of Lee County, Boca Ciega Bay, in Pinellas County, had experienced a collapse of its fishery not long before, due to extensive dredging and filling done to create finger canals and seawalls for condo development. As was noted at the time, dredge and fill operations created a double problem, the first being the obvious removal of the mangrove shoreline, used by many marine species in their younger stages to escape predation. But the second and less obvious result was the destruction of large areas of seagrass beds, rich feeding grounds for many species of commercial and sport fish.

Photos of north Estero Island taken in 1947 reveal the finger canals that had been cut as early as the 1920s. To the immediate north in Lee County, the Rosen brothers were beginning to carve out Cape Coral from coastal waters, mangrove and uplands considered prime hunting grounds by the old-timers. The dredging for Siesta Keys (Sarasota County) about this time was an omen that Estero Bay was going the way of Boca Ciega Bay. Map 2 contains geo-rectified 1944 aerial photographs and historical views of the initial 1966 (northern half), added 1983 (southern half) and present day aquatic preserve boundary.

There were many state and local groups that voiced concern, and probably the voice heard the most was the Lee County Conservation Association (LCCA) formed by fisherman, conservationists and other concerned citizens. During the course of producing a 40th anniversary video in 2006, the staff of Estero Bay Aquatic Preserve recovered the records of the LCCA from the Southwest Florida Museum of History in Fort Myers. LCCA records indicate that there was an effort in the early 1960s to include the bay within the newly formed Koreshan State Historic Site. However, concerns were raised regarding Florida Park Service fishing regulations. Since the majority of the people interested in the conservation of the bay were fisherman of some type, turning over administration of the bay to the Florida Park Service had some potential problems associated with it.

It should be recalled that at that time there were no “aquatic preserves,” “aquatic parks” or “aquatic conservation areas” of any type in Florida, and very few models worldwide. Therefore, the suggestion in 1966 that an “offshore preserve” be established in Estero Bay was a fairly novel one. From interviews taken by aquatic preserve staff in 2006 of people involved with the effort in the late 1950s and early 1960s, it seems that the progress made in establishment of the aquatic preserve was the result of two political forces, one local and one in Tallahassee.

The local force was the LCCA under the leadership of Bill Mellor of Fort Myers. At the same time, leadership in Tallahassee was becoming more sensitive to environmental issues. There was a growing awareness that the old policy of selling submerged lands for development was in fact harming the state’s various economic activities, at a rather small profit to the state in terms of revenue. Ney Landrum, at that time the Director of the Florida Outdoor Recreational Planning Committee, agreed to a public meeting in Fort Myers regarding the creation of an “offshore preserve.” This was done on behalf of the Outdoor Recreational Development Council, which was the seven-member Cabinet with the Governor as Chairman.

Jack Buford, head of the Bulkhead Section of the Board of Trustees of the Internal Improvement Trust Fund (the Trustees), traveled to Fort Myers for a public hearing. The local support was overwhelmingly in favor of creating an offshore preserve in Estero Bay. On December 6, 1966, the northern half of Estero Bay (just above Black Island to Matanzas Pass) was designated by the Trustees as the Estero Bay Offshore Preserve. Landrum and Buford would, a few years later, help set up a state-wide system of aquatic preserves, with Estero Bay being its first. By this time, Landrum was the head of Florida’s Division of Recreation and Parks. Landrum told an aquatic preserve staff member during an interview in 2006 that when he wrote the draft for Chapter 18-20, Florida Administrative Code (F.A.C), it was based upon his experience in setting up Estero Bay Aquatic Preserve. In the 1983 session of the Florida Legislature, Section §258.39, Florida Statute (F.S.) was amended to add the southern half of Estero Bay down to the Lee/Collier county line, expanding the Estero Bay Aquatic Preserve. In 2010, DEP’s Division of State Lands made modifications to the boundaries of all (or most) of the aquatic preserves through use of Geographic Information System (GIS) technology utilizing historic detailed legal descriptions and input from DEP’s Florida Coastal Office’s (FCO’s) Central Office and individual aquatic preserve offices’ staff (see Map 2).

It should be noted that the LCCA would probably be best remembered for its later court battles against developer Robert Troutman, who intended a large community development in the wetlands on the north side of Estero Bay, the Winkler Point area. Today this land is part of EBPS, currently managed by DRP. The LCCA challenged not only Troutman but the state as well, claiming that the filling of submerged lands within this parcel constituted stealing publicly owned lands. The LCCA was thus instrumental in two legal and regulatory victories, one being the establishment of the aquatic preserve (and by example, the creation of all Florida aquatic preserves). The second was challenging how coastlines could be developed in terms of bulkhead lines and filling submerged lands, which literally changed the way Florida would allow development of shorelines from that time forward.



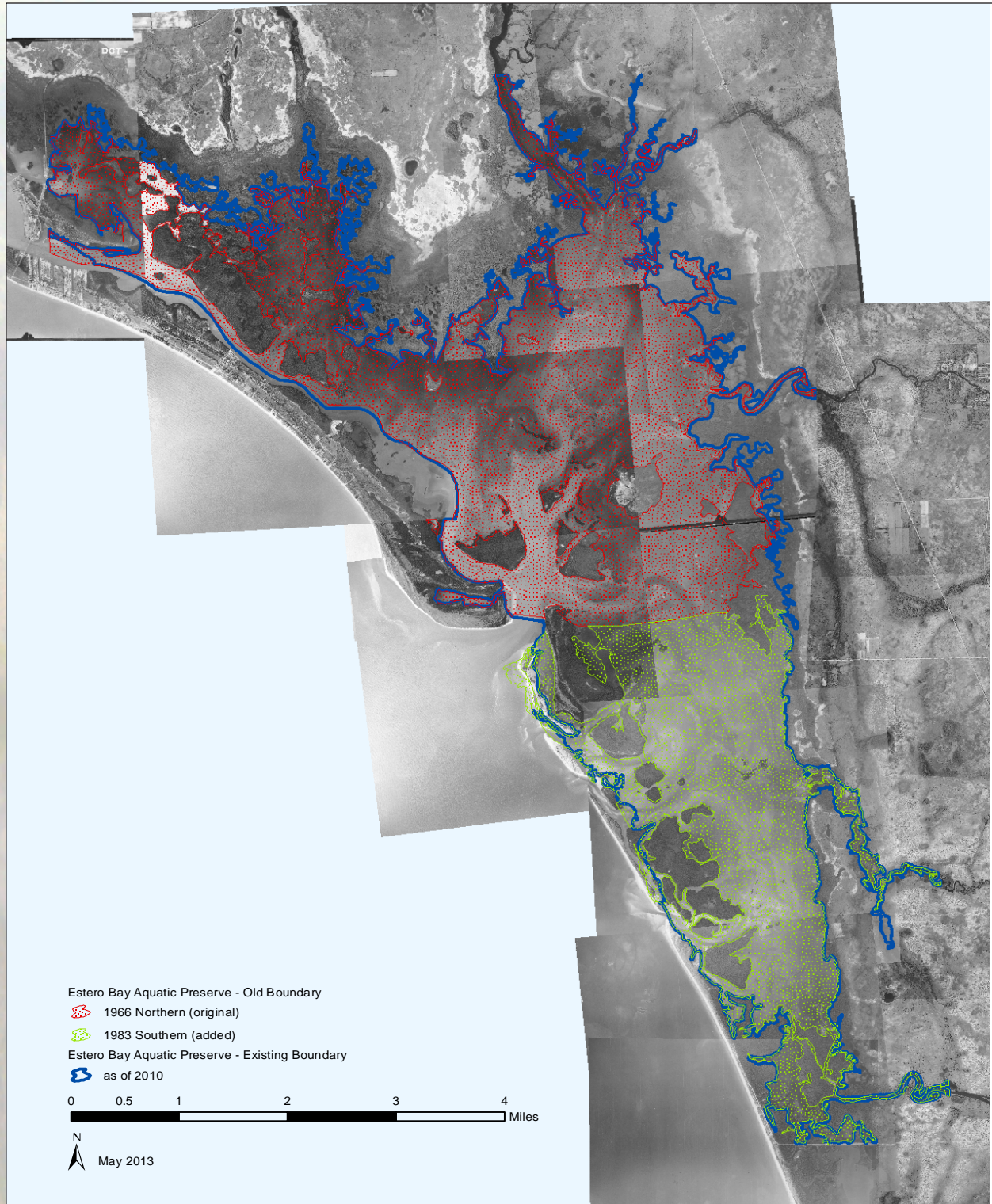
1966 *Estero Bay Aquatic Preserve* 2006
40th Anniversary Celebration

Supported by a local citizens’ initiative, Estero Bay was designated as Florida’s first aquatic preserve in 1966. The preserve was used as a model that led to the 1975 Florida Aquatic Preserve Act, and the protection of other environmentally significant submerged lands, biological resources and waters for future generations. Today, Florida’s 41 aquatic preserves encompass almost two million acres.

Estero Bay Aquatic Preserve celebrated the 40th anniversary of its designation in 2006.

Extensive documentation of these periods and events can be found in the Lee County Conservation Association historic collection held by the Southwest Florida Museum of History. The historical collection was under loan to the aquatic preserve starting in 2006. An archivist was hired and documents were preserved and archived by museum standards through June 2011, when it was determined due to on-going cuts in staffing, more detailed analyses and digital documentation of these historical records would not be possible.

The Division of Historical Resources (DHR) performed a site assessment on the aquatic and then-buffer preserves titled "Inventory and Assessment of Cultural Resources on the Estero Bay Aquatic and Estero Bay Buffer Preserves, Lee County, Florida, 1997." The site assessment provides a summary of



the known sites in both the aquatic preserve and the preserve state park, a description of each, and a synopsis of important details. Additional information on a few of these sites can be found in the text “An Archaeological Site Inventory Zone Management Plan for Lee County, Florida,” performed for the Lee County Department of Community Development, Division of Planning, by Robert J. Austin, Piper Archaeological Research, Inc., St. Petersburg, Florida, 1987. The purpose of this project was to assist Lee County in constructing a management plan to conserve and protect the county’s cultural resources. The entire aquatic preserve and preserve state park have not been systematically searched for cultural resources. Based on information received from DHR, it is likely that additional archaeological sites are present (DEP, 2004).

3.1.2 / General Description

International/National/State/Regional Significance

Estero Bay Aquatic Preserve is Florida’s first aquatic preserve, established in 1966. As an aquatic preserve, the estuary and portions of its tributaries also benefit from increased water quality protection through the Outstanding Florida Water (OFW) designation (pursuant to §403, F.S. and Chapter 62-302, F.A.C. These waters were found to be worthy of special protection because of their exceptional ecological or recreational significance. In general, DEP cannot issue permits for direct pollution and discharges to OFWs that would lower ambient (existing) water quality, or for indirect discharges that would significantly degrade a nearby waterbody designated as an OFW (DEP, 2012a).

The aquatic preserve and its watershed lie within the study area of the Charlotte Harbor National Estuary Program (CHNEP). “The [U.S. Environmental Protection Agency’s] (EPA) National Estuary Program was established by the U.S. Congress in 1987 to improve the quality of estuaries of national significance. The [CHNEP] is a partnership that protects the estuaries and watersheds from Venice to Estero Bay to Winter Haven. This partnership gives citizens, elected officials, resource managers, and commercial and recreational resource users in the 4,400-square-mile study area a voice to address diverse resource management concerns including fish and wildlife habitat loss, water quality and water flow. [The complete CHNEP] study area includes all or parts of Lee, Charlotte, Sarasota, Manatee, Polk, Hardee and DeSoto counties” (National Oceanic and Atmospheric Administration [NOAA], 2012).

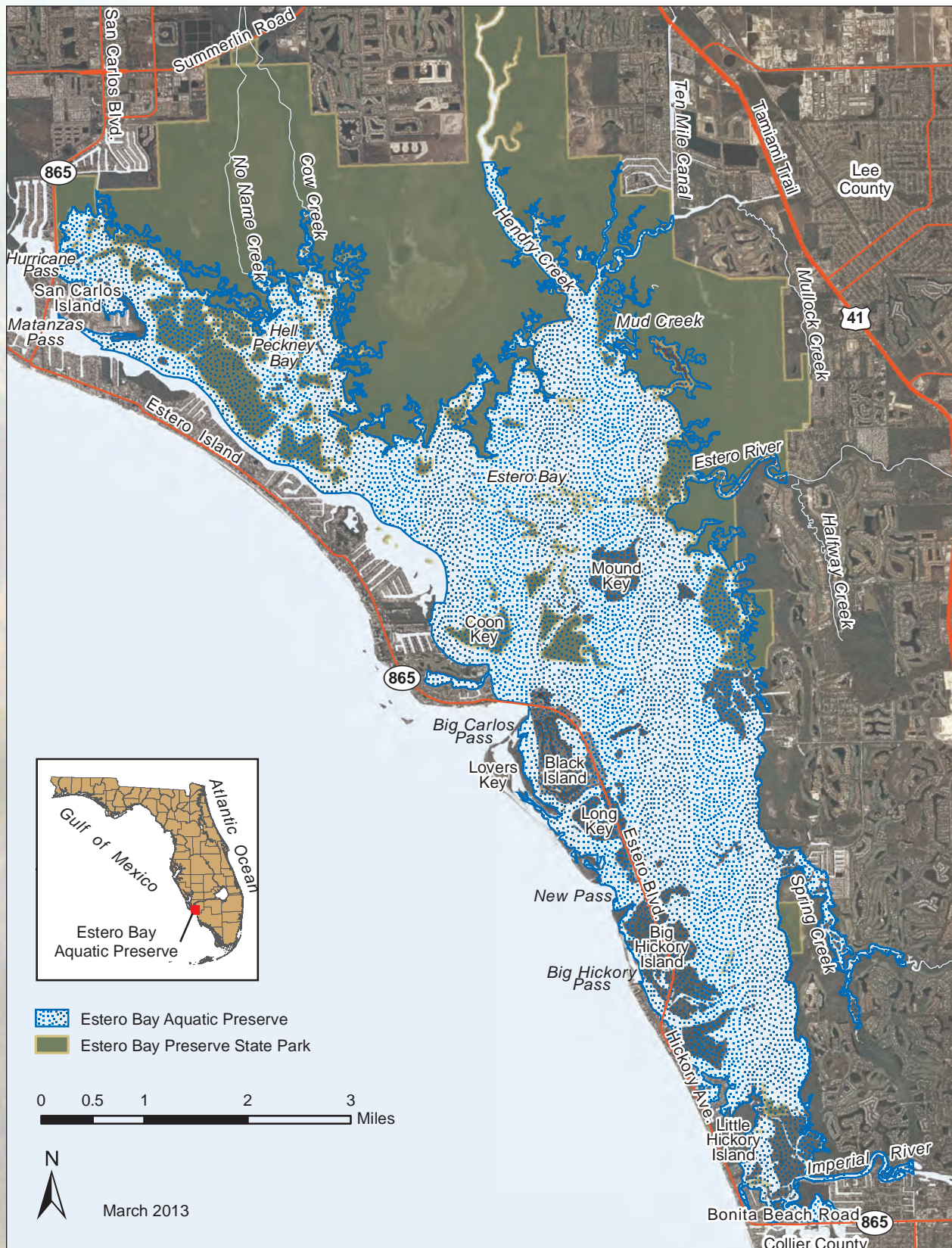
The Wild and Scenic Rivers Act of 1968 (Public Law 90-542 , 16 U.S.C. 1271-1287) serves to preserve certain rivers with outstanding natural, cultural, and recreational values in a free-flowing condition for the enjoyment of present and future generations. The Act strives to encourage river management that crosses political boundaries and promote public participation in developing goals for river protection. Less than one quarter of one percent of U.S. rivers are protected under the National Wild and Scenic Rivers System (National Wild and Scenic Rivers System, no date [n.d.]). The National Park Service maintains a Nationwide Rivers Inventory of river segments potentially eligible for future inclusion on the Wild and Scenic Rivers list. River segments on the inventory contain one or more “outstandingly remarkable value” including: exceptional scenery, fishing or boating, unusual geological formations, rare plant and animal life, and cultural or historical artifacts that are judged to be of more than local or regional significance (National Park Service, 2011). Four segments within the southwest Florida area have been identified by the National Park Service as potential national wild, scenic and recreational river areas and are included on the Nationwide Rivers Inventory list. These include three in Lee County (Estero River, Hendry Creek, and Orange River) and one in Charlotte County (Shell Creek). Details for the two river segments associated with Estero Bay are provided in Table 1.

River	County	Reach	Length (miles)	ORVs	Description
Estero River	Lee	RM 0, Estero Bay, to RM 8, US 41 and Koreshan State Historic Site (KSHS)	8	S, R, F, W, H, C	Established canoe/nature trail; flows through mangrove swamp; KSHS.
Hendry Creek	Lee	RM 0, Estero Bay, to RM 5, FL 865 and Gladiolus Drive	5	S, R, F, W	Diverse estuarine ecosystem.

Outstandingly Remarkable Values (ORVs): Scenery (S); Recreation (R); Fish (F); Wildlife (W); History (H); Cultural (C). Source: National Park Service, 2007

Table 1 / Nationwide Rivers Inventory, Florida - segments flowing into Estero Bay.

San Carlos Island, located in the northern portion of Estero Bay, is home to a large fleet of shrimping vessels that operate in the Gulf of Mexico. Matanzas Pass, Hurricane Bay and Hell Peckney Bay have a Class II water quality designation for use of “shellfish propagation or harvesting,” as defined in Chapter 62-302.400, F.A.C., but currently, no waters within Estero Bay are approved by the Shellfish Environmental Assessment Section of Florida Department of Agriculture and Consumer Services for shellfish propagation or harvesting.



Location/Boundaries

The Estero Bay Aquatic Preserve is located in Lee County, southwest Florida, approximately 10 miles south of Fort Myers. It is situated between the Town of Fort Myers Beach, City of Bonita Springs and unincorporated areas of Lee County: Estero, San Carlos Park and south Fort Myers. Most of Estero Bay is surrounded along the northern and eastern shoreline by EBSP; the western boundaries include several barrier islands including San Carlos, Estero (Fort Myers Beach), Black Island, Lovers Key, Long Key, Big Hickory Island and Little Hickory Island; and most of the southern areas are either privately owned or large-scale residential developments (Map 3).

From north to south, as the heron flies, the bay is nearly 11 miles long and ranges from 1.75 to 7 miles wide. Several freshwater tributaries form the rivers, creeks, and streams that feed the bay from its northern and eastern areas. These include Cow Creek, No Name Creek, Hendry Creek, Ten Mile Canal, Mullock Creek, Estero River, Mud Creek, Halfway Creek, Spring Creek and Imperial River (Map 3). Western and southern areas mainly exchange Gulf of Mexico marine waters tidally through the passes of Matanzas, Hurricane, Big Carlos, Big Hickory, and New. The aquatic preserve boundaries encompass nearly 11,000 acres of state-owned sovereign submerged lands occurring below the mean high water line to which the state holds title. With a couple of exceptions, uplands and manmade canals are excluded from the aquatic preserve. Exceptions include areas accreted near Lovers Key.

The aquatic preserve is encircled by several local highway systems: County Road (CR) 865 (depending on location: San Carlos Blvd., Estero Boulevard, Hickory Avenue, Bonita Beach Road), CR 869 (Summerlin Road), State Road (SR) 865 (Gladiolus Drive), and U.S. Highway 41 (Tamiami Trail). Within two miles of the aquatic preserve boundary, extensive public access points exist: five private and eleven public boat ramps, more than 30 marinas, at least six locations to rent canoes/kayaks, and numerous personal watercraft (PWC) and boat rental operators. There are well over 7,000 single and multi-family boat docks and slips built. The Town of Fort Myers Beach leases nearly 45 acres of submerged lands in Matanzas Pass for a 70-slip managed municipal anchorage mooring field called Matanzas Harbor Mooring Field. Most of the 70 moorings are within the aquatic preserve.

3.1.3 / Resource Description

Surrounding Population Data and Future Projected Changes

In 1885, the population of Lee County was 400, by 1900 it was 943. By 1950 – 23,404; 1980 – 205,266; 1990 – 335,113; and 2000 – 426,463 (Lee County Economic Development Office, 2008). In 2008, Florida Department of Health (2009) cited Lee County's population estimates at 634,660 while the U.S. Census Bureau estimated the number at 593,136 (U.S. Department of Commerce, 2013). In 2009, a University of Florida study (Keen, 2009) reported a decline of 8,601 Lee County residents due to the recession. In 2011, however, the U.S. Census Bureau estimated the population at 631,330.

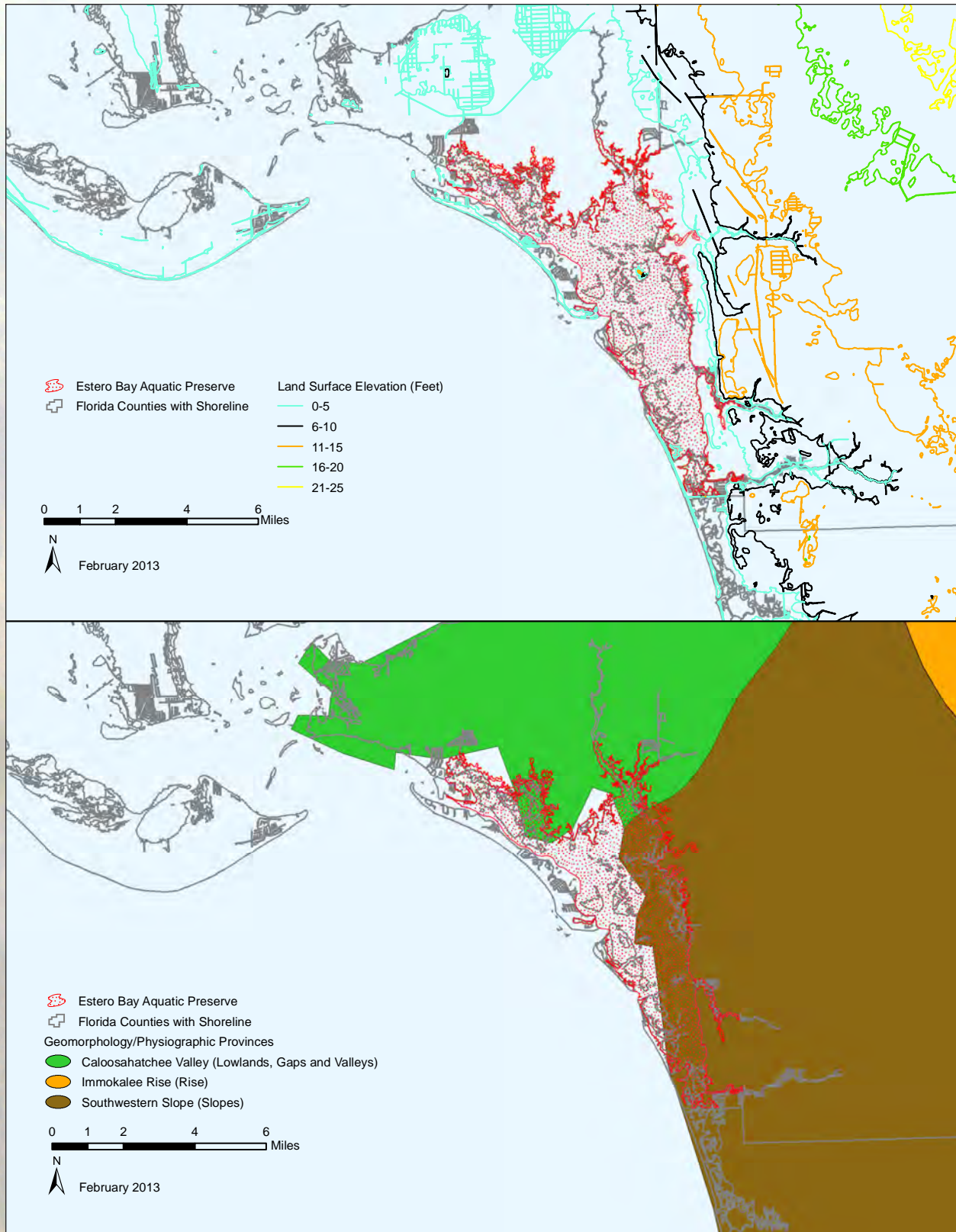
Of the 67 counties in Florida, Lee County ranks 22nd in land area covering 803.6 square miles. Forty-seven percent of Lee County residents live within the incorporated communities of Bonita Springs, Cape Coral, Fort Myers, Fort Myers Beach and Sanibel (Lee County Economic Development Office, 2008).

“The population of southwest Florida is dominated by retirees. People age 65 and older comprise 27 percent of the total population, and retirement incomes are the greatest single component of the region's economic base. Tourism is the next largest component of the economy – the population swells by as much as 30 percent each winter. Agriculture is the third largest economic component, thanks to a climate that allows for three growing seasons (winter, spring and fall) each year. Concurrent with the rise in population and its growing popularity as a tourist destination, the region's rural (non-urban) counties have emerged as a principal growth center for the state's sizeable agricultural community. Natural resources in southwest Florida have had a major influence on the area's economic development and growth. The most important of these resources are the region's location and climate, land and water resources, vegetation and wildlife, and inland and tidal wetlands. These resources have attracted the large number of retirees and tourists to the region, thereby fueling the area's service, trade, and construction industries” (Beever, 2001).

“The Florida human population has consistently allowed the highest coastal terrestrial and aquatic native habitat destruction rate within the continental United States through coastal urbanization and uncontrolled resource utilization” (Gilmore, 1995). Despite the recent drop in the county's population due to the recession, it is anticipated that this will quickly rebound and continue to grow as long as the region's natural resources are protected and enhanced and the area's communities show signs of economic improvement.

Topography and Geomorphology

Topography is the configuration of a surface including its relief and the position of its natural and man-made features. Topography is the result of natural forces acting upon regional geologic formations from ancient times until the present and includes any anthropogenic changes. It is an important aspect of a region's character and determines drainage patterns, flood limits, soil types, settlement history and potential, and vegetation and wildlife ranges. Topography in the area is quite flat, ranging from



sea level to a maximum elevation of about 30 feet in eastern regions of Lee County and the Calusa-built shell midden features on Mound Key in Estero Bay. As a result of the surrounding areas natural topographic features, several watersheds drain into Estero Bay. Within a half mile of the aquatic preserve's boundary, about 90 percent is 0-5 feet in elevation and the other 10 percent of the perimeter is 6-10 feet in elevation.

Geomorphology is the scientific study of the landforms of the Earth's surface and of the processes that have fashioned them (Allaby, 2005). Southwest Florida can be divided into ten major physiographic provinces. These are broad-scale subdivisions based on physical geography features such as terrain texture, rock type and geologic structure and history. Map 4 illustrates that the northern extent of Estero Bay Aquatic Preserve lies within the Caloosahatchee Valley physiographic province. The Caloosahatchee Valley province is found in northern Lee County as well as a portion of Charlotte, Glades and Hendry counties. Extreme eastern portions of the aquatic preserve are within the Southwestern Slope province. This region is characterized as a gently southwestward sloping plain composed of deposited sediments. These sediments are aligned parallel to the coastline, which indicates they were formed by marine forces (Missimer, 2001).

Geology

For millions of years, the Florida Platform was submerged in the ocean. Sediments accumulated upon it and hardened into sedimentary rock. Thirty-five million years ago, portions of Florida rose above the ocean's surface and for the next 12 million years it alternated between emersion and submergence. From 23 million years ago to the present, at least a small portion of the Florida Platform has always been above the ocean surface.

Ten lithostratigraphic units have been identified in the state of Florida. Lithostratigraphic units are differentiated by the conditions under which they were formed and when during geologic time they were formed. These lithostratigraphic units are further divided by timing of formation into stratigraphic units.

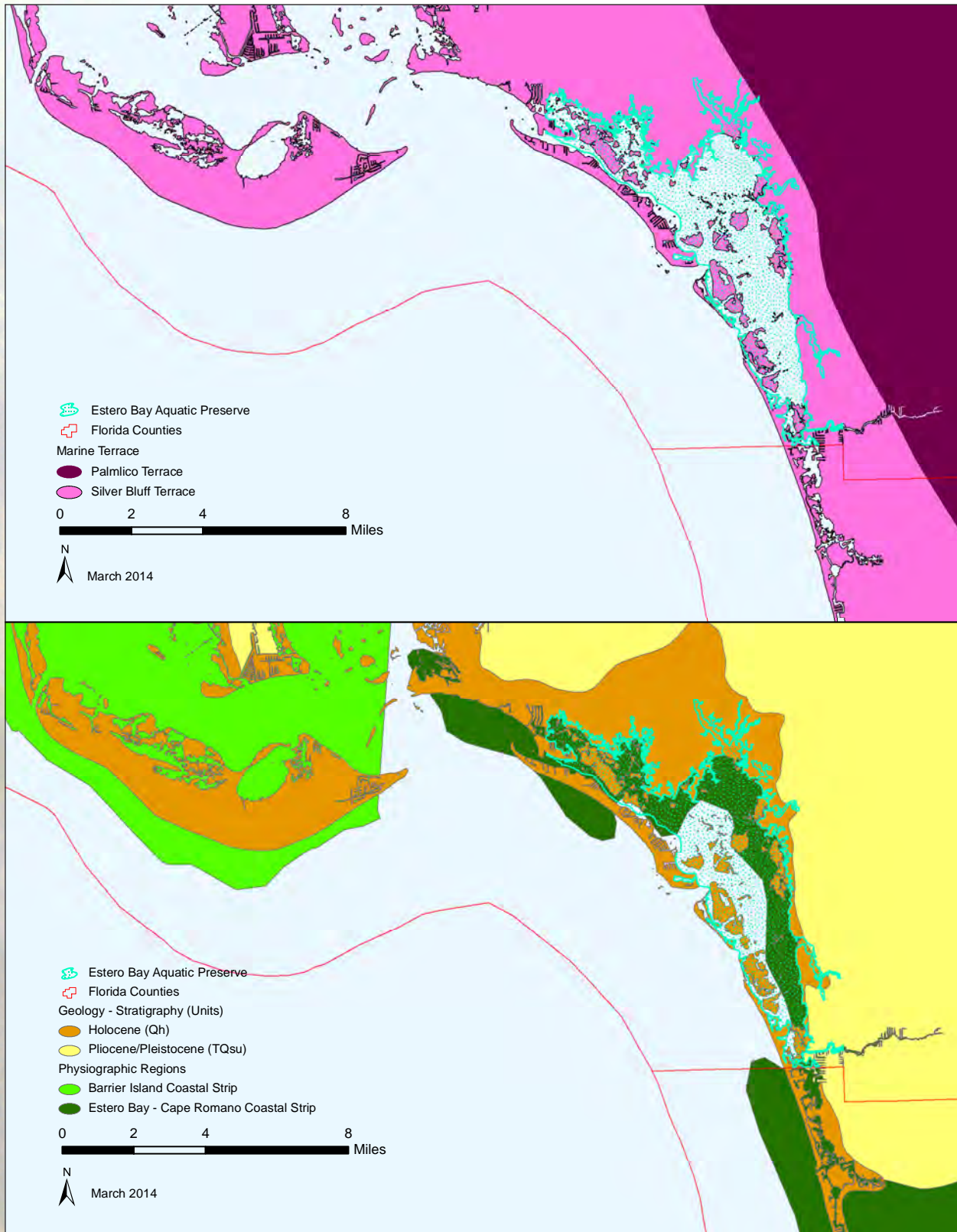
The far reaching eastern boundaries of the bay were created during the Pliocene Epoch between two million to 10,000 years ago. This period is also known as the Ice Age, where huge ice sheets formed across Canada and the northern United States. When these ice sheets were formed, they consumed large quantities of seawater, dropping the current sea level 300 or more feet, which greatly increased the land area of Florida. As the glaciers shrank, sea levels rose, and the Florida peninsula was again flooded. During the peak warm periods, sea level reached 150 feet above the current sea level. The waves and currents during these high sea level periods reworked the sediments and formed a series of geological units (Caloosahatchee, Fort Thompson, Anastasia, Miami Limestone and Key Largo Limestone). Each of these geological units is characterized by their unique compositions. However, throughout much of Lee County, including most portions of the aquatic preserve, the Caloosahatchee and Fort Thompson units are somewhat indistinct and have been lumped together as undifferentiated Tertiary-Quaternary Sediments. This unit consists of a quartz sand blanket covering limestone and clay. Fossils, including mollusks and corals, are very common and usually in excellent condition (Scott & Missimer, 2001). The majority of the bay is located in the Holocene Sediments (Map 5). These were formed in the last 10,000 years with the warming of earth and the beginning of man. These sediments occur near the coastlines with elevations generally less than five feet. Sediments here include quartz sands, carbonate sands and muds, and organics (Scott & Missimer, 2001).

Marine terraces are another type of geologic category identified by the Florida Geological Survey (Map 5). Three marine terraces are located in Lee County and most of the aquatic preserve falls within the Silver Bluff Terrace which is less than eight feet. The extreme northeastern Mullock Creek area of the aquatic preserve lies within the Palmlico Terrace, which is higher, between 8-25 feet. The regional area's physiographic character is categorized as "Estero Bay – Cape Romano Coastal Strip."

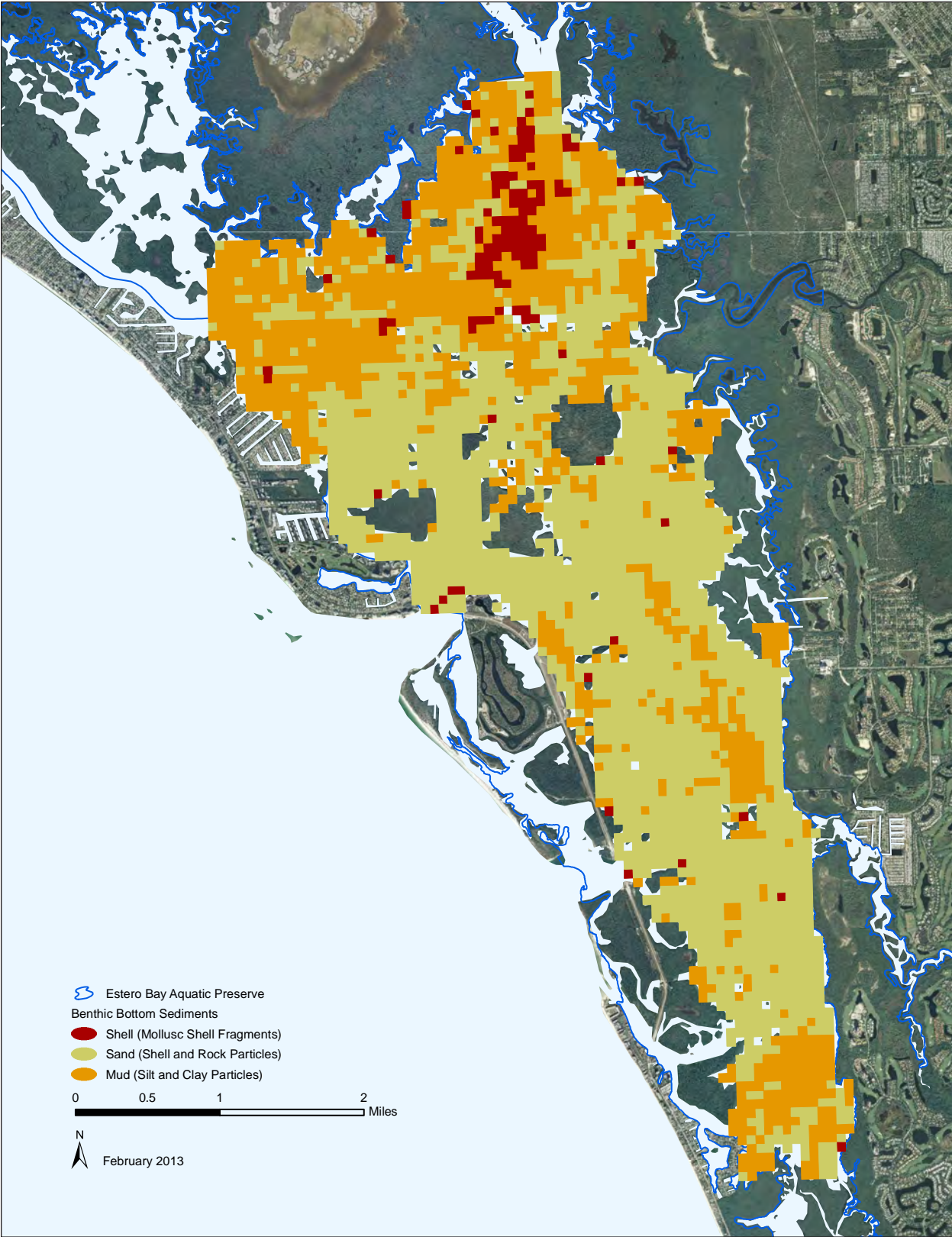
General sediment GIS mapping by Florida Fish and Wildlife Conservation Commission's Fish and Marine Research Institute in 1989 categorized Estero Bay with a depth of three feet and having only a sandy bottom. In 2009, the Conservancy of Southwest Florida completed a report for a research project within the bay for the EPA Gulf of Mexico Program Office. The vast majority of Estero Bay was the project area in which scientists charted sections in 100 meter squares. Map 6 provides a visual representation of the bottom sediments within the bay as sand, mud and shell.

As shown in Figure 2, there are three aquifer systems lying beneath the Estero Bay area: surficial, intermediate, and Floridan. The surficial aquifer system is an unconfined aquifer consisting of

undifferentiated sands, shell beds, and calcareous clays occasionally interbedded with thin seams of limestone. The clays sometimes act as a semi-confining layer called the Lower Tamiami confining zone, which separates the water table from the lower Tamiami Aquifer. The surficial aquifer ranges from 25 feet to 200 feet thick, but lays close to the surface and at times interacts with surface waters. Rainfall is its primary source of recharge water, and as a result, water levels in this aquifer react quickly to any precipitation. The intermediate aquifer system is also known as the Hawthorn



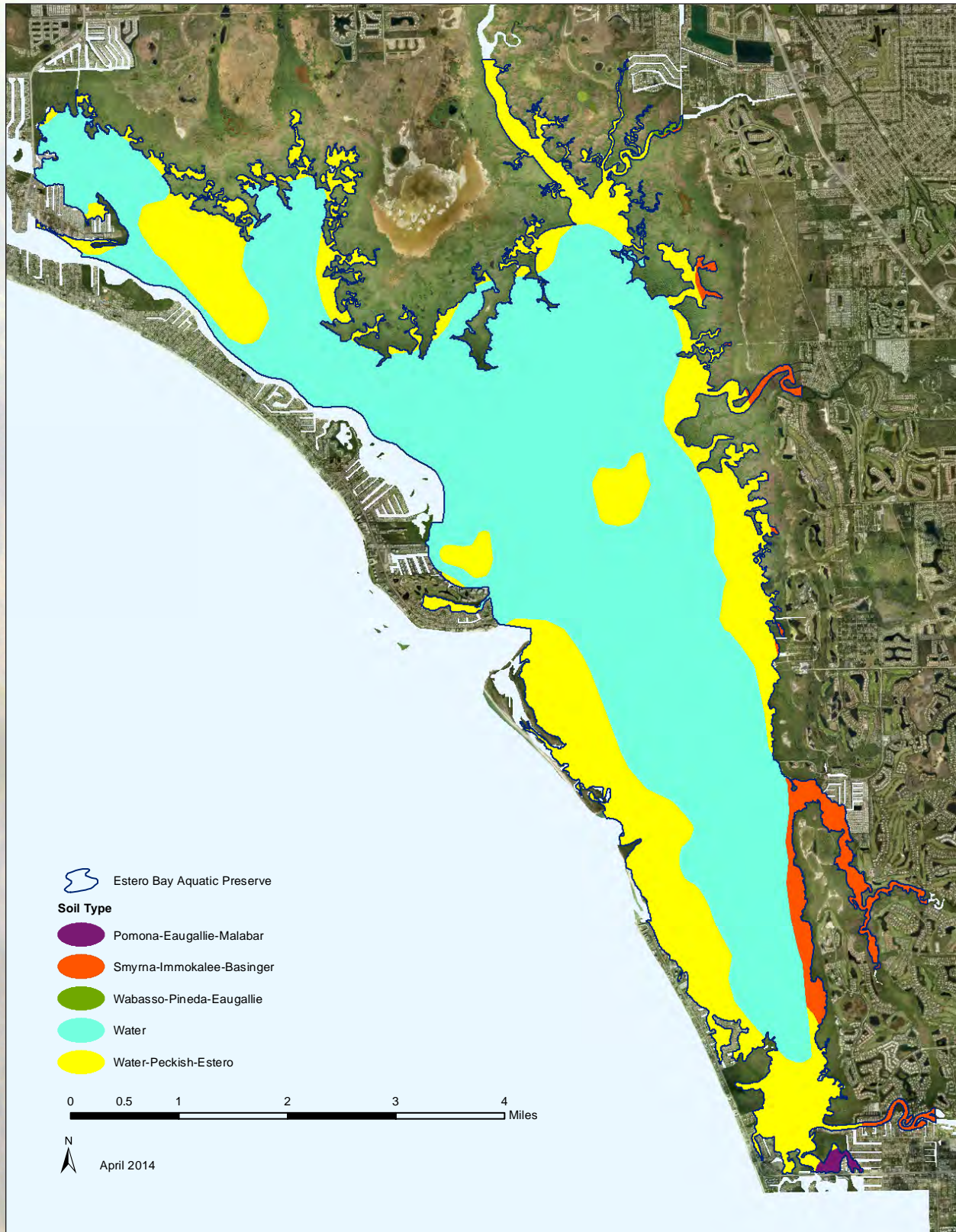
Aquifer System, and lies below the surficial aquifer. It is comprised of five units: 1) upper Hawthorn confining zone, 2) sandstone aquifer, 3) mid-Hawthorn confining zone, 4) mid-Hawthorn aquifer, and 5) lower Hawthorn confining zone. The Sandstone aquifer is comprised of sand, sandstones, sandy limestones and calcareous sands, while the Mid-Hawthorn aquifer consists of primarily limestone, dolomite, and sandstone. The Floridan Aquifer System is located below the intermediate aquifer system. The Floridan Aquifer underlies all of Florida (Johnson Engineering, 1999).



Map 6 | Benthic bottom sediments. (Conservancy of Southwest Florida, 2007)

Hydrology and Watershed

The watershed of Estero Bay is approximately 595 square miles, fairly large for an estuary of its size. The bay's entire watershed and its corresponding subbasins are defined in Map 8. Not supplied with freshwater by any one major river, the estuary instead is fed by a number of smaller rivers and creeks, as well as by sheetflow across the landscape. Historically, the Estero Bay basin consisted of low-lying topography with slow moving flow, allowing rainfall to provide a constant input of fresh water into the bay



throughout the year. This drainage pattern has made the bay extremely sensitive to changes in upland discharge, and hydrological modifications from activities such as agriculture and urban development have had a significant impact on the quantity, quality and seasonality of fresh water input. The bay is a very shallow estuary, around three feet on average, and major flushing is through tidal forces. Estero Bay's interaction with water from the Gulf of Mexico is the major energy force on the bay. Although geographically and hydrographically separated from the Charlotte Harbor estuary, Estero Bay does receive water from the Caloosahatchee River indirectly through San Carlos Bay (Florida Department of Natural Resources [FDNR], 1983).

Tributaries to Estero Bay include Hendry Creek and Mullock Creek in the north, Estero River along the eastern shore, and Spring Creek and Imperial River in the southernmost portion of the bay. Other smaller creeks worth noting are Cow Creek and No Name Creek, both of which empty into Hell Peckney Bay, Mud Creek that flows into the Horseshoe Keys area, and Halfway Creek that feeds into the Estero River. The Ten-Mile Canal discharges into Mullock Creek. These tributaries as well as the bay's passes are shown in Map 3.

Both Hendry Creek and Mullock Creek (via Ten-mile Canal) receive waters from the heavily commercialized southern and eastern portions of Fort Myers. The headwaters of Hendry Creek is Lakes Park, but the creek has a watershed of approximately 17 square miles and therefore receives discharge from the entire area around Daniels Parkway and U.S. Highway 41. Mullock Creek is fed by the Six-Mile Cypress Slough and Ten-Mile Canal that are both located within its watershed of approximately 78 square miles. Its upper headwaters receive input from the Estero-San

Carlos Park area, but portions of this area drain into the Estero River as well. Hydrological changes have increased the flow of the Estero River and enlarged its once 60 square mile watershed to approximately 69 square miles. Part of this increase can be attributed to the input from Halfway Creek, where mining and heavy development have severely altered the creek's watershed and drainage patterns. Alternately, Spring Creek and its approximately 10 square mile watershed once contributed a larger flow of water into Estero Bay but development west of U.S. Highway 41 have surrounded the fairly shallow creek, altering hydrology and shunting increasing amounts of water towards both the Estero and Imperial rivers. These two tributaries now provide the larger influx of water into the bay. The Imperial River has a watershed of approximately 86 square miles and is the deepest tributary of Estero Bay. While some of its fresh water flows into Fishtrap Bay and out through Big Hickory Pass, a portion does flow south under Bonita Beach Road and into Little Hickory Bay. Its watershed has been severely altered in the past and as a consequence now suffers periodic flooding during heavy rainfalls (Estero Bay Agency on Bay Management, 2000). All but one of the bay's tributaries contain man-made barriers to regulate the flow of water. Hendry Creek, Spring Creek and Imperial River all have weirs that prevent saltwater encroachment upstream, and Mullock Creek contains a gated structure on the Ten-Mile Canal. The Estero River is the only tributary still in its natural state (Byrne & Gabaldon, 2008).

Estero Bay has four main passes through which the estuary receives input from the Gulf of Mexico. From north to south, those passes are Matanzas Pass, Big Carlos Pass, New Pass, and Big Hickory Pass. Hurricane Pass also provides minimal exchange between San Carlos Bay and Matanzas Pass. Big Hickory Pass closed in the fall of 1976, reopened in November, then closed again (Jones, 1980). Matanzas Pass is located at the northern end of Estero Bay and is heavily used by shrimp trawlers, as well as other commercial and recreational vessels. Although the four mile long pass does receive

Series	Stratigraphic Units		Hydrogeologic Units	
Recent	Undifferentiated Sands	Hawthorn Group	Surficial Aquifer System	Water Table Aquifer
Pleistocene				Confining Beds
Pliocene	Lower Tamiami Aquifer			
Miocene	Miocene Coarse Clastics		Intermediate Aquifer System	Upper Hawthorn Confining Zone
	Peace River Formation			Sandstone Aquifer
				Mid-Hawthorn Confining Zone
	Arcadia Formation			Mid-Hawthorn Aquifer
	Lower Hawthorn Confining Zone			
Tampa Member	Lower Hawthorn Aquifer / Tampa Producing Zone			
Oligocene	Suwannee Limestone		Floridan Aquifer System	Confining Beds
Upper Eocene	Ocala Group	Suwannee Aquifer		
Middle Eocene	Avon Park Formation	Deeper Eocene Aquifer		

Figure 2 | Hydrostratigraphy of the South Lee County watershed plan study area. Source: South Lee County Watershed Plan, 1999.

freshwater input from Cow Creek and No Name Creek, input is minimal and influence from the Caloosahatchee River is much greater. Water in the pass is exchanged with San Carlos Bay, Hurricane Bay and Hell Peckney Bay, and is mostly driven by output from the Caloosahatchee River. Due to this fact, salinity in the pass is lower than in other passes around the bay. Big Carlos Pass is the widest, deepest pass in the bay and exchanges water with the Gulf of Mexico, Hendry Creek, Mullock Creek and Estero River. This one mile long pass has a tidal volume discharge three times that of Matanzas Pass and 15 times that of Big Hickory Pass. New Pass is less than one mile long and discharges more water than Big Hickory Pass, but less than Big Carlos Pass. It is influenced by the Gulf of Mexico and Spring Creek. Big Hickory Pass, the narrowest and shallowest of the passes, is more than one mile long and exchanges water with the Gulf of Mexico and Imperial River, although the river has a limited influence (Byrne & Gabaldon, 2008).

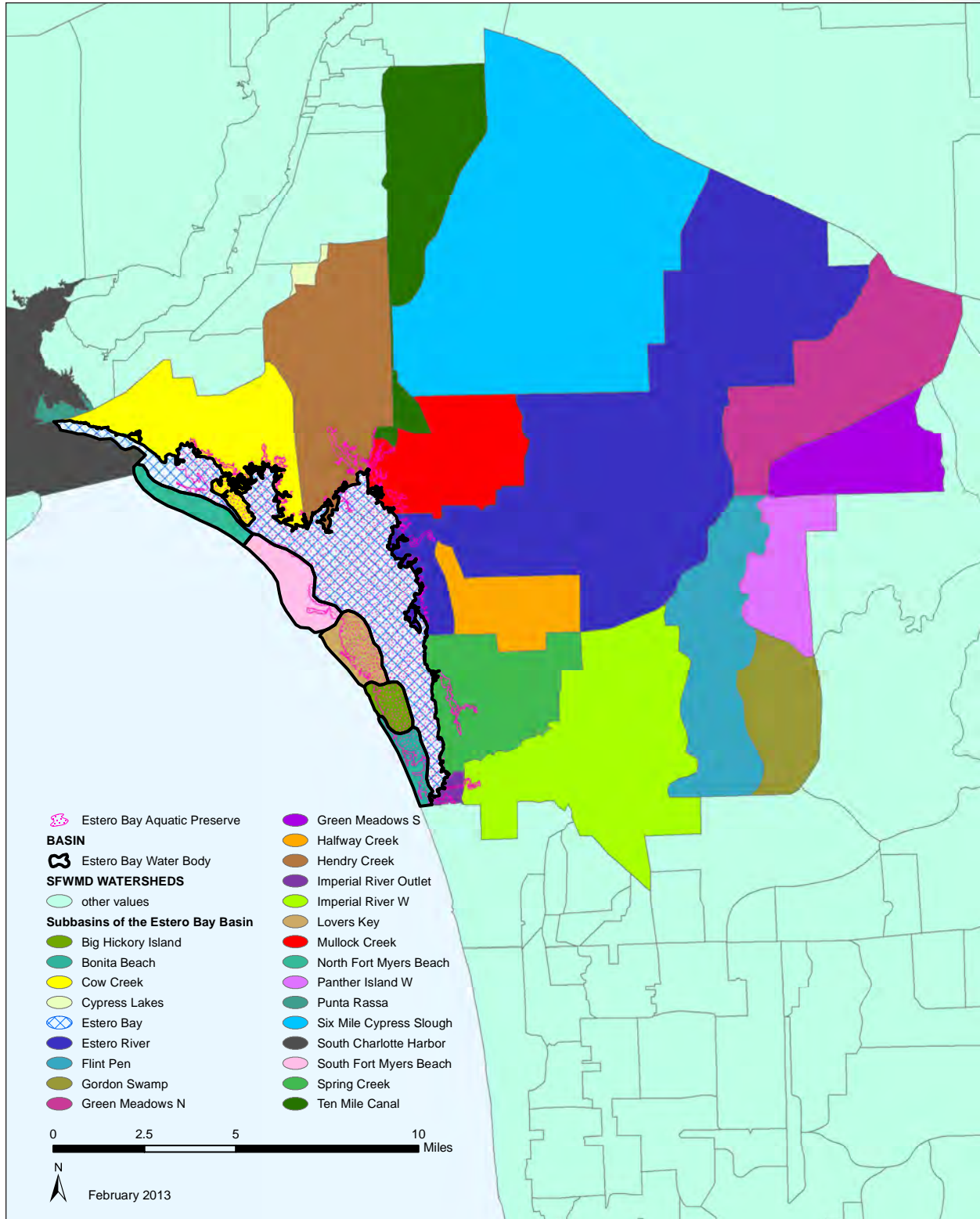
The basic characteristics of Estero Bay's water vary naturally in response to the daily, seasonal, and long term forces which make the estuarine habitat conditions among the most dynamic on earth. Added to this are the many and varied conditions found in each of the minor streams flowing into the estuary. The productivity of the estuary has been described as moderate to high for a semi-tropical estuary (FDNR, 1983). As one would expect, salinity, temperature and flow in Estero Bay vary greatly depending on tide stage, season, and location. Areas closer to the creeks, for example, tend to have on average lower salinity than those areas near passes, especially during times of ebb flow. Temperature can also vary widely, with rapid fluctuations exacerbated by the bay's shallow depths. For example, United States Geological Survey (USGS) data taken between 2002 and 2004 at Matanzas Pass marker G1 had a maximum temperature of 90°F (32.2°C) in June 2004 and a minimum of 55°F (12.8°C) in January 2003, while during the 2001-2005 time period the Horseshoe Keys area exhibited a maximum temperature of 96°F (35.7°C) in August 2005 and a minimum of 45°F (7.2°C) in January 2003 (U.S. Geological Survey [USGS], 2013). Additionally, as tidal currents enter the bay and flow away from passes, they begin to dissipate and decrease in strength, creating areas of slower moving water.

Salinity, temperature, and flow regimes within the bay are more complex than this, however. For example, Mullock Creek, Hendry Creek, and Imperial River have lower salinities than Estero River and Spring Creek (Schmid, 2009). Furthermore, the geomorphology of Estero Bay has helped to create distinct regions within the estuary that frequently have limited mixing between zones. These zones often possess their own unique characteristics. Hydrologic barriers including a Pleistocene ridge running from Hendry Creek to Julie's Island, as well as other mangrove islands, oyster bars and mudflats, have helped to form different sub basins within the bay, and allowed each basin to exhibit its own individual salinity range (Byrne & Gabaldon, 2008). These barriers, coupled with flow reductions from dissipating tidal input, can result in the development of 'null zones' that are characterized by modest water flow and mixing, with little variation in salinity.

In 1971 a preliminary study focusing on the area from Big Carlos Pass north to Matanzas Pass determined that this portion of Estero Bay could be divided into two hydrologically distinct regions by a northeast-southwest line drawn through the lower portion of Julie's Island, later described as a Pleistocene ridge. The northern portion was found to receive water through Cow Creek, No Name Creek and Matanzas Pass (and thereby, through the Caloosahatchee River), while the majority of exchange in the southern portion of the study area was between Big Carlos Pass, Hendry Creek, Mullock Creek and Estero River. Indeed, aquatic preserve staff have found this same condition to be true through analysis of their long-term, continuous-monitoring data sonde program data. One data sonde located in the 'null zone' near Julie's Island has documented such a phenomenon. Flow is minimal compared to other data sonde sites in the bay and the site does not exhibit the fluctuating patterns in salinity and dissolved oxygen that are clearly discernible at other data sonde locations. A 2008 USGS study also found that the estuary was made up of smaller, distinct sub basins due to its geomorphology (Byrne & Gabaldon, 2008), and included an additional null zone between Big Carlos Pass and New Pass in the central portion of the bay. The 1971 study also surmised that due to a smaller watershed size and reduced freshwater input, the northern region of Estero Bay would have a more stable salinity regime than the southern portion of the bay. Furthermore, salinity near the confluence of Hendry and Mullock Creeks in the north was found to be significantly lower than at Big Carlos Pass in the south, as would be expected, but also increased from west to east due to a ridge running southward from the Estero River (Tabb, Alexander, Rehner & Heald, 1971).

The aquatic preserve, which includes Estero Bay proper as well as portions of its tributaries, is classified as an OFW as specified in §403, F.S. and Chapter 62-302.700, F.A.C. Moreover, portions of the bay's tributaries outside of the aquatic preserve are classified as "special waters" OFWs, and all are shown in Map 9. This designation is the highest level of protection for water quality that a body of water

can receive, and no degradation of water quality, other than that allowed by rule, can be permitted. These waters were found to be worthy of special protection because of their exceptional ecological or recreational significance. In general, DEP cannot issue permits for direct pollution and discharges to OFWs that would lower ambient (existing) water quality, or for indirect discharges that would significantly degrade the OFW. Furthermore, any Environmental Resource Permits that are granted for activities in OFWs must be shown to be clearly in the public interest (DEP, 2012a). The Ten-Mile Canal and all other artificial waterbodies surrounding Estero Bay have not been declared OFWs.



Map 8 / South Florida Water Management District watersheds within Estero Bay and Estero Bay waterbody basins.

Matanzas Pass, Hurricane Bay and Hell Peckney Bay are the only waters within Estero Bay to have a Class II water quality designation, as defined in Chapter 62-302.400, F.A.C. This classification refers to a designated use of “shellfish propagation or harvesting,” although these waters are not listed by the Shellfish Environmental Assessment Section as approved for shellfish harvesting. All other waters within Estero Bay and its tributaries are Class III waters, or waters with a designated use of “recreation, propagation and maintenance of a healthy, well balanced population of fish and wildlife” (DEP, 2004).

A 2010 report entitled “State of the Southwest Florida Aquatic Preserves: Lemon Bay to Estero Bay” found that, over the last 40 years, protected waterbodies exhibited significantly superior water quality than unprotected waterbodies. For example, protected waters and those adjacent to protected uplands had lower total concentrations of nitrogen, phosphorus and chlorophyll a, as well as higher dissolved oxygen levels. Specifically, Estero Bay had the lowest average nitrogen levels within the greater Charlotte Harbor region over the 40-year period, while exhibiting a significant decrease in phosphorus levels (Leary, 2010).

Surface water and ground water are closely linked in southwest Florida, and the Estero Bay watershed is no exception. While most of the wet season rainfall runs off of the landscape, then drains into creeks and rivers and eventually empties into Estero Bay, during the dry season the limited input of freshwater may not at times be enough to drain to the bay and is consequently absorbed into the surficial aquifer instead (Grant & Tilton, 2001). Rainfall is the main source of recharge to the surficial aquifer, and during the wet season the water table generally ranges from near land surface to about four feet (one meter) below land surface. Throughout the dry season the water table may range from three to 10 feet (one to three meters) below the land surface (Missimer & Boggess, 1974). Because the surficial aquifer runs so close to the surface, it can periodically come into direct contact with surface waters, making surface water flow dependent not only on rainfall, surface topography, and drainage patterns, but on groundwater levels as well (Lewis & Gause, 2009).

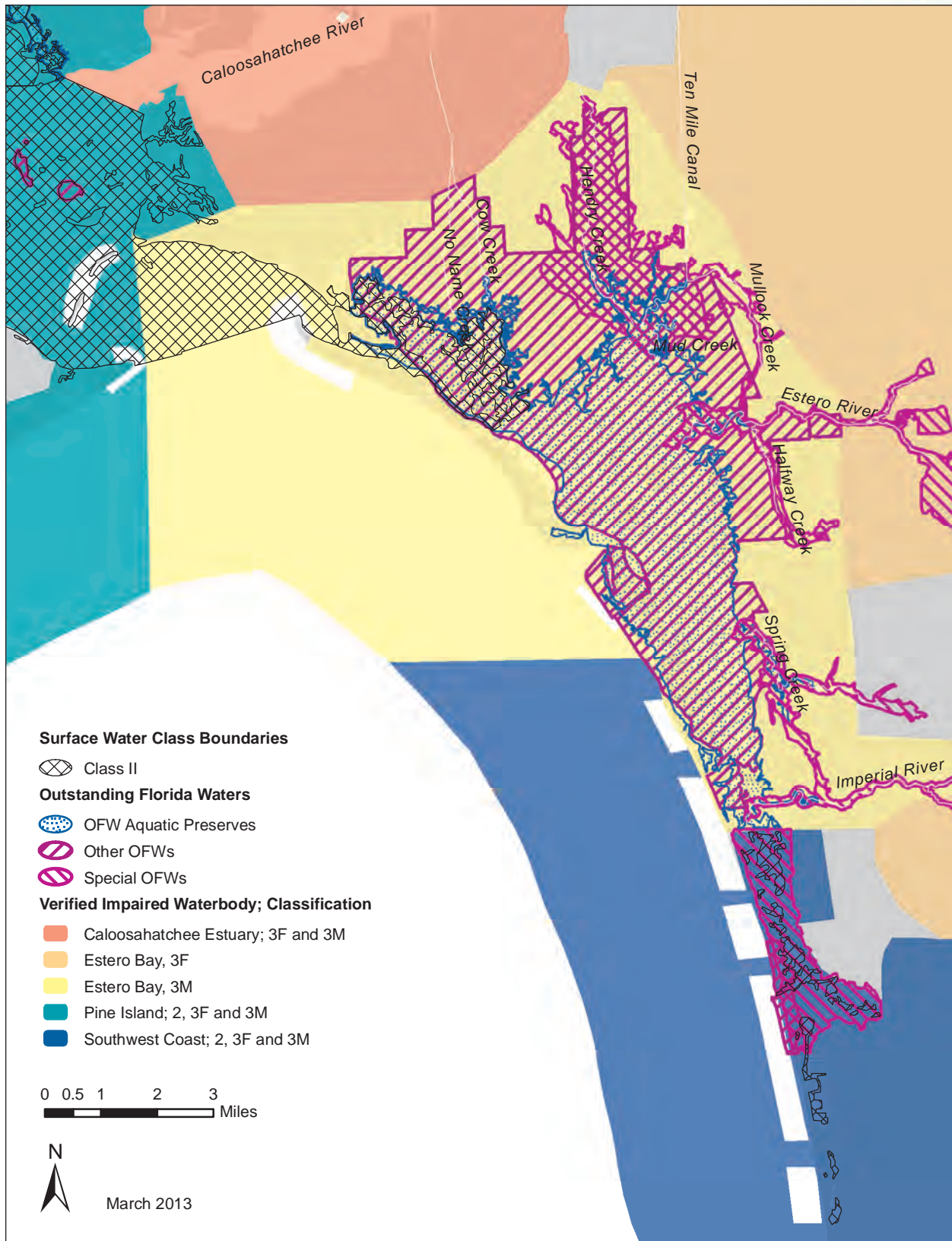
The water table naturally fluctuates, rising and falling in response to the seasonal rains (June to November) and subsequent dry seasons (December to May). But because of its proximity to the surface, it is also easily influenced by anthropological activities. Excavation of large canal networks, meant to drain land for urban development, has resulted in lowering of the water table. Coupled with inadequate freshwater recharge, saltwater intrusion has occurred (Missimer & Boggess, 1974). Added to this is the fact that the aquifer is also utilized as a source of water supply for domestic, agricultural, and municipal use. Agriculture in the eastern and southern portions of the Estero Bay watershed employs both ground and surface water, while public water supply wellfields, individual wells, and golf course communities in the remainder of the watershed place additional pressure on limited water resources (Dabbs, 2001).

Historic flow rates have also been altered and have been a topic of contention within recent years. Slow-moving water that traditionally flowed across the landscape throughout the year helped maintain a fairly constant and even flow of fresh water into the estuary. Urban and agricultural development, however, redesigned the landscape through the construction of canals, ditches, dikes and roads, and the subsequent shunting of accumulated fresh water into the tributaries. This decreased the number of functional wetlands, lowered groundwater levels, and reduced aquifer recharge. The result is now a concentrated flow of stormwater runoff rushing into the bay, instead of meandering across the landscape (Thomas & Rumbold, 2006). A study done over forty years ago in 1971 came to this conclusion in an almost prophetic passage when it stated that the watershed’s “topographic features delineate a natural watershed system that is fraught with problems for development of present properties, as well as offering some unique possibilities for future management. The problem of fresh-water quantity will be aggravated by development paving and as storm drains permit greater volumes of fresh-water to enter Estero Bay and neighboring bays to the northwest. Runoff periods will tend to be shorter too with corresponding increases in salinity in the estuary resulting. This accelerated runoff creates a ‘yo-yo’ effect whereby salinity fluctuations in the estuaries become so extreme that the bay and estuarine biota quickly diminish and decline in value” (Tabb et al., 1971).

As previously stated, the northern portion of Estero Bay receives input from the Caloosahatchee River indirectly through San Carlos Bay, and the Caloosahatchee River and Estuary has been listed on the South Florida Water Management District’s (SFWMD) 2012 Priority Waterbody List and Schedule for the possible revision of its Minimum Flows and Levels (MFLs). According to Chapter 40E-8.011(2), F.A.C., “Minimum flows are established [for a given waterbody] to identify where further withdrawals would cause significant harm to the water resources, or to the ecology of the area. Minimum levels are established [for the level of groundwater in an aquifer or the level of surface water] to identify where further withdrawals would cause significant harm to the water resources of the area. Specific minimum flows and levels are established...for specified priority water bodies that have been designated pursuant

to Section 373.042(2), F.S.” A minimum flow was established for the Caloosahatchee River in October 2008 and stipulated in Chapter 40E-8.221(2), F.A.C.

The Caloosahatchee River is a canal (C-43) utilized by the U.S. Army Corps of Engineers to help maintain the water level of Lake Okeechobee. During the heavy rainfalls of wet season, pulses of excess fresh water are released from the lake and sent down both the Caloosahatchee and St. Lucie rivers in an effort to maintain optimal water levels. These pulses of fresh water create a shock effect in the



Map 9 | Florida Department of Environmental Protection water classifications.

receiving estuary, rapidly lowering the salinity, at times to the point of environmental detriment. Salinity levels rebound, only to plummet again during subsequent releases of fresh water. These pulses can also carry with them heavy nutrient loads from the lake and surrounding watersheds. In recent years the stress placed upon the Caloosahatchee River has taken its toll as the number and severity of algal blooms in the river has increased. Many of the algal blooms have been Harmful Algal Blooms (HABs) and area residents have been advised to refrain from fishing or coming into contact with the water. As these algae die and are broken down by bacteria, dissolved oxygen (DO) can drop to levels disastrous for wildlife. During the dry season, however, lake water is withheld, again to maintain lake levels, with the effect of starving the receiving estuary of much needed fresh water input. Salinities can then rise to levels potentially harmful for marine life. A 2008 SFWMD report summarized the problem well when it stated that “estuaries in South Florida suffer from (1) disruption of the natural magnitude (excess or lack of) and timing of freshwater input, (2) increasing inputs of pollutants (nutrients, bacteria, toxics, etc.) and sediment, and (3) loss of critical estuarine habitat and biological communities” (SFWMD, 2008).

Climate

Southwest Florida enjoys subtropical weather, with temperatures primarily controlled by latitude and maritime influences. Summers are hot and humid, almost tropical, while spring and autumn exhibit subtle, but not non-existent, changes. Winters are mild, as cold air coming down from the north is moderated while passing over the warmer waters of the Gulf (USFWS, 2010). Winter temperatures average 63°F (17°C) and rarely reach freezing, 32° F (0°C). Frost is uncommon along the coast and temperatures below freezing are rare. Average maximum summer temperatures reach around 90°F (32°C) but on rare occasion have reached 100°F (38°C). The average summer temperature is 83°F (28°C) (Scarlatos, 1988). Relative humidity can be high, with the annual average for the area around 89 percent in the morning and 56 percent in the afternoon. Relative humidity is defined as a percentage of the amount of moisture in the air compared to the maximum amount of moisture the air can hold at the same temperature and pressure (Florida State University, n.d.).

Air temperature and rainfall data collected at the Fort Myers Federal Aviation Administration Airport is utilized by NOAA’s National Climatic Data Center, the world’s largest repository of weather and climate data and information, whose mission is to describe the climate of the United States. It acts as the “Nation’s Scorekeeper” regarding the trends and anomalies of weather and climate (National Climatic Data Center, 2013). During the 1981-2010 period, the Center determined that the Fort Myers area had an average annual mean temperature of 75.1°F (23.9°C), with an average maximum of 84.7°F (29.3°C) and minimum of 65.5°F (18.6°C). Annual rainfall averaged 55.93 inches (142 cm), although it did not fall consistently throughout the year. During this time period, August received the most rain with 10.14 inches (25.7 cm), while December the least with just 1.71 inches (4.3 cm). For its entire period of record from 1892 to 2012, the annual average maximum temperature for Fort Myers was 83.6°F (28.7°C), and minimum was 64.5°F (18.1°C), as shown in Table 2. Average annual total precipitation was 53.67 inches (136.3 cm) (Florida State University, n.d.).

Weather in southwest Florida is a dichotomy between wet season and dry. Just 18 to 23 percent of annual rainfall occurs in the dry season, while 60 to 72 percent occurs during the wet season (Beever, 2008). Throughout the rainy season which extends from June to October, warm air rises off of the heated landscape causing moist sea air to flow onshore and the subsequent development of thunderstorms. Summer rains are short in duration but high in intensity, and usually occur in late afternoon or early evening. Precipitation averages over eight inches (20 cm) per month, although tropical storms can bring in as much as 6-10 inches (15-25 cm) in one day (Scarlatos, 1988). This rainfall is a primary source for replenishing groundwater drinking supplies. In contrast, the dry season runs from November through May and frequently exhibits long periods of little to no rainfall. During these winter and spring months, water temperatures are typically warmer than land and cause breezes to flow offshore, suppressing

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Avg Max Temp (F)	74.4	75.9	79.8	84.1	88.2	90.0	90.6	90.8	89.3	85.1	79.6	75.4	83.6
Avg Min Temp (F)	53.8	54.8	58.5	62.4	67.4	72.1	73.8	74.2	73.4	68.2	60.4	55.2	64.5
Avg Total Precip (in)	1.75	2.01	2.48	2.02	3.65	9.31	8.69	8.78	8.33	3.65	1.44	1.56	53.67

Table 2 | Temperature and precipitation, Fort Myers station #083186, at latitude 2635, longitude 08152. Period of record monthly climate summary (Period of Record: 1/1/1892 to 4/30/2012). Source: Southeast Regional Climate Center.

rainfall and creating a distinct dry season (USFWS, 2010). Average rainfall for November to January is less than two inches (5 cm), and a little more than two inches (5 cm) from February to May (Scarlatos, 1988). This sharp contrast between wet season and dry season rainfall totals can be exacerbated by the demand for water, often highest during the dry months of winter and spring when demand is driven by a seasonal peak in tourism as well as by irrigation for winter and spring agriculture (Beever, 2008).

Prevailing winds are from the east (Scarlatos, 1988), and average annual wind speed for the area is eight miles per hour (mph). The month of March has the highest average annual wind speed with 9.3 mph, and August the lowest with 6.7 mph (Florida State University, n.d.). Localized wind speeds have been documented within the Horseshoe Keys of Estero Bay, however, with daily fluctuations in excess of 20 mph (Byrne & Gabaldon, 2008). Hurricanes also bring temporary high winds, with speeds of over 100 mph recorded.

On average, the region is affected by tropical activity every 2.55 years, and experiences hurricane force winds (for at least a few hours) every 9.33 years. Sustained winds of hurricanes that have affected the area averaged 112 mph (Hurricane City, n.d.). Although hurricane season extends from June 1 to November 30 each year, peak months for hurricane activity are September and October when the warm waters of the Atlantic, Caribbean and the Gulf of Mexico feed tropical waves coming off the coast of Africa. Over one hundred tropical waves a year can develop, although fewer than ten typically progress into tropical storms, and even fewer still into hurricanes (USFWS, 2010).

On August 26, 2012, Tropical Storm Isaac passed far offshore to the west of southwest Florida and caused little damage locally. Rainfall within the region ranged from one to three inches, with wind gusts of 30 mph (Briscoe, 2012). Tropical Storm Debby went through on June 25, 2012, creating local flooding and minor erosion of Fort Myers Beach where local beach renourishment efforts finished in April (NBC-2, 2012). Tropical Storm Faye in 2008 passed east of the region with 60 mph winds on a north northeast track. On October 24, 2005, Hurricane Wilma made landfall approximately 40 miles to the south with 125 mph winds (Hurricane City, n.d.). On Friday, August 13, 2004 Hurricane Charley passed through southwest Florida with winds up to 145 mph. The storm tore the island of North Captiva in half as it travelled and made landfall in Punta Gorda. Other major hurricanes (Categories 3-5) that have occurred in the area since 1900 include the Great Miami Hurricane of 1926 which passed over San Carlos Bay and Captiva Island as a Category 3 storm, an unnamed Category 3 storm in 1944 that passed to the west of the area, and Hurricane Donna in 1960 that made landfall as a Category 4 hurricane near Naples (USFWS, 2010).

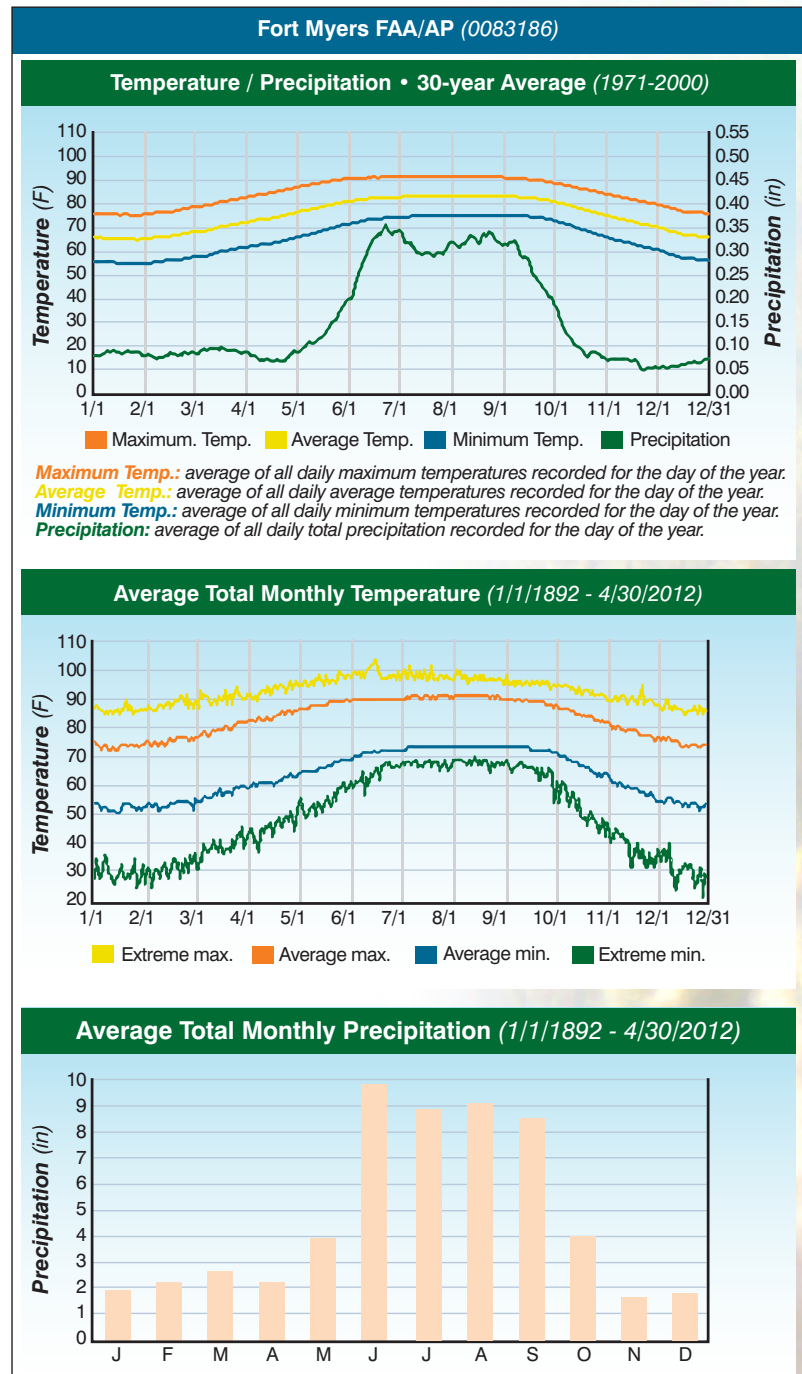
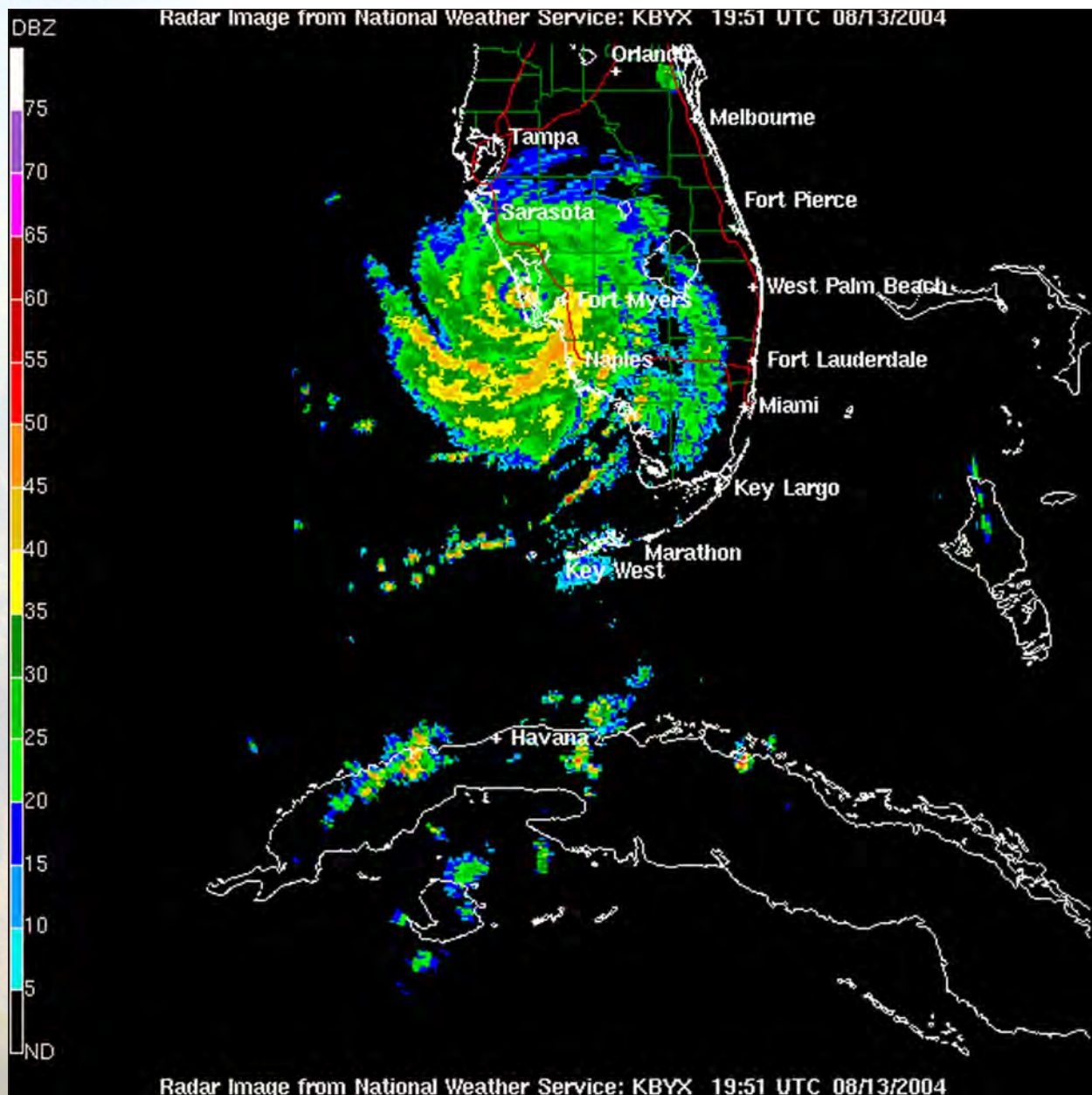


Figure 3 | Fort Myers, Florida, temperature and precipitation for station #083186, at latitude 2635, longitude 08152. Source: Southeast Regional Climate Center, undated.



Estero Bay has been impacted by several dramatic weather events, including Hurricane Charley in 2004.

Over the past century, the Earth's average temperature has risen 1.4°F and is projected to rise another 2° to 11.5°F over the next hundred years (EPA, 2012a). Temperatures within the greater Charlotte Harbor region have increased approximately 2°F over the past 40 years (Leary, 2010). This increase in temperature is just one effect of climate change, defined by the EPA as "major changes in temperature, precipitation, or wind patterns, among other effects, that occur over several decades or longer" (EPA, 2012a). Indeed, even small changes such as those in the average temperature of the planet can translate to large and potentially dangerous shifts in climate and weather (EPA, 2012a). Other changes include the rising of sea level, which rose by 1.7 ± 0.5 mm/yr throughout the 20th century, as well as an increase in global mean sea surface temperatures by approximately 0.6°C since 1950, in addition to associated atmospheric warming in coastal areas (Parry, Canziani, Palutikof, van der Linden & Hanson, 2007). The intensity of Atlantic hurricanes has also increased in recent decades (EPA, 2012a).

Such changes in climate and ocean conditions will have major implications for coastal communities. In south Florida, for example, precipitation is predicted to decrease, while sea levels will continue to rise (due to melting polar ice caps). Coastal communities will likely continue to experience stronger hurricanes due to increases in ocean temperatures. Subsequently, higher and stronger storm surges may wreak havoc on coastal populations and the surrounding environment, leading to erosion, flooding and property damage (EPA, 2012a). Lee County, in particular, is vulnerable due to its flat topography, poorly drained soils and proximity to sea level. For example, most of Estero Island and Lovers Key is

considered eroded, with portions considered critically eroded. There are also sections of shoreline near New Pass and Big Hickory Pass that are also considered critically eroded (Beever, Gray, Trescott, Cobb, Utley & Hutchinson, 2010).

Rising sea level and escalating storms will likely also increase the salinity of estuaries, coastal wetlands, and tidal rivers. As such, migration or loss of entire seagrass beds could occur (Beever et al., 2010). Rapid sea level rise could affect barrier islands, putting whole cities and towns such as Fort Myers Beach under water, and leaving inland habitats more exposed to the effects from incoming storms (EPA, 2012a). Changes in hydrology may alter surface water runoff to the coast as well as groundwater recharge, potentially allowing saltwater intrusion into shallow aquifers. Ocean acidification is already occurring and this trend will likely continue in the coming decades. Higher acidity can affect the health of many marine species including plankton, mollusks, and other shellfish (EPA, 2012a).

Species ranges within the area will most likely be affected. Warming waters will cause alterations in the natural ranges of fish and other marine species, such as in the habitat range of mangroves which has already begun to shift (EPA, 2012a). Die-offs of seagrasses and immobile faunal species including sponges could occur as a result of increasing water temperatures (Beever et al., 2010). Habitat shifts or local extirpation of keystone species such as seagrasses and red mangroves (*Rhizophora mangle*) will have an undeniable effect on the estuarine environment, as these species serve multiple functions within the ecosystem. Providing food and protection for many marine species, helping stabilize marine sediments, and mitigating effects of storm activity are just some of the services that these species provide to the local environment. Furthermore, as local, native species are displaced or eradicated, other exotic and possibly invasive species immigrate and colonize, often with unknown and unexpected consequences.

Changes in infectious disease transmission patterns are also likely to be a major consequence of climate change (World Health Organization, n.d.). The spread of some types of bacteria, for example, have been linked to warmer temperatures. Temperature increases have already amplified the frequency of shellfish-borne disease outbreaks throughout coastal waters, such as increases in food poisoning from eating shellfish infected with *Vibrio parahaemolyticus* bacteria. Incidences in the United States have increased by 41 percent from 1996 to 2006 (EPA, 2012a). Furthermore, environmental changes from sea level rise may provide new mosquito breeding areas and thus intensify mosquito-vector diseases such as West Nile virus and Saint Louis encephalitis. Additionally, increases in toxic algal blooms are already being documented (World Health Organization, n.d.). Red tide (*Karenia brevis*) blooms along the coasts and in local estuaries affect individuals with respiratory problems and produce eye, nose and throat irritation (Florida Department of Health, 2008). Blooms of blue-green algae (Cyanobacteria) such as those that have been documented in the Caloosahatchee can cause abdominal cramps, nausea, vomiting and diarrhea when ingested in large enough quantities (Florida Department of Health, n.d.). Blooms have also rendered local waters unsafe for swimming and fishing.

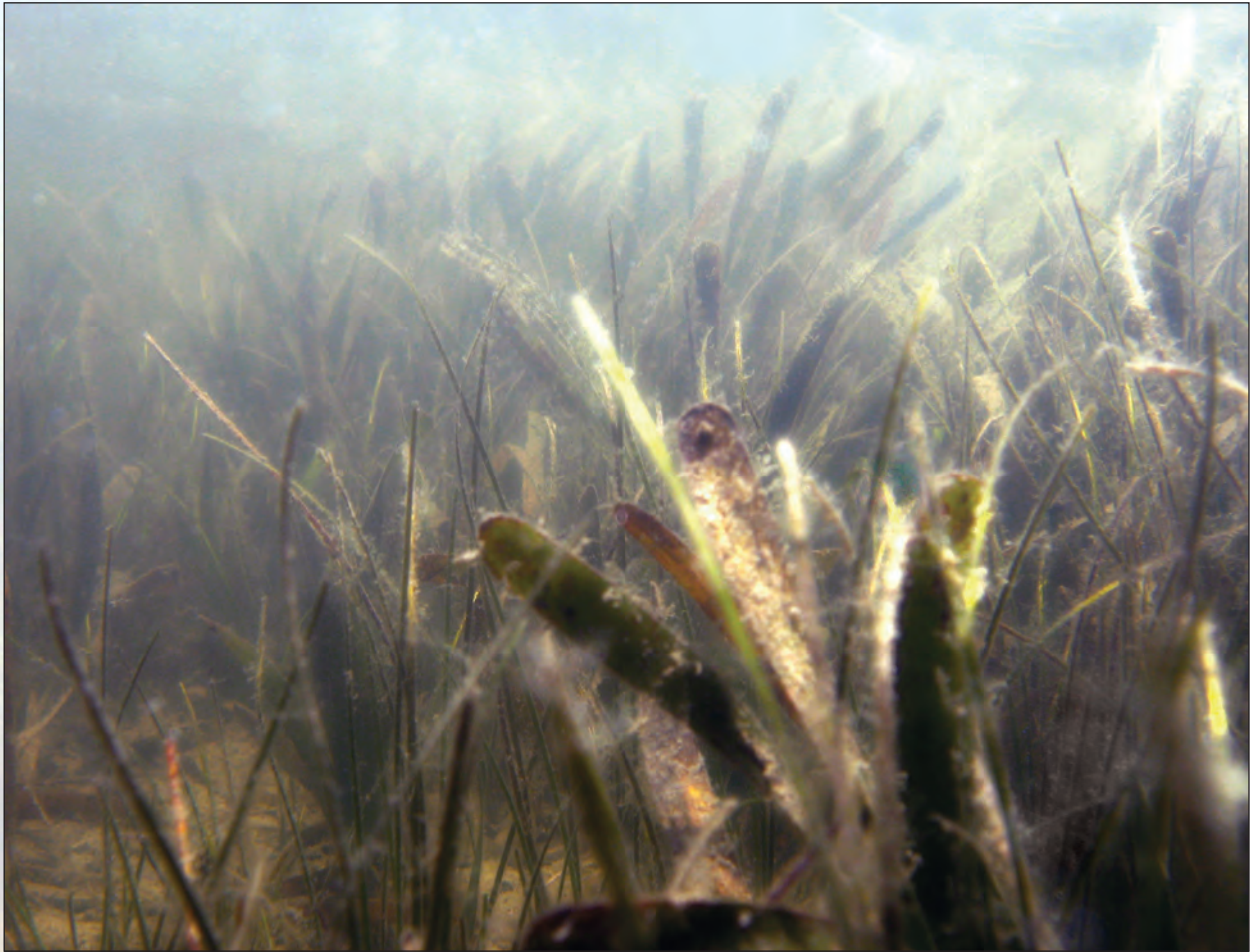
While only time will tell to what extent climate change will affect the southwest Florida region, it is imperative that aquatic preserve management goals and restoration efforts should not be based on current conditions, but should integrate into any future endeavors the projected impacts of sea level rise and other aspects of climate change as they are presently understood.

Natural Communities

The natural community classification system used in this plan was originally developed by the Florida Natural Areas Inventory (FNAI) and FDNR now DEP in 1990 (Florida Natural Areas Inventory & Florida Department of Natural Resources, 1990). In 2007, DEP's Division of State Lands, funded FNAI to update the original classification system. In 2010, FNAI finalized the Guide to the Natural Communities of Florida which created additional natural and altered community description types. Anthropogenic "altered" communities in this plan are simply referred to as "ruderal."

The community types are defined by a variety of factors, such as vegetation structure and composition, hydrology, fire regime, topography and soil type. The community types are named for the most characteristic biological or physical feature (FNAI, 2010). FNAI also assigns Global (G) and State (S) ranks to each natural community and species that FNAI tracks. These ranks reflect the status of the natural community or species worldwide (G) and in Florida (S). Lower numbers reflect a higher degree of imperilment (e.g., G1 represents the most imperiled natural communities worldwide, S1 represents the most imperiled natural communities in Florida).

The Estero Bay Aquatic Preserve falls within the subtropical biogeographic zone. The aquatic preserve is comprised of oligohaline (low salinity) and estuarine habitat types and is surrounded by a variety of upland communities that buffer the bay from outside influences.



The thick-bladed turtle grass and thin-bladed shoal grass are the most abundant seagrass species found in Estero Bay.

To date, ten natural communities have been identified within the bay. Of the natural communities found within the Estero Bay Aquatic Preserve, six communities (algal bed, blackwater stream, beach dune, coastal berm, seagrass bed, and sponge bed), are listed as S2, imperiled in Florida because of rarity. Most of the S2 communities have been affected by human activities attributed to intentional or unintentional consequences from pollution, turbidity, propeller scarring or trimming. Mollusk reef is ranked as S3, very rare or local throughout its range in Florida. The most common natural communities within Estero Bay Aquatic Preserve are unconsolidated substrate (S5), seagrass bed and mangrove swamp (S4), depending on the location within the bay. All have documented levels of disturbances. Ruderal or developed areas are also present.

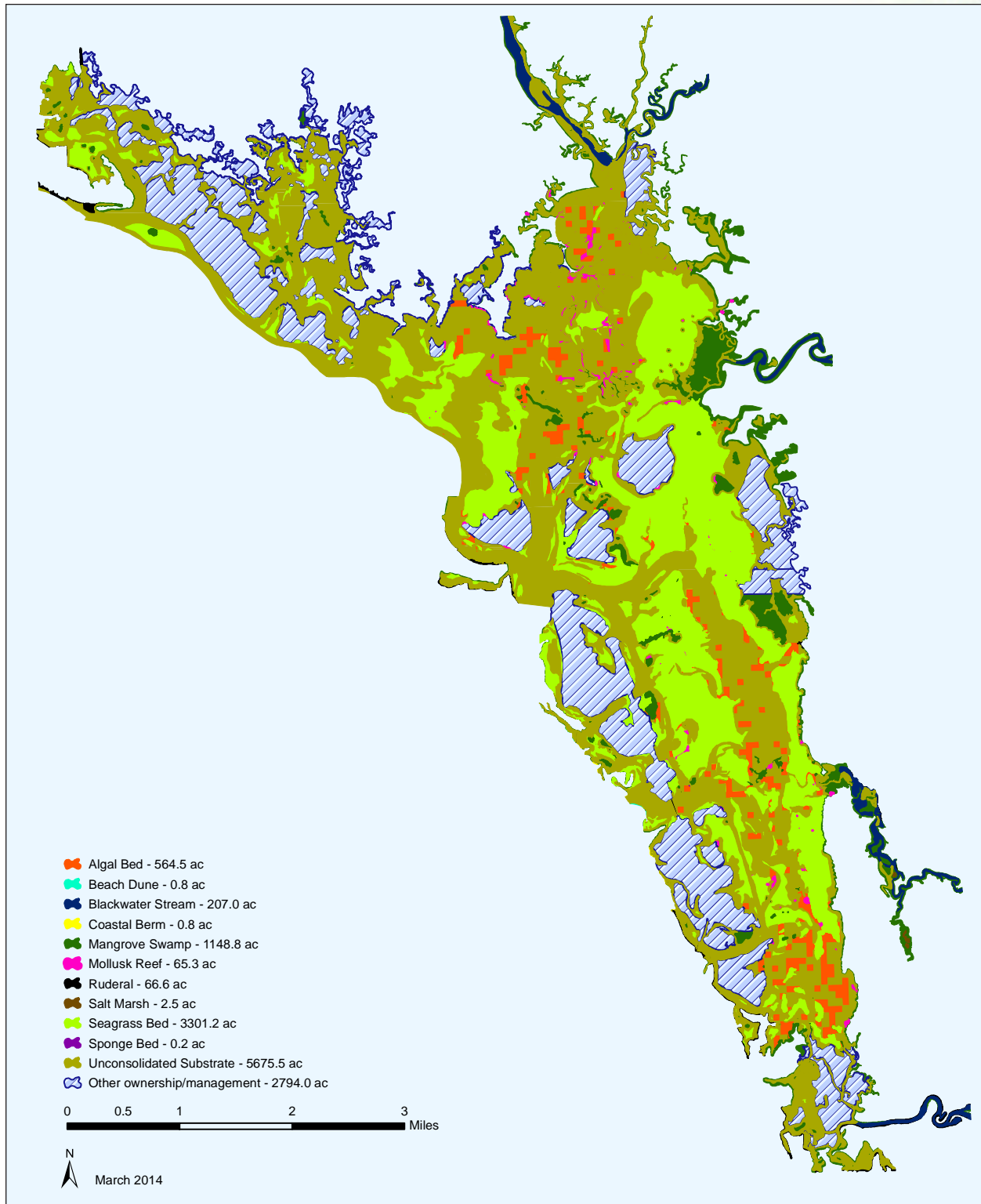
Data used to produce Map 10 delineating the major natural community types found on Estero Bay Aquatic Preserve were developed by staff using multiple sources that include, but were not limited to: GIS data from Digital Ortho-photographs, 2008; Florida Marine Research Institute, 2004; Florida Fish and Wildlife Conservation Commission Fish and Wildlife Research Institute (FWC-FWRI), 2008; DEP, 2004 and 2007; black and white aerial photographs (1:25,000 scale); and the Conservancy of Southwest Florida, 2008. These data are not always based on comprehensive or site-specific field surveys (the Conservancy of Southwest Florida's materials were the exception), and Estero Bay Aquatic Preserve staff have conducted a minimal amount of additional fieldwork for purposes of producing this map.

Algal Beds are characterized as large populations of non-drift macro or micro algae. These beds of attached algae, along with seagrasses, make up the Submerged Aquatic Vegetation (SAV) found within the bay. Species consist of *Caulerpa prolifera*, *C. mexicana*, and *C. sertularoides* and are mostly concentrated in the middle portions of the bay, often found along the interface between seagrass beds and unconsolidated substrate. The invasive *C. taxifolia* has not been recorded within the aquatic preserve.

Beach Dunes are characterized as a wind-deposited foredune and wave-deposited upper beach that are sparsely to densely vegetated with pioneer species, especially sea oats (*Uniola paniculata*). The only pocket of beach dune located within the aquatic preserve is located within Lovers Key State

Park. Species utilizing this community include the state-listed threatened Southeastern snowy plover (*Charadrius alexandrinus tenuirostris*) and the state and federally-listed threatened piping plover (*Charadrius melodus*). Ghost (*Ocypode quadrata*) and fiddler (*Uca pugilator*) crabs, southern black racers (*Coluber constrictor priapus*), railroad vine (*Ipomoea pes-caprae*), and dune sunflower (*Helianthus debilis*) can also be found within this community. This area is located within the nesting range of loggerhead sea turtles (*Caretta caretta*) (E. Haverfield, personal communication, September 14, 2012).

Blackwater Streams are characterized as perennial or intermittent seasonal watercourses originating deep in sandy lowlands where extensive wetlands with organic soils function as reservoirs, collecting rainfall and discharging it slowly to the stream. The tea-colored waters are laden with tannins,



Map 10 | Florida Natural Areas Inventory natural communities.

particulates, and dissolved organic matter and iron derived from drainage through swamps and marshes. They generally are acidic (pH = 4.0 - 6.0), but may become circumneutral or slightly alkaline during low-flow stages when influenced by alkaline groundwater. Hendry Creek, Mullock Creek, Estero River, Spring Creek, and Imperial River all fit into this category and flow into Estero Bay. Native species such as gar (*Lepisosteus* sp.), and the state-listed Species of Special Concern and federally-listed threatened (due to similarity of appearance) American alligator (*Alligator mississippiensis*) can be found within these areas. In the past, the state and federally-listed endangered American crocodile (*Crocodylus acutus*) could be found in the upper waters of the Estero River, but this species has not been seen within the Estero Bay watershed in years.

Coastal Berms are short forest or shrub thicket found on long narrow storm-deposited ridges of loose sediment formed by a mixture of coarse shell fragments, pieces of coralline algae, and other coastal debris. These ridges parallel the shore and may be found on the seaward edge or landward edge of the mangroves or further inland depending on the height of the storm surge that formed them. They range in height from one to 10 feet. Structure and composition of the vegetation is variable depending on height and time since the last storm event. There are three main areas where this type of accretion is occurring within the aquatic preserve. The largest is on the south side of New Pass. The other two are located at the entrance to Big Hickory Pass. One area is located wholly on Lee County property, while the other is on private land on Little Hickory Island but abuts Lee County property. The two accretion areas may be the result of a pair of jetties located on the north end of Little Hickory Island constructed as part of the renourishment of Bonita Beach in 1995. All three areas are located within the nesting range of loggerhead sea turtles (E. Haverfield, personal communication, September 14, 2012).

Mollusk Reefs are characterized as expansive concentrations of sessile mollusks occurring in intertidal and subtidal zones to a depth of 40 feet. In Florida, the most developed mollusk reefs are generally restricted to estuarine areas and are dominated by the American oyster (*Crassostrea virginica*) (also known as the Atlantic oyster or Virginia oyster). Indeed, oysters within the Estero Bay estuary do consist of the American oyster. In a recent benthic study, the Conservancy of Southwest Florida found a large complex of oyster reefs in the northeastern portion of the bay, with small isolated reefs occurring southward (Schmid, 2009). Additionally, the Florida Gulf Coast University Vester Field Station has an ongoing restoration program focusing on the creation of mollusk reefs within the Caloosahatchee River, San Carlos Bay and Estero Bay.

Ruderal areas, while not a natural community, exist along the federal channel within Matanzas Pass and within Hurricane Bay in the northern portion of the bay. These heavily disturbed sections include long-used shrimping and industrial sites, and adjacent commercial and residential locations. Other ruderal areas around the bay are primarily along western perimeter in the area of Buccaneer Lagoon and developed areas at the south end of Fort Myers Beach, Lovers Key State Park, roadways, Bonita Beach, and eastern residential areas along Imperial River and Spring Creek. Most of these ruderal locations contain fill material, seawalls and/or docks.

FNAI Natural Community Type	# Acres	% of Area	Global Rank	State Rank	Comments
Algal Bed	564.5	5.1	G3	S2	Survey used 10 meter-squares and entire bay not covered
Beach Dune	0.8	.01	G3	S2	Along western boundary
Blackwater Stream	207.0	1.9	G4	S2	Main flowing tributaries
Coastal Berm	0.8	.01	G3	S2	Along western boundary
Mollusk Reef	65.3	.6	G3	S3	Loss of area; restoration efforts in the bay continue
Ruderal	66.6	.6	n/a	n/a	Disturbed – anthropogenic; most are sea walls or docks
Salt Marsh	2.5	.02	G4	S4	Along eastern boundary areas of rivers generally surrounded by mangroves
Seagrass Bed	3,301.2	29.9	G3	S2	In various stages of health
Sponge Bed	0.2	.00	G2	S2	Located by staff
Mangrove Swamp	1,148.8	10.4	G5	S4	A major resource of rookery islands and fishery nurseries
Unconsolidated Substrate	5,675.5	51.4	G5	S5	Known areas and/or unmapped seagrass locations may fall under this category



Brown pelican and double-crested cormorant utilize exposed oyster bars in Estero Bay to rest.

Salt Marshes are a largely herbaceous community that occurs in the portion of the coastal zone affected by tides and seawater and protected from large waves, either by the broad, gently sloping topography of the shore, by a barrier island, or by location along a bay or estuary. The width of the intertidal zone depends on the slope of the shore and the tidal range. Salt marsh may have distinct zones of vegetation, each dominated by a single species of grass or rush. Flooding frequency and soil salinity are the two major environmental factors that influence salt marsh vegetation. Needle rush (*Juncus* spp.) and saltmarsh cordgrass (*Spartina alterniflora*) both tolerate a wide range of salinities, but cordgrass is found where the marsh is flooded almost daily, whereas needle rush is found where the marsh is flooded less frequently. A large number of rare animals are found in salt marshes. Several bird species nest in salt marshes and are dependent on them for their entire life cycle. Although there is well over a thousand acres of salt marsh community within the Estero Bay area, only a small portion falls within the aquatic preserve.

Seagrass Beds are characterized as expansive stands of vascular plants. This community occurs in subtidal (rarely intertidal) zones, in clear, coastal waters where wave energy is moderate. Aquatic preserve personnel monitor five of these SAV species within the bay: turtle grass (*Thalassia testudinum*), manatee grass (*Syringodium filiforme*), shoal grass (*Halodule wrightii*), star grass (*Halophila engelmannii*) and paddle grass (*Halophila decipiens*). The Conservancy of Southwest Florida also documented small patches of widgeon grass (*Ruppia maritima*) near the mouth of Spring Creek and in the New Pass area during its 2007 study. Moreover, the study also found that significant differences in the morphometrics of turtle grass throughout Estero Bay: “the northern area had the lowest biomass; northern and southern areas had shorter blade lengths than central areas; and south-central and southern areas had wider blades with the widest in the southern area. The distribution of blade lengths among the sampling areas is consistent with the salinity pattern in Estero Bay, but the different distribution of blade widths suggests that some other water quality parameter, such as nutrient availability or light attenuation, is also influencing the southern areas” (Schmid, 2009). Overall, seagrasses within the estuary have begun a slight resurgence after decades of decline, starting during the drought conditions that occurred during 2006-2007. Listed species such as the state and federally endangered Florida manatee (*Trichechus manatus latirostris*), Atlantic green turtle (*Chelonia mydas mydas*), leatherback turtle (*Dermochelys coriacea*), Atlantic hawksbill turtle (*Eretmochelys imbricata imbricata*), Kemp’s ridley turtle (*Lepidochelys kempii*) and the state and federally-listed threatened Atlantic loggerhead turtle (*Caretta caretta caretta*)



At low tide, mud flats are exposed throughout Estero Bay.

all rely on seagrass bed communities. In 2011, activities associated with a permit to dredge in Hurricane Bay, to provide access to a San Carlos Island community, impacted seagrass communities. Prop scar restoration was conducted in 2012 to mitigate for the impacts.

Sponge Beds are characterized as dense populations of sessile invertebrates of the phylum Porifera, Class Demospongiae. Although concentrations of living sponges can occur in marine and estuarine intertidal zones, sponge beds are confined primarily to subtidal zones. There is a small patch of sponge bed located in Estero Bay, bayside just north of Big Carlos Pass at the entrance to Buccaneer Lagoon. The Town of Fort Myers Beach obtained a permit in 2012 to dredge an access channel to Buccaneer Lagoon. Approximately 200 sponges were relocated as a part of this effort.

Mangrove Swamps are characterized as dense, low forests occurring along relatively flat, intertidal and supratidal shorelines of low wave energy along southern Florida. These are located southeast of the mouth of Mullock Creek, at the mouth of Estero River, along Spring Creek, west of the mouth of Imperial River, and scattered in other small pockets around the bay. Birds utilize mangrove swamps as nesting habitat and fish use their roots as nursery grounds and as protection from predators.

Unconsolidated Substrates are characterized as expansive, relatively open areas of subtidal, intertidal, and supratidal zones which lack dense populations of sessile plant and animal species. Unconsolidated substrates are unconsolidated material and include coralgall, marl, mud, mud/sand, sand or shell. This community may support a large population of infaunal organisms as well as a variety of transient planktonic and pelagic organisms. Furthermore, “unvegetated bottom with colonies of sessile invertebrates such as tube worms, tunicates, bryozoans, and sponges (i.e., live bottom) has been identified as essential foraging habitat for the endangered Kemp’s ridley turtle in the coastal waters of west Florida” (Schmid, 2009). This community accounts for over half of the substrate within the bay and is found not only in deeper waters such as channels but also in some of the shallowest and intertidal portions of the bay, where SAV are not found.

Native Species

The productivity of the bay has been described as moderate to high for a semi-tropical estuary, which has made Estero Bay a nature lover’s paradise. Mangrove islands dot the coastline, providing



A nine-armed sea star buries itself in the sand.

the perfect spot for wading birds to build their rookeries, safe from most would-be predators. In addition, seagrass beds teem with life, helping to support rookeries but also sustaining a multitude of invertebrate and fish species, including many commercially and recreationally important fishes.

Red mangroves (*Rhizophora mangle*) provide shelter for a variety of flora and fauna both under water and above. Among a mangrove's exposed roots and branches can be found animals such as tree snails and mangrove tree crabs (*Aratus pisonii*). Under water, tree roots serve as a protected nursery area for fishes, crustaceans, and shellfish. The red mangrove is easily identified by its tangled, reddish roots called prop roots, and these roots have earned mangroves the title of "walking trees." Red mangrove roots not only act as nursery areas, they also serve as physical traps that stabilize sediments, and serve as substrate for various marine organisms including filter-feeding oysters and sea squirts (*Styela plicata*). These attached filter-feeding organisms carry water through their bodies and, in turn, help to trap and cycle nutrients. Mangroves provide food for a variety of economically important marine species such as snook (*Centropomus undecimalis*), mangrove snapper (*Lutjanus griseus*) and sheepshead (*Archosargus probatocephalus*). Their canopies serve as nesting areas for wading bird species such as herons, egrets, pelicans and double-crested cormorants (*Phalacrocorax auritus*).

The six species of seagrasses documented in Estero Bay are also vital to the health of the estuary. Like mangroves, these plants help to stabilize sediments by trapping particles and dissipating wave energy. They provide habitat and food for a variety of species such as bay anchovy (*Anchoa mitchilli*), striped burrfish (*Chilomycterus schoepfi*), ocellated flounder (*Ancylopsetta quadrocellata*), spider crabs (*Libinia dubia*), pinfish (*Diplodus holbrooki*), lined seahorse (*Hippocampus erectus*), dwarf seahorse (*Hippocampus zosterae*), spotfin mojarra (*Eucinostomus argenteus*), snapping shrimp (*Alpheidae* spp.), ragged sea hare (*Bursatella leachi plei*) and horseshoe crab (*Limulus polyphemus*). In addition, the majority of commercial and recreationally important fish species including spotted seatrout (*Cynoscion nebulosus*) and mangrove snapper spend some part of their life cycle in a seagrass bed. Moreover, there is a healthy population of blue crab (*Callinectes sapidus*), which are harvested almost year-round. Larger fauna including the Florida manatee and various species of sea turtles can also be found feeding on the grasses or on other species living within the grass beds.

Besides flora and fauna found near mangroves and seagrass beds, other animals of interest within the aquatic preserve include bottlenose dolphin (*Tursiops truncatus*), rays such as the southern stingray (*Dasyatis americana*) and spotted eagle ray (*Aetobatus narinari*), and sharks such as bull sharks (*Carcharhinus leucas*) and blacktip sharks (*Carcharhinus limbatus*). River otters (*Lutra canadensis*) are not uncommon in the upper waters of the bay's tributaries, in particular Hendry Creek and Mullock Creek. Furthermore, anecdotal evidence supports the theory that the local population of bay scallops (*Argopecten irradians*) may have begun to increase in recent years. While nowhere near historic population sizes, the increased appearance of scallops around the bay is a welcome sight. See Appendix B.4 for a comprehensive list of species known to occur in the aquatic preserve, based on field data and other resources.

Listed Species

Estero Bay provides important habitat and foraging areas for many species listed as Endangered, Threatened, or Species of Special Concern (SSC) by either the federal government or by FWC, as designated in Chapters 68A-27.003 and 68A-27.005, F.A.C. As of 2010, all federally listed species that occur in Florida are now included on Florida's list as Federally-designated Endangered or Federally-designated Threatened species. In addition, the state has a listing process to identify species that are not federally listed but at risk of extinction. These species are called State-designated Threatened (FWC, 2012c).



A bald eagle enjoying a freshly caught fish from the bay.
(Photo credit: Geri Biggs)

Little blue heron (*Egretta caerulea*), reddish egret (*Egretta rufescens*), snowy egret (*Egretta thula*), tricolored heron (*Egretta tricolor*), and white ibis (*Eudocimus albus*) are all listed by the state as SSC and rely on mangrove islands in the aquatic preserve as nesting colonies. The state-listed SSC brown pelican (*Pelecanus occidentalis*) can also be found within these nesting colonies. The American oystercatchers (*Haematopus palliatus*) are listed by the state as SSC and can be found nesting on the exposed substrate beneath the mangroves. In addition, the state-listed SSC black skimmers (*Rynchops niger*), and state-listed threatened least tern (*Sterna antillarum*) rely on the estuary and its watershed for food.

In the seagrass beds, federally-designated endangered Florida manatees and Atlantic green turtles feed on grasses while federally-designated threatened Atlantic loggerhead turtles search

for mollusks and crustaceans. Federally-designated endangered Kemp's ridley turtles and smalltooth sawfish (*Pristis pectinata*) are also known to utilize the bay, while federally-designated endangered leatherback turtles have been documented offshore (E. Haverfield, personal communication, September 14, 2012). In 2006, the Coastal Bays and Barrier Islands Conceptual Ecological Model found that "altered flows into the coastal bays may affect the federally endangered Florida manatee, American crocodile, smalltooth sawfish and wood stork (*Mycteria americana*). The West Indian manatee forages, calves, and rests in the bays as well as tributaries leading into the coastal bays. Hydrologic changes may alter freshwater flows and biological conditions in the bays, which in turn may affect manatees. Changes in hydrology affect the American crocodile's use of tributaries and may affect nesting habits and success. The bays contain smalltooth sawfish habitat and excessive freshwater inflows or pulses could decrease the value of this habitat for sawfish" (Thomas & Rumbold, 2006).

Smalltooth sawfish prefer water less than three feet (1 m) deep and greater than 86°F (30°C), with moderate to high dissolved oxygen levels (> 6 mg/l) and salinities between 18 and 30 ppt (Poulakis et al., 2010). In 2003 the smalltooth sawfish was listed as endangered under the United States Endangered Species Act. Portions of Estero Bay have been designated as critical sawfish habitat by NOAA. Additionally, the World Conservation Union includes the smalltooth sawfish as critically endangered on its Red List. The main purpose of the Red List is to catalogue and raise awareness of species that are threatened with extinction (National Marine Fisheries Service, 2009). According to 68B-44.008(1)(bb), F.A.C., it is prohibited to harvest, possess, or land smalltooth sawfish. A complete list of endangered and threatened species known to occur in the aquatic preserve, based on information from FNAI and other resources is located in Appendix B.4.1.

Invasive Non-native Species

An exotic is a non-native organism or species that has been introduced into an area (Lincoln, Boxshall & Clark, 2003). Invasive exotics are those known to have a negative impact on other species or on habitats to which they have been introduced. The marine invasive exotic Asian green mussel (*Perna viridis*) has been documented in the aquatic preserve on several occasions, and efforts by staff are currently underway to educate the public on identification and reporting procedures. Aquatic preserve staff are actively involved in control measures. Freshwater invasive fish that may occur within the Estero Bay watershed include the freshwater oscar (*Astronotus ocellatus*), Mayan cichlid (*Cichlasoma urophthalmus*), armored catfish (*Hoplosternum littorale*), suckermouth catfish (*Hypostomus plecostomus*), spotted tilapia (*Tilapia mariae*) and blue tilapia (*Oreochromis aureus*). Refer to Appendix B.4.2 for a complete list of problem and invasive non-native species.

Other exotic threats include the giant tiger prawn (*Penaeus monodon*), the venomous red lionfish (*Pterois volitans*) and devil firefish (*Pterois miles*). Named for the black stripes on its shell, the giant tiger prawn is a native of southeast Asia and Australia and can grow up to eight to twelve inches long. A commonly cultivated species in the 1980s and 1990s, there have been several accidental releases since the first documented in Bluffton, S.C in 1988. Giant tiger prawn are an aggressive species that can compete with native shrimp species for food and habitat. Furthermore, their prey can consist of native crabs, bivalves, and even fish (FWC, 2011). An invasive non-native fish, not yet seen within the bay but being caught at artificial fishing reefs in Lee County, is the lionfish. Since the lionfish was first spotted in the spring of 2011, they have actively been removed by informed fishermen and members of a local dive club. Along with the devil firefish, these two have become prolific along the Atlantic coast in less than a decade and are now becoming so in the Gulf of Mexico. These fish, originally from the Indo-Pacific, have venomous spines on their dorsal, anal and pelvic fins that contain a debilitating neurotoxin. In their native habitat, they live in tropical coral reef communities about 10 to 175 feet deep, hiding within crevices during daytime hours and coming out at night to hunt small fish and crustaceans (Schofield, Morris, Langston & Fuller 2012). Red lionfish, however, are fairly good adapters and have been reported in water as cold as 56°F (13.3°C) off of Long Island, New York, as well as documented utilizing mangrove habitats in the Bahamas (Barbour, Montgomery, Adamson, Díaz-Ferguson & Silliman, 2010). In a 2010 study in Roatan Marine Park, Honduras, lionfish were found to inhabit aggregate reefs over half the time (54 percent), patchy reefs 30 percent of the time, and seagrass beds 16 percent of the time. Those in seagrass areas tended to be smaller, juvenile individuals, perhaps using the grass beds as a nursery, much like other fish species do (Biggs, 2011). Although no lionfish have been documented in Estero Bay, there are numerous confirmed sightings in the eastern Gulf of Mexico. The shallow nature of Estero Bay may preclude their establishment, as the average depth of the bay is only about three feet and may not be adequate for this species. Nevertheless, this rapid and dangerous invasion is one that aquatic preserve staff will need to watch closely. It is still not fully understood to what extent that lionfish can utilize the estuarine environment, and more will surely be learned in the coming years.



The exotic invasive Asian green mussel is a growing threat in Estero Bay Aquatic Preserve. (Photo credit: Judie Von Eiff)

Problem Species

Problem species are native species whose habits create specific concerns or management issues. Raccoon over-population, for example, can have decimating effects on both bird rookeries and sea turtle nests through the raiding of nests and predation of eggs and young. Additionally, populations of the native green macroalgae *Ulva* sp. and red macroalgae species such as *Acanthophora spicifera*, *Gracilaria* sp., *Laurencia* sp., and *Hypnea* sp. can proliferate quickly after an influx of nutrients. This is more prevalent during the summer months near areas of heavy freshwater inflow, where these macroalgae, as well as green filamentous algae, sometimes flourish to the point of smothering local seagrass beds. Aquatic preserve staff have noted this phenomenon at various locations during their bi-annual seagrass monitoring, and the Conservancy of Southwest Florida also found a similar situation during their 2007 study. The study found dense clusters of *Acanthophora spicifera* in the extreme northern and southern areas of Estero Bay, possibly indicative of nutrient loadings from Hendry and/or



Top layer remains of a mullet boat graveyard, a state listed cultural resource in Estero Bay, is found at the water's edge.

or Mullock Creeks and Imperial River, respectively. It also surmised that nutrient enriched waters of the Caloosahatchee River were entering northern Estero Bay via Matanzas Pass, as well. Filamentous green algae were found distributed throughout the bay with concentrations in the east-central and southern portions, near Spring Creek and Imperial River, respectively (Schmid, 2009).

HABs are also found periodically in the waters of Estero Bay. An HAB is defined as the proliferation of a toxic or nuisance algae. While normally present in the water column at low concentrations, these algae can quickly multiply into blooms that can discolor the water, making it appear red, greenish, brownish, and even purple in color. Depending on the species, the organisms may also produce a toxin that can affect the central nervous system of fish. In Florida, the species that causes the most red tide, a HAB, is *Karenia brevis*. Cyanobacteria (or blue-green algae) are also commonly found in Florida estuaries, as well as in lakes and rivers (FWC, 2012b) such as the Caloosahatchee River. HABs can have significant negative impacts on natural resources or humans, and recently there has been a noticeable increase in problems associated with HABs. Impacts of these natural phenomena include human illness (or death) from contaminated seafood, marine mammal and seabird deaths, and extensive fish kills (EPA, 2012b).

Archaeological and Historical Resources

Florida's coastal areas, especially uplands adjacent to water, often have a rich history of human settlement. Human activity on the aquatic preserve and EBSP possibly dates back to the Archaic Period, 6500 B.C. – 500 B.C., although no archaeological evidence has been found as of yet. However, archaeological sites dated to this period have been discovered on neighboring property, so it is likely that such sites exist on the preserves, as well. The majority of presently known archaeological sites date from approximately 1550 A.D. to the 20th century (DEP, 2004). Refer to Chapter 3.1.1 for more detailed information on the historical background of the area.

DHR maintains a Master Site File that documents many of Florida's archaeological and historical features. Based on the initial review of the Florida Master Site File on June 9, 2003 and a site assessment of the formerly co-managed Estero Bay Aquatic and State Buffer Preserves by a DHR team in 1997 and 2001, several archaeological and historical sites were found to be within or near the state managed preserves (DEP, 2004). The DHR Site Assessment of Archaeological and Cultural Resources documentation is included as an appendix in the EBSP Land Management Plan. Thirteen sites have

been specifically assigned to the preserve state park for management. Artifacts documented in the Master Site File attest to more than four cultures represented in the aquatic preserve and preserve state park (DEP, 2004). “These include Late Glades II-III, Unspecified Caloosahatchee/Glades, Glades area/ Caloosahatchee Subarea and twentieth century American, including WWII. Site types included in the files are prehistoric mounds, historic homesteads, a sand burial mound, shell middens, historic boat refuse, two airplane crashes, artifact and ceramic scatter, and a railroad grade segment” (DEP, 2004).

The 1997 DHR assessment report provides a summary of the known sites on both the aquatic preserve and the preserve state park, a description of each, and a synopsis of important details (DEP, 2004). Additional information on a few of these sites can be found in An Archaeological Site Inventory Zone Management Plan for Lee County, Florida (Austin, 1987). The project assisted Lee County in constructing a management plan to conserve and protect the county’s cultural resources. Of the nine archaeological sites, four of the sites were listed in the assessment. They included Lone Slash Pine, Dog Key, Julies Island and Starvation Key (DEP, 2004).

With the advent and dissemination of GIS software and databases, in November 2010 staff requested from DHR a review of their Florida Master Site File database, to which they provided additional recorded sites to Estero Bay Aquatic Preserve. Table 4 contains sites that are completely contained within or overlap the aquatic preserve boundary. Most of the recorded sites provided by DHR are excluded from Table 4 since they are upland areas (e.g. Dog Key, Mound Key, Hickory Blvd., San Carlos Island, and Big Bend Road or known to be totally destroyed) that are managed by other government agencies or on privately owned land.

As noted in the EBSP Unit Management Plan, specific problems that cultural/archaeological resources face include, but are not limited to, development, borrowing, vandalism, site looting, deterioration, and erosion (DEP, 2004). As of yet, the entire aquatic preserve has not been systematically searched for cultural resources, but based on information received from DHR it is likely that additional archaeological sites are present (DEP, 2004). Per guidelines to protect these resources, a map identifying these locations does not accompany this plan.

Other Associated Resources

The Great Florida Birding Trail has several parks and preserves listed within the Estero Bay area including, but not limited to, Matanzas Pass Preserve, Little Estero Island Critical Wildlife Area, EBSP, Lakes Regional Park, San Carlos Bay Bunche Beach Preserve, Bowditch Point Park, and Lovers Key State Park. In addition, hundreds of acres of nearby conservation lands offer protection measures for the bay and provide recreational opportunities to residents and visitors alike. These lands are managed by various agencies such as FWC, Lee County Conservation 20/20, Lee County Parks & Recreation, and DRP.

#	Site ID	Name	Description	Comment	Ownership/Managed By
1	LL00002	Mound Key	Building remains	On island; Calusa – 20 th C.	DEP/DRP
2	LL00003	Mound Key Burial Mound	Prehistoric burial mound(s)	On island; Calusa	DEP/DRP
3	LL00715	Old Naples Dock	Prehistoric shell midden	New dock – West Bay Club	Shoreline of Estero Bay Aquatic Preserve
4	LL00727	Starvation Key	Prehistoric shell midden	As of 2004, existing	EBPSP-shoreline of Estero Bay Aquatic Preserve
5	LL00728	Julies Island	Prehistoric shell midden	Includes historic refuse	EBPSP & w/i Estero Bay Aquatic Preserve
6	LL01788	Lovers Key State Recreation Area	Remains of building	Along shoreline In mangroves	Shoreline of DEP/DRP w/i Estero Bay Aquatic Preserve
7	LL01923	Mullet Boat Cove	Other – 20 th C.	Hulls from mullet boats	EBPSP-shoreline of Estero Bay Aquatic Preserve
8	LL01924	Bell P-39 Aircobra	WWII aircraft wreckage/ crash site	Portions removed in 1994	Lee Co.- shoreline of Estero Bay Aquatic Preserve
9	LL01928	Mullet Boat Graveyard	Other – 20 th C.	Hulls from mullet & fishing boats	Shoreline of Estero Bay Aquatic Preserve
10	LL2524	Hurricane Bay Mound 1	Habitation (prehistoric)		DEP/DRP
11	LL2526	Mosquito Midden	Specialized site for procurement of raw materials		DEP/DRP
12	LL02527	Three Middens			DEP/DRP
13	LL2612	CR865 over Big Carlos Pass	1965 bridge	Bascule bridge (drawbridge)	DOT

Table 4 | Cultural and archaeological resources within Estero Bay Aquatic Preserve.

Phase I (Estero Bay) of the Great Calusa Blueway, is part of Lee County's 190-mile paddling trail that travels down several rivers and meanders through the backwaters of the bay. Points of interest and reference points along the route are noted on the trail map, along with other important information.

3.1.4 / Values

Tourism is an important driving force in southwest Florida, fueled by a healthy environment. In Lee County alone, tourism employs one of every five people, with approximately five million visitors bringing in \$3 billion in economic impact annually (Lee County Visitor & Convention Bureau, 2009). The area enjoys both domestic and international tourism. During the spring and summer, Floridians flock to the southwest region from all parts of the state. Visitors from Britain arrive during the summer months, from Germany in the fall, and from Canada in the winter (Beever, 2008). In addition, the region also sees an annual population increase during the winter months, when seasonal residents arrive from states to the north. These residents, known as "snowbirds," typically arrive in autumn as temperatures in northern states begin to fall. Stays usually coincide with the local dry season, as temperatures here are mild and rainfall is minimal. In general, these seasonal residents begin heading back up north in the spring, before south Florida's summer weather pattern begins.

Water-dependent activities are a large draw for visitors to the area. Boating, kayaking and fishing are just some of the activities that attract people to southwest Florida. Within the vicinity of the aquatic preserve, for instance, there are no fewer than six canoe/kayak rental facilities, six canoe/kayak launches, 11 public boat ramps, 12 marinas, and numerous PWC and boat rental operators. This number is continuing to expand. As there are currently no guidelines set in place regarding PWC activity within the aquatic preserve, discussions concerning increasing PWC numbers within the area and their impacts on estuarine resources are ongoing. San Carlos Island and Fort Myers Beach are also home to several non-traditional boating activities such as the Big M Casino cruise, Key West Express ferry, and Pieces of Eight Pirate Cruise.

Eco-tour operators also abound in the Estero Bay area, bringing nature enthusiasts to the area and educating the public on the importance of a healthy ecosystem. They bring people into nature and give them the chance to learn about the importance of the local environment and provide them with the opportunity to encounter, first-hand, area wildlife including dolphins, manatees, wading birds, and sea turtles. Tours are generally conducted by kayak, PWC or boat, providing the participant the ability to tailor the experience to their preferences and abilities. Although there is currently no collection of Best Management Practices for the local eco-tourism industry, many operators promote environmental sustainability and ecological stewardship and some obtain certification through organizations such as Florida Society for Ethical Eco-Tourism (2012). However, with no standardized definition of what responsible eco-tourism entails, these eco-tour companies can run the gamut from true environmentalists to those not environmentally sound. Appropriate ethical ecotourism is mandatory for the sustainability of the industry and resources and must be integrated into the daily workings of local eco-tour companies.

One of the main draws to Florida continues to be its fishing opportunities. Indeed, Florida's recreational fishing industry is of great importance to the state economy, as one of every three tourists comes to Florida to fish (Beever, 2008). Florida's recreational fishery is among the largest in the country and is an important component of the state's tourism economy. Close to half the estimated recreational fishing trips in Florida are made by visitors to the state (FWC, n.d.). Additionally, DEP data indicate that 21 percent of the Florida population engages in recreational fishing, and total angling in the region exceeds \$1.1 billion annually (Beever, Gray, Trescott, Cobb, Utley & Hutchinson, 2009). While many anglers fish from shore, there continues to be a significant increase over time in the estimated number of trips made by anglers from private or rental boats. In west Florida specifically, estimated private or rental boat trips increased from approximately five million in 1981 to more than 8.9 million in 2006 (FWC, n.d.).

Boating within the aquatic preserve is popular with tourists and residents alike, and DEP encourages clean boating practices through its Florida Clean Marina Program. This program includes the Clean Marina, Clean Boatyard, Clean Marine Retailer, and Clean Boater programs, and recognizes facilities which engage in environmentally friendly practices, go beyond regulatory requirements, and protect and preserve Florida's natural environment. Participating marinas, boatyards, and marine retailers receive clean designations by demonstrating a commitment to implementing and maintaining a host of best management practices (DEP, 2012b). Designation provides recognition by boaters and the community that the facility is a good environmental citizen, and recognition and promotion by the marine industry that the facility considers the environment an important asset in conducting business (DEP, 2013b).

Several facilities in the Estero Bay area have been designated. These include Barefoot Boat Club and the Bonita Bay Marina Club in Bonita Springs which have both been designated as Clean Marinas, and Fish-Tale Marina and Snook Bight Yacht Club & Marina on Fort Myers Beach which have both been designated as Clean Marinas and Pumpout Facilities (DEP, 2012b).

Southwest Florida's commercial seafood industry has been vitally important to its economic base for decades. Even in 1955, Lee County led the state in the seafood harvesting industry, with over six million pounds of food fish, mostly black mullet (*Mugil cephalus*), and over one million pounds of shellfish, mostly blue crab and stone crab (*Menippe mercenaria*). At that time, the Fort Myers area also ranked third in the state in shrimp production due to the then-recently found shrimp beds in the Tortugas area. Shrimp fields off of Boca Grande and Sanibel Island were also discovered around this time, and it was these shrimp bed discoveries that led to a boom along Florida's coast likened to the gold rush days (St. Petersburg Times, 1956).

In 2010, the commercial fishing industry in the southwest Florida region (Manatee, Sarasota, Charlotte, Lee, and Collier) caught 15 million pounds of wild-harvested seafood (shellfish and fish). Of this, more than 1.6 million blue crabs were landed, approximately 20 percent of the state's total landings. Additionally, 27 percent of mullet landed in Florida came from the southwest region. Although black and silver mullet are both harvested locally, black mullet is the more commonly caught of the two species (University of Florida – Institute of Food and Agriculture Sciences [UFL-IFAS], 2012). In the region, 146 wholesalers and 394 retailers bought and sold seafood contributing to Florida's multi-billion dollar seafood industry. Nearly seven million pounds of harvested seafood was landed (value: \$12.4 million) in Lee County (National Ocean Economics Program, 2010); close to 3.4 million pounds were pink shrimp alone. Lee County was ranked second in the state for seafood landing, just behind Monroe County (Key West). Forty percent of the pink shrimp harvested in Florida was landed in Lee County (UFL-IFAS, 2012). Preliminary 2011 annual landings summary data from FWC show that a total of 8,017,297 pounds of seafood were landed in Lee County, including 3,038,157 pounds of total finfish, 839,217 pounds of blue crab (hard), 4,991 pounds of blue crab (soft), 189,367 pounds of stone crabs (claws), 97,850 pounds of brown shrimp, and 3,200,356 pounds of pink shrimp (FWC, 2012b).

There are three commercially important shrimp species along Florida's coastlines, including brown shrimp (*Farfantepenaeus aztecus*), white shrimp (*Litopenaeus setiferus*) and pink shrimp (*Farfantepenaeus duorarum*). All three species rely on nearshore waters and utilize estuaries for their nursery grounds. They also rely on seagrass beds and algal mats within estuaries during various juvenile stages of their life cycle. Both brown shrimp and pink shrimp are harvested from Lee County waters (FWC & FWRI, 2010). Pink shrimp, the most commonly caught species here, has a harvesting season that usually runs from late fall through spring (UFL-IFAS, 2012), with most shrimp coming from Lee County or the Dry Tortugas area. Shrimp vessels off-load their catches predominantly at one of three ports within the south Florida region: Key West, Tampa Bay, or San Carlos Island in Lee County. Of the three ports, San Carlos Island has perhaps become the most important off-loading site for shrimp, due to its proximity to fishing grounds, the presence of several processing/packing firms, the availability of a wide range of repair and maintenance services, the availability of fuel and ice, and room for off-loading and mooring (Adams, Mulkey & Hodges, 1999).

As a result of offloading sites on San Carlos Island, fisheries-dependent industries such as processing facilities, maintenance services and seafood markets have also become important to the local economy. Most of the shrimp offloaded, graded, packed, and processed in Lee County occurs on San Carlos Island. After shrimp are offloaded, vessels are moved to adjacent mooring locations to refuel, make repairs, and prepare for the next trip. During this time, most of the income earned on a trip is spent within Lee County (Adams, Mulkey & Hodges, 1999).

Due to its commercial fishing heritage, Fort Myers and the surrounding islands are officially designed as working waterfront communities by the state of Florida (UFL-IFAS, 2012). Sponsored in part by NOAA and by DEP's Florida Coastal Management Program, the Waterfronts Florida Partnership Program was created to assist coastal waterfronts with revitalization. In the case of San Carlos Island, it has also led to a marrying of the tourism and commercial fishing industries. San Carlos Island was among the first designated waterfronts communities in Florida, using seed money from the Waterfronts Florida Partnership Program, county matching funds, and sweat equity to develop a self-guided walking trail that promotes a sense of place and conveys the community's seafood traditions, as well as brochures to complement informational kiosks. The trail provides public access to a waterfront area lined by mangrove swamp and shrimp boat masts. Kiosks established at select locations explain different vistas – Matanzas Pass, the San Carlos Island working waterfronts, and Estero Island. The community's theme for the trail is "A Healthy Bay = Healthy Seafood" (Florida Department of Community Affairs, 2007). The

tour emphasizes the island's working waterfront and highlights other important environmental, historical and cultural aspects of San Carlos Island. With a defined trail, it was believed that the activities and features of the working waterfront could serve as an added attraction and amenity and would help to support some business opportunities (San Carlos Island Waterfronts Committee, 1999).

The effects of ongoing climate change on the area's commercial fishing industry remains to be seen. Warm water temperatures and intense hurricanes in recent decades have led to unusually low pink shrimp catches, and climate change may continue to make such conditions more common. Other commercially harvested species already stressed from over-fishing could feel additional pressure from loss or migration of essential habitats (Beever, Gray, Trescott, Cobb, Utley & Hutchinson, 2009). Industries such as recreational fisheries, coastal tourism, coastal development, transportation development and critical facilities may also be affected. Furthermore, increased population and subsequent infrastructure growth will lead to increased potential financial damage from storms, which could have devastating effects on the area's economy (Beever, 2010).

The mangrove forests fringing the bay are important to both the tourism industry and commercial fishing industry due to their role as a nursery area for numerous commercially and recreationally important fishery species. People living along the south Florida coasts also benefit tremendously from these trees, as mangrove forests protect uplands from storm winds, waves, and floods (Florida Department of Environmental Protection, 2013a). According to the 2011 Estuaries Report Card produced by the Conservancy of Southwest Florida, Estero Bay has lost 15 percent of its mangrove population (Conservancy of Southwest Florida, 2011).

3.1.5 / Citizen Support Organization

The Estero Bay Buddies, Inc. (EBB) is a non-profit 501(c)(3) Citizen's Support Organization (CSO) for the Estero Bay Aquatic Preserve. It was established in 1999 to support and further the protection, conservation, restoration, management and the enhancement of the natural and cultural resources of the coastal and aquatic ecosystems of the Estero Bay estuary and watershed for the enjoyment and appreciation of current and future generations. One of their first activities was to advocate for the preservation of a particular parcel of land within the Estero Bay Conservation and Recreation Lands acquisition project, a known vestige of the fast-disappearing scrub habitat. With staff justifying the uncommon use of eminent domain to acquire the unique land based on established criteria, EBB members rallied with tremendous local support, and the Board of Trustees of the Internal Improvement Trust Fund ultimately executed a purchase agreement with the landowner to acquire the tract. The land was preserved and the landowners received a fair purchase price. The state and the local community benefitted as the land became a key part of the Estero Bay State Buffer Preserve, managed by FCO at the time. EBB also assisted staff in land management and education and outreach efforts. In 2003 the buffer preserve was transferred to the management of DRP and renamed EBSP. Along with this move, EBB went on to become the CSO for both the Estero Bay Aquatic Preserve and EBSP. The goals of EBB are to increase public awareness through involvement in educational programs, resource-based activities and special events; to develop stewardship and a sense of shared responsibility for our estuaries and our public lands; and to improve and restore the natural and cultural resources of Estero Bay coastal and aquatic ecosystems. EBB serves as a local outreach resource and attends local festivals and events to educate the public about the aquatic preserve and EBSP.

EBB supports the Estero Bay Aquatic Preserve and EBSP by raising funds, providing volunteer services, and promoting environmental awareness of the preserves. Each September, EBB celebrates National Estuaries Days by hosting a paddling event at Estero River Outfitters and participating in Lee County's Estuaries Day Every Day event at San Carlos Bay Bunche Beach Preserve. They and aquatic preserve staff also participate in the International Coastal Cleanup sponsored by Keep Lee County Beautiful that is held in September, Great Outdoor Adventure Day at Lovers Key State Park, Monofilament Madness (marine debris cleanup) based at the Mound House archaeological site on Fort Myers Beach, the Florida Sportsman Fishing and Boating Show, Discovery Day at Lee County's Manatee Park, and Earth Day at Koreshan State Historic Site. EBB has also assisted DEP staff with restoration projects such as the riprap stabilization project at the EBSP Estero River Scrub parcel which helped stabilize an eroding shoreline along the Estero River, and periodically conduct cleanup and exotic plant eradication events at the preserve state park. Activities, accomplishments, and anything relevant to the aquatic preserve or the preserve state park is reflected in the EBB quarterly newsletter, Ebb Tide, available on their website.

Members of EBB can help by volunteering to work at the preserves. There are several diverse activities available for a wide variety of interests and expertise. Becoming a member and volunteering or making



Estero Bay Buddies board members volunteer at an Earth Day event.

a donation or memorial gift are some of the ways that the public's generosity will benefit the Estero Bay Preserves. Interested citizens and/or members can learn more about EBB or upcoming local events by visiting their webpage (<http://www.esterobaybuddies.org>).

3.1.6 / Adjacent Public Lands and Designated Resources

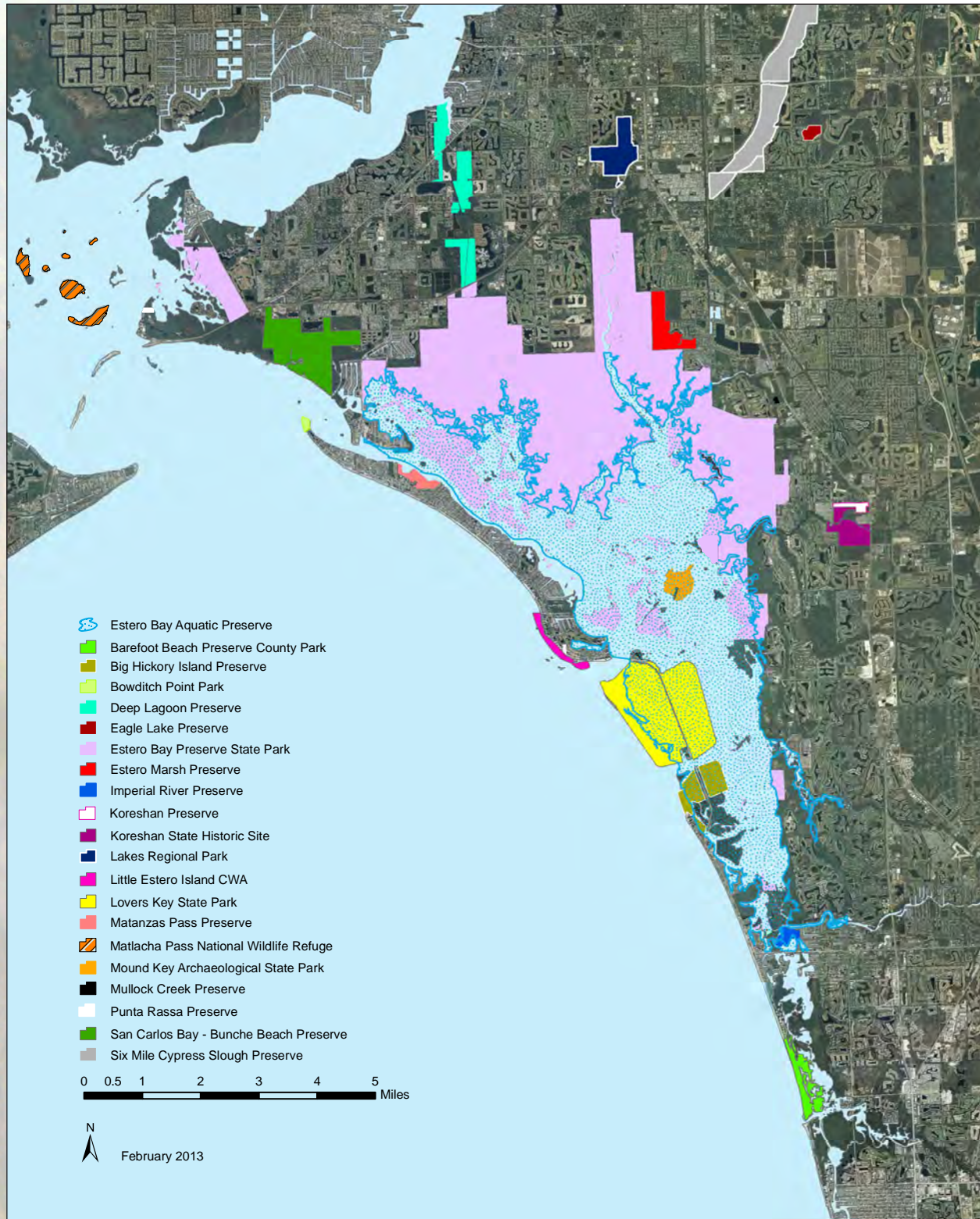
The Estero Bay Aquatic Preserve is located in Lee County, on the southwest coast of Florida, in one of the most populated coastal areas in the state. Contiguous public lands owned and managed by state and county agencies include the EBSP, Lovers Key State Park, Koreshan State Historic Site, and Mound Key Archaeological State Park, all managed by DRP; and Big Hickory Island Preserve, Matanzas Pass Preserve, Eagle Lake Preserve, Lakes Regional Park, Six Mile Cypress Slough Preserve, San Carlos Bay-Bunche Beach Preserve, and Bowditch Point Park, managed by Lee County Parks and Recreation. Other conservation lands within the vicinity of the aquatic preserve include the Collier County-managed Barefoot Beach Preserve, and Little Estero Island Critical Wildlife Area co-managed by the Town of Fort Myers Beach and FWC. In addition, Lee County Conservation 20/20, within the Lee County Parks and Recreation's department, manages Imperial River Preserve, Deep Lagoon Preserve, Estero Marsh Preserve, Mullock Creek Preserve and Koreshan Preserve. Map 11 illustrates the conservation lands near or adjacent to the Estero Bay Aquatic Preserve.

The EBSP was acquired for the purpose of buffering the aquatic preserve, and contains hiking trails open to the public on both the Winkler Point and Estero River Scrub tracts. Several Lee County parcels acquired through the Conservation 20/20 Program are located adjacent to EBSP and help to filter sheetflow flowing into the estuary. The parcels include the Estero Marsh Preserve, Imperial River Preserve, and portions of the Deep Lagoon Preserve. Additionally, the Little Estero Island Critical Wildlife Area serves as an important nesting area for least terns, willet and black skimmers, all of which utilize habitats found within the aquatic preserve.

3.1.7 / Surrounding Land Use

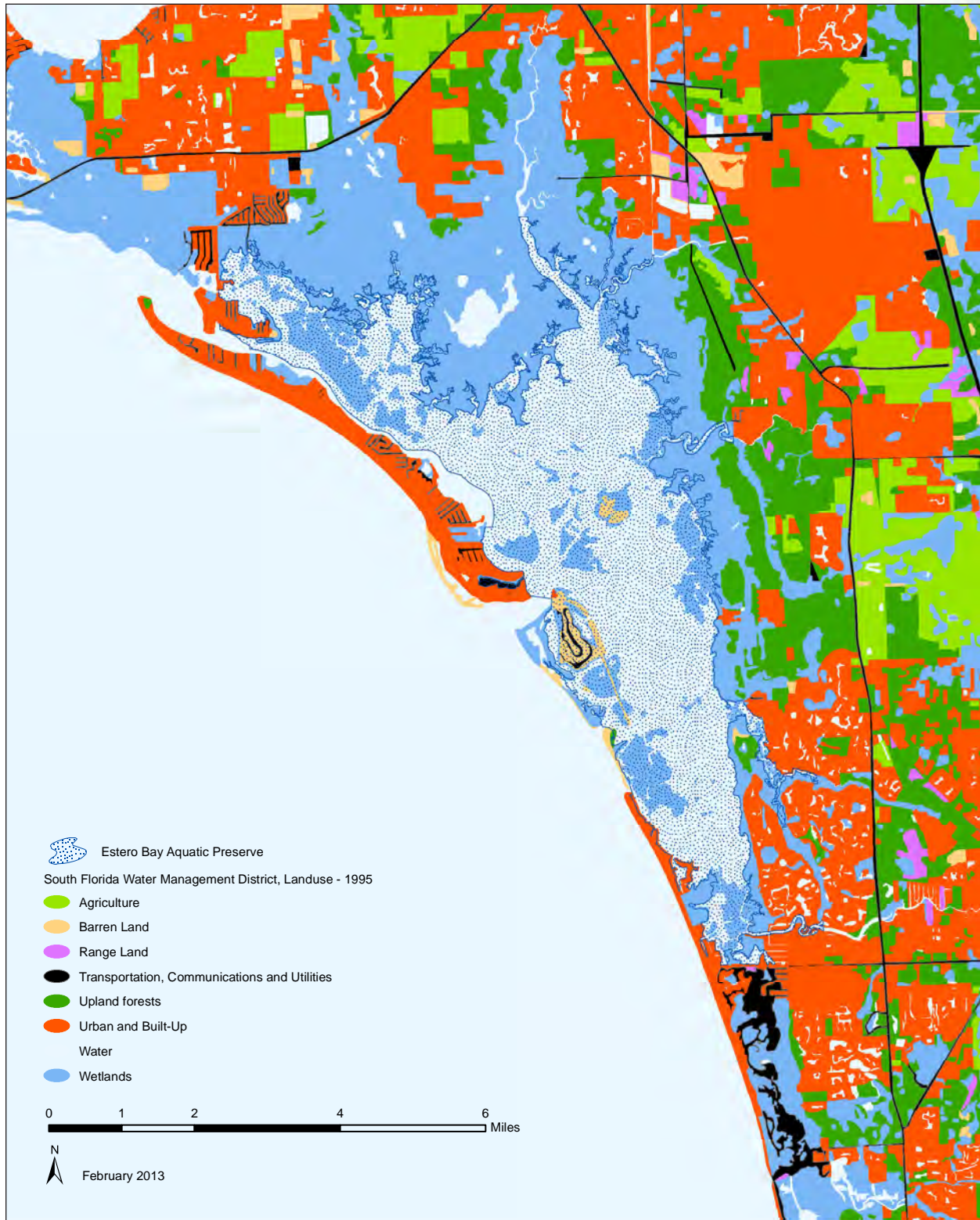
Much of the land adjacent to the Estero Bay Aquatic Preserve is state or county-owned conservation land acquired to act as a buffer from coastal development. The remainder of the shoreline is comprised of housing developments that are clustered in various locations, a number of single-family waterfront homes, commercial businesses including restaurants, marinas, and the county's shrimping industry.

Lee County's Department of Community Development has several land use and zoning categories that generally help plan and direct what human activities are allowed in or on particular parcels or areas of the county. One zoning designation that's rarely used is environmentally critical (EC), which



offers an additional layer of protection. Lee County's Conservation 20/20 staff are actively working with Lee County's planning staff to rezone conservation parcels into this category. Management for state and other county-managed properties have also begun rezoning some of their protected lands to this category from what was historically designated as agricultural.

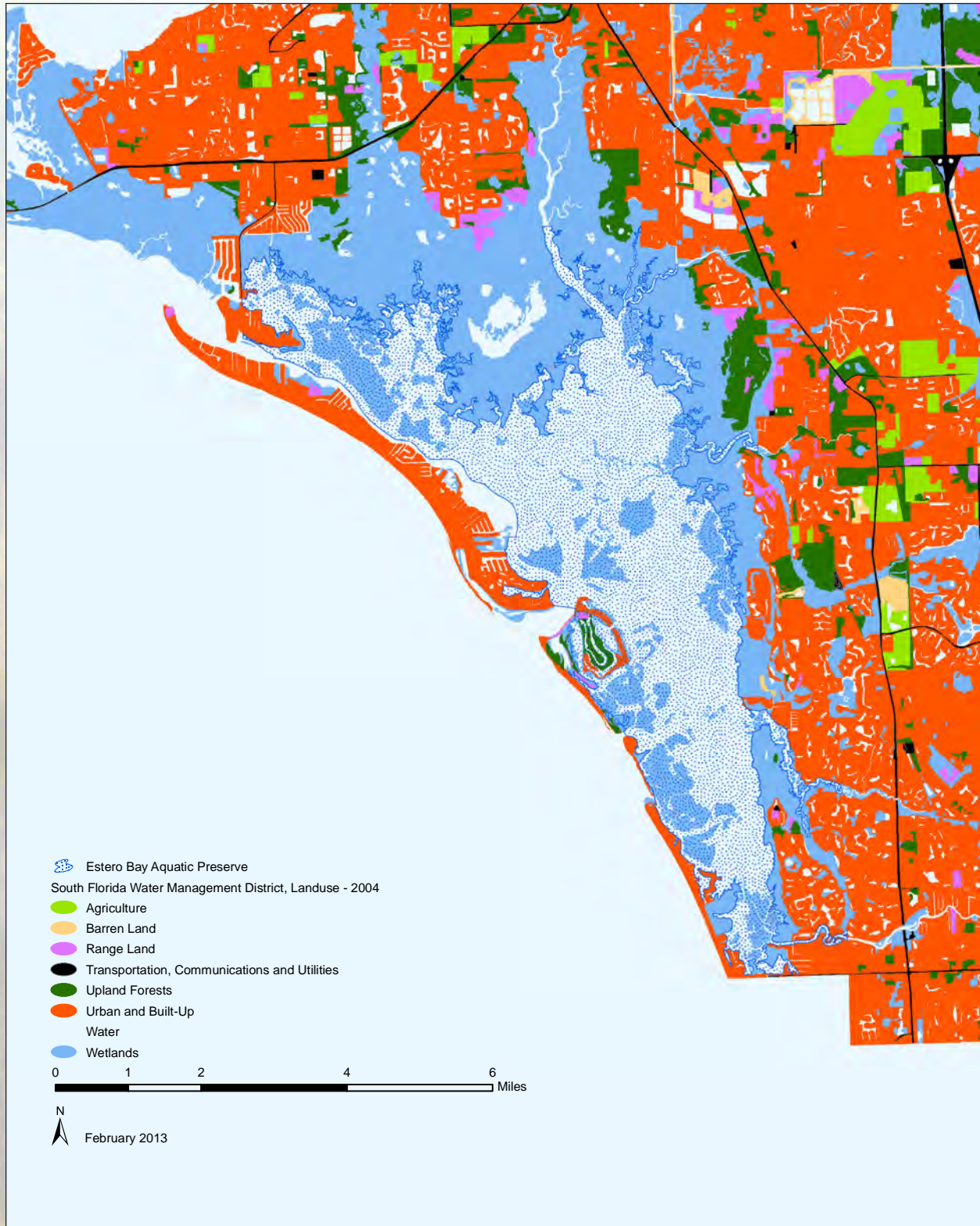
In some instances, agricultural zoning designations have had unexpected implications. The island of Mound Key, for example, is located within the aquatic preserve, mostly owned by the state and managed by DRP. A small nine-acre portion of the island, however, has remained privately owned since 1914, despite repeated unsuccessful attempts by the county and state in recent decades to purchase the

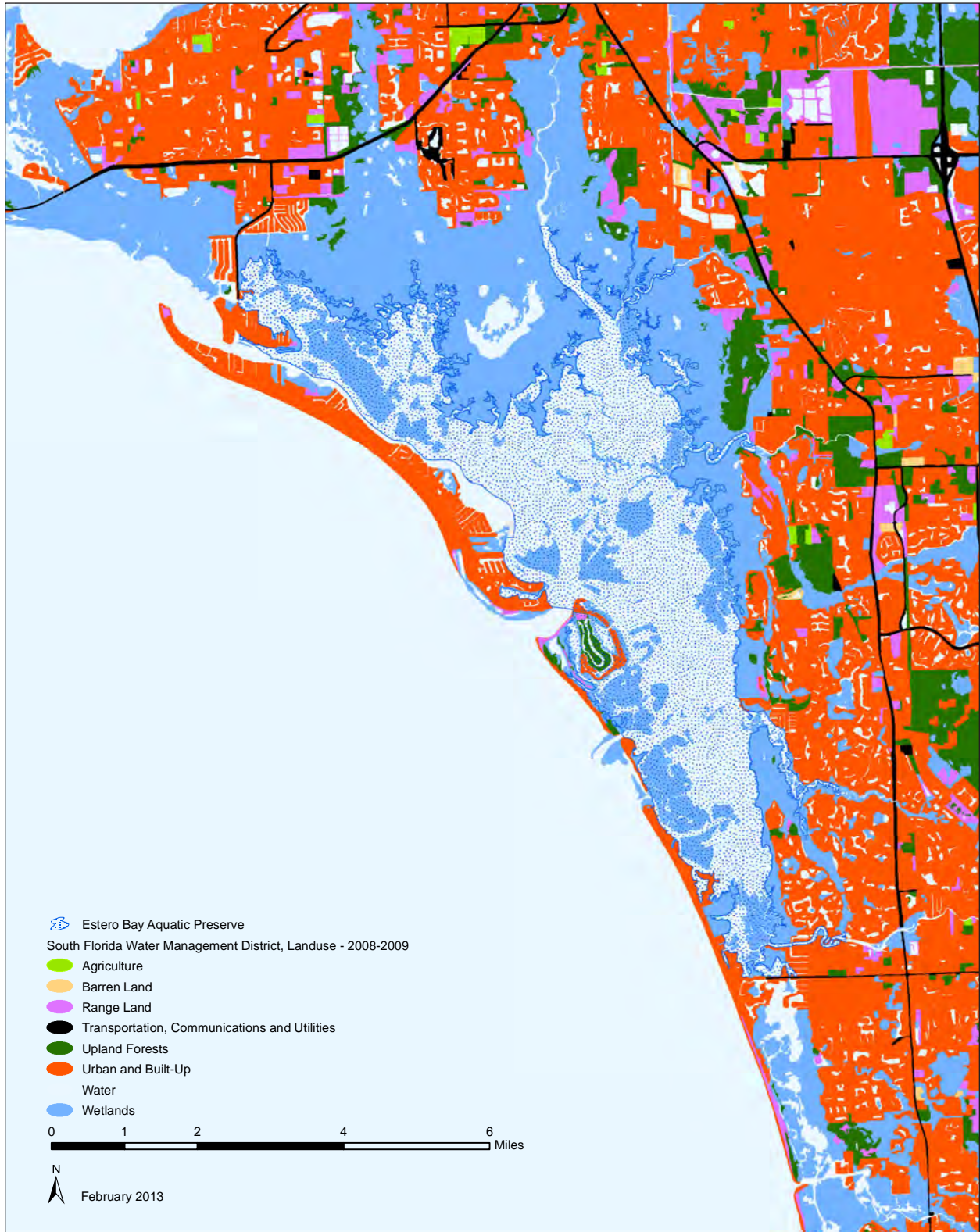


Map 12 / Land use 1995 (SFWMD).

land for conservation. Zoned for agricultural use, a goat farm was established on this privately-owned parcel of the island in 2009, prompting extensive discussions and debate as to whether the activity was in conflict with the historical and archaeological significance of the island. The allowance of goats was eventually approved, followed by the application and subsequent approval for construction of a single-family dock on the parcel, as well.

Comparing the 1995 (Map 12), 2004 (Map 13) and 2009 (Map 14) SFWMD's land use maps show the progression of natural (barren land, agriculture, forest, range land) areas being converted for infrastructure and/or other developmental uses.





Map 14 / Land use 2009 (SFWMD).



Snowy egret teaching chicks to fly. (Photo credit: Melissa Groo.)

Part II

Management Programs and Issues

Chapter Four

The Florida Coastal Office's Management Programs

The work performed by the Florida Coastal Office (FCO) is divided into components called management programs. In this management plan all site operational activities are explained within the following four management programs: Ecosystem Science, Resource Management, Education and Outreach, and Public Use.

4.1 / The Ecosystem Science Management Program

The Ecosystem Science Management Program supports science-based management by providing resource mapping, modeling, monitoring, research and scientific oversight. The primary focus of this program is to support an integrated approach (research, education and stewardship) for adaptive management of each site's unique natural and cultural resources. FCO ensures that, when applicable, consistent techniques are used across sites to strengthen the State of Florida's ability to assess the relative condition of coastal resources. This enables decision-makers to more effectively prioritize restoration and resource protection goals. In addition, by using the scientific method to create baseline conditions of aquatic habitats, the Ecosystem Science Management Program allows for objective analyses of the changes occurring in the state's natural and cultural resources.

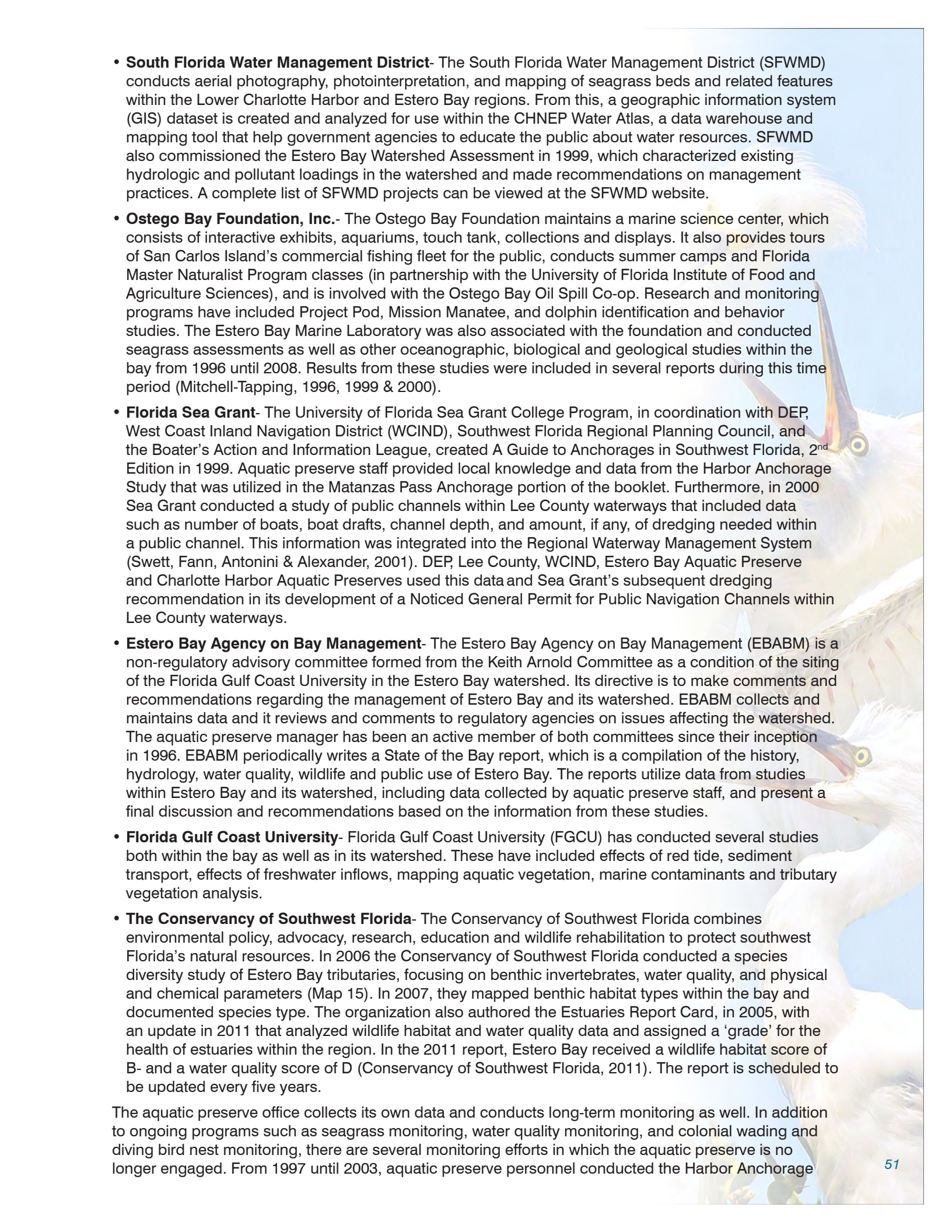
4.1.1 / Background of Ecosystem Science at Estero Bay Aquatic Preserve

Scientific studies occurring within the Estero Bay Aquatic Preserve date back to the 1970s. Most early research focused on gathering general baseline data on the bay's water quality, hydrology and biology as well as on gaining an understanding of the bay's environmental processes and coastal resources (Tabb, Alexander, Rehner, & Heald, 1971; Tabb, Rehner, Larsen, Berkeley, Heald, et.al.,

1974; Environmental Science and Engineering, Inc., 1978; Jones, 1980; Clark, 1987). A few studies, on the other hand, were conducted strictly for hydrological or engineering purposes (University of Florida, 1971; Florida Department of Transportation, 1972; Balough, Gershberg, Johnson, & Loewer, 1978; Jones, 1980). Regardless of the goal, however, most studies during this time period were linked to the issue of urban growth and the effect that development of the surrounding area might have on the estuary. The 1971 preliminary assessment of the bay's resources by the University of Miami, for example, was conducted at the request of several entities interested in developing the uplands abutting the marine preserve. Monitoring and research in the 1980s brought more consideration to management, with more of a focus on water quality assessments, beach restoration and even creating a petition for Outstanding Florida Waters designations (Pratt, 1980; Estevez, Miller & Morris, 1984; Calusa Group, Sierra Club, & Environmental Confederation of SouthWest Florida, 1987; Continental Shelf Associates, Inc., 1989).

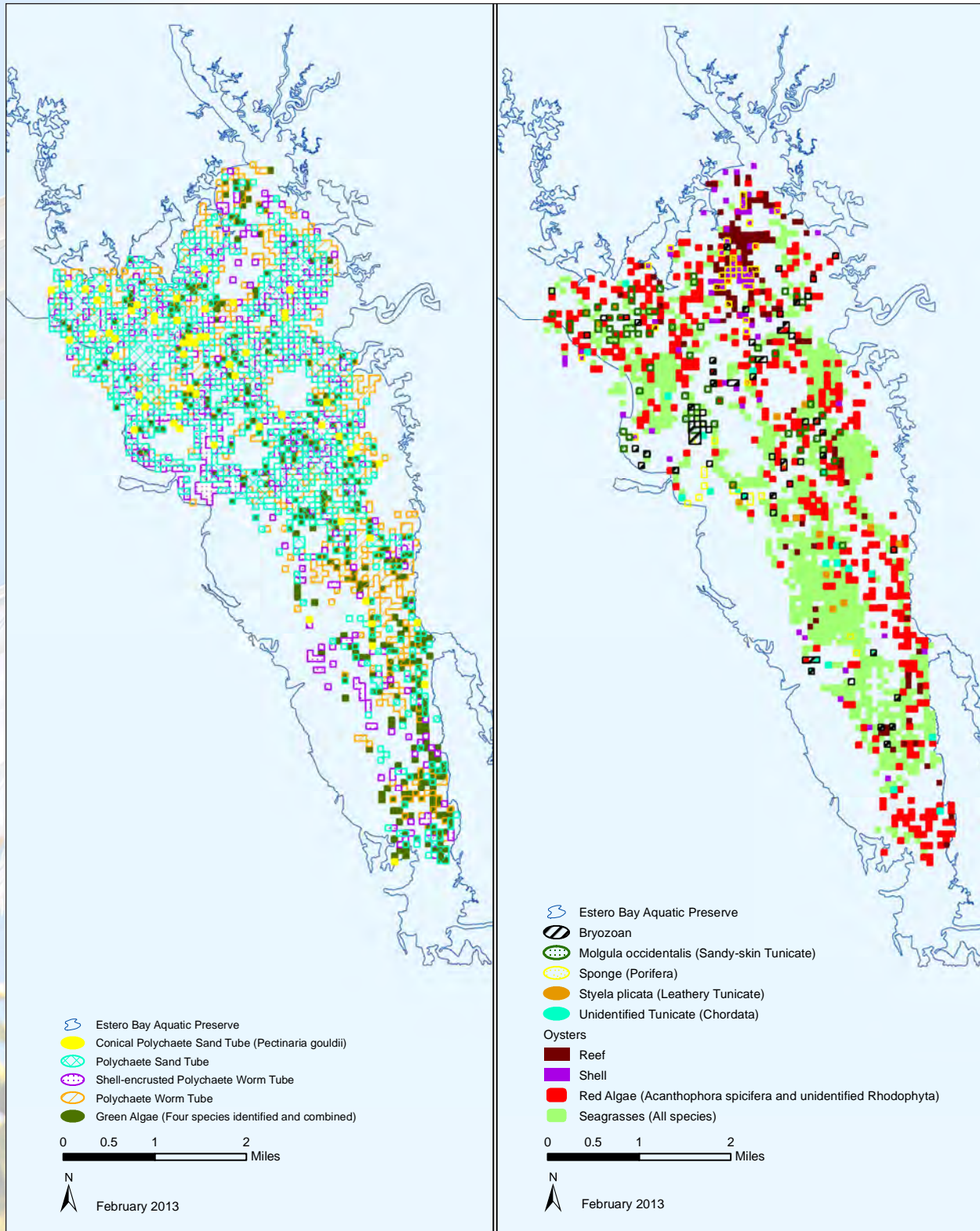
In recent decades, there has been a proliferation of scientific research within Estero Bay, and there are many agencies and organizations that have conducted or are currently conducting studies and collecting data. Some, but by no means all, of these include:

- **Lee County**- The Lee County Environmental Laboratory (LCEL) has conducted routine water quality monitoring throughout the bay and its tributaries since 1991 as part of an ongoing effort to maintain a long term water quality dataset, and as part of the Coastal Charlotte Harbor Monitoring Network. Furthermore, in 1992 LCEL conducted one of the first assessments of seagrasses within Estero Bay (Fite & Kibbey, 1992).
- **Florida Department of Environmental Protection**- The Division of Environmental Assessment and Restoration (DEAR) section of the South District Florida Department of Environmental Protection (DEP) office focuses on non-regulatory watershed planning and water resource issues in Southwest Florida. This includes involvement in Everglades restoration projects, the Northern Everglades and Estuaries Protection Plan, watershed monitoring and research, as well as biological monitoring and research. The DEAR program collects water quality data at fixed locations within the bay for use in the Impaired Waters Rule.
- **United States Geological Survey**- In 2001, the United States Geological Survey (USGS) initiated a study on the hydrodynamic characteristics and salinity patterns within Estero Bay. Parameters included discharge, stage, salinity, water temperature, turbidity, concentrations of suspended sediments and wind measurements (Byrne & Gabaldon, 2008). The study used a number of monitoring stations that USGS had established throughout Estero Bay to house continuously monitoring data sondes. Several of these stations are currently offline and no longer being used, while others are monitored in cooperation with Lee County.
- **Charlotte Harbor National Estuary Program**- The National Estuary Program was established in 1987 by an amendment to the Clean Water Act to identify, restore and protect estuaries along the coasts of the United States, and currently contains 28 "estuaries of national significance" within the program. Since its inception in 1995, the Charlotte Harbor National Estuary Program (CHNEP) has commissioned a number of studies and reports that include Estero Bay covering topics such as wildlife, water quality, and climate change. One example was a 2007 CHNEP-driven volunteer effort to assess the condition of the shoreline of the greater Charlotte Harbor area, including Estero Bay. This project provided ground truthing information to what had been at that time only aerial determination of shoreline classification. Kayakers and boaters classified surveyed shoreline as natural vegetation, nonnative vegetation, or "hardened" shoreline with seawalls or riprap (CHNEP, 2007). This data was combined with aerial photography interpretation and resulted in the Tidal Charlotte Harbor Shoreline Condition Map report in Photo Science (2008). Volunteers conducted ground surveys again in 2010 and 2013 to assess shoreline changes through time. Estero Bay Aquatic Preserve staff ground truthed the 2013 shoreline assessment.
- **Florida Fish and Wildlife Conservation Commission**- The Florida Fish and Wildlife Conservation Commission's (FWC) Fish and Wildlife Research Institute (FWRI) strives to provide timely information and guidance to protect, conserve, and manage Florida's fish and wildlife resources through effective research and technical knowledge. Through FWRI, the FWC conducts ongoing red tide sampling for their Harmful Algal Bloom (HAB) program which extends into Estero Bay, and for which the aquatic preserve assists with sample collection efforts. Other efforts in Estero Bay include the annual aerial manatee population surveys, the Fisheries Independent Monitoring program and the creation of seagrass prop scarring maps. FWRI also recently authored the Seagrass Integrated Mapping and Monitoring Report for the state of Florida in 2011, in which aquatic preserve staff served as a local seagrass expert and authored a portion of the Estero Bay chapter.

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- **South Florida Water Management District-** The South Florida Water Management District (SFWMD) conducts aerial photography, photointerpretation, and mapping of seagrass beds and related features within the Lower Charlotte Harbor and Estero Bay regions. From this, a geographic information system (GIS) dataset is created and analyzed for use within the CHNEP Water Atlas, a data warehouse and mapping tool that help government agencies to educate the public about water resources. SFWMD also commissioned the Estero Bay Watershed Assessment in 1999, which characterized existing hydrologic and pollutant loadings in the watershed and made recommendations on management practices. A complete list of SFWMD projects can be viewed at the SFWMD website.
 - **Ostego Bay Foundation, Inc.-** The Ostego Bay Foundation maintains a marine science center, which consists of interactive exhibits, aquariums, touch tank, collections and displays. It also provides tours of San Carlos Island's commercial fishing fleet for the public, conducts summer camps and Florida Master Naturalist Program classes (in partnership with the University of Florida Institute of Food and Agriculture Sciences), and is involved with the Ostego Bay Oil Spill Co-op. Research and monitoring programs have included Project Pod, Mission Manatee, and dolphin identification and behavior studies. The Estero Bay Marine Laboratory was also associated with the foundation and conducted seagrass assessments as well as other oceanographic, biological and geological studies within the bay from 1996 until 2008. Results from these studies were included in several reports during this time period (Mitchell-Tapping, 1996, 1999 & 2000).
 - **Florida Sea Grant-** The University of Florida Sea Grant College Program, in coordination with DEP, West Coast Inland Navigation District (WCIND), Southwest Florida Regional Planning Council, and the Boater's Action and Information League, created A Guide to Anchorages in Southwest Florida, 2nd Edition in 1999. Aquatic preserve staff provided local knowledge and data from the Harbor Anchorage Study that was utilized in the Matanzas Pass Anchorage portion of the booklet. Furthermore, in 2000 Sea Grant conducted a study of public channels within Lee County waterways that included data such as number of boats, boat drafts, channel depth, and amount, if any, of dredging needed within a public channel. This information was integrated into the Regional Waterway Management System (Swett, Fann, Antonini & Alexander, 2001). DEP, Lee County, WCIND, Estero Bay Aquatic Preserve and Charlotte Harbor Aquatic Preserves used this data and Sea Grant's subsequent dredging recommendation in its development of a Noticed General Permit for Public Navigation Channels within Lee County waterways.
 - **Estero Bay Agency on Bay Management-** The Estero Bay Agency on Bay Management (EBABM) is a non-regulatory advisory committee formed from the Keith Arnold Committee as a condition of the siting of the Florida Gulf Coast University in the Estero Bay watershed. Its directive is to make comments and recommendations regarding the management of Estero Bay and its watershed. EBABM collects and maintains data and it reviews and comments to regulatory agencies on issues affecting the watershed. The aquatic preserve manager has been an active member of both committees since their inception in 1996. EBABM periodically writes a State of the Bay report, which is a compilation of the history, hydrology, water quality, wildlife and public use of Estero Bay. The reports utilize data from studies within Estero Bay and its watershed, including data collected by aquatic preserve staff, and present a final discussion and recommendations based on the information from these studies.
 - **Florida Gulf Coast University-** Florida Gulf Coast University (FGCU) has conducted several studies both within the bay as well as in its watershed. These have included effects of red tide, sediment transport, effects of freshwater inflows, mapping aquatic vegetation, marine contaminants and tributary vegetation analysis.
 - **The Conservancy of Southwest Florida-** The Conservancy of Southwest Florida combines environmental policy, advocacy, research, education and wildlife rehabilitation to protect southwest Florida's natural resources. In 2006 the Conservancy of Southwest Florida conducted a species diversity study of Estero Bay tributaries, focusing on benthic invertebrates, water quality, and physical and chemical parameters (Map 15). In 2007, they mapped benthic habitat types within the bay and documented species type. The organization also authored the Estuaries Report Card, in 2005, with an update in 2011 that analyzed wildlife habitat and water quality data and assigned a 'grade' for the health of estuaries within the region. In the 2011 report, Estero Bay received a wildlife habitat score of B- and a water quality score of D (Conservancy of Southwest Florida, 2011). The report is scheduled to be updated every five years.

The aquatic preserve office collects its own data and conducts long-term monitoring as well. In addition to ongoing programs such as seagrass monitoring, water quality monitoring, and colonial wading and diving bird nest monitoring, there are several monitoring efforts in which the aquatic preserve is no longer engaged. From 1997 until 2003, aquatic preserve personnel conducted the Harbor Anchorage

Study in order to document the amount of transient and resident recreational boat use of the Matanzas Pass Anchorage area. The study area consisted of the waters located between the Matanzas Pass bridge and a small mangrove island approximately one mile away. The total number of anchored boats was counted, as well as the total number of masted (sailboats) versus unmasted (powerboats) vessels, and boats less than 26 feet overall length versus more than 26 feet. In addition, the number of docked shrimp boats was also recorded. The majority of counting took place weekly on Friday afternoons. The primary objective of this study was to develop information, through a systematic counting procedure, on the dynamics of small-vessel anchorage site use for a period of one year. Data were analyzed for patterns



relevant to harbor management. In addition, count data and statistics were developed for shrimp trawlers at dock during the boat counts. This secondary data was gathered because this readily identifiable type of boat is a conspicuous part of the harbor traffic. At the end of 1997, data from the original study was compiled into a report for distribution to the Sea Grant Anchorage Pilot Project Advisory Committee. This was integrated into an anchorage guide produced by the Boaters' Action and Information League, Inc., DEP, Florida Sea Grant College Program, Southwest Florida Regional Planning Council and WCIND.

Upon successful completion of the study, a review of the gathered data highlighted the importance of anchorage use observations, so the survey was expanded into a long-term monitoring project. The goal then became to collect data on the use of the harbor in order to determine the impacts of the increasing number of boats in the Matanzas Pass Anchorage area. Data were analyzed for patterns relevant to harbor management and utilized by the town of Fort Myers Beach in their development of a regulated mooring field within the Matanzas Pass Anchorage area and their approved sovereign submerged lands lease (Appendix A.4.2 Other Agreements) with the state and associated Harbor Management Plan (Coastal Engineering Consultants, 2002). During the establishment of the mooring field, however, a large number of vessels that had been moored within the area moved to just beyond the jurisdiction of the town. Obtaining accurate numbers of these vessels from the bridge vantage point became impossible, and the project was concluded in 2003.

Until 2003, the Estero Bay State Reserve, and later called the Estero Bay State Buffer Preserve was managed by the same staff that manage the aquatic preserve. In 2000, a monitoring program using photopoints to monitor long-term changes (natural and/or man-made) in vegetative communities in various habitats throughout the buffer preserve was initiated. This included additional site visits after various resource management projects were accomplished (i.e. exotic plant control, prescribed fire, habitat and/or hydrological restoration, condition of recorded archaeological sites) within a particular transect area. Field data included percent vegetative coverage, species type, species height, and any additional pertinent information. Photos were taken in a 360-degree panoramic (four photos in a north, south, east, and west direction) for visual comparison with previous years. In 2003, with the transfer of the Estero Bay State Buffer Preserve from FCO to the Division of Recreation and Parks (DRP), the program was transferred and is now currently under the jurisdiction of the renamed Estero Bay Preserve State Park (EBPSP), managed from Koreshan State Historic Site. Other monitoring programs transferred at the same time include the buffer preserve's small mammal trapping program, bald eagle nest monitoring, plant inventories, and frog and toad call surveys that were started in 1999 with the goal of determining the presence of native and exotic frog and toad species within the buffer preserve.



Photo surveys (2003) that documented moored vessels in the Matanzas Pass area were used in the establishment of a managed anchorage.



Photo surveys (2008) documented the installation and use of mooring buoys within the newly established Matanzas Harbor Mooring Field.

Estero Bay Aquatic Preserve staff have also assisted other agencies with studies on the bay, such as by providing timely water clarity (secchi) readings for the joint SFWMD/Southwest Florida Water Management District (SFWMD) aerial photography mapping efforts. Also, from 2002-2003, assisted the former Florida Marine Research Institute (now FWRI) with a study focusing on boat ramp usage and the possible effects of increasing boat activity on the bay.

4.1.2 / Current Status of Ecosystem Science at Estero Bay Aquatic Preserve

During the 1990s, the aquatic preserve began collecting its own data through several long-term monitoring programs. One such program is the Charlotte Harbor Estuaries Volunteer Water Quality

Waterbody Name	Waterbody Type	Waterbody Class*	Parameters Assessed Using the Impaired Surface Waters Rule (IWR)	Criterion Concentration or Threshold Not Met	Integrated Assessment Status	Priority for TMDL Development
Estero Bay Wetlands	Estuary	2	Mercury (in fish tissue)	Exceeds DoH Threshold (< 0.3 ppm)	Impaired	High
Hendry Creek	Estuary	3M	Iron	≤ 0.3 mg/L	Impaired	Medium
Hendry Creek	Estuary	3M	Mercury (in fish tissue)	Exceeds DoH Threshold (< 0.3 ppm)	Impaired	High
Mullock Creek	Stream	3F	Fecal Coliform	≤ 400 Counts / 100 mL	Impaired	Low
Mullock Creek	Stream	3F	Iron	≤ 1.0 mg/L	Impaired	Medium
Mullock Creek (Marine Segment)	Estuary	3M	Iron	≤ 0.3 mg/L	Impaired	Medium
Mullock Creek (Marine Segment)	Estuary	3M	Mercury (in fish tissue)	Exceeds DoH Threshold (< 0.3 ppm)	Impaired	High
Estero River (Marine Segment)	Estuary	3M	Fecal Coliform	≤ 400 Counts / 100 mL	Impaired	Low
Estero River (Marine Segment)	Estuary	3M	Iron	≤ 0.3 mg/L	Impaired	Medium
Estero River	Stream	3F	Fecal Coliform	≤ 400 Counts / 100 mL	Impaired	Low
Estero River	Stream	3F	Iron	≤ 1.0 mg/L	Impaired	Medium
Imperial River (Marine Segment)	Estuary	3M	Dissolved Oxygen (BOD)	≥ 4.0 mg/L	Impaired	Medium
Imperial River (Marine Segment)	Estuary	3M	Iron	≤ 0.3 mg/L	Impaired	Medium
Imperial River (Marine Segment)	Estuary	3M	Mercury (in fish tissue)	Exceeds DoH Threshold (< 0.3 ppm)	Impaired	High
Oak Creek	Stream	3F	Fecal Coliform	≤ 400 Counts / 100 mL	Impaired	Low
Spring Creek (Marine Segment)	Estuary	3M	Iron	≤ 0.3 mg/L	Impaired	Medium
Spring Creek (Marine Segment)	Estuary	3M	Mercury (in fish tissue)	Exceeds DoH Threshold (< 0.3 ppm)	Impaired	High

* Florida's waterbody classifications are defined as: 1 - Potable water supplies; 2 - Shellfish propagation or harvesting; 3F - Recreation, propagation, and maintenance of a healthy, well-balanced population of fish and wildlife in fresh water; 3M - Recreation, propagation, and maintenance of a healthy, well-balanced population of fish and wildlife in marine water (FDEP 2012c). Source: DEP, 2012c

Monitoring Network (CHEVWQMN) that was started in 1996 and has been monitoring the waters of Estero Bay and the greater Charlotte Harbor area since that time. Based out of the Charlotte Harbor Aquatic Preserves (CHAP) office, the CHEVWQMN program was created from a joint effort by CHAP, CHNEP and the Charlotte Harbor Environmental Center, and includes the regions of Lemon Bay, Gasparilla Sound, Pine Island Sound, Matlacha Pass, San Carlos Bay, Estero Bay and Charlotte Harbor proper. The program consists of more than 80 water quality monitor volunteers that sample 46 fixed stations within the greater Charlotte Harbor area. All volunteers collect samples at the same time of day, using the same techniques, testing for the same parameters which ensures validity of the data. Estero Bay Aquatic Preserve staff serves as local coordinator for volunteers monitoring at each of the seven sites within the Estero Bay region. Volunteers collect water samples for lab analysis as well as test specific parameters in the field, including temperature, salinity, pH and dissolved oxygen (DO). Titration techniques were used until 2009, at which time handheld automated meters were introduced so that the program would remain compliant with DEP Standard Operating Procedures. Volunteers also attend bi-annual Quality Assurance sessions to maintain precision and accuracy within the program. Information gleaned from water quality analyses is used to help identify potential pollutants and problem areas that may need the attention of governing agencies. To date, the Estero Bay data has been used by organizations and agencies to set regional water quality targets, identify state “impaired waters” and educate citizens and elected officials about the value of our exceptional estuarine resources.

Portions of each of the bay’s tributaries have been listed as “impaired” under the Impaired Waters Rule, Chapter 62-303, F.A.C. Impaired waterbodies are listed in Table 5 and displayed in Map 9. Parameters of current impairment include mercury, iron and fecal coliform, with one segment impaired for DO. Data from the ongoing CHEVWQMN, for which aquatic preserve personnel serve as local coordinator, have been used in the determination of impaired waters for both the bay proper and its tributaries. Additionally, as part of the Total Maximum Daily Load (TMDL) process, a water quality sampling program was initiated with the cooperation of DEP South District’s DEAR Section, Lee County Environmental Lab and aquatic preserve staff. The program has collected data that have been used in the determination of salinity gradients within the bay’s tributaries. Impaired waterbodies such as Estero Bay’s listed tributaries require the development of TMDLs, which stipulate the maximum amount of a pollutant that a waterbody can receive without exceeding water quality standards. Six TMDLs have been developed for the Everglades West Coast region that includes Estero Bay. Each TMDL requires the development of a Basin Management Action Plan (BMAP) which is aimed at reducing pollutant levels through programs and strategies addressing waterbody impairment causes. There are currently two BMAPs in development for the Estero Bay region, one combined BMAP for Hendry Creek (marine and freshwater) and one BMAP for the Imperial River. Additionally, in February 2003 Estero Bay was designated a priority Surface Water Improvement and Management waterbody by SFWMD. Data from the CHEVWQMN and tributary monitoring will be utilized by the SFWMD as it develops Pollutant Load Reduction Goals, as required by Estero Bay’s Surface Water Improvement and Management waterbody status.

In 2002, the aquatic preserve began bi-annual seagrass monitoring. Monitoring design and implementation was based on that used in a previous joint project between CHAP and SFWMD’s Surface Water Improvement and Management Plan program, in which Scheda Ecological Associates, Inc., SFWMD, and CHAP field staff conducted preliminary seagrass monitoring in northern Charlotte



Estero Bay water quality volunteers participating in a bi-annual quality assurance training session.

Harbor and Lemon Bay in 1998. Techniques in the Estero Bay Aquatic Preserve seagrass monitoring closely mirror those used by CHAP in their original study, with the exception that monitoring is conducted twice a year in Estero Bay and annually in annually in Charlotte Harbor (Map 16). There are five transects within Estero Bay, chosen to reflect conditions at various locations within the bay. These transects are monitored twice a year - during the summer growing season and the winter dormant season in order to coincide with minimum and maximum seagrass densities. Transect lengths at the five sites vary from 50 meters to over 400 meters, and transect lines begin on the shoreward side of the seagrass bed and are tagged with flagging tape. The start of the seagrass bed is marked using a stake, with Global Positioning System (GPS) coordinates recorded for both the beginning and end of the transect. Transect direction is followed using a compass heading and aided by the researcher following two visual reference points kept in line. Data is collected at a station every 50 meters, or every 10 meters if the total transect is less than 50 meters long. Parameters recorded at every station along a transect line include distance from shore, time, depth, species present, species abundance, seagrass blade lengths, epiphyte density, epiphyte description, sediment type, and comments. The Braun-Blanquet method is used to estimate both total and individual species abundance. Total abundance was added as a unique parameter in 2006 when it became evident that an overall estimation of abundance was needed for analysis purposes. Monitoring drift algae and attached algae has also increased in recent years, with each species of algae

now being recorded, where feasible. In the case of attached algae, the Braun-Blanquet method is used to estimate and record total attached algae abundance. While this layer of specificity may not be utilized in the present, the information may prove valuable in future analyses. Additionally, up until 2011 a short shoot density for each seagrass species found was recorded randomly within the quadrat at three random stations along the transect. This was done by counting the total number of shoots per species in a ten centimeter-squared section of the quadrat. Starting in 2012, shoot counts for each species are recorded at each station and is the same methodology used by CHAP and DEP South District DEAR programs. Finally, weather and tide stage (at beginning and end of monitoring) is recorded and a handheld meter is used at the end of the transect to record water quality parameters including salinity, DO, temperature, and secchi readings. Data from the past few years has seen an increase in the amount of seagrass coverage.

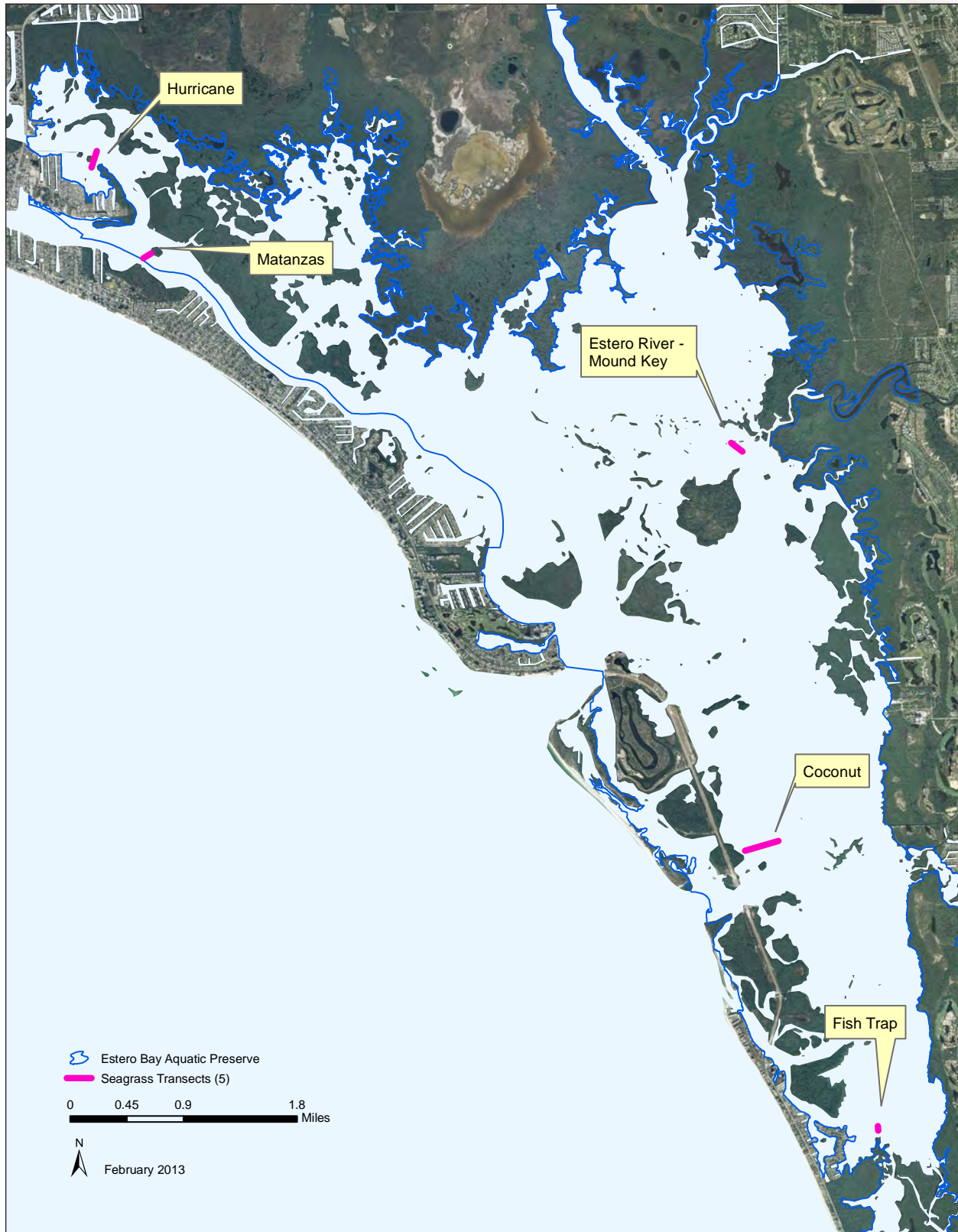


Left: Aquatic preserve staff conducting seagrass surveys in Matanzas Pass. Right: Underwater view of quadrat used to calculate seagrass abundance.

In 2003, aquatic preserve staff began a tributary monitoring program in collaboration with LCEL and DEP South District DEAR program (Map 17). This collaborative effort entailed obtaining water samples and recording field data at seven fixed stations in the tributaries of Estero Bay, both upstream and downstream on Hendry, Mullock and Spring creeks, as well as on the downstream only portion of the Imperial River. Locations were chosen to complement site locations already in use by the CHEVWQMN program and locations already sampled by LCEL. For the first several years in this tributary monitoring program, water quality samples were collected by aquatic preserve staff monthly at each selected site. Due to budget constraints and reduced staffing, the aquatic preserve was no longer able to monitor at this frequency, and DEAR agreed to assist in sample collections pending review at the end of their fiscal year. After approximately two years, DEAR, LCEL, and aquatic preserve staff agreed that in light of communal budgetary constraints, monthly testing was not necessary. DEAR and aquatic preserve staff each agreed to share bi-monthly sampling duties. Samples are collected at a half meter below the water's surface using a Van Dorn device and dispensed into sterilized bottles, with one site chosen at random each month in which to collect blank and duplicate samples for quality assurance purposes. Bottles are then placed on ice and transported to LCEL for analysis. Tested parameters include chlorophyll, nitrate, ammonia, total phosphorous, total nitrogen, and fecal coliform bacteria. The lab

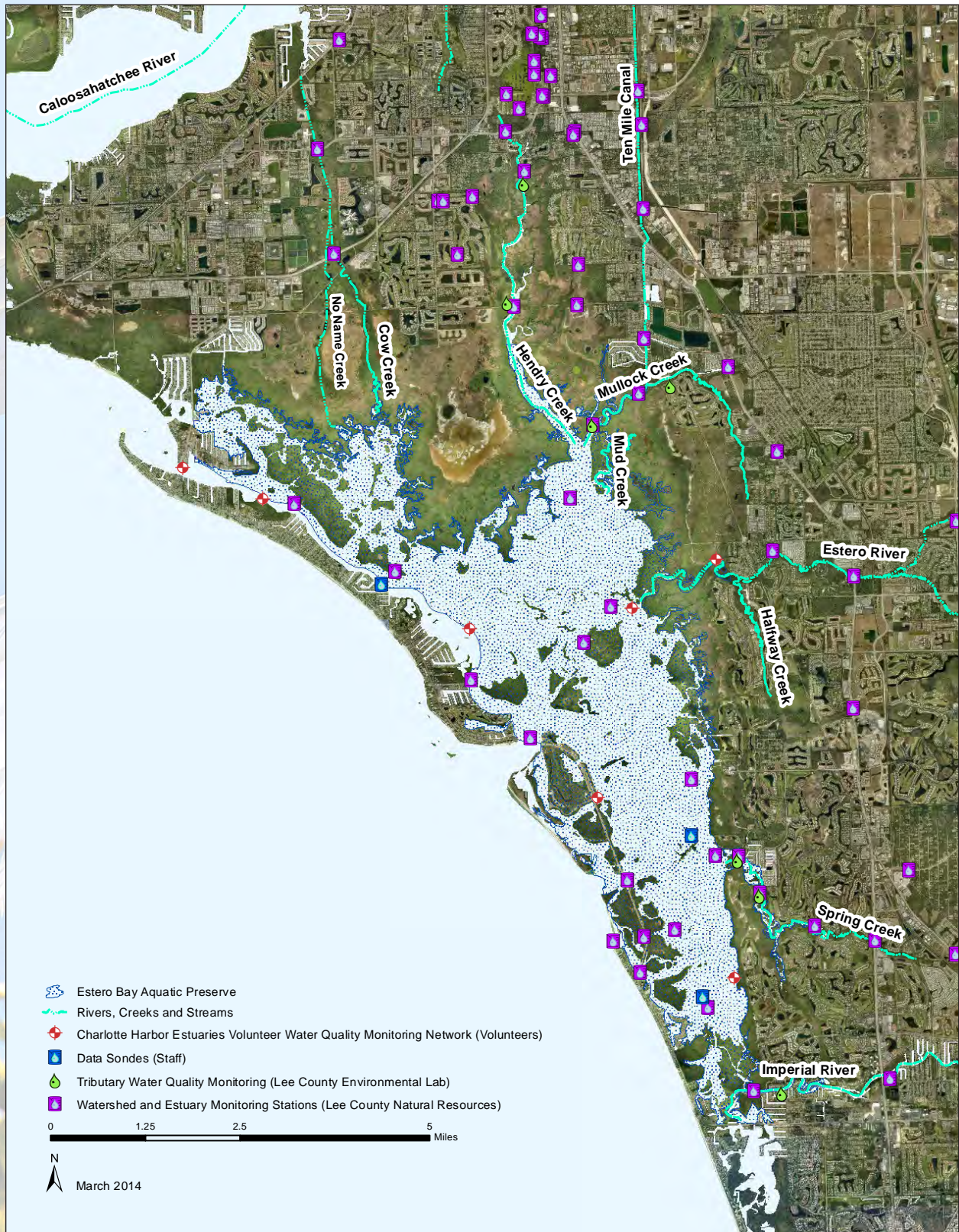
analysis data are then uploaded into the state's database STORET (an acronym for STORAGE and RETrieval) for use in its determination of "impaired waters."

In 2004, FCO obtained funding from the National Oceanographic and Atmospheric Administration's (NOAA) Coastal Zone Management Program to purchase 27 extended deployment water quality monitoring devices, or data sondes, for operation in aquatic preserves around the state. With these data sondes, FCO began a pilot program for several of its aquatic preserves, including Estero Bay Aquatic Preserve which received five data sondes. The original purpose of the program was to establish baseline



Map 16 / Seagrass monitoring transects.

data that would assist in determining the health of Florida's aquatic preserves around the state. The data was anticipated to help in assessing the impact of development on Estero Bay. Three fixed monitoring sites were established: at the mouth of the Imperial River in order to gather data on freshwater input, in Estero Bay near the entrance to Spring Creek in order to gather data on the effects of changing tides in this region, and near Julie's Island in order to gather data on the confluence of two designated nodal regions within the bay (Map 17).



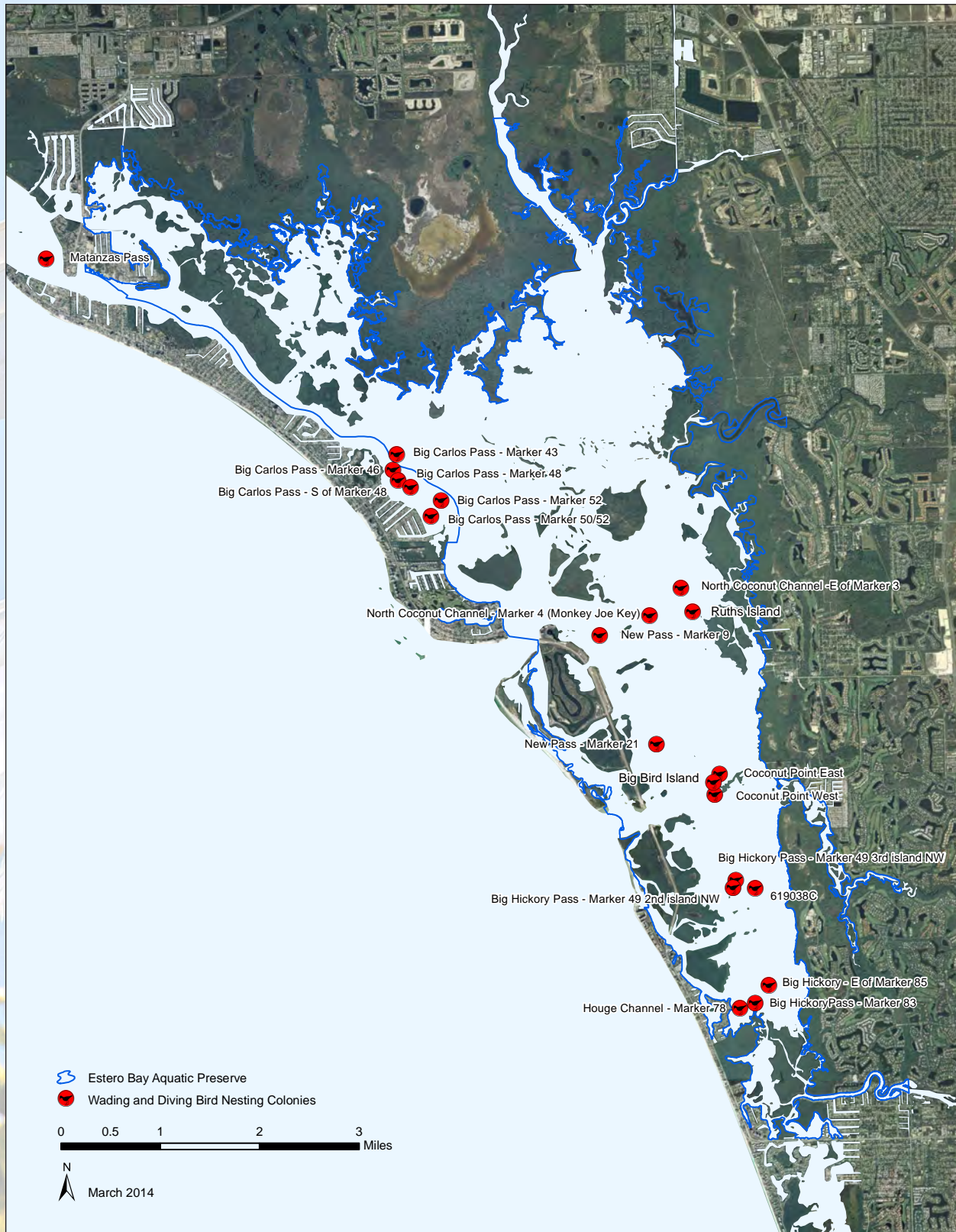
There were several factors considered when selecting the monitoring sites including salinity gradients, water depth, freshwater inputs, tidal circulation patterns and the location of navigational markers. Additionally, to correlate existing data collection efforts and refrain from duplicating data, locations of other water quality studies were also taken into consideration. The data sondes record data every 15 minutes for parameters including depth, temperature, salinity, specific conductance, pH, DO and turbidity. The program follows NOAA's Central Data Management Office procedures which include the data being reviewed for Quality Assurance and Quality Control using the Microsoft Excel macros provided by the Central Data Management Office. In addition, the program currently participates in the Red Tide Offshore Monitoring Program and samples are collected monthly at data sonde locations and sent to FWRI for analysis.

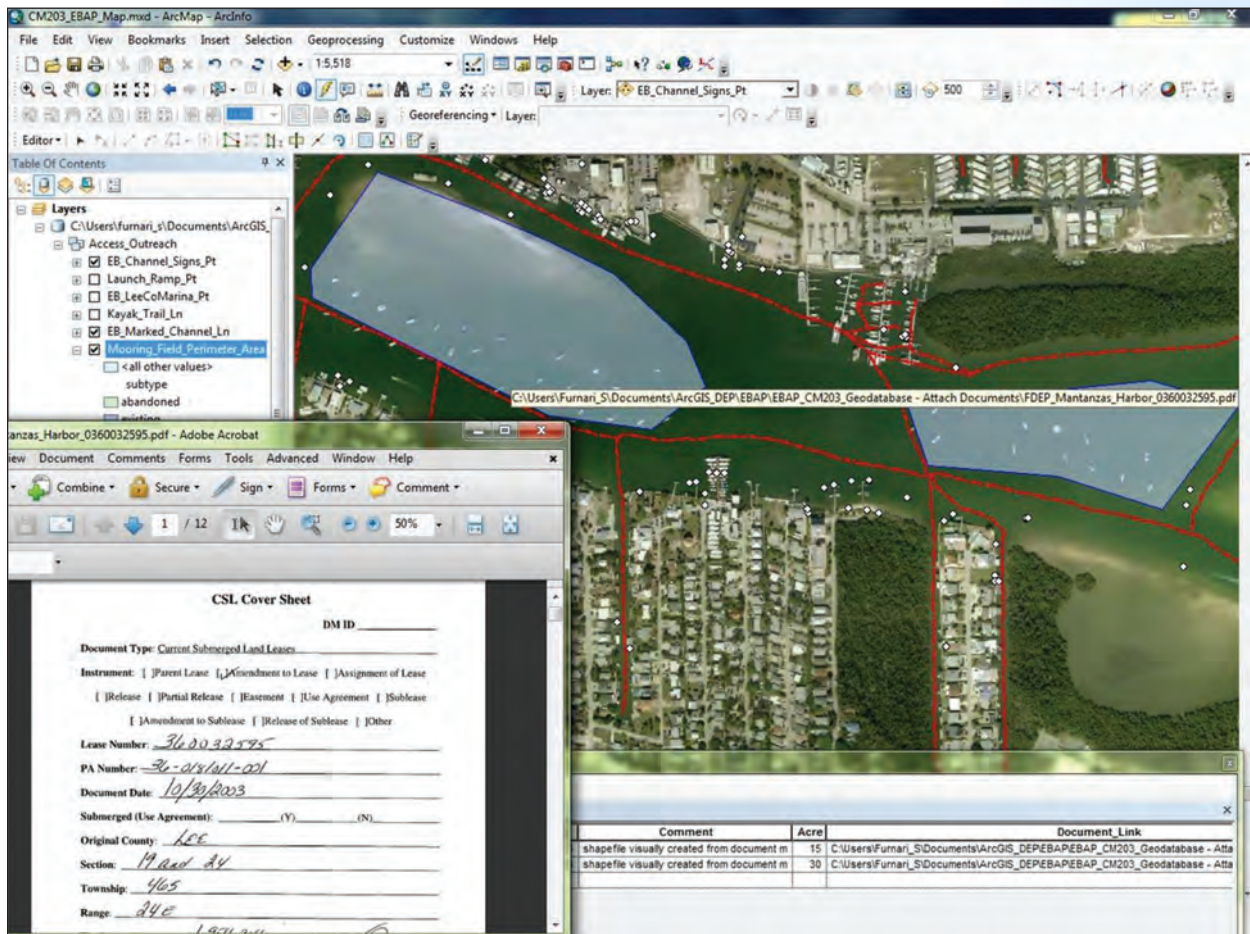
Year	Month(s)	Method Employed	Species Counted	Comments
1977	May	Perimeter	BRPE	No protocol available
1978	May	Perimeter	BRPE	No protocol available
1979	May	Perimeter	BRPE	No protocol available
1980	May	Perimeter	BRPE	No protocol available
1981	May	Perimeter	BRPE	No protocol available
1982	May	Perimeter	BRPE	No protocol available
1983	Late May	Ground	BRPE, DCCO, ANHI, GBHE, GREG, SNEG, LBHE, TRHE, REEG, CAEG	No protocol available; written correspondence indicates "walked through the islands"
1984	Late May	Ground	BRPE, DCCO, ANHI, GBHE, GREG, SNEG, LBHE, TRHE, REEG, CAEG	No protocol available; written correspondence indicates "walked through the islands"
1985	Late May	Ground	BRPE, DCCO, ANHI, GBHE, GREG, SNEG, LBHE, TRHE, REEG, CAEG	No protocol available; written correspondence indicates "walked through the islands"
1986	Late May	Ground	BRPE, DCCO, ANHI, GBHE, GREG, SNEG, LBHE, TRHE, REEG, CAEG	No protocol available; written correspondence indicates "walked through the islands"
1987	Late May	Ground	BRPE, DCCO, ANHI, GBHE, GREG, SNEG, LBHE, TRHE, REEG, CAEG	No protocol available; written correspondence indicates "walked through the islands"
1989	May	Perimeter	BRPE, DCCO, ANHI, GBHE, GREG, SNEG, LBHE, TRHE, REEG, CAEG	No protocol available; only BRPE were included in analyses
1997	May	Perimeter	BRPE	No protocol available
1998	April 29	Perimeter	BRPE, DCCO, ANHI, GBHE, GREG, SNEG, LBHE, TRHE, REEG, CAEG, YCNH, BCNH, GRHE	Direct Count method
1998	May	Perimeter	BRPE	No protocol available
2001	April 24	Perimeter	BRPE, DCCO, ANHI, GBHE, GREG, SNEG	Direct Count method LBHE, TRHE, REEG - species were present but nest counts were not conducted
2007	April 18	Perimeter	BRPE, DCCO, ANHI, GBHE, GREG, SNEG, LBHE, TRHE, REEG, CAEG, YCNH, BCNH, GRHE	Direct Count method as described by Audubon of Florida (2004)
2008	March-August	Perimeter	BRPE, DCCO, ANHI, GBHE, GREG, SNEG, LBHE, TRHE, REEG, CAEG, YCNH, BCNH, GRHE	Direct Count method as described by Audubon of Florida (2004)
2009	February-August	Perimeter	BRPE, DCCO, ANHI, GBHE, GREG, SNEG, LBHE, TRHE, REEG, CAEG, YCNH, BCNH, GRHE	Direct Count method as described by Audubon of Florida (2004)
2010	February-September	Perimeter	BRPE, DCCO, ANHI, GBHE, GREG, SNEG, LBHE, TRHE, REEG, CAEG, YCNH, BCNH, GRHE	Direct Count method as described by Audubon of Florida (2004)
2011	January-September	Perimeter	BRPE, DCCO, ANHI, GBHE, GREG, SNEG, LBHE, TRHE, REEG, CAEG, YCNH, BCNH, GRHE	Direct Count method as described by Audubon of Florida (2004)

Species Key: ANHI= anhinga; BCNH= black-crowned night-heron; BRPE= brown pelican; CAEG= cattle egret; DCCO= double-crested cormorant; GBHE= great blue heron; GREG= great egret; GRHE= green heron; LBHE= little blue heron; REEG= reddish egret; SNEG= snowy egret; TRHE= tri-colored heron; YCNH= yellow-crowned night-heron.

Table 6 / Nesting bird surveys

From 1977 until 2008, bird rookery monitoring was conducted sporadically, and a variety of survey methods were employed. May nest counts conducted 1977 through 1982, and again in 1997 and 1998 only monitored for brown pelicans, from 1983 through 1989 all wading and diving birds were included in the May survey counts. Survey schedules were changed in 1998, with surveys of all wading and diving bird species, conducted in April of that year and again in 2001 and 2007, when staff from Audubon's Florida Coastal Islands Sanctuaries in Tampa assisted with surveys. The Estero Bay Aquatic Preserve manager identified regular rookery monitoring as a gap in resource information needed to manage the aquatic





Geodatabases within ArcGIS software provide the ability to link documents to spatial data, such as maps.

preserve ecosystem as a whole. Since 2008, monthly nest counts of all active and historically active islands have been performed using a direct count method. Objectives of the current program include: to provide peak estimates of nesting effort for each species of colonial nesting bird; to monitor population trends; to document movement of colonies; to document human disturbance and bird fatalities due to fishing line entanglement; to reduce the number of entanglements and fatalities due to fishing line and trash within the bay; and to provide recommendations for long term monitoring of nesting wading bird colonies in the aquatic preserve. Many species of birds nest on islands in Estero Bay, including five state-listed Species of Special Concern: brown pelican, reddish egret, little blue heron, tricolored heron and snowy egret.

Colonial nesting bird surveys conducted in Estero Bay; including survey methods employed as described by Steinkamp and co-workers (2003) and species counted. Surveys were conducted once per month at each known active nesting colony for years and months listed.

Staff and volunteers monitor wading and diving bird nesting colonies throughout the year, with nineteen islands monitored each month during the 2011 season. During 2012, 21 islands were monitored for nesting activities (Map 18). Direct count surveys are conducted by slowly circling each island on a boat at a safe distance so that nesting birds will not be disturbed. Two observers count the number of nests by species and nesting stage. Nests are recorded as "empty" if no birds or eggs were observed, "unknown" if an adult was present at the nest but no eggs or chicks were visible or if the pair was copulating, "incubating" if the adult was in an incubating posture or if eggs were visible or "chicks" if chicks were present in the nest or within the vicinity of the nest. This data is analyzed and submitted each year to the South Florida Water Management District for publication in the annual South Florida Wading Bird Report. The report is used to follow trends in wading bird activity and to estimate the number of nesting wading birds in Florida. In 2012, staff submitted a manuscript, Monitoring Colonial Nesting Birds in Estero Bay Aquatic Preserve, to the Florida Scientist, highlighting the trends in nesting status since the start of the program in 1977. Staff and volunteers also work to protect nesting colonies by conducting trash cleanups and working with local agencies to educate the public about rookery islands.



A angelwing clam feeds by filtering water through its incurrent siphon and expelling it through the excurrent siphon.

The long-term monitoring programs of water quality, seagrass and colonial nesting waterbirds began more than a decade ago. Although trend analyses and reports exist for much of this data, there is not one location for resource managers and partners to access all of this information. Therefore, efforts to integrate aquatic preserve monitoring data are currently underway through the development of a geodatabase. The project integrates existing science-based data and information, and links it to a spatial management framework through the application of GIS software. As a result, this geodatabase will serve as a powerful information tool for use by not only the aquatic preserve staff, but also by regulatory personnel and other coastal management professionals. This information will contribute to the protection and management of the aquatic preserve's water quality and living marine resources, improvement of public access opportunities, and the increased understanding of the cumulative effects of land use in adjacent watersheds.

4.2 / The Resource Management Program

The Resource Management Program addresses how FCO manages the Estero Bay Aquatic Preserve and its resources. The primary concept of Estero Bay Aquatic Preserve Resource Management projects and activities are guided by FCO's mission: *Conserving and Restoring Florida's Coastal and Aquatic Resources for the Benefit of People and the Environment*. FCO's sites accomplish resource management by physically conducting management activities on the resources for which they have direct management responsibility, and by influencing the activities of others within and adjacent to their managed areas and within their watershed. Watershed and adjacent area management activities, and the resultant changes in environmental conditions, affect the condition and management of the resources within their boundaries. Coastal and aquatic resources are especially sensitive to upstream activities affecting water quality and quantity. FCO works to ensure that the most effective and efficient techniques used in management activities are used consistently within our sites, throughout our program, and when possible, throughout the state. The strongly integrated Ecosystem Science, Education and Outreach and Public Use Programs, provide guidance and support to the Resource Management Program. These programs work together to provide direction to the various agencies that manage adjacent properties, our partners and our stakeholders. The Estero Bay Aquatic Preserve also collaborates with these groups by reviewing various protected area management plans. The sound science provided by the Ecosystem Science Program is critical in the development of effective management projects and decisions. The nature and condition of natural and cultural resources within Estero Bay Aquatic Preserve are diverse. This section explains the history and current status of our Resource Management efforts.



Aquatic preserve staff participate in a Florida Gulf Coast University restoration project to create oyster habitat in Estero Bay.

4.2.1 / Background of Resource Management at Estero Bay Aquatic Preserve

Land use and hydrological alterations have permanently changed the timing, quantity and quality of freshwater flowing into Estero Bay. Historically, sheet flow in the Estero Bay watershed was predominantly from northeast to southwest, but with the excavation of the Ten Mile Canal for flood control in the 1920s, sheetflow from ten of the 70 square miles within the Six Mile Cypress basin was shunted south into Mullock Creek and ultimately into Estero Bay. Then in 1975, the canal was widened and deepened, and three water control structures were installed to preserve the water table and to defend against saltwater intrusion. The result is that the canal now holds water year round. Other landscape changes that have occurred in the eastern part of the county have changed sheetflow as well. Here, water becomes blocked by Interstate-75, collects within the Imperial River and Estero River watersheds, and can contribute to flooding problems in times of high rainfall (Estero Bay Agency on Bay Management, 2000). Spring Creek has experienced the opposite, however, and receives considerably less freshwater input than it did in the past. These hydrological alterations, meant to create a more hospitable landscape for man by draining lands during the wet season and retaining water during the dry, have served to permanently alter the timing of water entering the bay. During the dry season very little water flows into the bay, and in the rainy season water is quickly funneled, providing large freshwater pulses into the bay.

Hydrological changes within a watershed can put stress on native species and can encourage the proliferation of exotic species. Wetlands that drain too quickly, for example, are unable to maintain an ample food supply for wading birds, which can lead to diminished or failed reproductive efforts. Brown pelicans, in particular, have been affected by hydrological changes within Estero Bay's watershed (Gray, Beever & Beever, 2009). Between 1977 and 2011, Estero Bay Aquatic Preserve data showed a significant loss in brown pelicans, approximately five nesting pairs annually; between the 1980s and 2000s a 54.3 percent decrease in nesting activity was observed in Estero Bay (Clark & Leary, 2012). Furthermore, there have been documented declines in species such as spotted seatrout, mullet and blue crab. Decreases in landings numbers of these species were recorded from 1998 to 2008 (Gray & Beever, 2009).

In addition to its watershed, Estero Bay itself has also undergone alteration as well, with the development of the causeway on Estero Island, which connects Fort Myers Beach to Bonita Beach. This road expansion project caused filling of passes and permanently altered tidal exchanges within the area. These alterations subsequently led to decreased flushing and may have contributed to a decline of water quality within the bay (Balough, Gershberg, Johnson & Loewer, 1978).

Many of Estero Bay's tributary segments are currently listed as "impaired" due to mercury, iron and fecal coliform using the Impaired Surface Waters Rule to assess water quality impairments. Imperial River and Hendry Creek have also been identified to be impaired for low DO. This list of impaired waters, a requirement under the federal Clean Water Act, tasks Florida with not only creating a list of impaired waters throughout the state, but also developing Basin Management Action Plans to remediate the problem. The final Basin Management Action Plan document devised for Hendry Creek (marine and freshwater portions) and Imperial River was posted in November 2012. Impaired waters will be re-evaluated every five years to determine whether improvements are being achieved. The core stakeholders for the Everglades West Coast Basin Management Action Plan group include DEP, SFWMD, Lee County, City of Bonita Springs, Catalina at Winkler Community Development District, Florida

Department of Transportation, and Florida Department of Agriculture and Consumer Services.

The aquatic preserve continues to assist and partner with other agencies and organizations in order to accomplish mutually compatible goals. For example, for the past several years, FGCU has spearheaded an oyster restoration program within Estero Bay as well as in San Carlos Bay, Pine Island Sound, and the Caloosahatchee estuary. This program utilizes volunteers to create oyster reefs at various locations and monitors the viability and benefit of these reefs to the greater estuary. Hundreds of students and members of the public – many who have never been in the water except for pools and beaches – form human chains to carry bags of oyster shell from boats to predetermined restoration sites. Along with other state and local agencies, aquatic preserve staff has previously assisted FGCU with this annual oyster restoration project through providing a boat and staff member for the event. FGCU has also included the aquatic preserve's contributions in a NOAA grant application for oyster and seagrass restoration.

Staff have been trained members of the Southwest Florida Marine Mammal Stranding Network, coordinated and run by FWC. Staff have assisted in multiple carcass retrievals and on-site necropsies, as well as rescues of both dolphin and manatees. Furthermore, aquatic preserve staff are routinely contacted to retrieve injured or dead sea turtles. Coordination with Turtle Time and FWC for efficient and safe transport is always part of this process. Staff have also been pleased to assist with the determination of release sites and to provide a vessel for the release of healed turtles in Estero Bay.



Aquatic preserve staff assist the Florida Fish and Wildlife Conservation Commission Southwest Florida Marine Mammal Stranding Network with a dolphin rescue.



Aquatic preserve staff provided transportation to Turtle Time's founder, Eve Haverfield, for the release of a rehabilitated Kemp's ridley sea turtle into Estero Bay.

Aquatic preserve personnel have also been part of the Boca Grande Pass clean-up, a multi-organization event coordinated by Florida Sea Grant and organized for the purpose of extracting old fishing line, artificial lures and other debris from one of the most heavily fished passes in the area. Additionally, in 2009 staff assisted Florida Sea Grant with their cleanup effort of derelict crab traps. FWC enacted a closed season for crab traps, in which any commercial or recreational crab traps left in state waters during this time were considered derelict and could be removed by state authorized groups. Estero Bay Aquatic Preserve and EBSPSP staff and volunteers removed traps and other associated debris from the aquatic preserve.

Land acquisition and management efforts within the Estero Bay watershed include Conservation 20/20, the Corkscrew Regional Ecosystem Watershed (CREW), and the Estero Bay Florida Forever project. Conservation 20/20 is Lee County's land acquisition program that works in conjunction with Lee County's Division of County Lands and Division of Parks and Recreation in order to acquire and manage conservation lands around Lee County. This successful program has preserved nearly 25,000 acres between 1997 and 2012, with 2,097 acres within the Estero Bay watershed located adjacent to other conservation lands such as the EBPSP. Conservation 20/20 acquisitions in the Estero Bay watershed include San Carlos Bay-Bunche Beach, Matanzas Pass, Estero Marsh, Six Mile Cypress Slough, Flag Pond, Mullock Creek, Koreshan, Pine Lake, Hidden Cypress, Imperial Marsh, Oak Creek, Wild Turkey Strand, CREW (smaller parcels), Gator Hole, and Imperial River (Lee County, 2012). The CREW Land and Water Trust is a private, non-profit conservation organization committed to the preservation of water resources and natural communities. Land purchased within the Estero Bay Florida Forever project becomes part of EBPSP. In addition to using Conservation and Recreation Lands and Florida Forever funds, two \$1,000,000 U.S. Fish and Wildlife Service National Coastal Wetlands Conservation grants were obtained to acquire and manage land.

There are several restoration projects that have been constructed or are currently underway within the Estero Bay watershed. Extensive hydrological restoration and exotic plant control on all conservation lands contribute to a healthier bay. Some of these projects include:

- The Island Park Filter Marsh- To restore the flow-way and enhance water quality of freshwater inflow into Hendry Creek, and ultimately Estero Bay. The project took place on Conservation 20/20 property and is overseen by Lee County.
- Halfway Creek Filter Marsh- This completed project created drainage and water quality improvements by removing a Florida Power and Light berm, and increased habitat with native plantings on the created littoral shelf.
- Lakes Park Flow-way- Construction of a 40-acre marsh/flow-way to provide surface-water runoff quality treatment from a 2,000-acre watershed, while increasing wildlife habitat in an abandoned rock mine (project began in February 2012 with SFWMD). The marsh will help to remove nutrients, increase circulation and improve DO levels, as well as increase native habitat, all of which will improve water quality of freshwater flowing from Lakes Park into Hendry Creek, and ultimately into Estero Bay. It includes planting native vegetation on 11 acres of uplands and nine acres of littoral zone.
- East Mullock Drainage District- In 2008, Lee County and SFWMD installed floating islands with native vegetation in the San Carlos Park area of Mullock Creek in order to remove excess nutrients and improve the quality of water flowing from Mullock Creek into Estero Bay.
- Ten Mile Canal Filter Marsh- The 6,000 foot long filter marsh, completed in 2005, was installed to reduce nutrient levels and thereby enhance the quality of water flowing from the Ten Mile Canal into Mullock Creek, and eventually into Estero Bay. It is located approximately halfway down the length of and adjacent to the Ten Mile Canal. Water flows from the canal into the filter marsh via two 30-inch diameter pipes and can be regulated by means of a gate system (Karuna-Muni, Ottolini & Livingston, 2011).
- Estero Bay Preserve State Park- The park has benefitted from hydrological restoration through the installation of culverts under an abandoned railroad grade. Also, in coordination with SFWMD, conducted hydrological restoration at the state park 'Scrub' parcel in 2000/2001. Work consisted of creating a tidal connection via a shallow ditch/grading that would serve to facilitate water flow through tidal exchange with the Estero River. Estero Bay Buddies (EBB) and Estero Bay Aquatic Preserve have also assisted park staff with a riprap installation project at the EBPSP Scrub parcel which helped stabilize an eroding shoreline along the Estero River. Other restoration projects at the park include exotic plant control, prescribed fire and regrading spoil piles that were the result of past mosquito ditching.
- The Oil Pollution Act of 1990 makes those responsible for oil spills liable to the public and the environment. Natural Resource Damage Assessment (NRDA) is a legal process that determines the type and amount of restoration needed to compensate the public for harm to natural resources and their human uses that occur as a result of an oil spill incident. After the 2010 Deepwater Horizon oil leak in the Gulf of Mexico, pre-assessment baseline sampling was conducted by DEP throughout Florida in accordance with the NRDA procedure. As part of this process, Estero Bay Aquatic Preserve employees conducted benthic sampling in coordination with staff from Rookery Bay National Estuarine Research Reserve (NERR), CHAP, DEP South District DEAR and Lee County.

- DEP employees from around the state also descended upon the Florida panhandle to assist local staff with both oil spill-related duties as well day-to-day operations. Upon arrival, staff from Estero Bay Aquatic Preserve and Rookery Bay NERR were asked to assist Apalachicola NERR staff in the excavation of loggerhead sea turtle nests on Little Saint George Island. Staff spent several days carefully removing loggerhead sea turtle eggs from their nests on the beach and relocating them to encasements made of styrofoam coolers. Nests were excavated 7-10 days before they were scheduled to hatch so the embryos were almost fully developed. The eggs were then transferred by boat to the Apalachicola NERR lab where they were temporarily held until a FedEx "Gulf Turtle Rescue" truck transported the clutch to the east coast. There they were kept in their styrofoam cooler "nests" at Kennedy Space Center until they hatched and were later released on the beach of the Atlantic Ocean. After spending several days successfully excavating sea turtle nests, staff assisted the NRDA Shoreline/Marsh Pre-Assessment Survey Team with their shoreline assessments. This included documenting shoreline habitat type, presence or absence of oil, location and distribution of oil, dominant flora species, and the presence or absence of fauna. Survey locations were documented with GPS units and photographs. Although fortunately, these activities were not needed in the Estero Bay Aquatic Preserve, if needed, other aquatic preserve, FCO and DEP staff from around the state would assist Estero Bay Aquatic Preserve as staff assisted the Apalachicola NERR, giving Estero Bay Aquatic Preserve a valuable resource in a similar emergency.

4.2.2 / Current Status of Resource Management at Estero Bay Aquatic Preserve

Staff review DEP, SFWMD and other agency permit applications for any project that has the potential to impact the aquatic preserve. This includes applications for activities within the bay such as dredging or dock construction, as well as larger projects within the watershed such as Developments of Regional Impact or coastal alterations. It is important for all potential projects to be reviewed, as the aquatic preserve program is concerned with not only impacts of the proposed project, but also the cumulative impact from all projects within the area. It is this slowly increasing and collective pressure of development on the preserve that can be easily overlooked but can have significant consequences such as loss of habitat and degraded water quality. Staff conduct joint site inspections and aquatic preserve resource concerns and determination of public interest are discussed with permitting staff, including a monthly coordination call or meeting with Environmental Resource Permitting (ERP) staff.

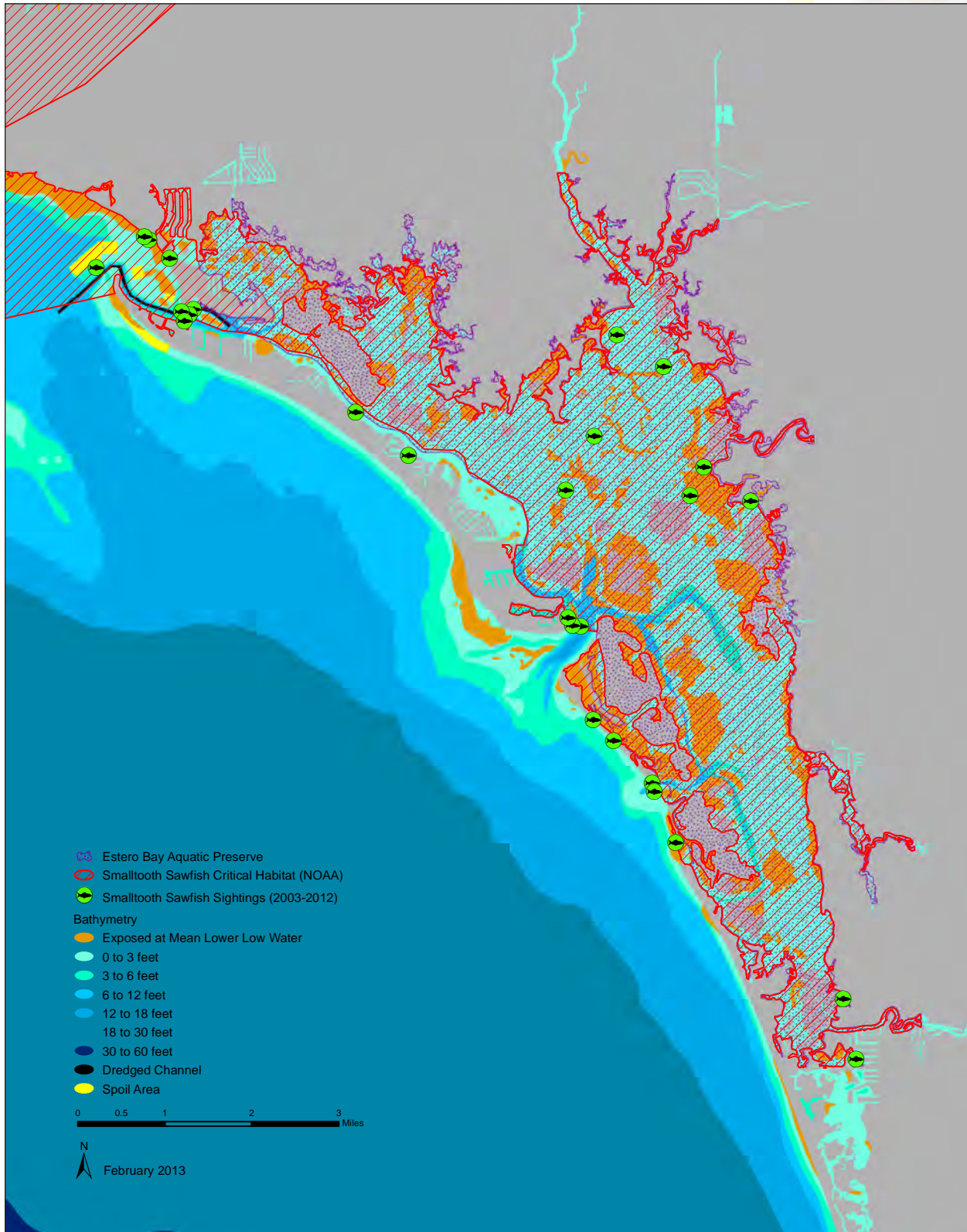
Aquatic preserve staff also keep abreast of current issues and collaborate with other agencies and organizations through participation in various meetings and working groups. Memberships include EBABM, Lee County Marine Law Enforcement Task Force, Fort Myers Beach Marine Resources Task Force and Estero Bay Nutrient Management Partnership, among others. In addition, the aquatic preserve has a member representative on the CHNEP Management Committee and is part of the CHNEP's Technical Advisory Committee conference group. These venues provide staff the opportunity to provide input on topics that may affect the aquatic preserve. Staff also use these associations to help promote the acquisition of environmentally important lands within the Estero Bay watershed, and to help refine land acquisition priorities within the Estero Bay Florida Forever project boundary.

One issue in the Estero Bay watershed is the Density Reduction Groundwater Resource area, which has been a topic of contention within recent years. Originally set aside to help protect local water supply, these 96,000 acres in Lee County were limited to no more than one home for every ten acres in an attempt to help curb urban sprawl. Since the construction of FGCU in the mid-1990s, however, development pressure has continued to increase for this region, and debate continues as to the importance of this area for aquifer recharge and freshwater input to the bay. This will continue to be an important regional issue with direct effects on both Estero Bay and its watershed.

Another resource management initiative is that the aquatic preserve has petitioned FWC's Division of Habitat and Species Conservation for the designation of five islands within Estero Bay as Long-Term Critical Wildlife Areas. Critical Wildlife Areas are established to protect important wildlife concentrations from human disturbance during critical periods of their life cycles, such as nesting. It is anticipated that this designation will assist aquatic preserve staff in the management and protection of colonial nesting wading and diving birds. Several wading and diving bird nesting colonies within the bay have been impacted by human disturbances, including camping on active nesting islands, eco-tour boats flushing colonies multiple times a day, pirate cruise boats firing blank cannons next to active colonies, photographers entering colonies and climbing trees to photograph nesting birds and chicks, and large numbers of bird fatalities due to entanglement in discarded fishing line. As current measures do not appear to provide an appropriate level of protection for these nesting colonies, those islands receiving the highest impacts from human disturbances were recommended for consideration as Critical Wildlife

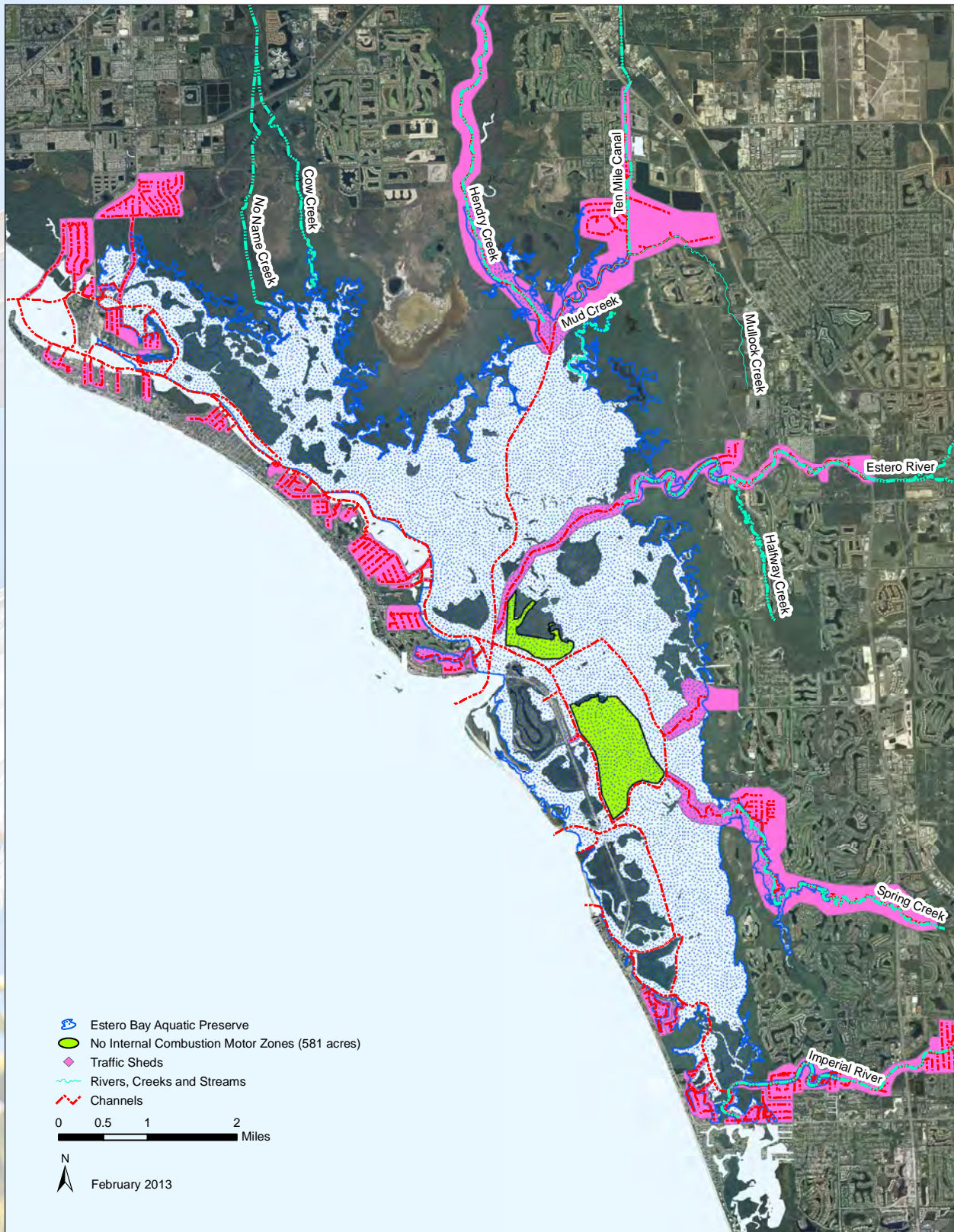
Areas. It is believed that the Critical Wildlife Area designation of these islands, as well as posting a 40 foot minimum buffer zone around the islands, will provide aquatic preserve and law enforcement staff with the tools necessary to protect these islands.

Habitat restoration and enhancement is important to both aquatic preserve staff and their Citizen Support Organization, EBB. For several years, EBB has participated in two annual community cleanups organized by Keep Lee County Beautiful (KLCB). The International Coastal Cleanup is organized internationally by the Ocean Conservancy, and coordinated locally by KLCB, the Sanibel-Captiva



Map 19 | Smalltooth sawfish critical habitat and sightings.

Conservation Foundation, the Environmental Education program of Lee County Public Schools and the Bonita Beach Improvement Association, Inc. The cleanup effort strives to remove and record unsightly and environmentally harmful debris from Florida's coastline and waterways, and raise public awareness about this preventable litter problem. Volunteers record the amounts and types of debris they collect, and this data is collected and sent to the Ocean Conservancy as part of vital research needed to ultimately prevent illegal and improper disposal of solid waste. Additionally, EBB and aquatic preserve staff, historically, have taken part in Monofilament Madness, a marine debris clean-up organized by





A lush seagrass bed can be seen in the foreground as aquatic preserve staff monitor a seagrass transect near New Pass.

KLCB that brings together boaters, kayakers and personal watercraft (PWC) enthusiasts out on the water. Discarded debris and monofilament line are removed from the mangrove areas of Estero Bay, while increasing public awareness about the dangers of abandoned monofilament line.

In 2009, Estero Bay was designated by NOAA as critical habitat for the endangered smalltooth sawfish as part of its Charlotte Harbor Estuary Unit and as displayed in Map 19. This designation excludes areas containing existing federally authorized or permitted man-made structures such as channels or canals maintained at depths greater than three feet (0.9 meters) at Mean Lower Low Water. Additionally, per the Endangered Species Act, section 3(5)(A)(i), boat ramps, docks, and marinas deeper than three feet at Mean Lower Low Water are excluded. This exemption also includes Matanzas Pass which is identified as an existing (already constructed) federally authorized channel. According to the National Marine Fisheries Service, activities that may be affected by this critical habitat designation include dredging/filling and other inwater construction (docks, marinas, boat ramps, etc.), among others. Specific areas within the critical habitat that may require special management considerations for the conservation of smalltooth sawfish include red mangroves and shallow euryhaline habitats, characterized by water depths between the Mean High Water line and three feet, as measured at Mean Lower Low Water.

Estero Bay contained an estimated 3,769 acres of seagrasses in 1950, but this acreage decreased between 1950 and 1999 to 2,488 acres. Furthermore, approximately 107 acres of the seagrasses that were lost during this time are regarded as no longer restorable due to severe damage. Seagrass coverage did increase between 1999 and 2004 to 3,409 acres, however in 2006 there was a decline to 3,298 acres (Gray & Beever, 2009). From 2006 to 2009, Estero Bay Aquatic Preserve seagrass monitoring showed a decrease in total abundance of seagrasses throughout the bay, although not significantly. However, from 2002 to 2009, overall abundance remained fairly stable, with four of the five monitored sites expanding. During this same time period, the abundances of both shoal grass and turtle grass increased significantly for the aquatic preserve as a whole (Leary, 2011). The aquatic preserve, in conjunction with the DEP ERP section, Lee County, WCIND and Sea Grant, recently concluded a multi-year effort studying the traffichsheds within Estero Bay. Traffichsheds are defined as a boat source area that contains a concentration of boats that use a common channel to gain access to secondary access channels and ultimately to deep, open water (Swett & Fann, 2001). The data collected in this study was used to develop a Noticed General Permit, a state rule that provides authorization for dredging within existing public navigation channels in Lee County Since

some of these channels are located within aquatic preserves and new dredging is authorized, the impact from that portion of the project must be offset to make the project clearly in the public interest. To this end, as a condition of the Noticed General Permit, four areas within aquatic preserves in Lee County will be designated, marked and enforced as No Internal Combustion Motor Zones (NICMZs) prior to commencing dredging activities. Two of these four areas are located within Estero Bay Aquatic Preserve (Map 20). These two zones, a total of 581 acres will allow for passive restoration of seagrasses in shallow, heavily prop scarred areas, and will help maintain a healthy seagrass bed in good condition. Hand-powered vessels or those with trolling motors are an appropriate use and will be permitted within the zones. NICMZs have been established in other areas around the state with improvements in these areas to both seagrass habitats as well as fishing prospects, and similar success is expected in this region.

Dredging, oyster mining (for road beds), sedimentation, shoreline alteration, coastal development, and commercial harvesting has led to a 90 percent loss of historic oyster habitat within the CHNEP study area. To address this loss, CHNEP, in partnership with The Nature Conservancy and through cooperation from the Southwest Florida Oyster Working Group (including Estero Bay Aquatic Preserve staff), recently finalized the Oyster Habitat Restoration Plan. The purpose of the plan is to provide a “technically sound, consensus-based approach for identifying oyster habitat restoration goals, methods and partnerships for the estuaries within the CHNEP” (Boswell, Ott & Birch, 2012). Other objectives are to develop consistency among restoration projects, form partnerships to implement restoration projects, provide guidance on permitting requirements and other management considerations, identify potential funding sources and identify opportunities for public outreach and involvement (Boswell, Ott & Birch, 2012). Throughout the development of the plan, the Southwest Florida Oyster Working Group has provided technical assistance by defining CHNEP oyster restoration success criteria, creating a list of suitable oyster restoration techniques for the CHNEP area, and developing pre-restoration and post-restoration monitoring guidelines (Boswell, Ott & Birch, 2012). It is anticipated that the plan will be updated no later than 2020. In August 2012, a subgroup of this working group, including Estero Bay Aquatic Preserve staff, initiated discussions and drafted language to be submitted to DEP for consideration of the development of a Noticed General Permit for low-profile oyster habitat restoration and enhancement to be applied statewide. Stakeholders from around the state were included in the process expected to result in agreement on final language to be submitted.

Invasive exotic species have been found both within the aquatic preserve and on its doorstep. The Asian green mussel, for example, was first discovered in Tampa Bay in 1999 where it quickly proliferated and began clogging water intake tunnels at several power plants. By 2000 it was found in Charlotte Harbor, and then in Estero Bay by aquatic preserve staff in 2002. These mussels out-compete native counterparts such as oysters and can change local environments with devastating results for other native species. Asian green mussels are easily introduced by boaters and can quickly establish populations. They tolerate salinity changes well, have no natural predators, and reach sexual maturity quickly, between two to three months. Juvenile green mussels possess a bright green shell while adult shells tend to be dark green to brown and up to six inches in length. Asian green mussels prefer deeper, saltier waters and man-made habitats, so are usually more prolific around pilings, piers and docks located near passes. Aquatic preserve staff currently assist FWC with efforts in educating the public on Asian green mussels and teaching them how to identify the invaders. To this end, staff have created educational materials and new reporting forms, have begun removal efforts and plan to focus removal efforts in areas where sightings are reported. These removals will be conducted at least quarterly.

4.3 / *The Education and Outreach Management Program*

The Education and Outreach Management Program components are essential management tools used to increase public awareness and promote informed stewardship by local communities. Education programs include on and off-site education and training activities. These activities include: field studies for students and teachers; the development and distribution of media; the distribution of information at local events; the recruitment and management of volunteers; and, training workshops for local citizens and decision-makers. The design and implementation of education programs incorporates the strategic targeting of select audiences. These audiences include all ages and walks of life, however, each represents key stakeholders and decision-makers. These efforts by the Education and Outreach Program allow the preserve to build and maintain relationships and convey knowledge to the community, invaluable components to successful management.

4.3.1 / Background of Education and Outreach at Estero Bay Aquatic Preserve

The creation of Estero Bay Aquatic Preserve began in the 1960s as a massive outreach event to mobilize the local community against the encroaching, and at that time inevitable development of the Estero Bay shoreline. The ongoing efforts of a few tireless citizens resulted in the formation of the Lee County Conservation Association (LCCA) and the creation of the state's first aquatic preserve, first called an offshore preserve, in 1966, which was used as the model for the 1975 Aquatic Preserve Act. During the 1960s and 1970s, LCCA made a name for itself with its court battles to save Estero Bay from development, which took it eventually to the Supreme Court of Florida. LCCA's success against well-funded developers remains an inspiring example of how environmentally responsible "little guys" can beat "big guys" if they have the determination to do so. The establishment of Estero Bay as an aquatic preserve, an early victory for LCCA, was even more impressive when considered that at that time the concept of "aquatic preserve" was yet unknown. The efforts of these key individuals were highlighted in 2006 when the aquatic preserve celebrated its 40th anniversary. A grand celebration was held in which current policy makers and environmental advocates were invited to honor the efforts of those key pioneering individuals, and a dinner and silent auction were conducted to raise funds for EBB. In addition, a commemorative video was created and presented at the celebration, which showcased key individuals and highlighted their groundbreaking undertaking and precedent-setting efforts that eventually led to the state's aquatic preserve program.

This endeavor was mirrored in the efforts of the EBB, formed in 1999. One focus of EBB at the time was land acquisition and preservation within the Estero Bay Conservation and Recreation Lands project. Of particular attention was a 1,200-acre parcel of land with a known vestige of the fast-disappearing rosemary scrub habitat that was becoming lost to encroaching development. With staff justifying the uncommon use of eminent domain to acquire the unique land based on established criteria, EBB members rallied with tremendous local support, and the Board of Trustees of the Internal Improvement Trust Fund ultimately executed a purchase agreement with the landowner to acquire the tract. The land was preserved and the landowners received a fair purchase price. The state and the local community benefitted as the land became a key part of the Estero Bay State Buffer Preserve, managed by FCO at the time. After their success, EBB assisted the



Wading trip participants share their finds and excitement with others at the event.



Children use seine nets to collect creatures inhabiting Estero Bay's seagrass beds during a wading trip led by aquatic preserve staff.

Estero Bay Aquatic and State Buffer Preserves in land management and education and outreach efforts. In 2003, the buffer preserve was transferred to the management of DRP and renamed EBPSF. Along with this move, the Buddies went on to become the Citizen Support Organization for both the Estero Bay Aquatic Preserve and EBPSF. The goals of EBB are to increase public awareness through involvement in educational programs, resource-based activities and special events; to develop stewardship and a sense of shared responsibility for our estuaries and our public lands; and to improve and restore the natural and cultural resources of Estero Bay's coastal and aquatic ecosystems. Although land acquisition is no longer their focus, EBB supports the efforts of the aquatic preserve and state park, serves as a local outreach resource, and members attend local festivals and events to educate the public about the aquatic preserve and EBPSF.

In 2004, EBB and the aquatic preserve procured support from CHNEP for the estuary wading trips conducted by aquatic preserve staff, one of several agencies and organizations conducting the outings for the general public several times a year and receiving a CHNEP mini-grant for the trips. With multiple

organizations participating, trips are able to be offered at multiple locations around the CHNEP area and at multiple times throughout the year. This gives the public a unique opportunity to not only experience many different seagrass beds within the region, but explore them in different seasons during the year. Initially aquatic preserve wading trips were conducted in a small lagoonal area next to New Pass, but parking alongside the road became an issue with the gaining popularity of the excursions. Lovers Key State Park stepped in and invited the aquatic preserve to conduct the trips on their property at Big Carlos Pass, where participants could use Lovers Key State Park's parking lot. The park also agreed to waive entrance fees for wading trip participants. During wading trips, participants learn about estuaries and aquatic preserves while exploring local seagrass beds and discovering the different species that call a seagrass bed home. They gain an understanding and respect for why seagrass beds are such an important habitat within the estuarine community. Participants also discover how seagrass beds are important nursery grounds for the majority of commercial and recreational fish species, and why estuaries are referred to as "cradles of the ocean." From the success of these wading trips, staff receive multiple requests each year for private trips for area schools and homeschool groups. CHNEP awarded a mini-grant to the aquatic preserve annually until 2011, but as Lovers Key State Park was also conducting wading trips onsite at this time, aquatic preserve staff concluded their outings at this location. While no longer receiving CHNEP mini-grant funding, aquatic preserve staff



Estero Bay Aquatic Preserve staff host annual wading trips for Leadership Bonita, a group of local business leaders. Here, one of the participants shows a nine-armed sea star she found.

continue the popular public wading trips at a new location bayside, just south of Lovers Key Resort, and have expanded the program to include trips as requested. In addition, staff continue to provide excursions each year for participants of the Leadership Bonita program. This program is run by the Bonita Springs Area Chamber of Commerce, to teach future area leaders about the Bonita Springs area and to provide them with the opportunity to both refine their leadership skills and grow personally from the experience (Bonita Springs Area Chamber of Commerce, 2012). Due to positive feedback from class participants, the Leadership Bonita group has now integrated the aquatic preserve-run wading trips into their annual leadership training regime.

In addition to outreach events and educational opportunities, aquatic preserve personnel have created a two page fact sheet to help highlight some of the aquatic preserve's accomplishments and

help enlighten the public about the uniqueness of Estero Bay. This recently updated fact sheet was originally produced to complement FCO's Program Overview booklet and is available in hard copy or in electronic version on the aquatic preserve website. Several years ago, as a founding member of the Fort Myers Beach Marine Resources Task Force, aquatic preserve staff played a role in many outreach efforts, including the production of a rack card that addressed how to boat correctly and protect resources in Estero Bay, and a sticker that was distributed specifically to rental boat and PWC vendors who placed them directly on the vessels. These stickers had bullet points of the do's and don'ts of vessel operation and resource protection in the bay. These outreach materials were reproduced several times. Staff have also worked with Sea Grant and a local marina to help create and distribute an informational brochure concerning the upcoming creation of NICMZs within Estero Bay. These brochures clarify the importance of NICMZs, or "pole and troll zones," and explain the benefits to heavily prop scarred seagrass beds and for anglers' fishing prospects. An Estero Bay Aquatic Preserve brochure was also created by staff in 2011 and will be distributed at events; funding for the first printing of the new brochure was provided by the Town of Fort Myers Beach as a public interest project. These materials and others are distributed at various education and outreach events to help educate and inform the public about the aquatic preserve and its mission. They are also available in local and state government office waiting rooms.

Staff also participate in local workshops to disseminate data and information about the aquatic preserve and to provide input on issues related to either Estero Bay or its watershed. On September 27-28, 2009, for example, a public symposium was held to showcase work being conducted within the region. The focus of the symposium was the health of Estero Bay and its watershed, and the agenda included topics such as land use and transportation; land acquisition programs; issues in the Density Reduction Groundwater Resource area; water quality monitoring; fish surveys and aquatic exotics; FGCU projects and outreach in the watershed; and climate change. Aquatic preserve personnel also presented results from recent colonial nesting wading and diving bird monitoring surveys. Sponsors of the two-day event included CHNEP, FGCU, the Responsible Growth Management Coalition, EBABM and the Southwest Florida Regional Planning Council.

4.3.2 / Current Status of Education and Outreach at Estero Bay Aquatic Preserve

Volunteers are a vital part of aquatic preserve management efforts. Without them, much of the data collected and cleanup efforts conducted would not be able to be accomplished. They assist staff with their monitoring efforts, help with cleanup events and provide support during outreach events. Additionally, students from FGCU occasionally serve as interns to gain service learning hours required for graduation as well as real world experience before entering the job market. Three of the aquatic preserve's monitoring programs would not be able to function if it were not for volunteer efforts.

The bi-annual seagrass monitoring program utilizes volunteers during the summer and winter months to assist in recording data at five seagrass monitoring locations within the bay. The data is used to determine the overall health trends of Estero Bay's five seagrass species. Volunteers assist either on the boat by recording data, or getting in the water to lend a hand in finding station locations and estimating seagrass coverage. They must be willing and able to work in the water for extended periods of time, which can be a challenge for even the stoutest during the winter months in Estero Bay's chilly waters. Additionally, volunteers must also obtain DEP snorkel certification prior to assisting with in water monitoring.

Colonial wading and diving bird nest monitoring volunteers assist in the monthly counting of bird nests and chicks on mangrove islands within and adjacent to the aquatic preserve. The purpose of



Aquatic preserve staff training volunteers to assist with monthly wading and diving bird nest monitoring activities.

the program is to monitor population trends, document movement of bird colonies, and provide peak estimates of nesting efforts for each species of colonial nesting bird. Program participants must be able to count active nests on the island, through binoculars, while on a moving vessel that is circumnavigating the island, and classify nests as incubating, chick, or unknown. Volunteers fill the vital roles of data recorder and secondary observer counting nests in conjunction with aquatic preserve staff to make sure that the documented numbers are precise. An annual training session is available for volunteers who wish to participate and learn more about the program prior to committing to a full day on the water. The training not only teaches new volunteers how to identify and count active nests, but also maintains consistency among the more experienced participants in the program and allows staff and volunteers to learn from the questions and experience of others. Volunteers who choose to obtain the DEP boating and trawling certification may also act as vessel captains for surveys.

CHEVWQMN is a coordinated system of over 80 volunteers who regularly conduct water quality monitoring throughout six local aquatic preserves in southwest Florida. CHEVWQMN ranges from its northernmost point in Lemon Bay to its southernmost point in Estero Bay. The project is a cooperative effort of DEP, the Charlotte Harbor and Estero Bay Aquatic Preserves, and the Charlotte Harbor Environmental Center. The program is valuable because it includes monitoring sites in all six of the aquatic preserves in the Charlotte Harbor estuaries, builds on and expands existing volunteer monitoring programs, provides both scientific and educational functions, and includes critical quality assurance, data management and training components necessary for providing credible data and long term volunteer support (DEP, 2011b). Aquatic preserve staff serve as regional coordinators for volunteers sampling within Estero Bay. They act as a local contact, collect samples when needed and arrange for transport of all fecal coliform samples to the local lab. In addition, they assist the CHEVWQMN program manager in bi-annual quality assurance sessions onsite.

CHEVWQMN is the only volunteer water quality monitoring program in the state whose data is housed in the state's water quality database. CHEVWQMN volunteers receive certificates and acknowledgment for their years of service, but in 2007, they and the aquatic preserve staff received additional recognition when the program received the prestigious Gulf Guardian award. The honor is given by the Gulf of Mexico Program, which is a partnership of 23 state and local governments, citizens, businesses and industries from around the Gulf of Mexico in the U.S., Mexico and Caribbean. The mission of the program is to facilitate collaborative actions that protect, maintain and restore the health of the Gulf of Mexico in ways which are consistent with the economic well-being of the region. The Gulf Guardian awards were created by the program in 2005 to recognize outstanding contributions to protecting and improving the Gulf of Mexico, and each year the program recognizes exceptional environmental stewardship projects from around the five Gulf of Mexico states and Mexico. The CHEVWQMN received the 2007 award for long term, cooperative efforts in monitoring water quality conditions throughout the Charlotte Harbor estuaries. Recently, in April 2012, each volunteer received a personalized letter of appreciation from United States Senator Bill Nelson recognizing their service and commitment to the community as a water quality volunteer.

Each year EBB celebrates National Estuaries Days by hosting a paddling event at Estero River Outfitters and participating in Lee County's Estuaries Day Every Day event at Bunche Beach Preserve. They and aquatic preserve staff also participate in the International Coastal Cleanup, Great Outdoor Adventure



This 2007 Gulf Guardian Award was awarded by the EPA to the volunteer water quality monitoring program for its outstanding contributions to protecting and improving the Gulf of Mexico.

Day at Lovers Key State Park, Monofilament Madness (marine debris cleanup), the Florida Sportsman Fishing and Boat Show, Discovery Day at Lee County's Manatee Park, and Earth Day at Koreshan State Historic Site. Activities, accomplishments, and anything relevant to the aquatic preserve or the state park is reflected in the EBB quarterly newsletter, *Ebb Tide*, available on their website.

In 2011, aquatic preserve staff assisted CHNEP by serving as one of 18 featured local experts on a 30-minute program entitled Sealife in Southwest Florida Estuaries. This 'virtual wading trip' focused on nearly 50 animals that live in and depend on local estuaries, including Estero Bay. Seven other featurette videos, ranging in length from one to three minutes each, highlighted experts from the longer video, including one from the Estero Bay Aquatic Preserve, and provided information on topics such as crabs, univalves, fish, and sea hares, among others. The 30 minute video was broadcast on local Public Broadcasting Service stations, and all eight videos were uploaded onto YouTube, with links from the CHNEP website. These videos provide the public an opportunity to learn about local estuaries, venture out along with actual participants into area seagrass beds and perhaps observe some species that they might not otherwise get a chance to encounter.

Aquatic preserve personnel regularly provide PowerPoint presentations on a variety of topics, including an introduction to Estero Bay Aquatic Preserve and FCO that was created for homeowner associations, boat clubs and other organizations interested in Estero Bay. Other technical presentations are aimed at providing pertinent information to assist agencies and organizations that work with the aquatic preserve in some capacity (such as providing seagrass identification and state lands resource rules and statutes training to law enforcement officials), and presentations of research and monitoring results to peers at local conferences and workshops. Additionally, a brochure was created in 2011 to educate the public on the significance of the aquatic preserve and what it has to offer. Combined with the existing two-page handouts and website material, citizens are able to familiarize themselves with the aquatic preserve. Educational displays are also mounted in the kiosk at the Lovers Key State Park boat ramp, and are periodically updated to provide the public with current and topical information.



Educational material installed in a kiosk at Lovers Key State Park boat ramp informs local boaters about the aquatic preserve and the value of its resources.

4.4 / The Public Use Management Program

The Public Use Management Program addresses the delivery and management of public use opportunities at the preserve. The components of this program focus on providing the public recreational opportunities within the site's boundaries which are compatible with resource management objectives. The goal of public use management in FCO's managed areas is to "promote and manage public use of our preserves and reserves that supports the research, education, and stewardship mission of FCO."

While access by the general public has always been a priority, the conservation of FCO's sites is the primary management concern for FCO. It is essential for staff to analyze existing public uses and define management strategies that balance these activities where compatible in a manner that protects natural, cultural and aesthetic resources. This requires gathering existing information on use, needs, and opportunities, as well as a thorough consideration of the existing and potential impacts to critical upland, wetland and submerged habitats. This includes the coordination of visitor program planning with social science research. One of FCO's critical management challenges during the next 10 years is balancing anticipated increases in public use with the need to ensure preservation of site resources. This section explains the history and current status of our Public Use efforts.

4.4.1 / Background of Public Use at Estero Bay Aquatic Preserve

The submerged lands within Estero Bay Aquatic Preserve are state-owned, and as such are held in trust by the Governor and Cabinet, sitting as the Board of Trustees of the Internal Improvement Trust Fund for the public. In fact, §258.36, Florida Statutes (F.S.) states: “It is the intent of the Legislature that the state-owned submerged lands in areas which have exceptional biological, aesthetic, and scientific value, as hereinafter described, be set aside forever as aquatic preserves or sanctuaries for the benefit of future generations.” The definition of an aquatic preserve follows in §258.37, F.S., “aquatic preserve means an exceptional area of submerged lands and its associated waters set aside for being maintained essentially in its natural or existing condition.” So, appropriately, aquatic preserves have a much higher degree of protection than other state-owned submerged lands. The Aquatic Preserve Rule, Chapter 18-20, F.A.C., spells out management policies, standards and criteria, and allowable uses within aquatic preserves. In southwest Florida, DEP’s Environmental Resource Permitting staff or the Water Management Districts’ permitting staff receive permit applications to construct docks or perform other activities within the aquatic preserve. Aquatic preserve staff review these applications, conduct on-site inspections and provide verbal or written comments, when needed, to the permitting staff that address the proposed activity’s consistency with Chapter 18-20, F.A.C., §258 F.S. and the approved aquatic preserve management plan.

There is a difference between the regulatory permitting process and the proprietary approval process that often occur concurrently. The regulatory process applies to both state-owned and privately-owned wetlands and submerged lands. The proprietary process applies only to state-owned submerged lands. Although some activities proposed within an aquatic preserve are exempt from the regulatory permitting process, the proprietary approval process requires that all activities approved in the aquatic preserve be clearly in the public interest. This means all demonstrable environmental, social and economic benefits, which would accrue to the public at large as a result of the proposed activity, would clearly exceed the costs. Because there are appropriate, allowable uses of the aquatic preserves, there will continue to be changes on the water and the developed shorelines, but the majority of aquatic preserve shorelines will remain in a natural condition. Through the review of proposed projects and any subsequent comments made to permitting personnel, aquatic preserve staff pay attention not just to the potential impacts of the proposed project, but the possible cumulative effects as well. Cumulative impacts are the sum total of major and minor changes or effects upon a natural system. Taken singularly, these effects may not constitute a notable change in the condition of the natural system, but as these single changes or uses accumulate, their combined impact may result in a substantive environmental disturbance or degradation of the natural system (Florida Department of Natural Resources, 1983).

In 2004, in an effort to increase awareness of aquatic preserve rules and regulations among DEP and Water Management District personnel, aquatic preserve staff developed an informative training video focusing on Chapter 18-20, F.A.C. This video highlighted FCO staff from different aquatic preserves around the state, as well as FCO’s central office team in Tallahassee, to explain the details of the aquatic preserves legislation and how the rules are applied to various resources around the state. In addition, the production also included an explanation of the different types of submerged aquatic vegetation that may be found in aquatic preserves and how to identify them in the field. The resulting educational video was distributed to DEP ERP offices around the state, as well as to Water Management District offices, all of which found the information useful and edifying. Furthermore, there have been multiple requests from private parties and consulting firms for copies of the finished product, and the overall reaction was high praise and gratitude.

In 2009, new legislation was enacted that makes a non-criminal offense of careless boat operation leading to the scarring of seagrasses within an aquatic preserve, punishable by fine. Sections 253.04(3) and 327.73(1)(x) F.S. define this disturbance as operating a vessel in a way that damage or destruction occurs to seagrass plant roots, shoots or stems, and such a violation is subject to a \$50 fine, with repeat offenses within specified timeframes subject to higher fines. In response to this new legislation, aquatic preserve personnel provided training for members of the Lee County Marine Law Enforcement Task Force, of which the aquatic preserve is a member. This included a PowerPoint presentation that explained the statutory changes and defined the boundaries of the local aquatic preserves, while emphasizing the importance of seagrass protection and familiarizing the officers with the various seagrass species found in Estero Bay. Packets of information were distributed and included laminated aquatic preserve boundary maps with legal descriptions, as well as laminated copies of the pertinent statutory language. The packets allowed each law enforcement boat to have relevant information on board at the ready for when an officer witnesses a prop scarring violation. Following the presentation, several of the officers accompanied FCO staff into the field for a hands-on identification tutorial of seagrass species found in Estero Bay. U.S. Coast Guard (USCG), DEP and

FWC law enforcement, Lee County Sheriff, Sanibel Police, Fort Myers Police, and U.S. Fish and Wildlife Service officers all benefitted from both the training and ensuing discussion that included ways to make the enforcement work and how to educate the public on the law. Map 21 illustrates Estero Bay areas containing seagrass beds and the degree of scarring calculated by FWRI.

Aquatic preserve personnel also worked with local marinas and boat rental facilities to display new seagrass legislation signs that were produced by FWC and FCO. Signs were provided to major boat rental facilities and installed at priority public access points such as the Lovers Key State Park boat ramp and Fish Tale Marina on Fort Myers Beach, in order to alert boaters entering the aquatic preserve of the new law. Eleven signs have been installed around Estero Bay Aquatic Preserve so far. Staff also educate the public about the law when opportunities arise and continue to coordinate with local marinas, municipalities and state parks to post seagrass scarring legislation signs at boat ramps and other public access facilities.

From 1997 until 2003, the aquatic preserve office conducted the Harbor Anchorage study, in which staff counted the number of vessels in the Matanzas Pass anchorage on a weekly basis, including derelict vessels. When the town of Fort Myers Beach, through the efforts of the Fort Myers Beach Marine Resources Task Force, decided to create a mooring field within the pass, at the recommendation of the Southwest Florida Regional Harbor Board, with Estero Bay Aquatic Preserve membership, the aquatic preserve provided them with this collected data so numbers could be compiled and the average daily use of the anchorage determined. This information was then utilized by the town in their development of a regulated mooring field within Matanzas Pass. Upon creation of the mooring field, the Fort Myers Beach Anchorage Advisory Committee was established as an advisory tool for town staff and the Town Council to keep them abreast on everything pertaining to the public mooring field. It oversees the Harbormaster position and grants authority to enforce the Matanzas Harbor Management Plan (Coastal Engineering Consultants, 2002).

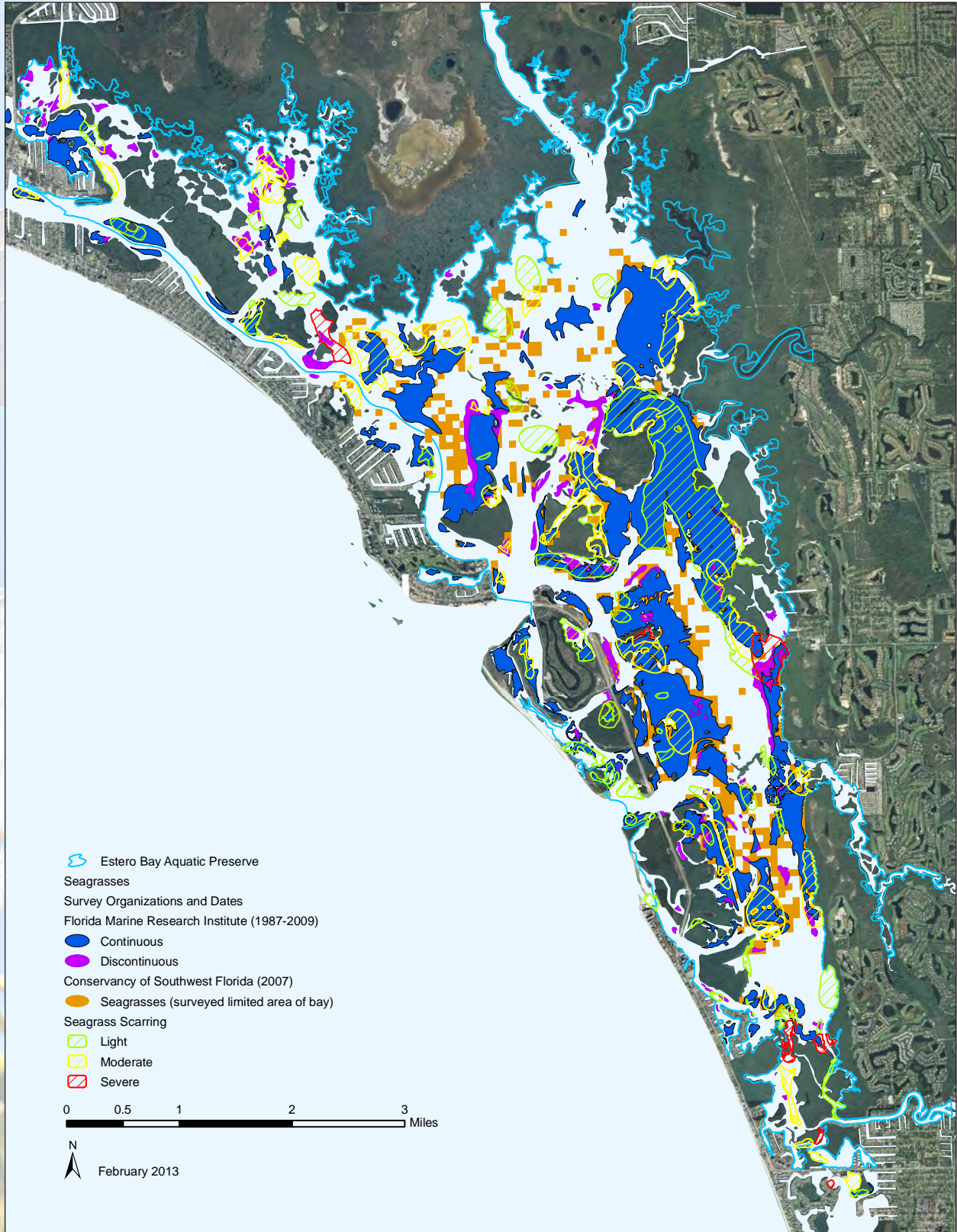
After the “official” designation of the mooring field in 2004, a large number of vessels relocated from where they had been moored within the anchorage to just beyond the jurisdiction of the town. Not wishing to pay the fee instilled by the Town of Fort Myers Beach, boaters moved their vessels and most settled in the waters of the aquatic preserve. An increasing number of vessels began to aggregate around and behind the point of San Carlos Island and into Hurricane Bay, even though vessels cannot legally moor within an aquatic preserve for extended periods of time and must not impede navigation. Unfortunately, many captains get around this law by hoisting anchor, moving a few feet, and then re-anchoring. Since they are then in a slightly different location, they are no longer considered long-term mooring but are deemed “under navigation.”

Anchorage numbers continued to grow until it became clear that action was necessary. In an effort to address the growing aggregation of illegal liveaboard and stored vessels within the aquatic preserve boundaries, a collaborative effort began that included the aquatic preserve staff, DEP Office of External Outreach and Public Education, DEP Office of General Counsel, DEP South District, Lee County and law enforcement agencies in Lee County. Aquatic preserve personnel spearheaded a FCO pilot program that would create and distribute informational brochures to residents of liveaboards anchored on sovereign submerged lands. The focus of the pilot program was vessels located in the area adjacent to the Matanzas Pass anchorage mooring field and into Hurricane Bay. As a first step, aquatic preserve staff met with local marine law enforcement agencies and devised a plan to create a “soft enforcement” program, in which the aquatic preserve would create an informational brochure and law enforcement personnel would deliver it to the liveaboards in the Matanzas Pass/Hurricane Bay area. The draft brochures included reasons to moor in a managed anchorage, what is needed to meet navigation laws, information on unlawful activities on sovereign submerged lands and supplied the applicable F.S. and Florida Administrative Codes (F.A.C.). Although the brochure was developed in draft form, the program was tentatively put on hold.



New informational seagrass signage has been installed at public boat ramps around the aquatic preserve.

The Matanzas Pass area has faced other concerns besides anchorages. The channel leading into the pass is heavily utilized by not only recreational boaters but by an extensive shrimping fleet as well. The shrimping industry has utilized San Carlos Island for over half a century, and today San Carlos Island remains home to one of the state's most active and productive fishing communities (San Carlos Island Waterfronts Committee, 1999). Commercial crabbing and recreational fishing take place throughout the bay, and these industries, along with the shrimping industry, provide significant input into the local economy. This contribution is discussed in more detail in Chapter 3.1.4. The shrimp boats depart and return to port



via the federal channel that runs under the Matanzas Pass Sky Bridge and then northwest to San Carlos Bay at Bowditch Point. Although dredging within this area has occurred numerous times in the past, first dating back to 1961, in recent years the channel had become shallower due to sand migrating from the tip of Estero Island into the waterway. In 2009, the situation reached a critical stage when shrimpers claimed that their boats were becoming grounded in the middle of the channel and that captains were unable to navigate at any time other than high tide. This limited window of entry led to one shrimp boat scraping the Matanzas Pass Sky Bridge while trying to pass under it at high tide. USCG, located nearby, also became concerned about the shallow depths and how it might impede their rescue capabilities in a crisis situation. Due to these facts the situation was deemed a federal emergency and dredging of the pass was proposed, approved and completed at an expedited pace. Dredging took six months instead of the usual twelve. In the fall of 2011, however, reports of the channel filling in began again and shrimp boats once again began having difficulty getting through at any time other than high tide. In June 2012, Tropical Storm Debby exacerbated the problem when large amounts of sand were deposited at the tip of the island, once again impeding navigation. Additional dredging was completed in early 2013.

Although shrimping vessels are a common sight in Matanzas Pass, the majority of vessels in Estero Bay are smaller boats due to the shallow depths. Other than a handful of larger vessels navigating the bay's main channels for access to the Gulf of Mexico via the passes, pontoon boats and small fishing boats are the predominant vessels. In the even shallower waters of Hell Peckney Bay, Hendry Creek and Mullock Creek, flats boats prevail. That is changing, however, with the increase in PWC and kayaks that are becoming more prevalent in the back waters. Pontoon boats have long been rented within Estero Bay and there are several rental companies located along the bay's shoreline, but recently PWC ecotours have become increasingly popular as several resorts on the Gulf side of Estero Island have begun offering them and bringing participants through the passes and into Estero Bay. A vendor has requested to provide PWC ecotours at Lovers Key State Park as well. Moreover, the diversity of boaters using the bay has increased as kayaks, canoes, and single person sailboats are also seen regularly. In addition to the increase in local PWC tours being offered, for several years in a row an online community of PWC enthusiasts inundated the area for an event known as "Southwest Florida Summer Ski Fest." Quickly rising in popularity and set to become an annual tradition, the event was just one of many that occurs every year in coastal areas around the country. The event was advertised as a way to get out and enjoy nature. However, many thrill seekers took it as an opportunity to race through narrow mangrove channels and shallow back waters. In addition to posing extreme danger to the riders and bystanders, it could cause environmental



Staff reviewing the state of abandoned and derelict vessels in the aquatic preserve.



A view of the Fort Myers Beach shrimp fleet based on San Carlos Island.

damage in the bay's shallow back waters by stirring up the bay's soft sediments, causing long-standing turbidity plumes. In addition, manatees were at risk from some PWC operators not abiding by slow and idle speed zones. The event caught the attention of local law enforcement officers and has moved to other coastal waters for the time being.

4.4.2 / Current Status of Public Use at Estero Bay Aquatic Preserve

Water-dependent activities are extremely popular with residents and visitors alike. Boating, kayaking and PWCs are all commonly found in the estuary, and recreational fishing and nature photography and observation are popular activities throughout the bay. Within the vicinity of the aquatic preserve there are no fewer than six canoe/kayak rental facilities, six canoe/kayak launches, 11 public boat ramps, 12 marinas, and numerous PWC and boat rental operators (Map 22).

Although the number of public access points in the Estero Bay area seems to be adequate at the current time, as the resident population within southwest Florida continues to rise and more people are vacationing within the region, so too do the number of vessels utilizing coastal waters. With the popularity of the region continuing to grow, more developments are popping up along shorelines of southwest Florida, displacing traditionally used public access points. Some of these access points are demolished while others are integrated into developments, becoming available essentially only to residents. This has put increasing pressure on remaining publically owned access points in southwest Florida, some of which are becoming overcrowded. To address this, local governments have been generating innovative ideas for access to area waters. One example is a once illegally used canoe and small boat ramp located in Bonita Springs. Unauthorized and located on city property, the launching area was eroding the shoreline, held inadequate parking, and contained no proper signage. The city



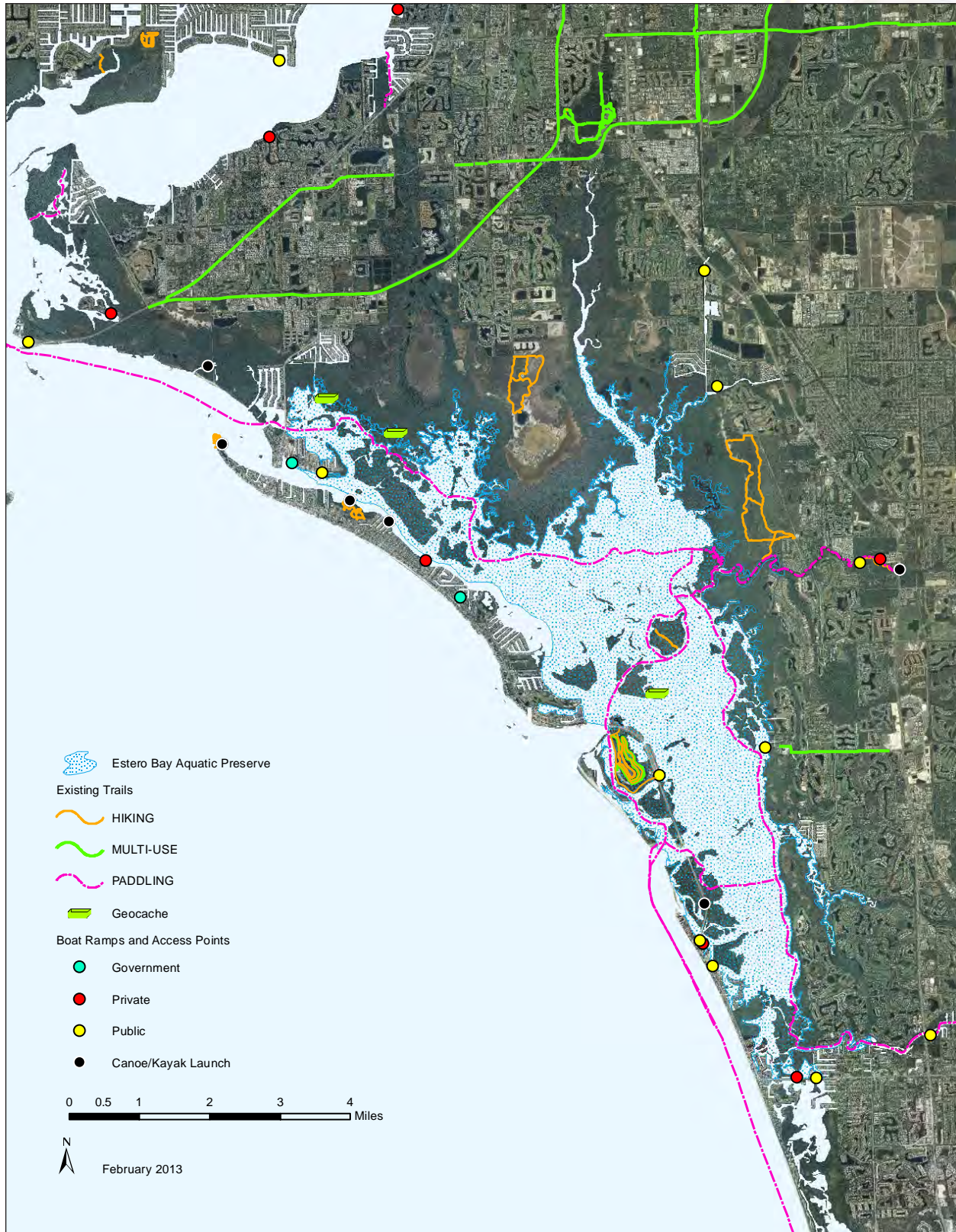
Kayakers enjoy paddling on the Estero River, a portion of which is within the aquatic preserve.

upgraded the area, installed geowebbing to cut down on shoreline erosion and added trash receptacles, correct signage and ample parking.

With this increase in use comes increased pressure on the bay and its resources. Prop scarring and turbidity from boaters has been an issue in the past and will continue to be so. With so many rental boats and tours coming into the bay, there are a lot of transient boaters who may not be knowledgeable of local rules or may not understand the shallowness of the bay. Groundings are frequent and can lead to prop scarring and turbidity plumes. One only has to venture out at low tide to see the evidence.

Many times the uniqueness of an area can lead to its own demise, as increased activity places pressure on the very resources that originally drew people to the bay. With the rise in ecotourism in recent years staff have noticed an intensification in the number of sightseers and fishermen boating in close proximity to active bird rookeries, with one tour company repeatedly exhibiting such behavior. This activity can have several disastrous effects: parents can be frightened off of their nests crushing the eggs that they are incubating or leaving them susceptible to predation, chicks can be frightened and fall out of the nest to their demise, and predators can be attracted to the rookery island by the additional activity of the birds. Staff are currently working with a local ecotour operator to elevate citizen awareness regarding tours that harass nesting wading birds on islands. Staff have also provided the company with scientific literature about buffer zones and the effects of human disturbance on nesting birds in addition to

educating the captains on how to determine when they were disturbing the colony and stressing the birds. Several local eco-tour owners have participated, through volunteering, in the rookery monitoring program to educate themselves about the wading and diving birds in the bay so that they can provide an educational experience for their customers and preserve the resources they rely on for income. Staff have also been addressing camping on rookery islands by stopping and educating the campers in cooperation with FWC.



Map 22 | Public use and access points.

Canoes and kayaks are becoming a more common sight throughout the bay, as well. One large contributor to this was the creation of the Great Calusa Blueway Paddling Trail, a 190-mile marked canoe and kayak trail that runs from the Imperial River through Estero Bay, San Carlos Bay, Pine Island Sound, Matlacha Pass, and up into the Caloosahatchee River and its tributaries. These marked trails provide a safe and informative environment for kayaking and canoeing enthusiasts, as the trails average only around four feet deep and traverse areas protected from heavy winds.

There are also private double-decker pontoon boat shuttles that run at regular intervals from the Hyatt Regency dock on the mainland north of Spring Creek through the Coconut Channel to private docks on the barrier island. The Hyatt Regency runs one of the shuttles for residents and guests only. The other shuttle is run by a private residential community. From mid-April to mid-December, shuttles depart from Coconut Point Marina every hour, and from mid-December to mid-April, every 30 minutes. At the barrier island private beach park, the shuttle is required to dock at the western dock, closer to the pass as long as tide allows, as per DEP agreement. Observations demonstrate that the turbidity generated from these trips does not have time to settle before the next shuttle. High turbidity is an issue in Estero Bay and

these types of trips that have the potential to increase turbidity will be an issue that aquatic preserve staff will address. Established or new developments on the mainland have private beach parks or may propose to land at Lovers Key State Park.

Another challenge facing the aquatic preserve is the presence of abandoned and derelict vessels. "Abandoned property" is defined in §705.101(3), F.S. as "all tangible personal property that does not have an identifiable owner and that has been disposed on public property in a wrecked, inoperative, or partially dismantled condition or has no apparent intrinsic value to the rightful owner. The term includes derelict vessels as defined in §823.11(1), F.S." Abandoned boats are often difficult for governmental entities to remove, both legally and economically, and can quickly progress from a mere eyesore to a navigation hazard or environmental threat. Derelicts can be vessels that are left with the best intentions by their owner of improving the boat should circumstances allow, but then unintentionally slip into disrepair. However, there are many more instances in which the boat is purposefully abandoned and the registration numbers removed so the owner cannot be traced. From drifting into a mangrove shoreline to tilting and settling into bay sediments, these abandoned vessels cost taxpayers exponentially more to remove after they deteriorate than if they had been dealt



Seagrass scarring in the bay.

with while still floating and sea worthy. Unfortunately, the derelict removal process takes time. The Pollutant Discharge Prevention and Removal Act states that "it is unlawful for any person, firm, or corporation to store or leave any vessel...in a wrecked, junked, or substantially dismantled condition or abandoned...in any public water...in this state without the consent of the agency having jurisdiction thereof..." (§376.15(1), F.S.). When this happens, FWC has the authority, as defined in §823, F.S., to determine which vessels are considered derelict, and the power to remove the vessel or have it removed. When a vessel is reported to FWC, the agency determines if the vessel is lost property, stolen property, or an abandoned or derelict vessel. FWC also determines if the vessel is a navigational hazard, or an actual or potential threat. Navigational hazards are reported to USCG, while pollution hazards are reported to USCG Marine Safety and the DEP Bureau of Emergency Response. FWC then attempts to determine the owner, who has 30 days to remove the vessel. The owner must also pay for the proper removal of the vessel and any needed remediation. If the owner does not comply, the matter is then referred to the Department of Legal Affairs,

and/or the vessel is removed at the owner's expense. If FWC cannot determine the owner of the vessel, the boat is marked for removal and removal proceedings can begin as long as funds are available. The aquatic preserve office currently coordinates with Lee County regarding derelict vessel removal as public interest projects and informs them when derelict vessels are observed.

Derelict vessel removal is funded through the Pollutant Discharge Prevention and Removal Act, the Florida Legislature and the Florida Coastal Protection Fund. This fund provides money to FWC, which then distributes the resources to local coastal governments as grants. In May of 2004 the Lee County Board of County Commissioners approved Amendment AC-7-10 to the Lee County Administrative Code concerning derelict and/or abandoned vessels in the coastal waters of Lee County. This amendment made provisions to allow the county to remove abandoned vessels under §705.103(2)(b), F.S., typically funded by WCIND.. Lee County's Department of Natural Resources keeps a regularly updated list of all vessels considered "abandoned," and aquatic preserve staff have assisted the county's marine services office in the past with updating this Abandoned Vessel List.

While Estero Bay is first and foremost an aquatic preserve that is set aside to maintain essentially natural or existing conditions for the enjoyment of future generations, those living along its shoreline have a right of access to the aquatic preserve as granted to them by the Florida Legislature. As such, they can receive DEP permits to build docks along their shoreline or conduct other water-dependent activities. These rights and the rules and regulations that define them are stipulated in §258, F.S. and are promulgated in Chapter 18-20, F.A.C.

All proposed activities must be consistent with these rules and regulations and must adhere to specific criteria in order to be permitted or approved. Recent years, however, have brought a host of proposed activities within the aquatic preserve that are not specifically identified in Chapter 18-20, F.A.C. or §258, F.S.

Setting off a fireworks display in the aquatic preserve, for example, was addressed in 2002, particularly because the activity was proposed to be located in close proximity to an active bird nesting island. A post-fireworks assessment conducted the year prior by aquatic preserve personnel brought in copious amounts of plastic covers from fireworks charges and other debris recovered within the aquatic preserve. Consequently, staff recommended relocating the activity to uplands.

Geocaching has exploded in popularity in recent years. Participants use handheld GPS devices to locate a specific location that usually contains a cache with a logbook and possibly some small item. Participants then go online to document their finding. Geocaching is a worldwide phenomenon that does not seem to be waning anytime soon, with caches all over the world. In fact, some people plan their vacation around geocaching adventures. Because caches are placed by participants, they



Derelict vessel in Matanzas Pass.



One of many abandoned boats in Estero Bay.

can be anywhere, and there are several caches within and around the aquatic preserve. Geocache guidelines stipulate that participants get authorization from the landowner to establish a cache. The aquatic preserve office should be notified prior to the placement of any cache, as locations chosen by geocachers could result in detrimental impacts to area natural resources. These could include damage to mangroves, disturbance of nesting birds, or navigational hazards due to the bay's shallow depths. Routes adequate for smaller vessels such as kayaks may unknowingly pose a threat for larger vessels or the underwater resources below them.

To expand on the popularity of geocaching, EarthCache evolved to help educate the public about the world around them. The Geological Society of America administers the listing of EarthCache sites around the world. These sites do not have a physical cache but instead provide the participant a location and information about the unique geosciences feature and how it is scientifically important. These virtual caches, as well as physical caches are a unique opportunity for aquatic preserve staff and FCO as a whole to use this worldwide phenomenon to both familiarize and teach the public about what aquatic preserves are and why they are important.

Daily rentals of motorized vessels by individuals and guided tours in the bay have increased in recent years, leading to concerns about impacts to estuarine resources. PWC tours, leading participants through the passes and around Estero Bay, are frequently observed operating outside of marked channels and in areas where disturbance to nesting birds and damage to shallow seagrass can occur. Consequently, discussions concerning PWCs and their potential impacts to bay resources are ongoing. In addition, the development of Best Management Practices for local eco-tour operators should be considered, as well as encouraging vendors and eco-tour operators to abide by guidelines set by the Society for Ethical Ecotourism.

Barge parties are becoming more popular in nearby waters such as Matlacha Pass, where concerts and other venues are conducted on large barges on the water. These events attract considerable numbers, hundreds, of boats that anchor in shallow water in relatively close quarters. Participants often tie vessels together, disembark and interact in the water. These large conglomerations of vessels and people congregating within a proportionately small area of water bring the potential for severe impacts on the area's seagrass beds, wildlife and local water quality. In fact, significant seagrass prop scarring has been documented by air and when ground truthed after these events. While no barge parties have been proposed in Estero Bay, this type of activity should be highly discouraged within sensitive areas of the aquatic preserve. Where possible, aquatic preserve staff can identify appropriate locations for these types of activities. Discussions about the need for some form of authorization for this activity, and enforcement of resulting seagrass damage have begun.

Finally, any scientific research, monitoring, or restoration conducted within the aquatic preserve that does not require Board of Trustees of the Internal Improvement Trust Fund authorization, should minimally require notification, and preferably approval from FCO with input from the local aquatic preserve office. This is standard procedure for state parks and should also be with FCO.

Concurrence from FCO should be a requirement for any nontraditional activity, granted after careful review by the aquatic preserve office. At a minimum, staff should continue to serve as a source of local knowledge and expertise, as well as provide input on current applications to the proper permitting authority, when appropriate. Complete knowledge of all current and proposed activities taking place within the aquatic preserve is essential for proper management.



A bay-to-gulf breach through a barrier island leads to the pursuit of an erosion control project.

Chapter Five

Issues

5.1 / Introduction to Issue-Based Management

The hallmark of Florida's Aquatic Preserve Program is that each site's natural resource management efforts are in direct response to, and designed for unique local and regional issues. When issues are addressed by an aquatic preserve it allows for an integrated approach by the staff using principles of the Ecosystem Science, Resource Management, Education and Outreach, and Public Use programs. This complete treatment of issues provides a mechanism through which the goals, objectives and strategies associated with an issue have a greater chance of being met. For instance, an aquatic preserve may address declines in water clarity by monitoring levels of turbidity and chlorophyll (Ecosystem Science – research), planting eroded shorelines with marsh vegetation (Resource Management – habitat restoration), creating a display or program on preventing water quality degradation (Education and Outreach), and offering training to municipal officials on retrofitting stormwater facilities to increase levels of treatment (Education and Outreach).

Issue-based management is a means through which any number of partners may become involved with an aquatic preserve in addressing an issue. Because most aquatic preserves are endowed with very few staff, partnering is a necessity, and by bringing issues into a broad public consciousness partners who wish to be involved are able to do so. Involving partners in issue-based management ensures that a particular issue receives attention from angles that the aquatic preserve may not normally address.

This section will explore issues that impact the management of Estero Bay Aquatic Preserve directly, or are of significant local or regional importance that the aquatic preserve's participation in them may prove beneficial. While an issue may be the same from preserve to preserve, the goals, objectives and

MacGREGOR'S BOULEVARD



MacGregor's Boulevard cartoon from 1994 News-Press.

strategies employed to address the issue will likely vary depending on the ecological and socioeconomic conditions present within and around a particular aquatic preserve's boundary. In this management plan, Estero Bay Aquatic Preserve will characterize each of its issues and delineate the unique goals, objectives and strategies that will set the framework for meeting the challenges presented by the issues.

Each issue will have goals, objectives and strategies associated with it. Goals are broad statements of what the organization plans to do and/or enable in the future. They address identified needs and advance the mission of the organization. Objectives are a specific statement of expected results that contribute to the associated goal, and strategies are the general means by which the associated objectives will be met. Appendix D contains a summary table of all the goals, objectives and strategies associated with each issue.

5.2 / Issue One: Water Quality

Nearly twenty years ago, the above cartoon was published in the Fort Myers News-Press. Editorial cartoonist, Douglas MacGregor, created five cartoons a week for this local newspaper. On Sundays, his popular *MacGregor's Boulevard* cartoon generally created a lot of commentary in the community regarding his views on topical events either on a local, state or national level. Many people saw what was quickly happening and grew quite concerned about how development around the bay was going to affect water quality and their way of life. This satirical cartoon came out two years before the Estero Bay office opened its doors; the Florida Coastal Office's (FCO's) mission is to ensure this isn't the fate of Estero Bay or any aquatic preserve.

The basic characteristics of Estero Bay's water vary naturally in response to the daily, seasonal, and long term forces which make the estuarine habitat conditions among the most dynamic on earth. Not supplied with freshwater by any one major river, the estuary instead is fed by a number of smaller rivers and creeks, as well as by sheetflow across the landscape. This drainage pattern has made the bay extremely sensitive to runoff and upland discharge. Historically, the Estero Bay basin consisted of low-lying topography with slow moving flow, allowing rainfall to provide a constant input of fresh water into the bay throughout the year. This water was filtered by vegetation and sediments as it slowly moved its way across the landscape and into the estuary, depositing nutrients and other materials in habitats like salt marshes before entering into the tributaries or into the bay itself. Through time, however, this slow moving sheetflow has been largely diverted and shunted into area creeks and rivers.

While there are numerous point sources of pollution located within the watershed including golf courses and water treatment facilities, the principal source for the bay is thought to be from nonpoint source pollution. Runoff from agriculture and development has led to an influx of excess nutrients, as well as pesticides, fecal coliforms, and other substances. Many people do not realize that materials entering into the majority of area stormwater drains are carried directly into the bay. A large portion of the land abutting the estuary on its eastern side has been acquired for preservation, and serves to filter some

of the sheetflow from across the landscape, providing some protection from nutrients entering the bay. Hydrological alterations, however, continue to exacerbate water quality conditions as a large percentage of the historical sheetflow has been diverted and shunted into the bay's tributaries. Such alterations have led to altered timing, flow, and reduced filtering of water coming off the landscape and entering into the bay. Additionally, increases in stormwater runoff from developments carries with it pesticides, fertilizers, and other substances into area creeks and rivers, as well as the estuary itself, unimpeded and unfiltered. Old and failing septic systems also add nutrients as well as pharmaceuticals and possibly other poisonous substances. As a result, increased loading has occurred. Fortunately, there are currently several efforts by multiple agencies and organizations addressing this issue through projects such as filter marshes along tributary headwaters. Some of these are discussed in more detail in Section 4.2.1.

In 1994 the Department of Environmental Protection (DEP) classified Estero Bay and its tributaries as Outstanding Florida Waters (OFWs), as specified in §403, Florida Statute (F.S.) and Chapter 62-302, Florida Administrative Code (F.A.C.) This is the highest level of protection for water quality that a body of water can receive, and no degradation of water quality, other than that allowed by rule, can be permitted. These waters were found to be worthy of special protection because of their exceptional ecological or recreational significance. In general, DEP cannot issue permits for direct pollution and discharges to OFWs that would lower ambient (existing) water quality, or for indirect discharges that would significantly degrade the OFW. A 2010 report entitled State of the Southwest Florida Aquatic Preserves: Lemon Bay to Estero Bay found that, over the last 40 years, protected waterbodies exhibited greater water quality than surrounding unprotected waterbodies. For example, protected waters and those adjacent to protected uplands had lower total concentrations of nitrogen, phosphorus and chlorophyll a, as well as higher dissolved oxygen levels. Specifically, Estero Bay had the lowest average nitrogen levels within the greater Charlotte Harbor region over the 40-year period, while exhibiting a significant decrease in phosphorus levels (Leary, 2010).

Conversely, portions of the same tributaries that are listed as OFWs are now also listed as "impaired" under the Impaired Waters Rule, Chapter 62-303, F.A.C. Parameters of impairment include mercury, iron and fecal coliform, with the Imperial River (marine) segment impaired for dissolved oxygen (DEP, 2012c).

Impaired waterbodies such as Estero Bay's listed tributaries require the development of Total Maximum Daily Loads (TMDLs), which stipulate the maximum amount of a pollutant that a waterbody can receive without exceeding water quality standards. Six TMDLs have been developed for the Everglades West Coast region that includes Estero Bay. Each TMDL requires the development of a Basin Management Action Plan (BMAP) that is aimed at reducing pollutant levels through programs and strategies addressing waterbody impairment causes. There are currently two BMAPs in development for the Estero Bay region, one combined BMAP for Hendry Creek (marine and freshwater) and one BMAP for the Imperial River. Additionally, in February 2003 Estero Bay was designated a priority Surface Water Improvement and Management waterbody by the South Florida Water Management District (SFWMD). Efforts are also underway to reduce nonpoint sources of pollution by educating residents on the dangers of over-fertilizing their yards, and explaining how stormwater drains carry neighborhood runoff straight into the bay unimpeded. Nevertheless, there is a high citizen turnover rate due to seasonal residents and tourists, making public education a difficult task. Additionally, recurrent budget cuts for many agencies and organizations often translate to diminished education and outreach efforts, and less water quality testing with subsequently fewer trends data.

Goal One: Advance scientific understanding of the health of Estero Bay in relation to its water quality.

Objective One: Determine long-term water quality status and trends.

Integrated Strategies:

Ecosystem Science: Consolidate and analyze data and information from aquatic preserve water quality monitoring programs.

Partnering: Continue collaboration with Florida Fish and Wildlife Conservation Commission (FWC), Fish and Wildlife Research Institute (FWRI) and assistance with Harmful Algal Blooms (HAB) program.

Partnering: Collaborate with other groups collecting data within the aquatic preserve to stay informed about bay and tributary water quality status.

Performance Measures:

Continue essential water quality monitoring efforts.

Continue providing monthly water samples to FWC-HAB program

Conduct reviews of the status and trends of water quality in Estero Bay every two years.

Compile and update a list of other agencies and organizations collecting water quality data within the bay.

Objective Two: Expand water quality data collection efforts and continue to enhance methodology.

Integrated Strategies:

Ecosystem Science: Continue data sonde program at three fixed locations.

Ecosystem Science: Contemplate data sonde program expansion, as budget and personnel allow.

Education and Outreach: Continue to participate and serve as local coordinator for the Charlotte Harbor Estuaries Volunteer Water Quality Monitoring (CHEVWQMN) program.

Partnering: Encourage continued consistency within aquatic preserve offices regarding water quality data collection and data management techniques.



Aquatic preserve staff member collecting water quality samples.

Partnering: Maintain working relationship with data sonde representatives and keep abreast of the company's recommended equipment handling techniques.

Partnering: Continue collaboration with Lee County lab and DEP's Division of Environmental Assessment and Restoration staff in the South District for tributary monitoring program, as budget and personnel allow.

Performance Measures:

Develop a prioritized list of water quality monitoring and data management needs.

Use or build on existing monitoring efforts to address information gaps.

Attend related conferences and workshops, as budget and personnel allow.

Goal Two: Reduce potential threats to the aquatic preserve from point and non-point sources of pollution.

Objective One: Identify potential sources of surface water contaminants.

Integrated Strategies:

Ecosystem Science: Employ existing information to familiarize staff regarding both point sources (such as National Pollutant Discharge Elimination System permits, golf courses, water treatment plants, septic systems, etc.) and non-point sources (such as storm water discharge locations) of pollution within the Estero Bay watershed.

Partnering: Support research within the bay that addresses water quality changes due to surface water contamination and the resultant effects on estuarine flora and fauna.

Performance Measures:

Utilize DEP Geographic Information System (GIS) software/website to keep abreast of pollutant sources within the watershed.

Attend monthly interagency meeting, as applicable, to stay informed on proposed projects in the watershed.

Objective Two: Encourage activities that improve water quality and discourage activities that exacerbate water quality.

Integrated Strategies:

Resource Management: Support hydrological improvement projects and restoration efforts.

Resource Management: Support development of TMDLs, BMAPs and Numeric Nutrient Criteria.

Partnering: Report water quality violations to appropriate law enforcement and permitting compliance personnel.

Performance Measures:

Participate in area groups and organizations that address regional water quality issues such as the Southwest Florida Watershed Council and the Charlotte Harbor National Estuary Program (CHNEP).

Objective Three: Improve public understanding of direct and indirect threats to aquatic preserve water quality.

Integrated Strategies:

Education and Outreach: Disseminate information to volunteers and the general public through various media materials. Conduct PowerPoint presentations for homeowner and boater groups to inform local residents on how they can reduce their impacts on the bay.

Partnering: Provide water quality data to other agencies and organizations, including the Citizen Support Organization (CSO), for dissemination to the public.

Partnering: Support other agencies' and organizations' water quality education efforts.

Performance Measures:

Post information in print and digital form (Estero Bay Buddies' newsletter, website, etc.).

Provide informational PowerPoint presentations to community groups and organizations.

Display informational posters in kiosks at various locations within the aquatic preserve watershed throughout the year.

5.3 / Issue Two: Coastal and Watershed Development

Since the 1950s, southwest Florida and Fort Myers have seen amazing growth and prosperity and have become premiere destinations for sun-seekers, investors and retirees. This has brought and will continue to bring a multitude of challenges to maintain a healthy environment for not only the local economy (of which a good segment is based on tourism), but also for the ecological health of area residents, and for the intrinsic value of southwest Florida habitats themselves. Fortunately, this importance was recognized decades ago by area citizens, and residents today are enjoying the result of their past efforts in the vast array of public lands located within the area. The motivation for the creation of Estero Bay Aquatic Preserve, for example, came from a growing awareness that coastal development was destroying the natural areas needed to maintain a healthy fishery, as well as an increasing realization that the old policy of selling submerged lands for development was in fact harming the state's economic activities, and at a rather small profit to the state in terms of revenue.

For some people this was primarily an esthetic and/or environmental issue. Others were concerned about detrimental effects on the commercial and recreational fishing industries, as well as other industries reliant on tourism which was a major economic engine of the region then, just as it is now. Finger canals had already been cut into north Estero Island as early as the 1920s, and the 1960s brought the efforts of the Rosen brothers carving out the emerging city of Cape Coral from coastal waters, mangroves and uplands that had once been considered prime hunting grounds. The citizen-based Lee County Conservation Association (LCCA) was instrumental in two legal and regulatory victories for Estero Bay and its watershed. The first victory was the establishment of the aquatic preserve and by example, the future creation of all Florida aquatic preserves. The second victory was the challenge of defining how coastlines could be developed, in terms of bulkhead lines and filling of submerged lands. This victory changed the way Florida would allow development of shorelines from that time forward. At that time, developer Robert Troutman intended to create a large community in the wetlands on the north side of Estero Bay near Winkler Point. The LCCA challenged not only Troutman but the state as well, claiming that the filling of submerged lands within this parcel constituted the stealing of publicly owned lands. As a result of this challenge, this land is now part of the Estero Bay Preserve State Park (EBPSP), currently managed by DEP's Division of Recreation and Parks (DRP). Today the state adheres to this principle of land preservation and as such actively continues to acquire environmentally important lands, both submerged and upland, in order to protect water quality and to help maintain essential ecological habitats. The state park, for example, is of vital importance to estuarine water quality due to its ability to filter sheetflow entering the bay from across the landscape.



Aerial view of development on Fort Myers Beach looking toward the east side of the bay. (Photo credit: Lee County Mosquito Control District)

In other portions of the estuary and its watershed that are currently undergoing growth, there has been a shift toward an emphasis on environmentally friendly building and development techniques, as well as an emphasis on the importance of project impact minimization. This focus on smart growth helps to assuage future cumulative impacts to the landscape. Additionally, in already developed portions of the watershed, efforts such as septic tank retrofitting for individual homes and even entire neighborhoods have begun to emerge. Moreover, endeavors to improve the water quality of Estero Bay and its tributaries have begun to concentrate more on nonpoint sources of pollution. As such, the combination of land preservation, smart growth principles, and development retrofitting efforts is essential to sustaining the area's healthy economy and quality of life for not only its current residents, but for future generations as well.

Goal One: Protect and improve the ecological integrity of the aquatic preserve.

Objective One: Preserve natural habitats within the watershed and adjacent waters in order to maintain or restore water quality and natural resources.

Integrated Strategies:

Education and Outreach: Engage in outreach and education opportunities with area decision-makers and the public and serve as a point of contact for information regarding the potential aquatic preserve expansion or creation process, and submerged resources and water quality in those areas.

Partnering: Support efforts to expand Estero Bay Aquatic Preserve boundaries to include adjacent segments of Estero Bay tributaries already designated as OFWs.

Partnering: Support efforts to expand Estero Bay Aquatic Preserve boundaries to include San Carlos Bay, to connect with Pine Island Sound Aquatic Preserve and Matlacha Pass Aquatic Preserve; or support the designation of a new aquatic preserve to encompass the same area.

Partnering: Support regional land acquisition program efforts within the Estero Bay watershed.

Public Use: Support and encourage science-based sustainable land-use strategies within the Estero Bay watershed.

Performance Measures:

Provide input to state and local land acquisition organizations regarding purchase of environmentally sensitive lands within the Estero Bay watershed.

Provide input to organizations regarding the expansions of Estero Bay Aquatic Preserve and/or the creation of a new adjacent aquatic preserve in San Carlos Bay.

Objective Two: Support local ordinances that protect the bay.

Integrated Strategies:

Education and Outreach: Engage in outreach and education opportunities with government and area decision makers and serve as a point of contact for information regarding the health of Estero Bay's natural resources.

Public Use: Promote and support research of innovative environmentally sensitive development and land-use practices.

Performance Measures:

Participate in area groups and organizations which address coastal and watershed development issues, such as the EBABM and CHNEP.

Continue outreach efforts such as the Leadership Bonita wading trips.

Objective Three: Coordinate with local regulatory programs to reduce impacts from development within and/or adjacent to the bay and its watersheds.

Integrated Strategies:

Resource Management: Assess possible cumulative impacts to the aquatic preserve by monitoring Environmental Resource Permitting's (ERP's) online self-certification system and utilizing DEP GIS software/website to keep abreast of permitted projects.

Resource Management: Assess possible cumulative impacts to the aquatic preserve by monitoring SFWMD's online ePermitting Records Search webpage.

Partnering: Maintain communications and when needed, attend meetings with DEP-ERP staff regarding current and ongoing project applications that have the potential to impact the aquatic preserve.

Partnering: Maintain communications with SFWMD permitting staff regarding current and ongoing project applications that have the potential to impact the aquatic preserve, and attend monthly interagency permitting meetings, when applicable.

Partnering: Maintain communications with Lee County and the City of Bonita Springs staff regarding current and ongoing project applications that have the potential to impact the aquatic preserve.

Partnering: Provide resource data for regulatory staff through routine site inspections.

Performance Measures:

Provide staff and equipment as requested and available to assist with biological assessments and reviews for site inspections and application reviews.

Provide comments regarding resources to ERP staff related to current and ongoing DEP permit applications, as needed.

Provide comments regarding resources to SFWMD permitting staff related to current and ongoing SFWMD permit applications, as needed.

Provide comments to Lee County and the City of Bonita Springs staff regarding current and ongoing permit applications, as needed.

Report coordination efforts in the Secretary's quarterly report and regulatory key performance indicator tracking mechanism.

Objective Four: Promote improvement projects that will enhance areas already developed.

Integrated Strategies:

Partnering: Support efforts to restore and protect natural freshwater inflows (e.g., water quality, timing and quantity) to the fullest extent possible, such as through the SFWMD's Priority Waterbody List and development of Minimum Flows and Levels.

Education and Outreach: Facilitate knowledge and understanding of how activities in the watershed impact the bay.



One of many oyster bars in the Horseshoe Keys area of the bay. (Photo credit: Lee County Mosquito Control District)

Partnering: Support septic tank retrofitting and connection to city sewer systems, where available, within the watershed.

Performance Measures:

Participate in groups such as EBABM

Provide outreach efforts such as PowerPoint presentations to homeowners associations and other organizations.

Ensure that the aquatic preserve remains listed on the Priority Waterbody List of SFWMD, if appropriate.

5.4 / Issue Three: Submerged Resources

In 1950, Estero Bay contained an estimated 3,769 acres of seagrasses, but this acreage diminished to 3,298 in 2006 (Gray & Beever, 2009). While still not at historical levels, transect data collected within the bay through 2009 shows that overall abundance has remained fairly stable (Leary, 2012). Beginning with drought-like conditions around 2006, seagrass populations began to rebound as salinities in the bay increased and input from tributaries and sheetflow diminished. Water quality is one determining factor in the health of seagrasses within the bay, and this reduced freshwater input served to diminish levels of nonpoint source pollution, including excess nutrients, pesticides and fecal coliforms. These observations help support the hypothesis that the health of area seagrass beds can serve as an indicator of water quality.

Different grass species have different light and nutrient requirements and tolerance levels. Changes in water quality can therefore affect seagrass range and distribution, as well as species makeup. Moreover, as species migrate and changes in seagrass bed composition occur, there can be ramifications throughout the food web, affecting a wide variety of floral, faunal and algal species. Although it is obvious that large changes in seagrass bed composition and density can produce major changes in the community structure, even subtle variations can produce major community differences (Zieman & Zieman, 1989). This is a particularly important point since many commercially and recreationally

important fish species rely on area seagrass beds at some point in their life.

Water quality can also affect seagrasses indirectly, as increases in nutrient levels can intensify naturally occurring populations of drift algae. Populations of the native green macroalgae *Ulva* spp. and red macroalgae species such as *Acanthophora spicifera*, *Gracilaria* spp., *Laurencia* spp., and *Hypnea* spp. can proliferate quickly after an influx of nutrients. This is more prevalent during the summer months near areas of heavy freshwater inflow, where these macroalgae, as well as green filamentous algae, can flourish. Aquatic preserve staff have noted this phenomenon several times during the bi-annual seagrass monitoring. The Conservancy of Southwest Florida also found a similar situation during their 2007 study. The study found dense clusters of *Acanthophora spicifera* in the extreme northern and southern areas of Estero Bay, possibly indicative of nutrient loadings from Hendry and/or Mullock creeks and Imperial River, respectively. It was also surmised that nutrient-enriched waters of the Caloosahatchee River were entering northern Estero Bay via Matanzas Pass, as well. Filamentous green algae were found distributed throughout the bay with concentrations in the east-central and southern portions, near Spring Creek and Imperial River, respectively (Schmid, 2009). When drift algae blooms occur, they can overrun seagrass beds, blocking out sunlight and effectively smothering the seagrasses.

In addition to water quality, hydrological changes within a watershed can have negative impacts on seagrasses and other native species, which can thereby encourage the proliferation of exotic species. There have been documented declines in native species such as spotted sea trout, mullet and blue crab. Decreases in landings numbers of these species were recorded from 1998 to 2008 (Gray, Beever & Beever, 2009). Furthermore, invasive exotic species such as the Asian green mussel have been found within the aquatic preserve, discovered in Estero Bay by aquatic preserve staff in 2002. These mussels outcompete native counterparts such as oysters and can change local environments with devastating results for other native species. Asian green mussels are easily introduced by boaters and can quickly establish populations.

HABs can have significant negative impacts on natural resources or humans, and recently there has been a noticeable increase in problems associated with HABs. Impacts from these blooms can include human illness (or death) from contaminated seafood, marine mammal and seabird deaths, and extensive fish kills (EPA, 2012b). Gaining an understanding of these events is of vital importance, as HABs in recent years in the Caloosahatchee River and along the coastline have been in the headlines. Scientists are racing to understand the causes and its effects on area waters and human health.

Goal One: Advance scientific understanding of the health of Estero Bay in relation to its submerged resources.

Objective One: Determine long-term SAV status and trends.

Integrated Strategies:

Ecosystem Science: Maintain aquatic preserve seagrass monitoring program database and analyze data.

Ecosystem Science: Compile and update a list of other agencies and organizations collecting SAV data within the bay.

Partnering: Collaborate with other groups collecting submerged aquatic vegetation (SAV) data within the aquatic preserve to stay informed about SAV status.

Performance Measures:

Conduct an annual review of the status and trends of SAV in Estero Bay.

Objective Two: Continue to enhance SAV monitoring methodology.

Integrated Strategies:

Ecosystem Science: Continue bi-annual (twice per year) seagrass monitoring program at five fixed transects.

Ecosystem Science: Conduct algae surveys in conjunction with seagrass transect surveys.

Ecosystem Science: Encourage continued regional consistency within DEP regarding SAV data collection and recording.

Partnering: Enhance collaboration with other agencies/organizations, such as FGCU, with regard to their SAV monitoring efforts.

Performance Measures:

Continue participation in the annual methodology field collaboration with DEP lab and CHAP, among others.

Develop a prioritized list of SAV monitoring and data management needs.

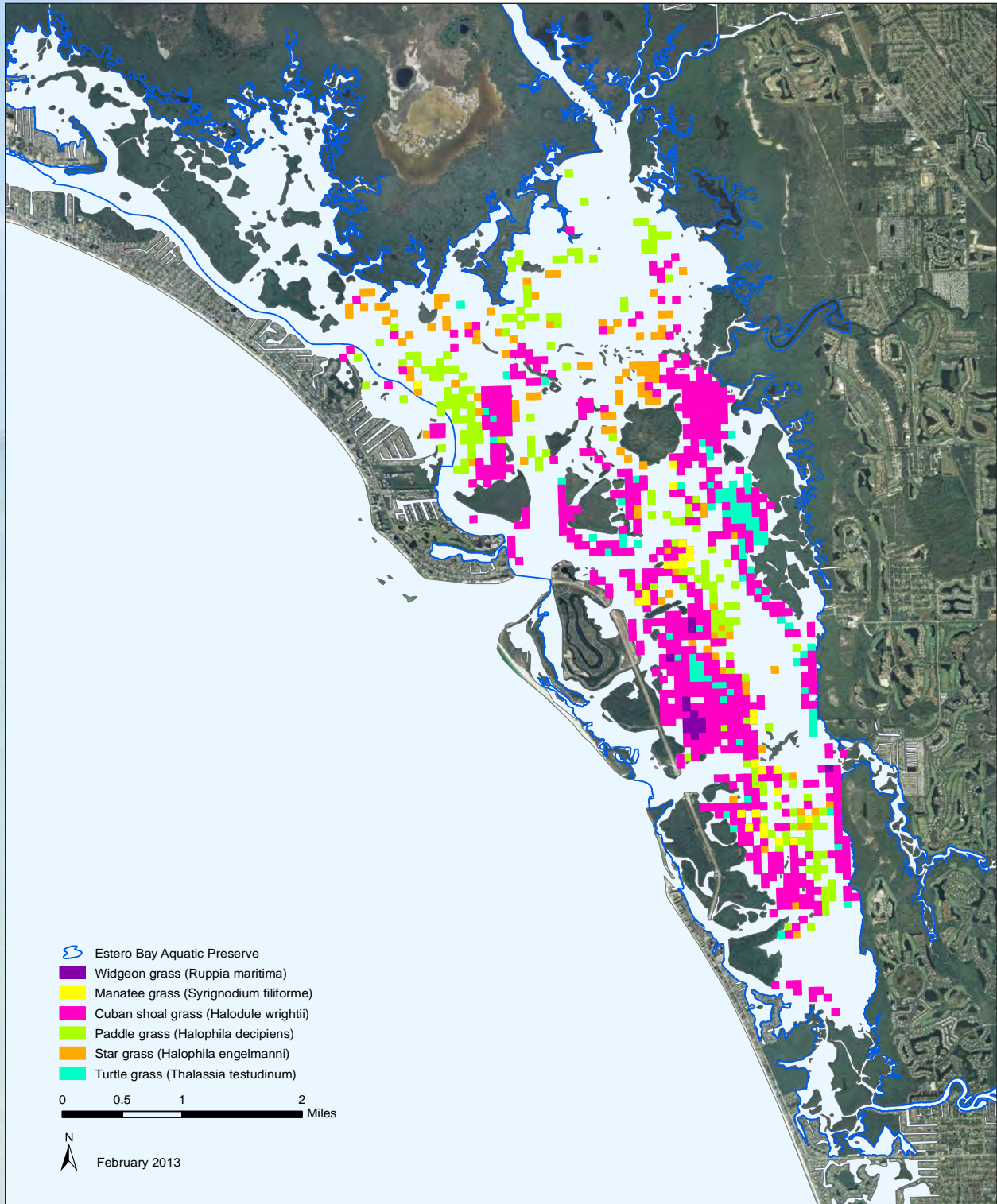
Continue bi-annual (twice per year) SAV monitoring efforts.

Compile a list of algal species found within Estero Bay and report algal abundance in conjunction with seagrass data.

Objective Three: Maintain knowledge of submerged resources found within the aquatic preserve, including plant, animal and algal communities.

Integrated Strategies:

Ecosystem Science: Map oyster bar habitat within the bay.



Ecosystem Science: Keep abreast of projects conducted within the aquatic preserve by other agencies and organizations.

Performance Measures:

Build or obtain GIS layers of submerged resources found within the aquatic preserve.

Compile data from scientific studies and reports, and create a list of submerged resources within the bay.

Maintain a list of species identified during field surveys and wading trips.

Goal Two: Preserve and protect submerged resources within the aquatic preserve.

Objective One: Continue and expand interagency collaboration regarding submerged resources found within the aquatic preserve.

Integrated Strategies:

Ecosystem Science: Keep abreast of current knowledge on topics such as SAV transplanting, conservation, mapping, etc.

Resource Management: Maintain knowledge of submerged cultural resource locations within the aquatic preserve.

Partnering: Collaborate with local stakeholders to generate an Estero Bay seagrass restoration and protection plan.

Performance Measures:

Work with partners to implement No Internal Combustion Motor Zones in Estero Bay.

Map SAV communities for restoration and protection.

Create an Estero Bay seagrass protection and restoration plan.

Develop a Wildlife Management Strategy in conjunction with FWC, as staff and funding are available, to address imperiled fish and turtle species and associated management prescriptions for their habitats; based on site-specific occurrence, population and sustainability data.

Objective Two: Continue and expand collaboration with other agencies/organizations regarding the presence and threat of invasive exotic species.

Integrated Strategies:

Ecosystem Science: Continue expansion of Estero Bay's Asian green mussel eradication program.

Education and Outreach: Encourage the public to report locations within the bay of exotic species such as the Asian green mussel.

Partnering: Collaborate with groups collecting data on exotic species within the aquatic preserve to stay informed.

Performance Measures:

Use or build on existing monitoring efforts to address information gaps.

Maintain a list of exotic species found within the aquatic preserve.

Assist other agencies/organizations in their efforts to control invasive exotics found within the bay, as budget and personnel allow.

Report any invasive species found within the bay to the appropriate documenting agency/organization.

Objective Three: Continue interagency collaboration regarding HABs that may affect the aquatic preserve.

Integrated Strategies:

Ecosystem Science: Keep abreast of current written information regarding HAB species and related topics.

Education and Outreach: Provide informational brochures and pamphlets from other agencies and organizations to public concerning natural resources within the bay, sustainable use practices, etc.

Partnering: Continue collaboration with FWC and assistance with HAB program.

Partnering: Collaborate with groups collecting data on HABs to stay informed.

Performance Measures:

Continue providing monthly water samples to FWC-HAB program.

Assist other agencies/organizations in their efforts to understand HABs within the area, as budget and personnel allow.

Report any fish kills within the bay to the appropriate documenting agency/organization.



A brown pelican shares a quiet bonding moment with her chick. (Photo credit: Melissa Groo)

Objective Four: Improve public understanding of aquatic preserve submerged resources.

Integrated Strategies:

Education and Outreach: Disseminate information to the general public and volunteers through various media materials.

Partnering: Support other agencies' and organizations' submerged resources education efforts.

Public Use: Provide and encourage volunteer opportunities.

Partnering: Provide SAV data to other agencies and organizations, including the CSO, for dissemination to the public.

Performance Measures:

Provide printed educational information to the public at outreach events.

Post information in print and digital form (Estero Bay Buddies newsletter, bulletin board, website, etc.).

Provide informational PowerPoint presentations to community groups and organizations.

Display informational posters in kiosks at various locations within the aquatic preserve watershed throughout the year.

House related informational brochures and pamphlets from other agencies/organization at the aquatic preserve office for dissemination to the public.

5.5 / Issue Four: Wading and Diving Colonial Nesting Birds

In the late 19th century, after 40 years of plume hunting, wading birds became a focal point for conservation. In the 1970s, extensive colonial nesting bird surveys were initiated along the North American Atlantic and Gulf coasts (Kushlan, 1997). Wading birds maintain a high aesthetic and recreational value to humans and their reproductive performance is a crucial aspect of their population dynamics (Kushlan, 1993). Nesting surveys in Estero Bay began in 1977 and the program implemented a variety of survey techniques throughout its history.

Anthropological interference has led to the decline of many bird species in southwest Florida, through both direct and indirect effects. Hydrological changes within a watershed, for example, can put stress on native bird species as wetlands that drain too quickly are unable to maintain ample food supplies for wading birds. This can lead to diminished or failed reproductive efforts, such as was the case with brown pelicans in the Estero Bay watershed; a 54.3 percent mean decrease between the 1980s and the 2000s was observed in Estero Bay (Clark & Leary, 2012) and between 1986 and 1999, rookeries in the interior wetlands were lost and decreased from nine to six.

Other anthropological activities have more direct and immediate consequences. Colonial nesting wading birds are particularly susceptible to local human disturbances (Parnell, Ainley, Blokpoel, Cain, Custer, Dusi et al., 1988). Many recreational activities within the aquatic preserve happen within the 100 meter (109 yards) buffer suggested for nesting wading birds (Erwin, 1989; Rodgers & Smith, 1995; Burger, 1998; Carney & Sydeman, 1999). For example, several wading and diving bird nesting colonies within the bay have been impacted by human disturbances including camping on active nesting islands, eco-tour boats flushing colonies multiple times a day, pirate cruise boats firing blank cannons next to active colonies, and photographers entering colonies and climbing trees to photograph nesting birds and chicks. Disturbances in early nest building and incubation periods can cause nest desertion (Steinkamp et al., 2003) and frequent disturbance may cause a reduction in clutch size and hatching success (Schreiber & Risebrough, 1972). Predation of eggs by fish crows (*Corvus ossifragus*) when adult birds were flushed from the nest due to disturbance was noted by Schreiber and Risebrough (1972) as the leading cause of egg loss.

Education is a reasonable step in addressing many of the anthropological issues facing wading and diving bird colonies. However, efforts to provide the public with information on safe wildlife viewing procedures and proper boating distances to rookery islands are ongoing. High population turnover rates due to the large number of seasonal residents and vacationing visitors in the area demand that educational efforts be maintained continuously. Islands with species of special concern, high disturbance levels and high fishing line fatalities as well as islands supporting species that have shown documented declines in nesting effort should be evaluated and considered for recommendation as Critical Wildlife Areas to increase public knowledge and compliance.



Volunteers participate in a colonial wading and diving bird nest monitoring training session.



A great blue heron chick feeds among the mangroves at the edge of the nesting colony. (Photo credit: Melissa Groo)



At the end of its journey, a shrimp boat motors through Matanzas Pass during sunrise.

Goal One: Preserve and protect wading and diving bird colonies.

Objective One: Determine long-term status and trends of wading and diving bird populations within the aquatic preserve.

Integrated Strategies:

Ecosystem Science: Monitor bird nesting activity and movement of nesting colonies.

Ecosystem Science: Maintain up-to-date survey records throughout nesting season.

Performance Measures:

Continue monthly colonial wading bird surveys.

Continue annual survey of potential nesting islands within the bay and its tributaries.

Conduct an annual review of status and trends and produce a report of population trends.

Produce an annual report of findings and submit to SFWMD.

Produce a report of bird fatalities due to fishing line entanglement and submit to FWC.

Develop a Wildlife Management Strategy in conjunction with FWC, as staff and funding are available, to address wading and diving bird nesting colonies, with specific focus on imperiled species, and associated management prescriptions for their habitats; based on site-specific occurrence, population and sustainability data.

Objective Two: Improve public understanding of colonial wading birds.

Integrated Strategies:

Education and Outreach: Disseminate information and educate the public at environmental events.

Education and Outreach: Create educational materials for display at public boat ramps and marinas.

Education and Outreach: Provide volunteer opportunities and train volunteers to assist with rookery monitoring.

Partnering: Maintain current partnerships and donated display spaces at kiosks.

Performance Measures:

Produce an annual nesting bird population trends report for the general public and provide at outreach events.

Produce and update a fact sheet about colonial nesting birds, and provide at outreach events.
Post information in print and digital form (Estero Bay Buddies newsletter, bulletin board, website, etc.).
Display informational posters in kiosks at various locations within the aquatic preserve watershed.

Goal Two: Preserve and protect wading bird nesting islands.

Objective One: Preserve and improve nesting island function.

Integrated Strategies:

Partnering: Remove exotic vegetation from nesting islands.

Partnering: Conduct fishing-line and trash cleanups within the bay, in cooperation with other agencies, organizations and volunteers.

Performance Measures:

Document information including trash removed from nesting islands, number of volunteers participating in cleanups, number of working partnerships, etc.

Objective Two: Preserve and improve nesting island habitat.

Integrated Strategies:

Partnering: Coordinate with law enforcement regarding monitoring of nesting islands for harassment of wildlife.

Partnering: Coordinate with ERP on any proposed public use activities (e.g. fireworks and building) in range of active nesting islands.

Performance Measures:

Post informational signage around wading bird nesting islands, pending Critical Wildlife Area designation.

Report wildlife harassment activity to appropriate law enforcement personnel.

Provide comments regarding resources to ERP staff related to current and ongoing DEP permit applications, as needed.

5.6 / Issue Five: Public Use and Access

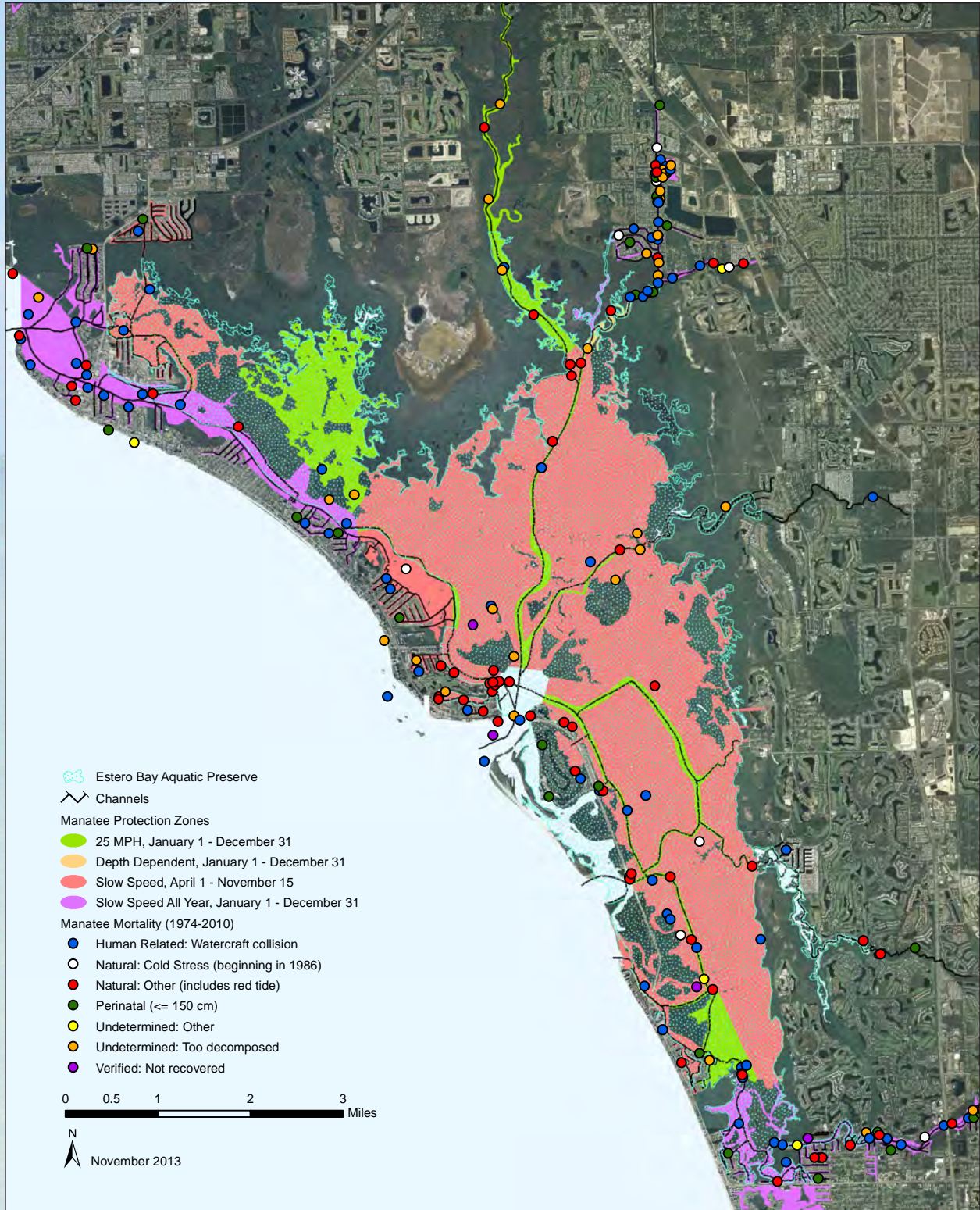
Tourism is one of the largest economic industries in Florida, with approximately 82.4 million travelers having visited the Sunshine State in 2007. While here, those tourists generated more than \$65 billion in taxable sales. That amount of spending produced \$3.9 billion in tax-related revenue for the state of Florida, to be spent on public necessities such as schools, transportation and museums, as well as on enhancing Florida's offerings to entice even more visitors. Nearly one million Floridians are employed by the tourism industry, creating a combined annual payroll of \$15.4 billion. In Lee County, tourism employs one person out of every five, and visitors generate an annual economic impact of approximately \$3 billion. In 2009, the Tourist Tax collection alone generated \$23.1 million (Lee County Visitor & Convention Bureau, 2009).

Lee County has 590 miles of shoreline, 50 miles of white sand beaches and 238 square miles (652,000 acres) of water. As such, local waters and surrounding uplands are a natural draw for many visitors to southwest Florida. There are 58 marinas and 15 boat rental/charters in the county, 12 marinas within a one-mile radius of Estero Bay, and six canoe/kayak launches within two miles of the aquatic preserve. Boating is popular with tourists and residents alike. There were 922,491 boats registered in Florida in 2011, according to the Florida Department of Highway Safety and Motor Vehicles. In Lee County alone there were 43,618 boats registered, representing nearly five percent of the boats registered within the state. Lee County ranked third in the state, behind Miami-Dade and Pinellas counties (Florida Department of Highway Safety and Motor Vehicles, 2011). With so many boats on the water, impacts to natural resources have become a concern. Increasing threats to seagrass beds from improper boating techniques recently led to the passing of legislation (Section 253.04(3)(a), F.S.) making it illegal to cause destruction to seagrass beds in aquatic preserves. Given the legislation has a direct impact on the aquatic preserve, staff assisted law enforcement agencies with their education of this new law and familiarized them with local seagrass species. The increased boat numbers and threat to seagrass further strengthen the case to mark and enforce the NICMZs to preserve and protect the resources.

Besides motorized vessels, canoes, kayaks, and personal sailboats have also increased in number within the bay in recent years, partly due to the establishment of the Great Calusa Blueway Paddling

Trail. This 190-mile canoe and kayak trail, divided into three distinct segments, meanders through the coastal waters and inland tributaries of Lee County. Estero Bay was the first region marked, and since that time has enjoyed an increasing popularity with canoe and kayak enthusiasts.

Geocaching has also become a popular past-time for adventurous individuals, groups or families. As of June 2012, three geocaches were located along mangrove islands within the bay. Although geocache guidelines stipulate to get authorization from the landowner, and some of the placed caches indicated they did, none of the geocache owners contacted nor received authorization from the Estero Bay Aquatic Preserve office. FCO has a webpage providing information on how to hide caches and



tips for responsible geocaching techniques, however, this web page was primarily created for land-based geocaching activity on FCO's managed uplands and/or spoil islands. Moreover, since most general users of the bay do not know that they are in an aquatic preserve, they may be unaware of who to contact. Unfortunately, it is cost prohibitive to place signage at all possible access points leading into the bay.

The ability of so many different user groups to be able to enjoy the resources of the aquatic preserve comes, regrettably, at a cost. In 2011, there were 70 manatee deaths recorded in Lee County, 13 of which were watercraft-related (FWC, 2012a). Moreover, between 1974 and 2002, Estero Bay accounted for 22.8 percent of all Lee County watercraft-related manatee deaths, while only 15.5 percent of total manatee deaths from all causes. Seasonally, manatee mortality in Lee County is higher in the winter-spring months (December - March), accounting for 49.3 percent of manatee deaths. This seasonal mortality rate correlates strongly with cause of death, including cold stress and watercraft-related mortality. In particular, this period corresponds with some of the lowest temperatures of the year in December and January, which then begin to rise in the spring. These months also correlate with typically high boating activity (Lee County Division of Natural Resources, 2004). Unlike federal, state, and local law enforcement officers, FCO does not have authority to regulate boat speed within the aquatic preserve. However, local governments (such as Lee County) have the authority to adopt local ordinances that limit the speed in areas where human safety is an issue.

Debris is a continuous challenge within the aquatic preserve. Fishing line, in particular, is of critical concern to colonial water bird populations, as well as to other species. Animal entanglement is a problem as abandoned line caught among mangroves and manmade structures is prevalent around the estuary. Derelict vessels also litter portions of the bay, creating potential navigational and environmental hazards. Although local agencies and organizations continue to work tirelessly to remove these and other forms of debris from the aquatic preserve, public education and stewardship is vital to addressing the problem and helping to maintain and even improve the health of the bay. High resident turnover rates and tourism-based recreation mean that education and outreach is a continuous effort and stewardship may be an elusive goal. To this end, aquatic preserve staff regularly join their CSO, Estero Bay Buddies (EBB), in public awareness efforts, attending various outreach events and facilitating public education efforts regarding minimization of user impacts on the environment.

Goal One: Assist federal, state and local agencies and organizations in managing public use and access while protecting natural resources.

Objective One: Identify specific issues that may affect the aquatic preserve and coordinate with the appropriate agency or agencies.

Integrated Strategies:

Partnering: Work with regulatory agencies, law enforcement, U.S. Coast Guard, and other resource management entities to identify and address non-water dependent uses within the aquatic preserve such as fireworks displays, as well as activities that are potentially illegal or harmful to natural resources, such as "barge parties" that attract hundreds of boats, and other marine activities that do not currently require state regulatory approval and/or DEP's Division of State Lands authorization.

Partnering: Support local governments (e.g., Lee County, Town of Fort Myers Beach, and others) in their efforts to promote conservation, proper stewardship, and resource protection (e.g., seagrass and manatee protection, derelict vessel removal, etc.).

Partnering: Maintain effective relations with local FWC law enforcement and Lee County Sheriff's personnel, and serve as a point of contact for natural resource information.

Partnering: Maintain effective partnerships with, and keep abreast of potential user issues facing regional aquatic preserves and state parks.

Performance Measures:

Participate in Lee County Marine Law Enforcement Task Force.

Participate in Lee County Waterways Advisory Committee.

Report unauthorized or illegal activities to the appropriate law enforcement personnel.

Continue mutual assistance with regional aquatic preserves and state park offices.

Continue regular meetings as required by the Memorandum of Agreement between DRP and FCO (Appendix A.4.3).

Objective Two: Support and provide input regarding legislative rules and local ordinances.

Integrated Strategies:

Public Use: Stay abreast of potential rule changes that may affect aquatic preserves and provide input, when applicable.

Public Use: Stay abreast of changes in local ordinances and land use policies, and provide input, when applicable.

Partnering: Work with DEP-ERP to disseminate to applicable agencies any information concerning new legislation that may affect the aquatic preserve.

Partnering: Work with West Coast Inland Navigation District, Lee County, FWC and DEP-ERP to mark and enforce NICMZs.

Performance measures: Continue participation in EBABM, CHNEP and the Southwest Florida Watershed Council.

Goal Two: Provide public education and outreach opportunities.

Objective One: Create and/or support programs for appropriate and compatible uses of the aquatic preserve.

Integrated Strategies:

Public Use: Support appropriate-use activities within the aquatic preserve, such as the Great Calusa Blueway Paddling Trail.

Public Use: Examine public use activities within the aquatic preserve to proactively identify potential resource/public use conflicts.

Partnering: Support other agencies in their efforts to develop/update and distribute information to the public identifying potential use conflicts and methods of prevention.

Performance Measures:

Continue soft enforcement efforts to address illegal mooring and derelict vessels within the aquatic preserve, as budget and personnel allow.



A wading trip participant uses a viewing scope to get a closer look at critters from the bay.

Provide printed educational information to the public at outreach events, regarding appropriate use activities available within the bay.

Develop strategies to address incompatible public uses within the aquatic preserve and/or damage to its natural resources, as budget and personnel allow.

Objective Two: Continue to collaborate with the CSO on public education and outreach.

Integrated Strategies:

Resource Management: Assist the CSO with various cleanup efforts.

Education and Outreach: Utilize CSO media to educate the public about the aquatic preserve.

Education and Outreach: Educate the public at outreach events about the role of the CSO.

Partnering: Continue cooperation with the CSO and EBSP in order to further the mission of the CSO.

Partnering: Support expanded CSO use of its member database.

Performance Measures:

Attend CSO meetings and provide aquatic preserve updates.

Contribute articles that disseminate information about the aquatic preserve to the CSO newsletter, EbbTide.

Publicize educational and volunteer opportunities in the EbbTide, on the CSO website, and to the

CSO member database.

Participate in CSO outreach events, such as the Estuaries Day paddle.

Participate in bay cleanup efforts such as Monofilament Madness.

Objective Three: Increase public (resident and visitor) knowledge and awareness of the aquatic preserve, its issues and importance

Integrated Strategies:

Education and Outreach: Provide a variety of formal and informal educational opportunities that foster stewardship while offering a chance to experience the coastal environment.

Education and Outreach: Disseminate information through static displays at public boat ramps and marinas.

Public Use: Provide internships and volunteer opportunities to promote stewardship.

Partnering: Utilize local fishing guides, boat charter services and other eco-tourism groups to disseminate outreach materials regarding the aquatic preserve and its resources.

Performance Measures:

Continue and expand wading trip opportunities to the public.

Provide PowerPoint presentations to various homeowners associations, clubs, and other community groups.

Present monitoring results at various scientific and professional forums, such as CHNEP Science Forum meetings.

Maintain displays with current resource information and explanation of proper boating techniques to minimize environmental impacts.

Provide educational brochures and outreach materials to area eco-tourism businesses for dissemination to the public.



A sponge attached to a clump of oysters is brought above the surface for a closer look.

Part III

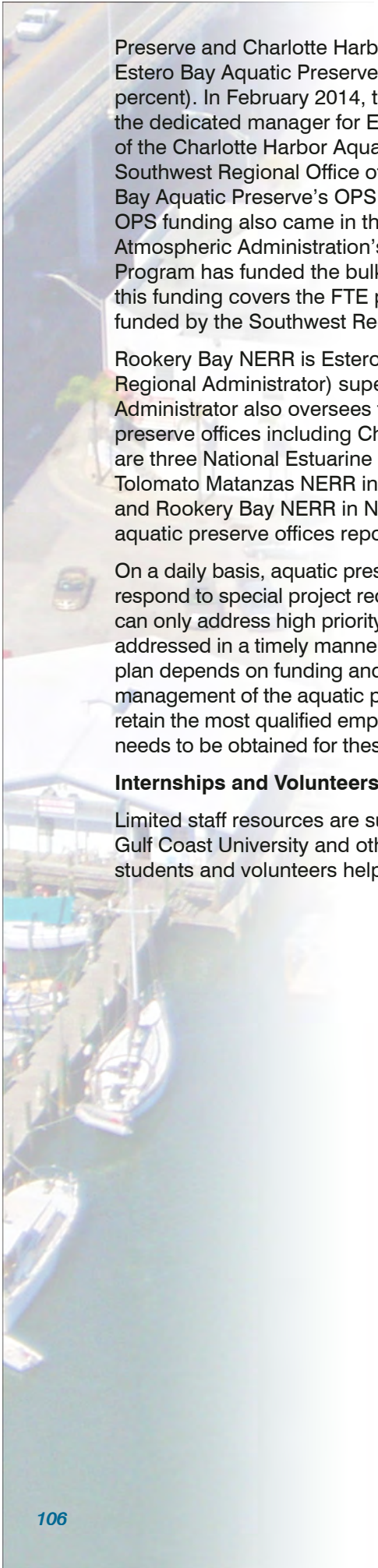
Additional Plans

Chapter Six

Administrative Plans

Successful implementation of the Estero Bay Aquatic Preserve program and the goals outlined in this management plan are dependent upon adequate staffing, facilities, and funding. Citizen support and the cooperation of partnering agencies, non-governmental organizations, and other groups are also critical. Current Estero Bay Aquatic Preserve staffing includes one Full Time Equivalent (FTE) and three Other Personal Services (OPS) positions. The FTE position is a Career Service (CS) aquatic preserve manager (Environmental Specialist [ES] III). The full time and both part-time OPS positions (one 10 hours/week and the other 30 hours/week) are ES Is. Since there is no dedicated administrative position at Estero Bay Aquatic Preserve, the bulk of the daily and monthly administrative tasks such as purchasing, budget tracking, and scheduled reports are performed by the CS ES III, who also conducts resource management, monitoring, education and outreach activities, and supervises two of the OPS positions. The minimal staffing level requires that all team members perform a variety of tasks to ensure priority resource management and administrative tasks are addressed.

In the past ten years, major administrative changes have occurred. In 2003, Estero Bay State Buffer Preserve was placed under the Division of Recreation and Parks, along with funding and staff, including an SES ES II position that functioned as the Estero Bay Aquatic Preserve manager. Between 2003 and February 2014, the ES III position served as the aquatic preserve manager of the Estero Bay Aquatic



Preserve and Charlotte Harbor Aquatic Preserves and her time was divided between the two offices; Estero Bay Aquatic Preserve office (30 percent) and Charlotte Harbor Aquatic Preserves office (70 percent). In February 2014, the FTE CS ES I position was converted to an FTE CS ES III to serve as the dedicated manager for Estero Bay Aquatic Preserve. The earlier ES III maintained management of the Charlotte Harbor Aquatic Preserves. Throughout this time, reductions in funding compelled the Southwest Regional Office of the Florida Coastal Office (FCO) to find the funds to cover all of Estero Bay Aquatic Preserve's OPS positions. Over the past several years, some project-specific, time-limited OPS funding also came in the form of federal grants. But as of July 2012, the National Oceanic and Atmospheric Administration's Coastal Zone Management Act, through the Florida Coastal Management Program has funded the bulk of FCO's Aquatic Preserve program. For Estero Bay Aquatic Preserve, this funding covers the FTE position and the expense budget, but not the OPS positions which are still funded by the Southwest Regional Office.

Rookery Bay NERR is Estero Bay Aquatic Preserve's regional office and the manager (FCO's Southwest Regional Administrator) supervises the Estero Bay Aquatic Preserve manager. The Southwest Regional Administrator also oversees two aquatic preserves within the NERR boundary and two other aquatic preserve offices including Charlotte Harbor and Tampa Bay, totaling 12 aquatic preserves in all. There are three National Estuarine Research Reserve (NERR) offices in the state of Florida including the Guana Tolomato Matanzas NERR in Ponte Vedra Beach near St. Augustine, Apalachicola NERR in Eastpoint, and Rookery Bay NERR in Naples. These NERRs also function as regional offices through which most aquatic preserve offices report.

On a daily basis, aquatic preserve staff must address a myriad of complex interrelated issues and at times respond to special project requests from senior management. The workload is frequently such that staff can only address high priority resource management issues while other important issues may not be addressed in a timely manner. Successful implementation of the strategies outlined in this management plan depends on funding and staffing factors over the next 10 years. To adequately address short-term management of the aquatic preserve, two OPS ES I positions need to be upgraded to CS FTEs in order to retain the most qualified employees and dedicated funding within the Estero Bay Aquatic Preserve budget needs to be obtained for these positions.

Internships and Volunteers

Limited staff resources are supplemented by active intern and volunteer programs. Students from Florida Gulf Coast University and other colleges gain valuable work experience while filling program needs. The students and volunteers help staff accomplish Estero Bay Aquatic Preserve's mission.



The Estero Bay Aquatic Preserve office has been located on San Carlos Island since 1996.

Chapter Seven

Facilities Plans

The headquarters for the Estero Bay Aquatic Preserve office has been located on San Carlos Island (700-1 Fisherman's Wharf, Fort Myers Beach, Florida) at the north end of the aquatic preserve since 1996. The leased office space is within a building adjacent to and east of the San Carlos Boulevard (State Road [SR] 865) bridge over Matanzas Pass to Fort Myers Beach and is situated less than 100 feet from the northwestern boundary line of the aquatic preserve. The lease includes 1,049 square feet of office space, 100 square feet of equipment storage, a 300 square foot boat wet slip with dock and 300 square feet of non-adjacent exterior space in a fenced-in compound. This space houses one boat. The annual 2012 lease fee for all space is \$14,866.56 and includes facility maintenance, city water, sewer and trash pickup. Additional yearly administrative costs include \$1,600 for electric and \$3,000 for communications. Other off-site storage locations include a Lee County Mosquito Control District facility located about two and a half miles from the Estero Bay Aquatic Preserve office where boats and trailers can be stored if needed, including in the event of a hurricane evacuation. Evacuation destinations for all files, equipment, vehicles and vessels located at the Estero Bay Aquatic Preserve facilities are outlined in the Hurricane Evacuation Procedures that are reviewed and updated annually by staff. This plan has been successfully implemented several times.

In 2007, funding was made available to conduct a site analysis that included options for relocation of the Estero Bay Aquatic Preserve office and a Florida Department of Environmental Protection (DEP) South District laboratory. The location was also to provide support space for DEP law enforcement

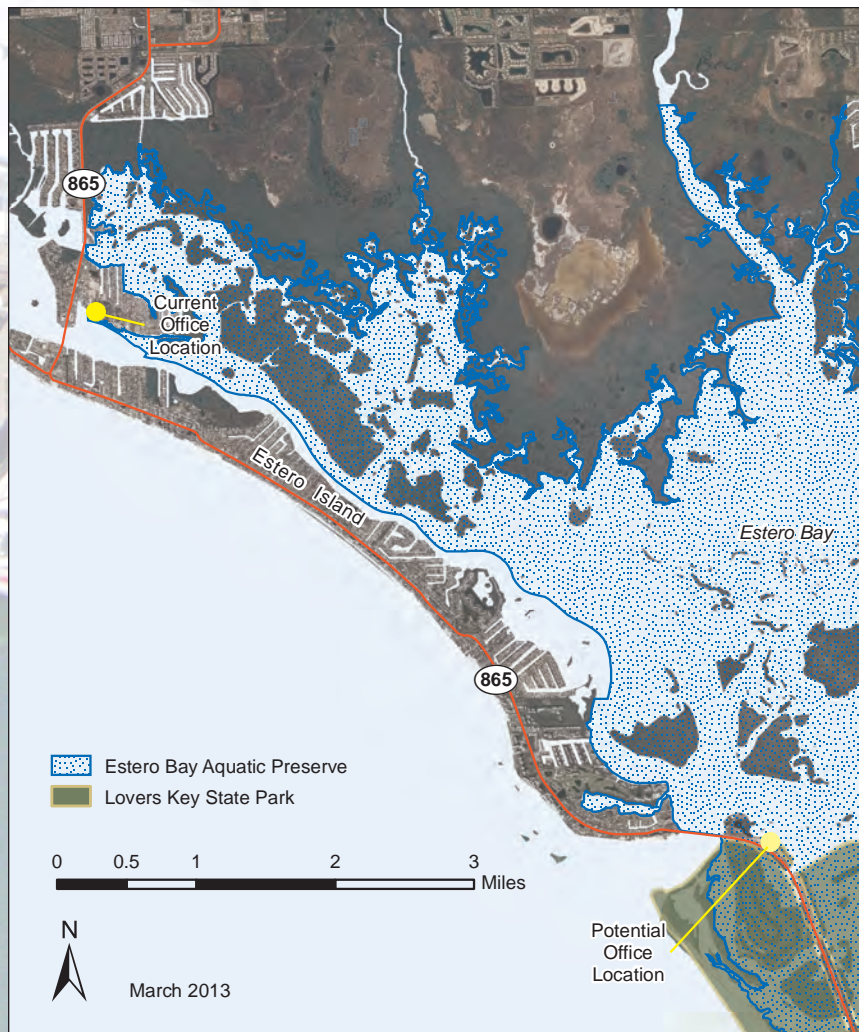
officers when in the area. There was support from the local government to build on Lee County-owned property on San Carlos Island. The property is used for staging for local dredging projects and derelict vessel removal, and includes an existing boat ramp that is for government use only. A proposal was made to make it a limited access public boat ramp if developed for the combined state and local government use. The resultant 2008 Estero Bay Aquatic Preserve Site Analysis Report that examined two possible office locations on the site and included a conceptual site plan. No action was taken to implement the plan. Local government interest waned and the DEP laboratory was established at the South District office. The county-owned boat ramp remains for government use only.

Over the next few years, other Estero Bay Aquatic Preserve office locations were researched, and the pros and cons considered. In 2012, DEP determined that staying at the existing office made the most sense when considering all factors. During this process however, and with a focus on planning for the long term, much effort was put into the concept of creating Estero Bay Aquatic Preserve office space at the Lovers Key State Park property on Black Island, on the western shoreline of the aquatic preserve. Several locations and concepts were considered by Estero Bay Aquatic Preserve, DEP's Florida Coastal Office (FCO) and DEP's Division of Recreation and Parks (DRP), including providing space in a proposed educational facility yet to be constructed at the park, bringing in a mobile office unit and placing it in one of two possible locations within the park, and finally agreeing on constructing an Estero Bay Aquatic Preserve office on the Bayside Park area of the park property, adjacent to Estero Bay (Map 25). Costs and funding opportunities were being considered by FCO in 2009, but have not come to fruition as of 2013. If relocated, Estero Bay Aquatic Preserve's presence on the opposite side of Estero Boulevard, outside of the main entrance to the park and adjacent to a playground and picnic area, would add extra protection to the park. Estero Bay Aquatic Preserve staff would have boat access to the aquatic preserve by using the adjacent Lovers Key Carl E. Johnson boat ramp. The location would make the office more visible to the public, thereby

attracting increased visitation and public interest in the aquatic preserve and FCO. The location is adjacent to the area where Estero Bay Aquatic Preserve staff conducts wading trips for the public. It is anticipated that with increased visibility, there would be interest in more wading trips and Estero Bay Aquatic Preserve would expand the outreach program to accommodate this need.

Vehicles and Vessels

– All vehicles and vessels are shared between staff depending on project needs. Scheduled, preventative maintenance of all vehicles and vessels are performed by authorized vendors. Minor repairs and maintenance are performed by staff. The annual budgeted fuel cost for all vehicles and vessels is \$1,325. The maintenance budget for the two vessels is \$1,869, while \$1,250 was budgeted for the three vehicles. Expenses typically go up with increasing cost of fuel and age of vehicles and vessels.



Map 25 / Existing and potential office locations.

Vehicles

- **2000 4x4 Chevy Blazer** – In 2000, this was the office's first new 4x4 vehicle and now has over 115,000 miles. The Blazer is a multipurpose vehicle used for towing vessels, transportation to meetings, transporting water samples to the lab, transporting equipment for education and outreach programs, long distance travel, and storing and transporting office documents and equipment during hurricane evacuations.
- **2004 4x4 Ford Explorer** – This vehicle, currently with 98,000 miles, was transferred from the Charlotte Harbor Aquatic Preserves office in November 2011. The Explorer replaces a surplused 1997 Chevy S10 and is used to tow vessels, as transportation to meetings, to transport water samples to laboratory, to transport equipment for education and outreach programs and for storing and transportation of office documents and equipment during hurricane evacuations.
- **2008 4x4 Ford F150** – This new vehicle, with 8,000 miles, replaced a surplused 1985 Dodge Ram Charger and is used for heavy duty towing, transporting vessels to boat ramps, transportation of marine debris and injured marine animals, and for storing and transportation of office documents and equipment during hurricane evacuations.



A macroscopic view of a sea hare with its wings extended over native drift algae.

Vessels

- **1984 17' Boston Whaler with a 2005 90 horsepower Yamaha four-stroke outboard engine** – In 1996, when the Estero Bay office opened, this vessel was transferred from the Charlotte Harbor Aquatic Preserves office. In 2000, the trailer was replaced using the Estero Bay Aquatic Preserve office budget, and in 2005 a private citizen donated a new 90 horsepower Yamaha four-stroke outboard motor. The Whaler has been outfitted with a Power Pole, donated to the Estero Bay Buddies by the manufacturer, and a Minn Kota trolling motor. This vessel is the office's primary vessel and is used to perform most field work out in the bay. Estero Bay Preserve State Park staff also utilizes the vessel on occasion.
- **1988 17' Carolina Skiff with a 2005 Evinrude E-Tec 50 horsepower two-stroke outboard motor** – Transferred in March 2012 from Apalachicola National Estuarine Research Reserve; the trailer age is unknown. The Carolina Skiff has a shorter draft than the 17' Mako which it replaced making it better suited for the shallow bay. The boat is used by Estero Bay Aquatic Preserve staff for seagrass monitoring and cleanup events and is also utilized by Estero Bay Preserve State Park staff on occasion.
- **Two 1998 14' Aquaterra Prism kayaks** – In 1998, these two kayaks were acquired. They have been used to get into shallow or difficult areas (e.g. shallow, mosquito ditches, along mangrove edge) involving activities such as clean-up and monofilament removal, bird rookery monitoring and exotic plant removal.



This shrimp is nearly invisible to the naked eye.

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Legal Documents

A.1 / Aquatic Preserve Resolution

WHEREAS, the State of Florida, by virtue of its sovereignty, is the owner of the beds of all navigable waters, salt and fresh, lying within its territory, with certain minor exceptions, and is also the owner of certain other lands derived from various sources; and

WHEREAS, title to these sovereignty and certain other lands has been vested by the Florida Legislature in the State of Florida Board of Trustees of the Internal Improvement Trust Fund, to be held, protected and managed for the long range benefit of the people of Florida; and

WHEREAS, the State of Florida Board of Trustees of the Internal Improvement Trust Fund, as a part of its overall management program for Florida's state-owned lands, does desire to insure the perpetual protection, preservation and public enjoyment of certain specific areas of exceptional quality and value by setting aside forever these certain areas as aquatic preserves or sanctuaries; and

WHEREAS, the ad hoc Florida Inter-Agency Advisory Committee on Submerged Land Management has selected through careful study and deliberation a number of specific areas of state-owned land having exceptional biological, aesthetic and scientific value, and has recommended to the State of Florida Board of Trustees of the Internal Improvement Trust Fund that these selected areas be officially recognized and established as the initial elements of a statewide system of aquatic preserves for Florida;

NOW, THEREFORE, BE IT RESOLVED by the State of Florida Board of Trustees of the Internal Improvement Trust Fund:

THAT it does hereby establish a statewide system of aquatic preserves as a means of protecting and preserving in perpetuity certain specially selected areas of state-owned land: and

THAT specifically described, individual areas of state-owned land may from time to time be established as aquatic preserves and included in the statewide system of aquatic preserves by separate resolution of the State of Florida Board of Trustees of the Internal Improvement Trust Fund; and

THAT the statewide system of aquatic preserves and all individual aquatic preserves established thereunder shall be administered and managed, either by the said State of Florida Board of Trustees of the Internal Improvement Trust Fund or its designee as may be specifically provided for in the establishing resolution for each individual aquatic preserve, in accordance with the following management policies and criteria:

(1) An aquatic preserve is intended to set aside an exceptional area of state-owned land and its associated waters for preservation essentially in their natural or existing condition by reasonable regulation of all human activity which might have an effect on the area.

(2) An aquatic preserve shall include only lands or water bottoms owned by the State of Florida, and such private lands or water bottoms as may be specifically authorized for inclusion by appropriate instrument from the owner. Any included lands or water bottoms to which a private ownership claim might subsequently be proved shall upon adjudication of private ownership be automatically excluded from the preserve, although such exclusion shall not preclude the State from attempting to negotiate an arrangement with the owner by which such lands or water bottoms might be again included within the preserve.

(3) No alteration of physical conditions within an aquatic preserve shall be permitted except: (a) minimum dredging and spoiling for authorized public navigation projects, or (b) other approved activity designed to enhance the quality or utility of the preserve itself. It is inherent in the concept of the aquatic preserve that, other than as contemplated above, there be: no dredging and filling to create land, no drilling of oil wells or excavation for shell or minerals, and no erection of structures on stilts or otherwise unless associated with authorized activity, within the confines of a preserve - to the extent these activities can be lawfully prevented.

(4) Specifically, there shall be no bulkhead lines set within an aquatic preserve. When the boundary of a preserve is intended to be the line of mean high water along a particular shoreline, any bulkhead line subsequently set for that shoreline will also be at the line of mean high water.

(5) All human activity within an aquatic preserve shall be subject to reasonable rules and regulations promulgated and enforced by the State of Florida Board of Trustees of the Internal Improvement Trust Fund and/or any other specifically designated managing agency. Such rules and regulations shall not interfere unduly with lawful and traditional public uses of the area, such as fishing (both sport and commercial), hunting, boating, swimming and the like.

(6) Neither the establishment nor the management of an aquatic preserve shall infringe upon the lawful and traditional riparian rights of private property owners adjacent to a preserve. In furtherance of these rights, reasonable improvement for ingress and egress, mosquito control, shore protection and similar purposes may be permitted by the State of Florida Board of Trustees of the Internal Improvement Trust Fund and other jurisdictional agencies, after review and formal concurrence by any specifically designated managing agency for the preserve in question. (7) Other uses of an aquatic preserve, or human activity within a preserve, although not originally contemplated, may

be permitted by the State of Florida Board of Trustees of the Internal Improvement Trust Fund and other jurisdictional agencies, but only after a formal finding of compatibility made by the said Trustees on the advice of any specifically designated managing agency for the preserve in question.

IN TESTIMONY WHEREOF, the Trustees for and on behalf of the State of Florida Board of Trustees of the Internal Improvement Trust Fund have hereunto subscribed their names and have caused the official seal of said State of Florida Board of Trustees of the Internal Improvement Trust Fund to be hereunto affixed, in the City of Tallahassee, Florida, on this the 24th day of November A. D. 1969.

CLAUDE R. KIRK, JR, Governor

TOM ADAMS, Secretary of State

EARL FAIRCLOTH, Attorney General

FRED O. DICKINSON, JR., Comptroller

BROWARD WILLIAMS, Treasurer

FLOYD T. CHRISTIAN, Commissioner of Education

DOYLE CONNER, Commissioner of Agriculture

As and Constituting the State of Florida Board of Trustees of the Internal Improvement Trust Fund

A.2 / Florida Statutes

All the statutes can be found according to number at: <http://www.leg.state.fl.us/Statutes>

Florida Statutes, Chapter 253: State Lands

Florida Statutes, Chapter 258: State Parks and Preserves, Part II (Aquatic Preserves)

Florida Statutes, Chapter 370: Saltwater Fisheries

Florida Statutes, Chapter 372: Wildlife

Florida Statutes, Chapter 403: Environmental Control (Statute authorizing the Florida Department of Environmental Protection (DEP) to create Outstanding Florida Waters is at 403.061(27))

Florida Statutes, Chapter 597: Aquaculture

A.3 / Florida Administrative Code

All rules can be found according to number at: <https://www.flrules.org/Default.asp>

Florida Administrative Code, Chapter 18-20: Florida Aquatic Preserves

<http://www.dep.state.fl.us/legal/Rules/shared/18-20.pdf>

Florida Administrative Code, Chapter 18-21: Sovereignty Submerged Lands Management

<http://www.dep.state.fl.us/legal/Rules/shared/18-21.pdf>

Florida Administrative Code, Chapter 62-302: Surface Water Quality Standards (Rule designating Outstanding Florida Waters is at 62-302.700)

<http://www.dep.state.fl.us/legal/Rules/shared/62-302/62-302.pdf>

FWC #12085

MEMORANDUM OF AGREEMENT

BETWEEN

THE FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION

AND

THE FLORIDA FISH AND WILDLIFE CONSERVATION COMMISSION

The Florida Fish and Wildlife Conservation Commission (FWC), a state agency with headquarters located in the Bryant Building at 620 South Meridian Street, Tallahassee, Leon County, Florida, 32399, and the Florida Department of Environmental Protection (DEP), a state agency with headquarters in the Douglas Building located at 3900 Commonwealth Boulevard, Tallahassee, Leon County, Florida, 32399, enter into this Memorandum of Agreement (MOA) as the parties hereto, for the provision of law enforcement-related services in all State Parks and on other DEP-managed lands, which include Coastal and Aquatic Managed Areas, and for investigation of criminal violations of the State's environmental laws and rules.

PURPOSE

During the 2012 regular session, the Florida Legislature passed House Bill 1383 (Chapter 2012-88) to consolidate the DEP, Division of Law Enforcement (DEP-DLE), with the FWC, Division of Law Enforcement (FWC-DLE). This consolidation is accomplished through a Type II transfer (Transfer) of the DEP-DLE, except the Bureau of Emergency Response, to the FWC-DLE. The bill was signed into law (Law) on April 6, 2012 by Florida Governor Rick Scott.

On July 1, 2012, the DEP-DLE shall cease to exist, and the FWC shall be in control of all duties, responsibilities, and assets of the former DEP-DLE, and the Bureau of Emergency Response shall be renamed the Office of Emergency Response (the Bureau of Emergency Response and Office of Emergency Response are jointly referred to as OER) and all of its duties, responsibilities, and assets shall be transferred to the DEP Office of the Secretary.

The Law grants FWC the authority to enforce all laws, rules, and standard operating procedures relating to State Parks and other DEP-managed lands. This authority includes all violations punishable by criminal or civil infraction penalties. It also includes the authority to investigate and enforce all criminal violations of Chapters 161, 258, 373, 376, and 403, Florida Statutes.

The Law transfers the personnel, property, and authority to provide law enforcement patrol and investigative services for all State Parks and other DEP-managed lands to the FWC. The DEP will have a continued need for the provision of those services. The purpose of this MOA is to coordinate law enforcement services for the DEP with the FWC after the Transfer.

FWC #12085

This MOA recognizes the concurrent jurisdiction of both agencies to address violations pursuant to their specific statutory authority associated with State Parks, other DEP-managed lands, and the environmental laws of the State.

This MOA will go into effect on July 1, 2012 or upon signature of the parties, whichever is later. It may be amended, as necessary, to conform to the provisions of the Law and the continuing needs of the parties. This MOA details the responsibilities of each of the parties to the other and in particular the FWC to the DEP regarding:

1. Support and response for pollutant spills, releases of hazardous substances and hazardous wastes, and natural disasters;
2. Law enforcement patrol and investigative services for all State Parks and other DEP-managed lands;
3. Law enforcement investigative services for all criminal law violations of Chapters 161, 258, 373, 376, and 403, Fla. Stat;
4. Enforcement services for all civil violations of all DEP rules related to the Division of Recreation and Parks (DRP), Myakka River wild and scenic segment, the Office of Greenways and Trails (OGT) (management units of which shall be referenced collectively as "State Parks" or "DRP-managed lands"), and the Office of Coastal and Aquatic Managed Areas (CAMA); and
5. Current and future funding for positions and property being transferred from the DEP to the FWC, which are funded through any trust fund.

The Law created the "transition advisory working group" which met on May 10, 2012 and, as mandated in the Law, resolved the following issues:

1. The appropriate, proportionate number of administrative, auditing, inspector general, attorney, and operational support positions, their related funding levels and sources, and assigned property to be transferred from the DEP Office of General Counsel, Office of Inspector General, and Division of Administrative Services, or other relevant office or division;
2. A detailed plan for the transfer or shared use of buildings, regional offices, and other facilities owned, leased, or managed by the DEP and which are currently being used by the DEP-DLE (See attachment "A" which is incorporated herein); and
3. Operating budget adjustments necessary to implement the requirements of the Law.

The transition advisory working group met on June 8, 2012 to address whether any DEP or Board of Trustees of the Internal Improvement Trust Fund rules need to be amended to reflect the changes made by the Law. The working group determined that no rule changes or amendments were necessary.

MISSION

Coordinate wherever possible the enforcement of the laws and rules applicable to State Parks, laws and rules applicable to other DEP-managed lands, and the environmental laws and rules of the State.

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6/20/12

Maximize resources through joint investigative processes wherever possible.

Facilitate the orderly collection, handling, preservation, storage, and transportation of evidence in the criminal investigative process from initial collection through prosecution of any related violation(s).

Provide for on-going communication and resolution of issues involving the provision of law enforcement services on State Parks and other DEP-managed lands and criminal violations of the environmental laws of the State.

PROPERTY

The DEP agrees that the entirety of the seventh floor of the Douglas Building or equivalent space as agreed to by the parties will be immediately available for use by the FWC. The DEP agrees that all offices, buildings, structures, or facilities including but not limited to the Annex to the Douglas Building, (hereinafter collectively referred to as "Facilities"), being utilized by DEP-DLE personnel, with the exception of OER personnel, prior to the execution of this MOA will immediately be available for use by the FWC. Use of the Facilities by the FWC outside the Tallahassee area shall include use of the Facilities' current internet, network, and telecommunication connectivity supported by the DEP.

Telecommunication connectivity includes both the telephone itself and the provided telephone service. The DEP shall allow the use of enough unused optical fiber to interconnect the existing FWC lines in the Douglas Building to other locations within the Douglas Building and the Annex. The DEP will provide such unused optical fiber so that the FWC's employees will be able to connect to the FWC's Private VRF (the FWC's Intranet). Notwithstanding the FWC's right to use the Facilities, the FWC will allow the DEP reasonable access to all the DEP's networking and communications closets that may reside within the FWC occupied areas. The DEP, after the Transfer, will continue to provide network and telecommunication capabilities for the facilities outside the Tallahassee area but will not provide on-going support or replacement of the FWC's applications, servers, VPN, or network peripheral devices or hardware such as desktop or laptop computers, printers, switches, or wireless access points.

The DEP will continue to allow the FWC to house law enforcement operations in DRP-owned or managed facilities historically used by the DEP-DLE unless use of the facilities is altered through the DRP unit management planning process. The DEP agrees to consider the need for facilities to be used by the FWC as part of the DRP unit management planning process whenever altering the use of the facilities historically used by the DEP-DLE. The DEP also agrees to accommodate, when possible, requests made by the FWC for additional or new DRP-owned or managed facilities or facility space. Any such accommodation shall be documented in writing by the Director of DRP and the FWC MOA Manager or their respective designees identified for this purpose. Such agreement will not require a formal amendment to this MOA. The FWC acknowledges that the DRP shall have sole authority to manage all DRP-owned or managed facilities. The FWC accepts the DRP-owned or managed facilities "as is." Florida State Park buildings that will be occupied in their entirety by FWC-DLE shall be maintained in accordance with DRP's operations manual and the following:

1. Routine exterior maintenance will be provided by DRP;

FWC #12085

2. Routine interior maintenance and janitorial services will be provided by FWC;
3. In the event that major repair is needed, DRP will provide to the best of DRPs budget ability; and
4. All non-routine maintenance, building modifications, additions or renovations will be provided by FWC with concurrence of DRP.

Florida State Park buildings that will be occupied by staff of the Park and FWC-DLE shall be maintained in accordance with the DRP's operations manual and the following:

1. Routine interior and exterior maintenance will be provided by DRP;
2. Janitorial services will be provided by DRP;
3. In the event that major repair is needed, DRP will provide such major repair to the best of DRPs budget ability; and
4. All non routine maintenance, building modifications, additions or renovations will be provided by FWC with concurrence of DRP.

The DEP and FWC agree to continue the current utility payment arrangement between DEP-DLE and DRP at the Florida State Park facilities. Utility bills currently paid by DEP-DLE will be transferred to and paid by FWC. Utility bills currently paid by DRP will continue to be paid by DRP. Current utility payment responsibility is identified in Attachment A.

The FWC will not be required to assume any bills currently being paid by OER. Further, FWC may, but is not required to, continue the occupancy of and assume any proportionate associated bills related to those facilities shared by OER and FWC after the Transfer, which are currently being paid for exclusively by the OER. The OER will continue to pay the bills associated with these facilities unless otherwise agreed to in writing by the Director of OER and the FWC MOA Manager or their respective designees identified for this purpose. Such agreement will not require a formal amendment to this MOA.

The FWC agrees that the request for and posting of any signage on State Parks, including the replacement or maintenance of currently existing DEP-DLE signs, related to identifying law enforcement facilities, requirements, or services must first be submitted to and approved by the DRP Park Managers prior to posting. Such signs will be manufactured by the DRP.

Separate and apart from this MOA, any FWC officers, whether former DEP-DLE officers or otherwise, residing on DRP-managed lands will be required to have a resident agreement in accordance with and shall adhere to the guidelines provided by the DRP Operations Manual.

The parties agree to coordinate with the Department of Management Services to modify agency lease agreements, as necessary, so that the FWC will pay the appropriate rent payments directly to that agency.

PARTICIPATION COMMITMENT

The parties agree to maintain open lines of communication and to freely share information. This will help ensure that information is disseminated at the appropriate levels of both agencies. If either party believes that the other party is not openly communicating or sharing information, its respective MOA manager shall attempt to facilitate such communication or information sharing.

To further the communication and information-sharing process, the parties agree to the following:

1. The FWC Regional Commanders (Commanders) will invite the appropriate DRP District Bureau Chiefs (DBC) and CAMA Regional Managers (RM) to their Regional law enforcement meetings. The DBCs and RMs or their designees may attend those portions of the Regional meetings set aside to address the FWC's provision of law enforcement services.
2. The DBCs will invite the appropriate RMs and Commanders to their District meetings. The RMs and Commanders or their designees may attend those portions of these meetings set aside to address the FWC's provision of law enforcement services.
3. The Commanders, RMs, and DBCs or their designees will meet no less than twice annually. These twice-annual meetings may be scheduled separately or to coincide with the above-noted Regional or District meetings. At a minimum, the twice-annual meetings will address the following:
 - a. The allocation and distribution of law enforcement services;
 - b. Access to DRP-managed lands and CAMA-managed uplands;
 - c. Communication and information sharing; and
 - d. The report of data compilation.
4. The FWC agrees to create and implement a data collection process for the purpose of compiling and providing data to the parties to assist in their discussions of allocation and distribution of law enforcement services. The parties will also work towards designing a tracking measure for individual units of CAMA-managed aquatic areas. The DEP will provide annually to the FWC an updated ESRI map shape layer of DRP-managed lands and CAMA-managed upland areas as well as a listing of the names of the management units/areas. The FWC will provide the compiled data in a format designed to measure activity for each DRP-managed lands management unit and CAMA-managed upland management area. The compiled data shall be formatted to include the following:

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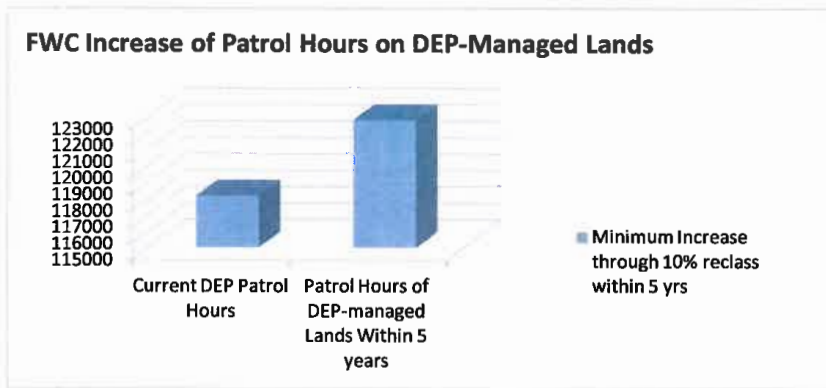
- a. The number of incidents to which the FWC responded on DRP-managed lands and on CAMA-managed uplands;
 - b. The number of patrol hours provided by the FWC on DRP-managed lands and CAMA-managed uplands;
 - c. The average response time per call for service.
5. In addition to the meetings previously identified, the Directors of the DRP, CAMA, and the FWC-DLE, or their designees will meet no less than annually to discuss any issue(s) related to this MOA. The FWC will schedule this meeting.
6. The FWC agrees to offer boating safety, crime prevention, and other types of outreach events on DEP-managed lands.
7. The FWC will provide no less than one hour during each academy class for a representative of the DRP and CAMA to address the recruits.
8. The DRP will provide no less than one hour during each Ranger Academy for a representative of the FWC-DLE to address the participants.
9. The DRP and CAMA shall report incidents and make requests for law enforcement service to the FWC's Regional Communications Centers. This will enable the FWC to report an accurate accounting of law enforcement services provided to the DEP.

The FWC is committed to rendering the best possible law enforcement patrol and investigative services to the DEP, specifically, the DRP, CAMA, and the regulatory programs associated with Chapters 161, 258, 373, 376, and 403, Fla. Stat.

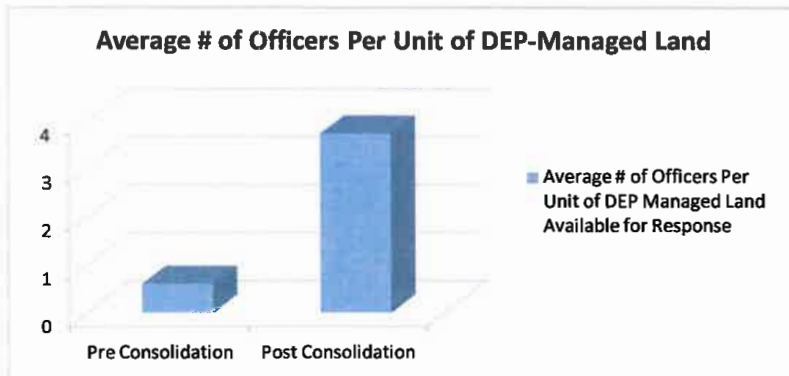
The FWC agrees to furnish uniformed law enforcement personnel to patrol State Parks and other DEP-managed lands for violations of the DEP's administrative rules and for criminal violations of the laws of Florida. As described below, the FWC will provide an increase over the level of patrol provided by the former DEP-DLE, unless the Legislature mandates a reduction in positions or budget funded by the Land Acquisition Trust Fund, which necessitates a reduction in overall services provided by the FWC. The FWC will also provide the equipment, training, facilities, and supervision necessary to deliver those law enforcement patrol services.

The FWC agrees to furnish the following:

1. The DEP-DLE currently supplies the DEP annually with approximately 118,174 hours of uniformed law enforcement patrol. The FWC agrees to increase those hours over the next five years by reclassifying 10% of the former DEP-DLE, Bureau of Park Police (BPP) supervisory-level positions to officer-level positions. The duties of the reclassified positions will be to patrol State Parks and other DEP-managed lands.



2. The DEP currently has an average of .6 officer positions per State Park and unit of other DEP-managed lands to respond to calls for service on said properties. Post-Transfer, the average number of officer positions per State Park and unit of other DEP-managed lands that will be available to respond to calls for service on said properties will be 3.74, or a 523% increase. The parties agree that all calls for service will take precedence over routine patrol of privately-owned property and routine patrol of state-owned or managed property.



The FWC concludes that the presence of uniformed law enforcement personnel is a deterrent to crime. The parties agree that uniformed presence is a common strategy employed by law enforcement agencies in order to reduce violations (as practiced by the Florida Highway Patrol in speeding enforcement on Interstate highways). The parties agree that the presence of law enforcement personnel often results in an increase in detection of certain offenses and the likely prevention of an unquantifiable number of other unknown incidents. It is presumed that the overall prevention of

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incidents will become more effective over time as the increased presence of law enforcement personnel begins to deter criminal activity.

The parties mutually expect to realize a cost savings to the people of the state through increased prevention, shorter response time and distance, more patrol officers, and reclassification of supervisory level positions. It is also expected that local and county governments will see a cost savings as the FWC supplants the counties' sheriff's offices as primary in responding to most calls for service in the State Parks and on other DEP-managed lands during times and in locations that the DEP-DLE historically was unable to deliver service.

The transit time between the DEP-managed properties is currently included in the documentation of the DEP-DLE patrol hours. The FWC does not include transit time between properties as patrol hours. The FWC will continue to document and record transit time separately from the number of patrol hours. The FWC intends to apply its current method for documenting patrol hours to its patrol of State Parks and other DEP-managed lands subsequent to the Transfer. Any comparison made between current patrol hours received by the DEP from the DEP-DLE and subsequent patrol hours received by the DEP from the FWC shall include an acknowledgment and explanation of such difference.

The DRP will work closely with and provide the FWC with access to all lands managed by the DRP in order to facilitate the provision of law enforcement services by the FWC.

The FWC agrees to provide law enforcement investigative personnel to conduct investigations for criminal violations associated with Chapters 161, 258, 373, 376, and 403, Fla. Stat. It also agrees to provide those personnel with the equipment, training, facilities, and supervision necessary for them to perform those duties. The FWC agrees to continue providing these services unless legislative action related to staffing or budgetary issues requires a reduction in overall services being provided by the FWC.

The FWC agrees to continue providing personnel and support for response to pollutant spills, releases of hazardous substances and hazardous wastes, and natural disasters. The OER will not be transferred to the FWC, and the DEP will retain all personnel, property, duties, responsibilities, and management of the OER and its mission.

The DEP agrees to continue providing personnel and support from the OER and the DEP Bureau of Laboratories for criminal investigative forensic services.

The FWC will continue to provide law enforcement services on CAMA-managed areas. The CAMA will also work closely with and provide the FWC with access to all areas managed by CAMA in order to facilitate such provision of law enforcement services by the FWC.

The Divisions and Regulatory Districts within DEP heretofore receiving law enforcement services from the DEP-DLE will work closely with and provide the FWC with access to all buildings and facilities, other than residences managed by the DEP, in order to facilitate the provision of law enforcement services by the FWC.

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Each party agrees to furnish necessary equipment, personnel, resources, and facilities, and to render services to the other as set forth in this MOA; however, no party shall be required to unreasonably deplete its own equipment, personnel, resources, facilities, and services in furtherance of this MOA.

PUBLIC RECORDS

The DEP acknowledges that any request for records or documents made by the FWC as part of an ongoing criminal investigation or that may be considered a request related to criminal intelligence information and any response by DEP to any such request is exempt from production pursuant to Section 119.071(2)(c) 2. a., Fla. Stat. The DEP agrees that it will not produce any records or documents in response to a public records request for such information without the knowledge and consent of the FWC.

The DEP acknowledges that certain personal information, as identified by Section 119.071, Fla. Stat., regarding law enforcement personnel is confidential and exempt from production pursuant to that section. The DEP agrees to maintain the confidential and exempt nature of all such information as may remain in its possession following the execution of this MOA.

The DEP acknowledges that all documents regarding an active criminal investigation or that are active criminal intelligence information, as defined by Section 119.011, Fla. Stat., are exempt from production pursuant to Section 119.071(c)(1), Fla. Stat. The DEP agrees to maintain the exempt nature of all such information as may remain in its possession following the execution of this MOA.

The DEP acknowledges that all documents regarding surveillance techniques, as defined by Section 119.011, Fla. Stat., are exempt from production pursuant to Section 119.071(c)(1), Fla. Stat. The DEP agrees to maintain the exempt nature of all such information as may remain in its possession following the execution of this MOA.

STANDARD OPERATING PROCEDURES

By no later than July 2, 2012, the DEP shall adopt a policy for the proper collection, handling, preservation, storage, and transportation of evidence seized as part of a criminal investigation. This policy shall be in compliance with applicable accreditation standards for the Commission for Florida Law Enforcement Accreditation (CFA), and shall be revised to reflect changes in any applicable accreditation standards, if necessary. The DEP shall consult with the FWC prior to adoption or implementation of any changes to this policy.

The DEP shall permit the FWC to conduct annual inspections and inventories of any evidence storage facilities used, controlled, or managed by the OER. The DEP agrees to immediately correct any deficiencies identified by the FWC as a result of the inspections and inventories.

The DEP agrees that the public safety communications (dispatch) services heretofore provided to the DEP-DLE, including to the OER, under agreement with the Florida Department of Highway Safety and

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Motor Vehicles will be transitioned to similar services provided by the FWC. The DEP agrees to comply with any protocol established by the FWC in its use of these services as they are implemented.

The FWC's personnel shall be responsible for complying with all applicable FWC policies, and the DEP's personnel shall be responsible for complying with all applicable DEP policies, except as noted in the previous paragraph regarding the OER's use of the FWC's dispatch services.

LIABILITY

Each party agrees to assume its own liability and responsibility for the acts, omissions, or conduct of such party's own employees in relation to this MOA, subject to the provisions of Section 768.28, Fla. Stat., where applicable, and subject to other relevant state and federal law.

Nothing in this MOA shall be construed as a waiver of sovereign immunity or to the provisions of Section 768.28(5), Fla. Stat., by either of the parties or the State of Florida in general.

FUNDING AND COSTS

The agency furnishing any equipment pursuant to this MOA shall bear the loss or damage to such equipment and shall pay any expenses incurred in the operation and maintenance thereof.

The DEP agrees that it will work with the FWC to maintain current and seek appropriate future funding for the positions and property being transferred to the FWC that are funded through any trust fund overseen by the DEP.

AMENDMENTS AND TERMINATION

Amendments to this MOA shall be in writing only and executed by both parties. The MOA managers are hereby delegated the authority, after complying with each agency's review and routing procedures, to execute any amendments to this MOA, and those amendments are thereby binding on the parties to the extent allowed by law.

This MOA may be terminated only as provided or required by law.

MOA MANAGERS

Department of Environmental Protection

Fish and Wildlife Conservation Commission

Director Donald Forgione
3900 Commonwealth Boulevard
Tallahassee, FL 32399
(850) 245-3029

Colonel Jim Brown
620 South Meridian Street
Tallahassee, FL 32399
(850) 488-6251

Each party shall, within 30 days, provide the other party notice of a change in MOA manager.

The parties mutually agree to abide by the terms hereof, as reflected by the acknowledgments of their duly-authorized officials below:

Department of Environmental Protection

Fish and Wildlife Conservation Commission

Signed by:  Date: 7/20/12
Name: Herschel T. Vinyard Jr.

Signed by:  Date: 7-9-12
Name: Nick Wiley

Title: Secretary, Department of Environmental Protection

Title: Executive Director, Fish and Wildlife Conservation Commission

Approved as to form and legality,
subject to execution:

Approved as to form and legality,
subject to execution:

Signed by:  Date: 7/12/12
Name: Reagan K. Russell

Signed by:  Date: 7/2/12
Name: Harold Vielhauer

Title: Senior Assistant General Counsel,
Department of Environmental Protection

Title: General Counsel, Fish and Wildlife Conservation Commission

AGREEMENT RELATED TO SHARED FACILITIES

CURRENT LOCATION	DEP Bldg or Prop #	Offices Occupied By FWC/DLE	Offices Occupied By DER	Bldg. Type	Manager of Property/Facility	LEASE/RENT CURRENTLY PAID BY DLE	UTILITIES CURRENTLY PAID BY							
							Electric	Water	Sewer	Garbage/ Recycling	Phone/ Internet	Other		
Anastasia State Park - 1340-A A1A South St. Augustine, FL 32080-5422	BL003042	0	0	Workstation	Florida State Park	NO	Park	Park	Park	Park	Park	Park	Park	N/A
Big Lagoon SP - Pensacola	N/A	0	0	Outdoor Storage Space	Florida State Park	NO	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Big Pine Key - Bahia Honda S.P.	BL005003/ shared with DRP	0	0	Evidence locker in storage bldg.	Florida State Park	NO	Park	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Bill Baggs Cape FL SP	N/A	0	0	Outdoor Storage Space	Florida State Park	NO	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Bill Baggs Cape FL SP	BL011042/ shared with DRP	0	0	Storage Space	Florida State Park	NO	Park	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Blue Springs SP - Orange City - 2100 West French Avenue	BL200401	0	0	Evidence Locker/Storage Space	Florida State Park	NO	DLE	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Blue Springs State Park	00139755	0	0	Outdoor Storage Space	Florida State Park	NO	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Bulow Creek	BL139008	0	0	Shed	Florida State Park	NO	Park	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Bulow Creek	BL139009	0	0	Workstation	Florida State Park	NO	Park	Park	N/A	N/A	N/A	N/A	N/A	N/A
Cayo Costa SP - Boca Grande	00130793	0	0	Outdoor Storage Space	Florida State Park	NO	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Charlotte Harbor Preserve SP - Punta Gorda	BL600105	0	0	Outdoor Storage Space	Florida State Park	NO	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Charlotte Harbor Preserve State Park	BL100090	0	0	Indoor storage	Florida State Park	NO	Park	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Crystal River - 10247 N Suncoast Blvd.	BL600104	0	0	Outdoor Storage Space	Florida State Park	NO	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Deleon Springs - 601 Ponce Deleon Blvd.	00140913	0	0	Outdoor Storage Space	Florida State Park	NO	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Deleon Springs SP - Deleon Springs	00132189	0	0	Outdoor Storage Space	Florida State Park	NO	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Deleon Springs-601 Ponce Deleon		1	0	Office Space	Florida State Park	NO	Park	Park	Park	Park	Park	Park	Park	N/A
Delnor-Wiggins Pass S.P. - Naples	N/A	0	0	Outdoor Storage Space	Florida State Park	NO	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Delnor-Wiggins Pass S.P. - Naples	BL191004	0	0	Shop/Storage	Florida State Park	NO	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Florida Caverns SP - Marianna	BL025029	0	0	Evidence Locker located at park shop	Florida State Park	NO	Park	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Fort Clinch State Park - Fernandina Beach	N/A	0	0	Outdoor Boat Storage	Florida State Park	NO	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Fort George-Talbot Islands	N/A	0	0	Outdoor Boat Storage	Florida State Park	NO	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Fort White-Ichluucknee Springs	N/A	0	0	Outdoor equipment storage	Florida State Park	NO	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

CURRENT LOCATION	DEP Bid or Prop #	Offices Occupied By FWC/DLE	Offices Occupied By OER	Bldg. Type	Manager of Property/Facility	LEASE/RENT CURRENTLY PAID BY DLE	UTILITIES CURRENTLY PAID BY								
							Electric	Water	Sewer	Garbage/ Recycling	Phone/ Internet	Other			
Fred Gannon Rocky Bayou SP - Crestview	N/A	0	0	Outdoor Storage Space	Florida State Park	NO	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Fl. Myers - Victoria Ave.		5	2	Office	Reg District Office	DLE (60%) OER(40%)	Regulatory	Regulatory	Regulatory	Regulatory	Regulatory	Regulatory	Regulatory	N/A	N/A
Fl. Pierce Inlet S.P. - Ft. Pierce	N/A	0	0	Outdoor Storage Space	Florida State Park	NO	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Fl. Zachary Taylor H.S.P. - Key West	BL125007/ shared with DRP	0	0	Evidence Locker	Florida State Park	NO	Park	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Fl. Zachary Taylor H.S.P. - Key West	BL125009	0	0	Outdoor Storage Space	Florida State Park	NO	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Gold Head Branch SP - Keystone Heights	BL187011	0	0	Evidence Locker/Storage Space	Florida State Park	NO	DLE	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Henderson Beach SP - Destin-	BL186003	0	0	Evidence Locker located at park shop and outside storage	Florida State Park	NO	Park	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Highlands Hammock State Park	BL036008	0	0	Indoor storage (locker)	Florida State Park	NO	Park	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Highlands Hammock State Park	BL036052	0	0	Pole barn (outdoor)	Florida State Park	NO	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Hillsborough River SP - Thonotosassa - 15402 US 301 N	BL600112	0	0	Outdoor Storage Space	Florida State Park	NO	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Hillsborough River State Park	BL600074	0	0	Modular Office	Florida State Park	NO	Park	Park	Park	Park	Park	Park	Park	N/A	N/A
Holt-Blackwater River SP	BL008018	0	0	Evidence Locker located at Ranger Station	Florida State Park	NO	Park	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Homosassa Springs-HSSP	BL218025	0	0	Evidence Locker	Florida State Park	NO	Park	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Honeymoon Island - Dunedin - 1 Causeway Blvd.	BL200301	0	0	Outdoor Storage Space	Florida State Park	NO	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Honeymoon Island - Dunedin - 1 Causeway Blvd.	BL600111	0	0	Outdoor Storage Space	Florida State Park	NO	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Honeymoon Island State Park	N/A	0	0	Boat slip w/lift	Florida State Park	NO	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Honeymoon Island State Park	BL120002	0	0	Workstation	Florida State Park	NO	Park	Park	Park	Park	Park	Park	Park	N/A	N/A
Jacksonville - Baymeadows Way		6	3	Office	Reg District Office	OER	Regulatory	Regulatory	Regulatory	Regulatory	Regulatory	Regulatory	Regulatory	N/A	N/A
John Pennekamp - Key Largo - 3 LaCroix Court	BL600107	0	0	Outdoor Storage Space	Florida State Park	NO	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
John Pennekamp - Key Largo - 3 LaCroix Ct.		1	0	Office	Florida State Park	NO	Park	Park	Park	Park	Park	Park	Park	N/A	N/A
John U Lloyd Beach SP - Dania	00124951	0	0	Outdoor Storage Space	Florida State Park	NO	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
John U Lloyd Beach SP - Dania Beach	BL107009/ shared with DRP	0	0	Gas Shed	Florida State Park	NO	Park	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

CURRENT LOCATION	DEP Bldg or Prop #	Offices Occupied By FWC/DLE	Offices Occupied By OER	Bldg. Type	Manager of Property/Facility	LEASE/RENT CURRENTLY PAID BY DLE	UTILITIES CURRENTLY PAID BY							
							Electric	Water	Sewer	Garbage/ Recycling	Phone/ Internet	Other		
Jonathan Dickenson SP - Hobe Sound - 13796 SE Federal Hwy	BL600109	0	0	Outdoor Storage Space	Florida State Park	NO	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Jonathan Dickenson SP - Hobe Sound - 13796 SE Federal Hwy		3	0	Office	Florida State Park	NO	Park	Park	Park	Park	Park	Park	Park	Pest Control -DLE
Koresian State Historic Site	N/A	0	0	Outdoor Storage Space	Florida State Park	NO	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Lignumvitae Key Botanical SP	N/A	0	0	Outdoor dock slip shared with DRP	Florida State Park	NO	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Little Talbot Island SP - Jacksonville	BL600116	0	0	Outdoor Storage Space	Florida State Park	NO	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Lovers Key - Ft. Myers - 8700 Estero Blvd.	BL600106	0	0	Outdoor Storage Space	Florida State Park	NO	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Meaday Gardens - Tallahassee	BL500020	0	0	Workstation	Florida State Park	NO	Park	Park	Park	Park	Park	Park	N/A	N/A
Myakka River State Park	N/A	0	0	Outdoor Storage Space	Florida State Park	NO	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
North Miami -3200 NE 151st St.		1	0	Office	FWC	NO	FWC	FWC	FWC	FWC	FWC	FWC	FWC	N/A
O'Leno State Park - High Springs	00130790	0	0	Outdoor Storage Space	Florida State Park	NO	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
O'Leno State Park - High Springs	BL600110	0	0	Outdoor Storage Space	Florida State Park	NO	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Oleia River SP - North Miami	00132188	0	0	Outdoor Storage Space	Florida State Park	NO	Park	Park	Park	Park	Park	Park	Park	Pest Control -DLE
Orlando - Maguire Blvd.		5	4	Office	Reg District Office	OER	Regulatory	Regulatory	Regulatory	Regulatory	Regulatory	Regulatory	Regulatory	N/A
Oscar Scherer State Park	BL132865	0	0	Shed (outdoor)	Florida State Park	NO	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Paynes Prairie SP - Gainesville-		1	0	Office	Florida State Park	NO	DLE	Park	Park	Park	Park	DLE	DLE	Pest Control -DLE
Pensacola - Government Center		1	2	Office	Reg District Office	NO	Regulatory	Regulatory	Regulatory	Regulatory	Regulatory	Regulatory	Regulatory	N/A
Sebastian Inlet State Park		0	0	Workstation	Florida State Park	NO	Park	Park	Park	Park	Park	Park	Park	N/A
St Andrews SP - Panama City - 4505	BL067069	0	0	Outdoor Storage Space	Florida State Park	NO	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
STATE PARK LANE														
St Andrews SP - Panama City - 4505	BL067060	0	0	Outdoor Storage Space	Florida State Park	NO	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
STATE PARK LANE														
St Andrews SP - Panama City - 4505	BL600113	0	0	Outdoor Storage Space	Florida State Park	NO	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
STATE PARK LANE														
St Andrews SP - Panama City-		4	0	Office	Florida State Park	NO	Park	Park	Park	Park	Park	Park	Park	N/A
St. George Island SP	BL0689028	0	0	Evidence Locker located in Ranger Station	Florida State Park	NO	Park	N/A	N/A	N/A	N/A	N/A	N/A	N/A
St. Sebastian Park Preserve (Fellsmeare)		1	0	Office	Florida State Park	NO	Park	Park	Park	Park	Park	Park	Park	N/A
Stump Pass State Park	N/A	0	0	Boat slip w/ 2 lifts	Florida State Park	NO	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tallahassee - Annex Bldg		12	9	Office	DEP Headquarters	NO	OER	DLE	DLE	DLE	DLE	DLE	DLE	Janitorial - OER
Tallahassee - Douglas Bldg 7th floor		45	0	Office	DEP Headquarters	DLE	DLE	DLE	DLE	DLE	DLE	DLE	DLE	N/A
Tallahassee Annex Fenced Compound	BL600115	0	0	Outdoor Storage Space	DEP Headquarters	NO	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

CURRENT LOCATION	DEP Bldg or Prop #	Offices Occupied By FWC/DLE	Offices Occupied By OER	Bldg. Type	Manager of Property/Facility	LEASE/RENT CURRENTLY PAID BY DLE	UTILITIES CURRENTLY PAID BY					
							Electric	Water	Sewer	Garbage/ Recycling	Phone/ Internet	Other
Tampa - Telecom Pkwy.		6	7	Offices	Reg District Office	DLE(48%) OER(52%)	Regulatory	Regulatory	Regulatory	Regulatory	Regulatory	N/A
Terra Ceia Preserve State Park	N/A	0	0	Outdoor Storage Space	Florida State Park	NO	N/A	N/A	N/A	N/A	N/A	N/A
Tomoka SP - Ormond Beach - 2099 N. Beach St.	00140879	0	0	Outdoor Storage Space	Florida State Park	NO	N/A	N/A	N/A	N/A	N/A	N/A
W. Palm Beach-400 N. Congress Ave.		5		Offices	Reg District Office	NO	Regulatory	Regulatory	Regulatory	Regulatory	N/A	N/A
Wekiwa Springs State Park	BL080005	0	0	Workstation in Ranger Station	Florida State Park	NO	Park	Park	Park	Park	N/A	N/A
Wekiwa State Park - Apopka - 1800 Wekiwa Circle	00130484	0	0	Outdoor Storage Space	Florida State Park	NO	N/A	N/A	N/A	N/A	N/A	N/A
Wekiwa State Park - Apopka - 1800 Wekiwa Circle	BL600103	0	0	Outdoor Storage Space	Florida State Park	NO	N/A	N/A	N/A	N/A	N/A	N/A
Werner-Boyce Salt Springs State Park	BL259005	0	0	Outdoor Storage Space	Florida State Park	NO	N/A	N/A	N/A	N/A	N/A	N/A
Werner-Boyce Salt Springs State Park	BL259007	0	0	Workstation Office	Florida State Park	NO	Park	Park	Park	Park	N/A	N/A
Ybor City Museum		1	0	Office	Florida State Park	NO	Park	Park	Park	Park	N/A	N/A

CSL Cover Sheet

DM ID _____

Document Type: Current Submerged Land Leases

Instrument: Parent Lease Amendment to Lease Assignment of Lease

Release Partial Release Easement Use Agreement Sublease

Amendment to Sublease Release of Sublease Other

Lease Number: 360032595

PA Number: 36-0181011-001

Document Date: 10/30/2003

Submerged (Use Agreement): _____ (Y) _____ (N)

Original County: LEE

Section: 19 and 24

Township: 465

Range: 24E

Total Area / Area Unit: 1,954.346 (A) Acreage (S) Square Feet

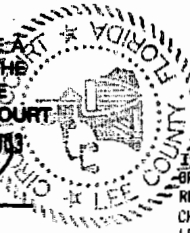
County Book / Page / Type: LEE IB 4127 IP 44910

OR Instrument Number: _____

Comments: W/B Matanzas Pass

I CERTIFY THIS DOCUMENT TO BE A TRUE AND CORRECT COPY OF THE ORIGINAL ON FILE IN MY OFFICE
CHARLIE GREEN, CLERK CIRCUIT COURT
LEE COUNTY, FLORIDA NOV 20 2003

DATE: Janita Lewis
BY: Janita Lewis
Deputy Clerk



INSTR # 6053128
BR BK 04127 Pgs 0449 - 458; (10pgs)
RECORDED 11/20/2003 03:57:41 PM
CHARLIE GREEN, CLERK OF COURT
LEE COUNTY, FLORIDA
RECORDING FEE 46.50
DEPUTY CLERK C Keller

This Instrument Prepared By:
M. Sue Jones
Recurring Revenue Section
Bureau of Public Land Administration
3900 Commonwealth Boulevard
Mail Station No. 125
Tallahassee, Florida 32399

BOARD OF TRUSTEES OF THE INTERNAL IMPROVEMENT TRUST FUND
OF THE STATE OF FLORIDA

SOVEREIGNTY SUBMERGED LANDS LEASE

BOT File No. 360032595
PA No. 36-0181011-001

10

THIS LEASE is hereby issued by the Board of Trustees of the Internal Improvement Trust Fund of the State of Florida, hereinafter referred to as the Lessor.

WITNESSETH: That for and in consideration of the faithful and timely performance of and compliance with all terms and conditions stated herein, the Lessor does hereby lease to Town of Fort Myers Beach, Florida, hereinafter referred to as the Lessee, the sovereign lands described as follows:

Two parcels of sovereign submerged land in Sections 19 and 24, Township 46 South, Range 24 East, in Matanzas Pass, Lee County, containing 1,954,346 square feet, more or less, as is more particularly described and shown on Attachment A, dated February 6, 2002.

TO HAVE THE USE OF the hereinabove described premises for a period of 10 years from November 26, 2002, the effective date of this lease. The terms and conditions on and for which this lease is granted are as follows:

1. **USE OF PROPERTY:** The Lessee is hereby authorized to construct and operate a 70-slip managed municipal anchorage mooring field exclusively to be used for mooring of recreational vessels in conjunction with an adjacent marina, located on private submerged lands, having a ship's store, shore side amenities and harbormaster facilities, without fueling facilities, with a sewage pumpout facility if it meets the regulatory requirements of the Department of Environmental Protection or local authority, whichever entity applies the more stringent criteria, and with liveboards as defined in paragraph 24, as shown and conditioned in Attachment A, and the Department of Environmental Protection, Consolidated Environmental Resource Permit No. 36-0181011-001, dated June 25, 2003, incorporated herein and made a part of this lease by reference. The construction of the structures described in Attachment A shall be completed within the initial term hereof or within the first 5 years of the initial term if the initial term is for a period greater than 5 years. The failure to complete the construction of all authorized structures within this time period shall constitute a material breach of the lease causing the lease to automatically terminate upon the expiration of the initial term or first 5 years, whichever is sooner, without any right of renewal. All of the foregoing subject to the remaining conditions of this Lease.

2. **AGREEMENT TO EXTENT OF USE:** This lease is given to the Lessee to use or occupy the leased premises only for those activities specified herein and as conditioned by the Department of Environmental Protection, Consolidated Environmental Resource Permit. The Lessee shall not change or add to the approved use of the leased premises as defined herein (e.g., from commercial to multi-family residential, from temporary mooring to rental of wet slips, from rental of wet slips to contractual agreement with third party for docking of cruise ships, from rental of recreational pleasure craft to rental or temporary mooring of charter/tour boats, from loading/offloading commercial to rental of wet slips, etc.), shall not change activities in any manner that may have an environmental impact that was not considered in the original authorization or regulatory permit, or shall not change the type of use of the riparian uplands without first obtaining a regulatory permit/modified permit, if applicable, and the Lessor's written authorization in the form of a modified lease, the payment of additional fees, if applicable, and, if applicable, the removal of any structures which may no longer qualify for authorization under the modified lease.

[29]



3. **PROPERTY RIGHTS:** The Lessee shall make no claim of title or interest to said lands hereinbefore described by reason of the occupancy or use thereof, and all title and interest to said land hereinbefore described is vested in the Lessor. The Lessee is prohibited from including, or making any claim that purports to include, said lands described or the Lessee's leasehold interest in said lands into any form of private ownership, including but not limited to any form of condominium or cooperative ownership. The Lessee is further prohibited from making any claim, including any advertisement, that said land, or the use thereof, may be purchased, sold, or re-sold.

4. **ASSIGNMENT OF LEASE:** This lease shall not be assigned or otherwise transferred without prior written consent of the Lessor or its duly authorized agent. Such assignment or other transfer shall be subject to the terms, conditions and provisions of management standards and applicable laws, rules and regulations in effect at that time. Any assignment or other transfer without prior written consent of the Lessor shall be null and void and without legal effect.

5. **INDEMNIFICATION/INVESTIGATION OF ALL CLAIMS:** The Lessee shall investigate all claims of every nature arising out of this lease at its expense, and shall indemnify, defend and save and hold harmless the Lessor and the State of Florida from all claims, actions, lawsuits and demands arising out of this lease.

6. **VENUE:** Lessee waives venue as to any litigation arising from matters relating to this lease and any such litigation between Lessor and Lessee shall be initiated and maintained only in Leon County, Florida.

7. **NOTICES/COMPLIANCE/TERMINATION:** The Lessee binds itself, its successors and assigns, to abide by the provisions and conditions herein set forth, and said provisions and conditions shall be deemed covenants of the Lessee, its successors and assigns. In the event the Lessee fails or refuses to comply with the provisions and conditions herein set forth, or in the event the Lessee violates any of the provisions and conditions herein, or fails or refuses to comply with the provisions and conditions herein set forth within 20 days of receipt of the Lessor's notice to correct, this lease may be terminated by the Lessor upon thirty (30) days written notice to Lessee. If canceled, all of the above-described parcel of land shall revert to the Lessor. All costs and attorneys' fees incurred by the Lessor to enforce the provisions of this lease shall be paid by the Lessee. All notices required to be given to the Lessee by this lease or applicable law or administrative rules shall be sufficient if sent by U.S. Mail to the following address:

Town of Fort Myers Beach
Town Council
2523 Estero Blvd.
Fort Myers Beach, Florida 33931

The Lessee shall notify the Lessor by certified mail of any change to this address at least ten (10) days before the change is effective.

8. **TAXES AND ASSESSMENTS:** The Lessee shall assume all responsibility for liabilities that accrue to the subject property or to the improvements thereon, including any and all drainage or special assessments or taxes of every kind and description which are now or may be hereafter lawfully assessed and levied against the subject property during the effective period of this lease.

9. **NUISANCES OR ILLEGAL OPERATIONS:** The Lessee shall not permit the leased premises or any part thereof to be used or occupied for any purpose or business other than herein specified unless such proposed use and occupancy are consented to by the Lessor and the lease is modified accordingly, nor shall Lessee knowingly permit or suffer any nuisances or illegal operations of any kind on the leased premises.

10. **MAINTENANCE OF FACILITY/RIGHT TO INSPECT:** The Lessee shall maintain the leased premises in good condition, keeping the structures and equipment located thereon in a good state of repair in the interests of public health, safety and welfare. No dock or pier shall be constructed in any manner that would cause harm to wildlife. The leased premises shall be subject to inspection by the Lessor or its designated agent at any reasonable time.

Page 2 of 10 Pages
Sovereignty Submerged Lands Lease No. 360032595

11. **NON-DISCRIMINATION:** The Lessee shall not discriminate against any individual because of that individual's race, color, religion, sex, national origin, age, handicap, or marital status with respect to any activity occurring within the area subject to this lease or upon lands adjacent to and used as an adjunct of the leased area. During the lease term, the Lessee shall post and maintain the placard furnished to the Lessee by the Lessor in a prominent and visible location on the leased premises or adjacent business office of the Lessee. It shall be the responsibility of the Lessee to post the placard in a manner which will provide protection from the elements, and, in the event that said placard becomes illegible at any time during the term of this lease (including any extensions thereof), to notify the Lessor in writing, so that a replacement may be provided.

12. **ENFORCEMENT OF PROVISIONS:** No failure, or successive failures, on the part of the Lessor to enforce any provision, nor any waiver or successive waivers on its part of any provision herein, shall operate as a discharge thereof or render the same inoperative or impair the right of the Lessor to enforce the same upon any renewal thereof or in the event of subsequent breach or breaches.

13. **PERMISSION GRANTED:** Upon expiration or cancellation of this lease all permission granted hereunder shall cease and terminate.

14. **RENEWAL PROVISIONS:** Renewal of this lease shall be at the sole option of the Lessor. Such renewal shall be subject to the terms, conditions and provisions of management standards and applicable laws, rules and regulations in effect at that time. In the event that Lessee is in full compliance with the terms of this lease, the Lessee may apply in writing for a renewal. Such application for renewal must be received by Lessor no sooner than 120 days and no later than 30 days prior to the expiration date of the original or current term hereof. The term of any renewal granted by the Lessor shall commence on the last day of the previous lease term. If the Lessee fails to timely apply for a renewal, or in the event the Lessor does not grant a renewal, the Lessee shall vacate the leased premises and remove all structures and equipment occupying and erected thereon at its expense.

15. **REMOVAL OF STRUCTURES/ADMINISTRATIVE FINES:** If the Lessee does not remove said structures and equipment occupying and erected upon the leased premises after expiration or cancellation of this lease, such structures and equipment will be deemed forfeited to the Lessor, and the Lessor may authorize removal and may sell such forfeited structures and equipment after ten (10) days written notice by certified mail addressed to the Lessee at the address specified in Paragraph 7 or at such address on record as provided to the Lessor by the Lessee. However, such remedy shall be in addition to all other remedies available to the Lessor under applicable laws, rules and regulations including the right to compel removal of all structures and the right to impose administrative fines.

16. **REMOVAL COSTS/LIEN ON RIPARIAN UPLAND PROPERTY:** Any costs incurred by the Lessor in removal of any structures and equipment constructed or maintained on state lands shall be paid by Lessee enforceable in summary proceedings as provided by law.

17. **RECORDATION OF LEASE:** The Lessee, at its own expense, shall record this fully executed lease in its entirety in the public records of the county within which the lease site is located within fourteen (14) days after receipt, and shall provide to the Lessor within ten (10) days following the recordation a copy of the recorded lease in its entirety which contains the O.R. Book and pages at which the lease is recorded.

18. **RIPARIAN RIGHTS/FINAL ADJUDICATION:** In the event that any part of any structure authorized hereunder is determined by a final adjudication issued by a court of competent jurisdiction to encroach on or interfere with adjacent riparian rights, Lessee agrees to either obtain written consent for the offending structure from the affected riparian owner or to remove the interference or encroachment within 60 days from the date of the adjudication. Failure to comply with this paragraph shall constitute a material breach of this lease agreement and shall be grounds for immediate termination of this lease agreement at the option of the Lessor.

19. **AMENDMENTS/MODIFICATIONS:** This lease is the entire and only agreement between the parties. Its provisions are not severable. Any amendment or modification to this lease must be in writing, must be accepted, acknowledged and executed by the Lessee and Lessor, and must comply with the rules and statutes in existence at the time of the execution of the modification or amendment. Notwithstanding the provisions of this paragraph, if mooring is authorized by this lease, the Lessee may install boatlifts within the leased premises without formal modification of the lease provided that (a) the Lessee obtains any state or local regulatory permit that may be required; and (b) the location or size of the lift does not increase the mooring capacity of the facility.

Page 3 of 10 Pages
Sovereignty Submerged Lands Lease No. 360032595

20. **ADVERTISEMENT/SIGNS/NON-WATER DEPENDENT ACTIVITIES/ADDITIONAL ACTIVITIES/MINOR STRUCTURAL REPAIRS:** No permanent or temporary signs directed to the boating public advertising the sale of alcoholic beverages shall be erected or placed within the leased area. No restaurant or dining activities are to occur within the leased area. The Lessee shall ensure that no permanent, temporary or floating structures, fences, docks, pilings or any structures whose use is not water-dependent shall be erected or conducted over sovereignty submerged lands without prior written consent from the Lessor. No additional structures and/or activities including dredging, relocation/realignment or major repairs or renovations to authorized structures, shall be erected or conducted on or over sovereignty, submerged lands without prior written consent from the Lessor. Unless specifically authorized in writing by the Lessor, such activities or structures shall be considered unauthorized and a violation of Chapter 253, Florida Statutes, and shall subject the Lessee to administrative fines under Chapter 18-14, Florida Administrative Code. This condition does not apply to minor structural repairs required to maintain the authorized structures in a good state of repair in the interests of public health, safety or welfare; provided, however, that such activities shall not exceed the activities authorized by this agreement.

21. **ACOE AUTHORIZATION:** Prior to commencement of construction and/or activities authorized herein, the Lessee shall obtain the U.S. Army Corps of Engineers (ACOE) permit if it is required by the ACOE. Any modifications to the construction and/or activities authorized herein that may be required by the ACOE shall require consideration by and the prior written approval of the Lessor prior to the commencement of construction and/or any activities on sovereign, submerged lands.

22. **COMPLIANCE WITH FLORIDA LAWS:** On or in conjunction with the use of the leased premises, the Lessee shall at all times comply with all Florida Statutes and all administrative rules promulgated thereunder. Any unlawful activity which occurs on the leased premises or in conjunction with the use of the leased premises shall be grounds for the termination of this lease by the Lessor.

23. **LIVEABOARDS:** The term "liveaboard" is defined as a vessel docked at the facility and inhabited by a person or persons for any five (5) consecutive days or a total of ten (10) days within a thirty (30) day period. If liveaboards are authorized by paragraph one (1) of this lease, in no event shall such "liveaboard" status exceed six (6) months within any twelve (12) month period, nor shall any such vessel constitute a legal or primary residence.

24. **GAMBLING VESSELS:** During the term of this lease and any renewals, extensions, modifications or assignments thereof, Lessee shall prohibit the operation of or entry onto the leased premises of gambling cruise ships, or vessels that are used principally for the purpose of gambling, when these vessels are engaged in "cruises to nowhere," where the ships leave and return to the state of Florida without an intervening stop within another state or foreign country or waters within the jurisdiction of another state or foreign country, and any watercraft used to carry passengers to and from such gambling cruise ships.

25. **SPECIAL LEASE CONDITIONS:**

A. A minimum of 90 percent of the slips at the marina shall be made available for rent to the public maintained on a "first-come, first-served" basis. To help ensure compliance with the requirement and to assist in providing public awareness of this requirement, the Lessee shall erect permanent signs at the waterward entrance to the docking facility and at the upland entrance to the marina which are clearly visible to passing boaters and the general public. The signs shall contain language clearly indicating that no less than 90 percent of the slips within this docking facility are available for rental by the general public. Any dockage rate sheet publications and dockage advertising for the marina shall clearly state that slips are open to the public on a "first-come, first-served" basis

B. Lessee shall establish and maintain for the term of this lease and any subsequent renewal periods the manatee educational program as required by the Department of Environmental Protection Consolidated Environmental Resource Permit No. 36-0181011-001 dated June 25, 2003.

C. Lessee shall submit annual certified financial records of income and expenses to DEP's South District office, SLERP Compliance and Enforcement Section, at P.O. Box 2549, Fort Myers, Florida 33902-2549, or by fax machine at (239)332-6969. Those records shall include, but not be limited to, the books, records, contracts and other documents pertaining to the gross income derived from the mooring field, and expenses incurred by Lessee and the Harbormaster for operation and maintenance of the mooring field. Those annual certified financial records of income and expenses shall include ancillary income and expenses directly related to the mooring field, and net income derived from the mooring field. Gross income is defined as the actual income collected from the use of sovereignty submerged lands, and shall include any ancillary user charges required for and directly attributable to the use of the structures or activities on sovereignty submerged lands. The submitted information shall be certified by a certified public accountant. The Lessor reserves the right to assess the Lessee a lease fee, in accordance with section 18-21.011, F.A.C.

D. Lessee shall submit all ordinances that pertain to the "Town of Fort Myers Beach Matanzas Pass Municipal Anchorage", within 30 days of adoption. The Lessee shall ensure that any ordinances that are adopted are not contrary to Permit No. 36-0181011-001 or this mooring field lease (or any subsequent modification/renewal to either the permit or lease).

E. Prior to allowing any vessel to utilize the mooring field, the Lessee shall implement and maintain for the life of the facility the DEP-approved "Town of Fort Myers Beach Municipal Anchorage Matanzas Harbor Management Plan" (or a DEP approved modification of the same) attached to Permit No. 36-0181011-001 and incorporated herein into this mooring field lease by reference. Modifications to the referenced Plan may be made upon written agreement by both the Lessee and the Lessor. A violation of the above referenced plan is a direct violation of this lease.

F. Prior to allowing any vessel to utilize the mooring field, the Lessee shall execute and comply for the life of the facility the DEP-approved "Matanzas Harbor Mooring Fields Operations Town of Fort Myers Beach Municipal Anchorage Draft Agreement" (or a DEP approved modification of the same) attached to Permit No. 36-0181011-001 and incorporated herein into this mooring field lease by reference. Modification to the reference Agreement may be made upon written agreement by both the Lessee and the Lessor. A violation of the above referenced Agreement is a direct violation of this lease.

G. This lease allows the following nonstandard use: authorization to allow only 10 slips for use by liveaboard vessel occupants to moor beyond six months with the requirement that the Lessee review these ten individual Mooring Rental Agreements every six months for compliance purposes.

H. If the Lessee allows mooring at the leased facility of vessels occupied by a person or persons on an overnight basis, the Lessee shall provide and make available to such vessels operational and well maintained sewage pumpout facilities acceptable to the department or local government, whichever entity applies the more stringent criteria.

I. The terms and conditions herein, including those related to assessment of lease fees, may be reviewed at any time during the term of this lease as deemed necessary by the Lessor or its designated agent, and such terms and conditions may be modified or additional conditions may be imposed as deemed necessary by the Lessor. For the purpose of this provision the terms and conditions of the lease, including additional conditions, may be modified for, but not limited to the following reasons:

1. to conform to the adoption or revision of Florida Statutes (F.S.), rules, and standards that require the modification of the lease for compliance;
2. to ensure compliance with the federal Endangered Species Act, 16 USC, s. 1531, et seq., and the Florida Endangered and Threatened Species Act of 1977, section 372.072, F.S.;
3. to conform to adoption or revision of rules regarding the assessment of lease fees;
4. to conform to any modification to terms and conditions of a permit from the Department of Environmental Protection, the U.S. Army Corps of Engineers, or any other required form of approval; and,
5. to remove any structure declared to be a public nuisance.

Lessor shall allow a reasonable time for compliance with the amended or additional terms and conditions.

Page 5 of 10 Pages
Sovereignty Submerged Lands Lease No. 360032595

WITNESSES

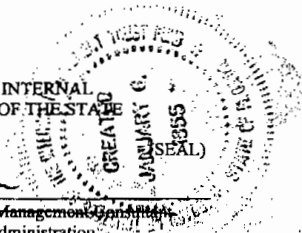
Glen Teal
Original Signature

Glen Teal
Print/Type Name of Witness

Jeff Gentry
Original Signature

Jeff Gentry
Print/Type Name of Witness

BOARD OF TRUSTEES OF THE INTERNAL
IMPROVEMENT TRUST FUND OF THE STATE
OF FLORIDA



BY: Ed Wood
* ~~Ralph M. Perkins, Operations and Management Consultant~~
* ~~Manager, Bureau of Public Land Administration,~~
* ~~Division of State Lands, Department of Environmental~~
* ~~Protection, as agent for and on behalf of the Board of Trustees of the~~
* ~~Internal Improvement Trust Fund of the State of Florida~~
* Ed Wood, Bureau Chief

"LESSOR"

STATE OF FLORIDA
COUNTY OF LEON

The foregoing instrument was acknowledged before me this 30th day of October, 2003, by
* ~~Ralph M. Perkins, Operations and Management Consultant~~ Manager, Bureau of Public Land Administration, Division of State
Lands, Department of Environmental Protection, as agent for and on behalf of the Board of Trustees of the Internal Improvement
Trust Fund of the State of Florida. He is personally known to me.

APPROVED AS TO FORM AND LEGALITY:

Amy K. Hosen
DEP Attorney

Florence L. Davis
Notary Public, State of Florida

Printed, Typed or Stamped Name

My Commission Expires October 11, 2004
Commission/Serial No. Florence L. Davis
MY COMMISSION # CC974560 EXPIRES
October 11, 2004
SIGNATURE INSURANCE, INC.

WITNESSES:

Michelle D. Mayher
Original Signature

MICHELLE D. MAYHER
Typed/Printed Name of Witness

Kath Knight
Original Signature

KATH KNIGHT, ADMIN.
Typed/Printed Name of Witness

STATE OF FLORIDA
COUNTY OF LEE

Town of Fort Myers Beach, Florida (SEAL)

BY: Daniel L. Hughes
Original Signature of Executing Authority

Daniel L. Hughes
Typed/Printed Name of Executing Authority

MAYOR
Title of Executing Authority

"LESSEE"

The foregoing instrument was acknowledged before me this 6 day of OCTOBER, 2003, by
Daniel L. Hughes as MAYOR, for and on behalf of Town of Fort Myers Beach, Florida. He is personally known to me or who has
produced _____ as identification.

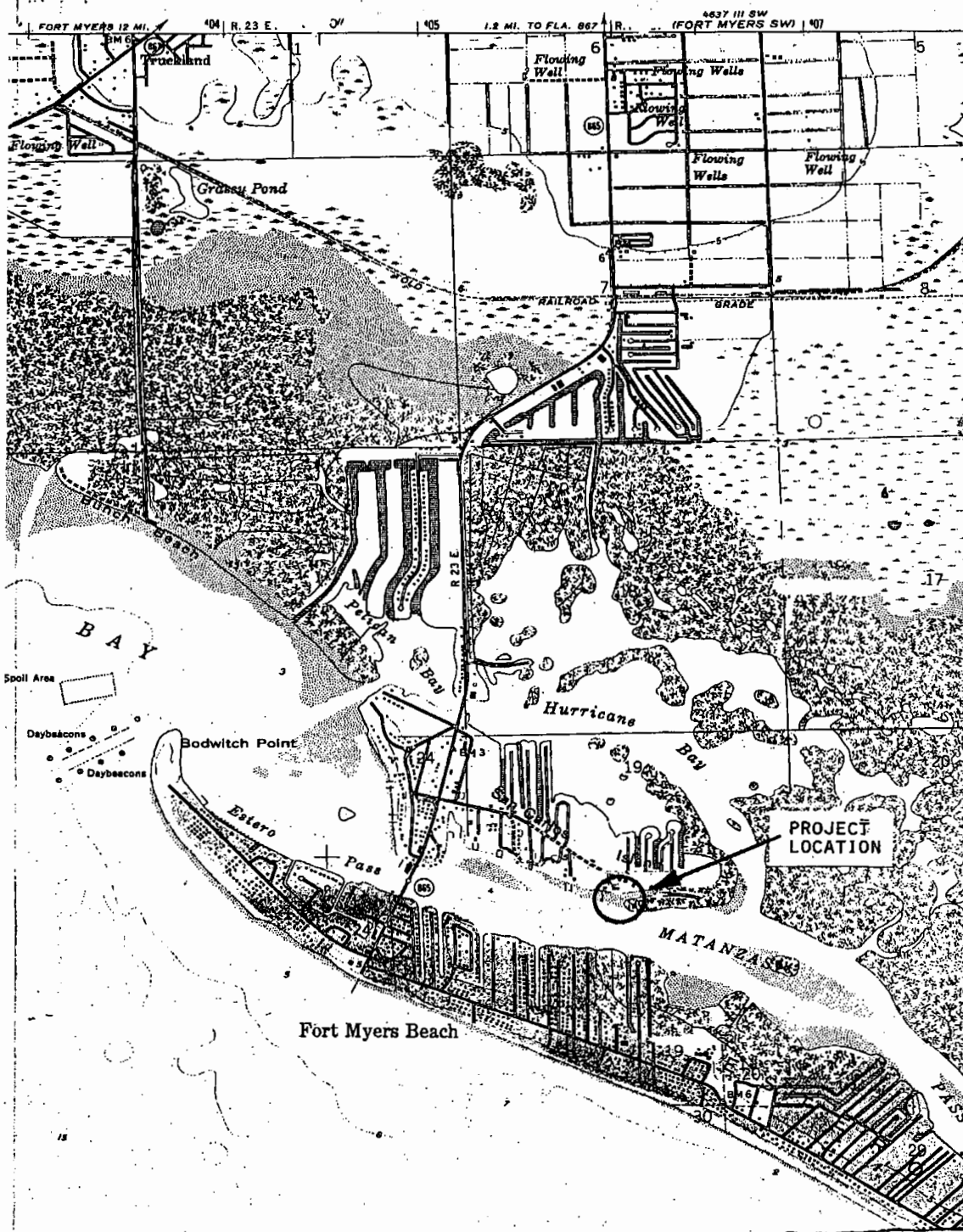
My Commission Expires:
3-20-06

Commission Expires March 20, 2006
OFFICIAL SEAL
Jill C. Bitterman
DD# 101828
My Commission Expires March 20, 2006

Jill C Bitterman
Notary Public, State of FLORIDA

Jill C Bitterman
Printed, Typed or Stamped Name

Page 6 of 10 Pages
Sovereignty Submerged Land Lease No. 360032595



Attachment A
 Page 7 of 10 Pages
 SSSL NO. 360032696



**COASTAL
ENGINEERING
CONSULTANTS
INC**

A CECI GROUP COMPANY

CECI Group Services

Civil Engineering
Survey & Mapping
Coastal Engineering
Real Estate Appraisal
Environmental Assessment

Website: www.coastalengineering.com

**MANTANZAS HARBOR
EAST MOORING FIELD
LEGAL DESCRIPTION**

A PARCEL OF LAND SUBMERGED IN MANTANZAS HARBOR LYING IN SECTION 19, TOWNSHIP 46 SOUTH, RANGE 24 EAST, LEE COUNTY, FLORIDA, BEING DESCRIBED AS FOLLOWS:

COMMENCING AT THE NORTHEAST CORNER OF PARCEL 2, AS RECORDED IN OFFICIAL RECORD BOOK 2609, PAGE 342 OF THE PUBLIC RECORDS OF LEE COUNTY, FLORIDA:

THENCE CONTINUE N23°02'16"E A DISTANCE OF 967.64 FEET, THENCE RUN S66°57'44"E A DISTANCE OF 3,253.32 FEET TO THE POINT OF BEGINNING;
THENCE N88°52'39"E A DISTANCE OF 544.69 FEET;
THENCE N87°37'29"E A DISTANCE OF 849.48 FEET;
THENCE S56°08'41"E A DISTANCE OF 385.24 FEET;
THENCE S27°02'08"W A DISTANCE OF 485.67 FEET;
THENCE N72°03'34"W A DISTANCE OF 702.66 FEET;
THENCE N79°39'16"W A DISTANCE OF 581.45 FEET;
THENCE N56°14'56"W A DISTANCE OF 303.09 FEET;
THENCE N00°00'00"E A DISTANCE OF 112.08 FEET; TO THE POINT OF BEGINNING.

THE ABOVE DESCRIBES AN AREA OF 661,656 SQUARE FEET OR 15.19 ACRES OF SUBMERGED LANDS MORE OR LESS.

SUBJECT TO EASEMENTS, RESTRICTIONS, AND RESERVATIONS OF RECORD.

COASTAL ENGINEERING CONSULTANTS, INC.
FLORIDA BUSINESS AUTHORIZATION NO. LB 2464

Dana L. Worley

DANA L. WORLEY, P.S.M.
PROFESSIONAL SURVEYOR AND MAPPER
FLORIDA CERTIFICATE NO. 5651
NOT VALID WITHOUT THE SIGNATURE AND
THE ORIGINAL RAISED SEAL OF A FLORIDA
LICENSED SURVEYOR AND MAPPER
CEC FILE NO. 99.273
DATE SIGNED: 02-06-02

RECEIVED

MAR 11 2002

D.E.P. - South District

17695 S. Tamiami Trail, Suite #102, Fort Myers, Florida 33908 • Phone (941) 590-9900 Fax (941) 590-9909 • E-Mail: info@cecliff.com
SERVING FLORIDA SINCE 1977

Attachment A
Page 8 of 10 Pages
SSL NO. 360032586



**COASTAL
ENGINEERING
CONSULTANTS
INC**

A CECI GROUP COMPANY

CECI Group Services

- Civil Engineering
- Survey & Mapping
- Coastal Engineering
- Real Estate Appraisal
- Environmental Assessment

Website: www.coastalengineering.com

**MANTANZAS HARBOR
WEST MOORING FIELD
LEGAL DESCRIPTION**

A PARCEL OF LAND SUBMERGED IN MANTANZAS HARBOR LYING IN SECTION 19, TOWNSHIP 46 SOUTH, RANGE 24 EAST, LEE COUNTY, FLORIDA, BEING DESCRIBED AS FOLLOWS:

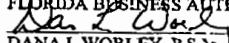
COMMENCING AT THE NORTHEAST CORNER OF PARCEL 2, AS RECORDED IN OFFICIAL RECORD BOOK 2609, PAGE 342 OF THE PUBLIC RECORDS OF LEE COUNTY, FLORIDA:

THENCE CONTINUE N23°02'16"E A DISTANCE OF 276.85 FEET, THENCE RUN S66°57'44"E A DISTANCE OF 535.39 FEET TO THE POINT OF BEGINNING;
 THENCE N21°42'39"E A DISTANCE OF 645.20 FEET;
 THENCE S65°47'08"E A DISTANCE OF 325.99 FEET;
 THENCE S68°15'12"E A DISTANCE OF 213.44 FEET;
 THENCE S72°48'07"E A DISTANCE OF 361.46 FEET;
 THENCE S63°39'19"E A DISTANCE OF 243.11 FEET;
 THENCE S69°36'35"E A DISTANCE OF 280.98 FEET;
 THENCE S49°56'59"E A DISTANCE OF 506.43 FEET;
 THENCE S13°05'04"E A DISTANCE OF 124.99 FEET;
 THENCE S18°30'52"E A DISTANCE OF 119.85 FEET;
 THENCE S64°15'36"W A DISTANCE OF 349.53 FEET;
 THENCE N78°21'01"W A DISTANCE OF 682.96 FEET;
 THENCE N66°28'50"W A DISTANCE OF 1014.21 FEET;
 THENCE N46°21'15"W A DISTANCE OF 139.72 FEET; TO THE POINT OF BEGINNING.

THE ABOVE DESCRIBES AN AREA OF 1,292,690 SQUARE FEET OR 29.68 ACRES OF SUBMERGED LANDS MORE OR LESS.

SUBJECT TO EASEMENTS, RESTRICTIONS, AND RESERVATIONS OF RECORD.

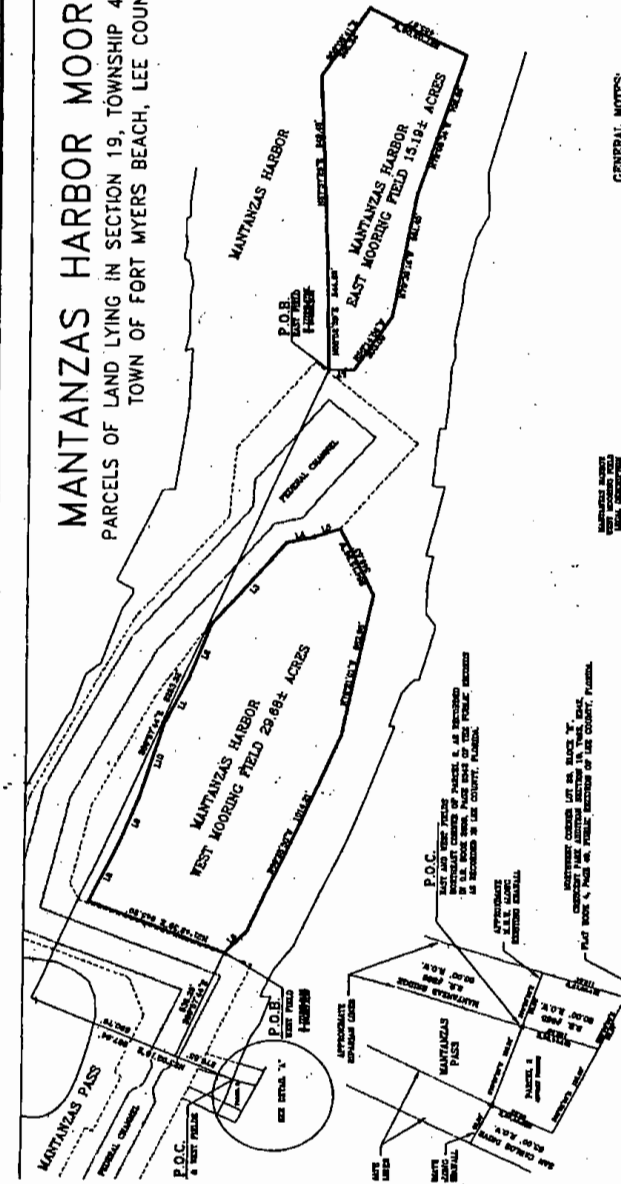
COASTAL ENGINEERING CONSULTANTS, INC.
 FLORIDA BUSINESS AUTHORIZATION NO. LB 2464


 DANA L. WORLEY, P.S.M.
 PROFESSIONAL SURVEYOR AND MAPPER
 FLORIDA CERTIFICATE NO. 5651
 NOT VALID WITHOUT THE SIGNATURE AND
 THE ORIGINAL RAISED SEAL OF A FLORIDA
 LICENSED SURVEYOR AND MAPPER
 CEC FILE NO. 99.273
 DATE SIGNED: 02-06-02

17595 S. Tamiami Trail, Suite #102, Fort Myers, Florida 33908 • Phone (941) 590-9900 • Fax (941) 590-9909 • E-Mail: Info@ceci.fl.com
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Attachment A
 Page 9 of 10 Pages
 SLLL NO. 360032596

MANTANZAS HARBOR MOORING FIELDS
 PARCELS OF LAND LYING IN SECTION 19, TOWNSHIP 46 SOUTH, RANGE 24 EAST,
 TOWN OF FORT MYERS BEACH, LEE COUNTY, FLORIDA.



GENERAL NOTES:

1. ALL DIMENSIONS ARE IN FEET (UNLESS OTHERWISE NOTED).
2. ALL DIMENSIONS ARE TO THE CENTERLINE OF THE ROAD OR CANAL UNLESS OTHERWISE NOTED.
3. ALL DIMENSIONS ARE TO THE CENTERLINE OF THE CANAL UNLESS OTHERWISE NOTED.
4. ALL DIMENSIONS ARE TO THE CENTERLINE OF THE MOORING FIELD UNLESS OTHERWISE NOTED.
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20. ALL DIMENSIONS ARE TO THE CENTERLINE OF THE MOORING FIELD UNLESS OTHERWISE NOTED.

MANUFACTURED HOME
 MANUFACTURED HOME LOTS IN SECTION 19, TOWNSHIP 46 SOUTH, RANGE 24 EAST, TOWN OF FORT MYERS BEACH, LEE COUNTY, FLORIDA. THIS SURVEY SHOWS THE LOTS AND THE MANUFACTURED HOMES ON EACH LOT. THE LOTS ARE 1/4 ACRES EACH. THE MANUFACTURED HOMES ARE 28 FEET BY 44 FEET. THE SURVEY IS TO BE USED FOR THE PURPOSES OF THE COUNTY, FLORIDA.

MANUFACTURED HOME
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RECEIVED
 MAR 11 2002
 D.E.P. - South District

COASTAL ENGINEERING CONSULTANTS A CCOC GROUP COMPANY 17595 S. TANDLERI TRAIL, #102 FORT MYERS, FLORIDA 33908 Phone: (813) 930-9300 Fax: (813) 930-9300 www.cecc.com E-Mail: cecc@cecc.com		TOWN OF FORT MYERS BEACH MANTANZAS HARBOR MOORING FIELDS SPECIFIC PURPOSE SURVEY FIELD SURVEY
DRAWN BY: J.P. CHECKED BY: J.P. PROJECT NO.: 02-03173	DATE: 02-27-02 SHEET NO.: 10 TOTAL SHEETS: 10	TITLE: MANTANZAS HARBOR MOORING FIELDS SPECIFIC PURPOSE SURVEY FIELD SURVEY

Attachment A
 Page 10 of 10 Pages
 SSSL NO. 360032696

BUREAU OF PUBLIC LAND ADMINISTRATION
RECURRING REVENUE SECTION

DELEGATION OF AUTHORITY ACTION
(APRIL 18, 1996)

DELEGATION OF AUTHORITY NO. DERP-005

LEASE NO. 360032595

PA NO. 36-0181011-001

ACTION TAKEN: Execution of a ten-year, extended term sovereignty, submerged lands lease for a managed, municipal anchorage mooring field

LESSEE: Town of Fort Myers Beach, Florida
Staff has verified that the appropriate entity has executed the lease instrument.

COUNTY: Lee
This project not located within an aquatic preserve.

CONSIDERATION: Fees Waived

STAFF REMARKS: The Board of Trustees approved this item on November 26, 2002
Special lease conditions have been incorporated into lease addressing:
A. All slips open to public for rent
B. Establish and maintain manatee educational program
C. Financial reports/income and expenditure
D. Submit all ordinances that pertain to "Town of Fort Myers Beach Matanzas Pass Municipal Anchorage"
E. Implement and maintain Management Plan
F. Comply with DEP approved Operations Draft Agreement
G. Non-standard use-liveaboards (10) allowed more than 6 months
H. Sewage pumpouts
I. Extended Term

RECOMMEND: Execution

Instrument Routing

Review/Approved by (Signature)

/ Date

1. Originator

Joe James 9/4/03

2. ~~Senior Acquisition Review Agent~~ *omcm*
(Pre-approval prior to mailout)

Ronald 9/4/03

3. Legal, (Pre-approval prior to mailout)

Frank H. Hester 9/15/03

4. Legal, (Approval as to form and legality)

Frank H. Hester 10/27/03

5. OMCM/Executing Authority

Z. Wood 10/28/03

09/18/2001



Jeb Bush
Governor

Department of Environmental Protection

Marjory Stoneman Douglas Building
3900 Commonwealth Boulevard
Tallahassee, Florida 32399-3000

Colleen M. Castille
Secretary

MEMORANDUM AGREEMENT BETWEEN DIVISION OF RECREATION & PARKS AND COASTAL & AQUATIC MANAGED AREAS

DRP and CAMA are programs with comparable missions: to protect and manage Florida's diverse natural resources and provide outdoor recreation. Ecosystems do not recognize divisional lines and organizational structure must not impede our mission to protect Florida's resources. Because of our similar missions and close proximity in the field, DRP and CAMA will collaborate on upland and submerged land management issues, as well as share manpower, facilities, vehicles, boats and other resources. DEP employees will work in teams and share resources, regardless from which Division or Office an employee or resource originates. If Parks or Aquatic Preserve staff needs assistance with resource management, events or programs, it is encouraged and expected that staff from each Office or Division will assist as time allows.

To promote an even greater spirit of cooperation among our two sister divisions, we are directing the DRP District Bureau Chiefs and the CAMA Environmental Administrators to foster inter-division employee cooperation. In the future, we will:

- * Hold two joint CAMA/FPS district staff meetings onsite where appropriate per year. FPS District Bureau Chiefs and CAMA Environmental Administrators shall attend these meetings. The respective directors must be notified of the meeting schedule. Additional meetings should be scheduled as needed.
- * On an annual basis, work together to identify and develop joint priority project plans that share efforts to protect and manage neighboring resources. Possibly a good time to perform this work would be at one of the meetings discussed in the previous paragraph.
- * Hold meetings where properties have changed hands so that the FPS can learn about CAMA experience with their properties and vice-versa. We encourage the exchange of information regarding managed lands wherever there is the opportunity.
- * Encourage joint participation in site management plans of both the FPS and CAMA.
- * Actively explore ways to share office space, equipment, tools and staff, where appropriate, to achieve a specific project or goals. (Examples might be: heavy equipment, staff for burning, staff for an event, administrative staff costs, etc...)
- * Seek to help the other division whenever possible, while not interfering with present work responsibilities.

"More Protection, Less Process"

Printed on recycled paper.

Page Two

Please share this memorandum with your staff. DRP and CAMA's joint commitment to work together in the spirit of true cooperation to manage Florida's natural resources and provide quality outdoor recreation will enhance our accomplishments, benefiting both programs. The success of this partnership will be monitored on an ongoing basis.

Mike Bullock 4-27-05
Mike Bullock (Date)
Director
Florida Park Service

Katherine Andrews 4-27-05
Katherine Andrews (Date)
Director
Coastal and Aquatic Managed Areas

Bob Ballal 4/27/05
Witness (Date)

Resource Data

Abbreviation	Description	Abbreviation	Description
A	Adult	GIS	Geographic Information System
BMAP	Basin Management Action Plan	GPS	Global Positioning System
CE	Commercially Exploited	HAB	Harmful Algal Blooms
CFM	City of Fort Myers	J	Juvenile
CHAP	Charlotte Harbor Aquatic Preserve	L	Larval
CHNEP	Charlotte Harbor National Estuaries Program	LCCA	Lee County Conservation Association
CHEVWQMN	Charlotte Harbor Estuaries Volunteer Water Quality Monitoring Network	LCEL	Lee County Environmental Laboratory
CR	County Road	KLCB	Keep Lee County Beautiful
CREW	Corkscrew Regional Ecosystem Watershed	MFL	Minimum Flows and Levels
CSO	Citizen Support Organization	MOA	Memorandum of Agreement
DEAR	Division of Environmental Assessment and Restoration	MOU	Memorandum of Understanding
DEP	Florida Department of Environmental Protection	MPH	Miles Per Hour
DHR	Division of Historical Resources	NERR	National Estuarine Research Reserve
DNR	Florida Department of Natural Resources (now DEP)	NICMZ	No Internal Combustion Motor Zones
DO	Dissolved Oxygen	NOAA	National Oceanic and Atmospheric Administration
DRP	Division of Recreation and Parks	NRDA	Natural Resource Damage Assessment
E	Egg	OFW	Outstanding Florida Water
EBABM	Estero Bay Agency on Bay Management	OPS	Other Personal Services
EBB	Estero Bay Buddies	PWC	Personal Water Craft
EBPSP	Estero Bay Preserve State Park	S	State
EC	Environmentally Critical	S/A	Listed due to similarity of appearance
EPA	Environmental Protection Agency	SAV	Submerged Aquatic Vegetation
ERP	Environmental Resource Permitting	ST	State-Designated Endangered
ES	Environmental Specialist	SFWMD	South Florida Water Management District
F.A.C.	Florida Administrative Code	SR	State Road
F.A.R.	Florida Administrative Register	SSC	State Species of Special Concern
FCO	Florida Coastal Office	ST	State-Designated Threatened
FE	Federally and State-Designated Endangered	STORET	STORage and RETrieval
FGCU	Florida Gulf Coast University	SFWWMD	Southwest Florida Water Management District
FNAI	Florida Natural Areas Inventory	TMDL	Total Maximum Daily Load
F.S.	Florida Statutes	UFL-IFAS	University of Florida – Institute of Food and Agriculture Sciences
FT	Federally and State-Designated Threatened	USCG	United States Coast Guard
FTE	Full-Time Equivalent	USGS	United States Geological Survey
FWC	Florida Fish and Wildlife Conservation Commission	USFWS	United States Fish and Wildlife Service
FWRI	Fish and Wildlife Research Institute (formerly Florida Marine Research Institute)	WCIND	West Coast Inland Navigation District
G	Global		

B.2 / Glossary of Terms

References to these definitions can be found at the end of this list and in Appendix B.3.

- algal bloom** - an explosive increase in the density of phytoplankton within an area. (Lincoln, Boxshall & Clark, 2003)
- anaerobic** - growing or occurring in the absence of molecular oxygen. (Lincoln et al., 2003)
- anthropogenic** - resulting from human activity. (Allaby, 2005)
- aquaculture** - the cultivation of aquatic organisms. (Lincoln et al., 2003)
- aquatic** - living in or near water; used of plants adapted for a partially or completely submerged life. (Lincoln et al., 2003)
- aquifer** - permeable underground rock strata which hold water. (Lincoln et al., 2003)
- attenuation** - a reduction in strength or intensity. (Lincoln et al., 2003)
- bathymetry** - the measurement of the depth of the ocean floor from the water surface. (Allaby, 2005)
- benthic** - pertaining to the sea bed, river bed or lake floor. (Lincoln et al., 2003)
- berm** - large deposits of dry loose sediment above the high tide line on a beach. (Lincoln et al., 2003)
- biodiversity** - the existence of a wide variety of species of plants, animals, and microorganisms in a natural community or habitat, or of communities within a particular environment; genetic variation within a species. (Hine & Martin, 2004)
- biota** - all the organisms living in a particular region, including plants, animals, and microorganisms. (Hine & Martin, 2004)
- biotic community** - a group of interacting species coexisting in a particular habitat. (Lincoln et al., 2003)
- buffer** - to protect a system from change by external factors; anything that reduces an impact. (Lincoln et al., 2003)
- carrying capacity (K)** - the maximum population of a given organism that a particular environment can sustain. (Allaby, 2005)
- community** - a grouping of populations of different organisms found living together in a particular environment. (Allaby, 2005)
- conjunction** - a joining together; combination. (Neufeldt & Sparks, 1990)
- conservation** - the planned management of natural resources; the retention of natural balance, diversity and evolutionary change in the environment; preservation. (Lincoln et al., 2003)
- cumulate** - to gather together, to combine into one. (Lincoln et al., 2003)
- cyanobacteria** - the blue-green bacteria and the grass-green bacteria, or chloroxybacteria. Both groups obtain their food by photosynthesis in a manner very similar to that of green plants and true algae, producing oxygen in the process. They occur in all aquatic habitats. (Hine & Martin, 2004)
- database** - a mass of data in a computer, arranged for rapid expansion, updating, and retrieval. (Neufeldt & Sparks, 1990)
- degradation** - breakdown into smaller or simpler parts; reduction of complexity. (Lincoln et al., 2003)
- derelict** - deserted by the owner; abandoned. (Neufeldt & Sparks, 1990)
- dike** - an embankment or dam made to prevent flooding as by the sea. (Neufeldt & Sparks, 1990)
- dissemination** - scattering or spreading, as of infections agents, seeds, or spores; distribution. (Lincoln et al., 2003)
- diversity** - a measure of the number of species and their relative abundance in a community. (Lincoln et al., 2003)
- drainage basin (catchment)** - the area from which a surface watercourse or a groundwater system derives its water; watershed. (Allaby, 2005)
- dredge** - an apparatus for scooping up mud, for deepening channels. (Neufeldt & Sparks, 1990)
- easement** - a right that one may have in another's land. (Neufeldt & Sparks, 1990)
- ecology** - the study of the interrelationships between living organisms and their environment. (Lincoln et al., 2003)
- ecosystem** - a community of organisms and their physical environment interacting as an ecological unit. (Lincoln et al., 2003)
- ecosystem management** - the active and purposeful manipulation of an ecosystem in order to exploit its productivity or to enhance its biodiversity and conservation value. (Allaby, 2005)
- ecotourism** - travel to an area of ecological, geographical, or natural history interest, with an interest in avoiding bringing additional pressures upon the region, and concern to ensure that both local human culture and the environment are enhanced rather than damaged. (Allaby, 2005)
- emergent** - an aquatic plant having most of the vegetative parts above water; a tree which reaches above the level of the surrounding canopy. (Lincoln et al., 2003)
- endangered species** - an animal or plant species in danger of extinction throughout all or a significant portion of its range. (U.S. Fish and Wildlife Service [USFWS], 2005)

endemic - native to, and restricted to, a particular geographical region. (Lincoln et al., 2003)

environment - the physical, chemical and biological surroundings of an organism at any given time. (Lincoln et al., 2003)

epifauna - the animal life inhabiting a sediment surface or water surface. (Lincoln et al., 2003)

epiphyte - a plant that uses another plant, typically a tree, for its physical support, but which does not draw nourishment from it. (Allaby, 2005)

estuary - semi-enclosed coastal water, open to the sea, having a high freshwater drainage and with marked cyclical fluctuations in salinity; usually the mouth of a river. (Lincoln et al., 2003)

euryhaline - used of organisms that are tolerant of a wide range of salinity. (Lincoln et al., 2003)

exotic - not native; an organism or species that has been introduced into an area. (Lincoln et al., 2003)

extinction - the disappearance of a species from a given habitat. (Lincoln et al., 2003)

extirpation - extermination of the population of a given species from an area. (Lincoln et al., 2003)

fauna - the animal life of a given region, habitat or geological stratum. (Lincoln et al., 2003)

flora - the plant life of a given region, habitat or geological stratum. (Lincoln et al., 2003)

geocaching - a game in which players are given the geographical coordinates of a cache of items which they search for with a GPS device. (Merriam-Webster, 2013)

geographic information system (GIS) - computer system supporting the collection, storage, manipulation and query of spatially referred data, typically including an interface for displaying geographical maps. (Lincoln et al., 2003)

geomorphology - the scientific study of the landforms or the Earth's surface and of the processes that have fashioned them. (Allaby, 2005)

habitat - the living place of an organism or community, characterized by its physical or biotic properties. (Allaby, 2005)

hydric - pertaining to water; wet. (Lincoln et al., 2003)

hydrology - the study of the hydrologic cycle, emphasized the study of bodies of surface water on land and how they change with time. (Allaby, 2005)

infauna - the animal life within a sediment; epifauna. (Lincoln et al., 2003)

intertidal zone - the shore zone between the highest and lowest tides; littoral. (Lincoln et al., 2003)

invasive exotics - non-native; are exotics known to have a negative impact on other species or on habitats to which they have been introduced. (Lincoln et al., 2003)

listed species - a species, subspecies, or distinct population segment that has been added to the Federal list of endangered and threatened wildlife and plants. (USFWS, 2005)

lithostratigraphic - the organization and classification of rock strata according to their lithological character (Lincoln et al., 2003)

littoral - the intertidal zone of the seashore; sometimes used to refer to both the intertidal zone of the seashore and the adjacent continental shelf to a depth of about 200 m. (Lincoln et al., 2003)

load - the total amount of material carried by a stream or river. (Allaby, 2005)

mandate - an order or command; the will of constituents expressed to their representative, legislature, etc. (Neufeldt & Sparks, 1990)

mesic - pertaining to conditions of moderate moisture or water supply; used of organisms occupying moist habitats. (Lincoln et al., 2003)

midden - a refuse heap; used especially in archeology. (Lincoln et al., 2003)

mitigation - to make or become less severe, less painful; to work against. (Neufeldt & Sparks, 1990)

monitor - to watch or check on. (Neufeldt & Sparks, 1990)

muck - highly decomposed plant material typically darker and with higher mineral content than peat. (Lincoln et al., 2003)

native - indigenous; living naturally within a given area. (Lincoln et al., 2003)

oligohaline - brackish water having a salinity between 0.5 and 3.0 ppt, or sea water having a salinity between 17 and 30 ppt. (Lincoln et al., 2003)

pesticide - a chemical agent that kills insects and other animal pests. (Lincoln et al., 2003)

physiographic - pertaining to geographical features of the Earth's surface. (Lincoln et al., 2003)

phytoplankton - planktonic plant-life. (Lincoln et al., 2003)

plankton - organisms that are unable to maintain their position or distribution independent of the movement of water or air masses. (Lincoln et al., 2003)

pollution - the contamination of a natural ecosystem. (Lincoln et al., 2003)

population - all individuals of one or more species within a prescribed area. A group of organisms of one species, occupying a defined area and usually isolated to some degree from other similar groups. (Lincoln et al., 2003)

restoration - being returned to a former or normal state, to health. (Neufeldt & Sparks, 1990)

riparian - pertaining to, living or situated on the banks of rivers and streams. (Lincoln et al., 2003)

ruderal - pertaining to or living amongst rubbish or debris, or inhabiting disturbed sites. (Lincoln et al., 2003) (Florida Natural Areas Inventory describes ruderal as areas impacted by development measures such as roadways, drainage ditches, navigational channels or are considered hydrological alterations.)

runoff - part of precipitation that is not held in the soil but drains freely away. (Lincoln et al., 2003)

salinity - a measure of the total concentration of dissolved salts in seawater. (Lincoln et al., 2003)

sediment - material derived from preexisting rock deposited at or near the Earth's surface. (Allaby, 2005)

seine - a large fishing net weighted along the bottom. (Neufeldt & Sparks, 1990)

sessile - non-motile; permanently attached at the base. (Lincoln et al., 2003)

shoal - a shallow place in a river, sea etc.; a sand bar forming a shallow place. (Neufeldt & Sparks, 1990)

sonde - any of various devices for testing physical conditions. (Merriam-Webster, 2013.)

spat - a young oyster or oysters. (Neufeldt & Sparks, 1990)

spawn - the eggs of certain aquatic organisms. The act of producing such eggs or egg masses. (Lincoln et al., 2003)

species - a group of organisms, minerals or other entities formally recognized as distinct from other groups; the basic unit of biological classification. (Lincoln et al., 2003)

species of concern - an informal term referring to a species that might be in need of conservation action. This may range from a need for periodic monitoring of populations and threats to the species and its habitat, to the necessity for listing as threatened or endangered. Such species receive no legal protection and use of the term does not necessarily imply that a species will eventually be proposed for listing. "Imperiled species" is another general term for listed as well as unlisted species that are declining. (USFWS, 2005)

stakeholder - any person or organization who has an interest in the actions discussed or is affected by the resulting outcomes of a project or action. (USFWS, 2005)

stratigraphy - study of the origin, composition, distribution and succession of rock strata (Lincoln et al., 2003)

submergent - pertaining to a plant growing entirely under water. (Lincoln et al., 2003)

subtidal - environment which lies below the mean low water level. (Allaby, 2005)

supratidal - the zone on the shore above mean high tide level. (Lincoln et al., 2003)

synopsis (synoptic) - a brief description of the essential features of a taxon. (Lincoln et al., 2003)

threatened species - an animal or plant species likely to become endangered within the foreseeable future throughout all or a significant portion of its range. (USFWS, 2005)

topography - the configuration of a surface including its relief and the position of its natural and man-made features. (Florida Department of Environmental Protection, 2009)

transect - a line or narrow belt used to survey the distributions of organisms across a given area. (Lincoln et al., 2003)

trawl - a large net dragged along the bottom of a fishing bank. (Neufeldt & Sparks, 1990)

trophic - pertaining to nutrition, food or feeding.

turbid - cloudy; opaque with suspended matter. (Lincoln et al., 2003)

upland - land elevated above other land. (Neufeldt & Sparks, 1990)

vector - any agent responsible for the introduction or dispersal of an animal or plant species. (Lincoln et al., 2003)

vegetation - plant life or cover in an area; also used as a general term for plant life. (Lincoln et al., 2003)

viable - having the capacity to live, grow, germinate or develop. (Lincoln et al., 2003)

water column - the vertical column of water in a sea or lake extending from the surface to the bottom. (Lincoln et al., 2003)

watershed - an elevated boundary area separating tributaries draining in to different river systems; drainage basin. (Lincoln et al., 2003)

wetland - an area of low lying land, submerged or inundated periodically by fresh or saline water. (Lincoln et al., 2003)

wildlife - any undomesticated organisms; wild animals. (Allaby, 2005)

B.3 / References

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B.4 / Species Lists

B.4.1 / Native Species

Common Name	Species Name	Status
<p>Legend: FT = Federally and State-Designated Threatened • FE = Federally-and State-Designated Endangered • ST = State-Designated Threatened • SE = State-Designated Endangered • SSC = State Species of Special Concern • (S/A) = listed due to similarity of appearance • CE= commercially exploited • E = egg • L = larval • J = juvenile • A = adult</p>		
Plants		
Division Chlorophyta (green algae)		
umbrella algae	<i>Acetabularia calyculus</i>	
green microalgae	<i>Ankistrodesmus falcatus</i>	
Batophora	<i>Batophora oerstedii</i>	
Mexican feathery green seaweed	<i>Caulerpa mexicana</i>	
leafy Caulerpa	<i>Caulerpa prolifera</i>	
feathery Caulerpa	<i>Caulerpa sertularioides</i>	
Caulerpa	<i>Caulerpa</i> spp.	
fuzzy Caulerpa	<i>Caulerpa verticillata</i>	
Chaetomorpha	<i>Chaetomorpha minima</i>	
Cladophora	<i>Cladophora montagneana</i>	
Cladophoropsis	<i>Cladophoropsis</i> sp.	
green microalgae	<i>Crucigenia irregularis</i>	
green microalgae	<i>Crucigenia quadrata</i>	
green microalgae	<i>Crucigenia tetrapedia</i>	
green microalgae	<i>Dunaliella</i> sp.	
green microalgae	<i>Pandorina morum</i>	
green filamentous algae	<i>Rhizoclonium riparium</i>	
sea lettuce	<i>Ulva lactuca</i>	
Ulva	<i>Ulva</i> spp.	
Ulva	<i>Ulva prolifera</i>	
Division Rhodophyta (red algae)		
sheep's wool	<i>Acanthophora spicifera</i>	
Chrysymenia	<i>Chrysymenia planifrons</i>	
Dasya	<i>Dasya pedicellata</i>	
Digenea	<i>Digenea simplex</i>	
Eucheuma	<i>Eucheuma isiforme</i>	
Gracilaria	<i>Gracilaria</i> spp.	
graceful red seaweed	<i>Gracilaria tikvahiae</i>	
Gracilariopsis	<i>Gracilariopsis longissima</i>	
hook weed	<i>Hypnea musciformis</i>	
Laurencia	<i>Laurencia intricata</i>	
Laurencia	<i>Laurencia</i> spp.	
Polysiphonia	<i>Polysiphonia subtilissima</i>	
Division Phaeophyta (brown algae)		
Dictyota	<i>Dictyota</i> spp.	
Sargassum	<i>Sargassum</i> spp.	
Division Pteridophyta (ferns)		
giant leather fern	<i>Acrostichum danaeifolium</i>	
Division Magnoliophyta (flowering plants)		
<i>Class Liliopsida (grass-like flowering plants)</i>		
swamp lily	<i>Crinum americanum</i>	
butterfly orchid	<i>Encyclia tampensis</i>	CE
Cuban shoal grass	<i>Halodule wrightii</i>	

Common Name	Species Name	Status
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paddle grass	<i>Halophila decipiens</i>	
star grass	<i>Halophila engelmannii</i>	
widgeon grass	<i>Ruppia maritima</i>	
manatee grass	<i>Syringodium filiforme</i>	
stiff leaf wild pine	<i>Tillandsia fasciculata</i>	SE
ball moss	<i>Tillandsia recurvata</i>	
giant wild pine	<i>Tillandsia utriculata</i>	SE
needle leaf airplant	<i>Tillandsia setacea</i>	
Spanish moss	<i>Tillandsia usneoides</i>	
turtle grass	<i>Thalassia testudinum</i>	
twisted airplant	<i>Tillandsia flexuosa</i>	ST
Division Magnoliophyta (flowering plants)		
<i>Class Magnoliopsida (woody flowering plants)</i>		
pond apple	<i>Annona glabra</i>	
black mangrove	<i>Avicennia germinans</i>	
buttonwood	<i>Conocarpus erectus</i>	
love vine	<i>Cuscuta pentagona</i>	
coinvine	<i>Dalbergia ecastophyllum</i>	
white mangrove	<i>Laguncularia racemosa</i>	
mangrove rubber vine	<i>Rhabdadenia biflora</i>	
red mangrove	<i>Rhizophora mangle</i>	
white twinevine	<i>Sacrostemma clausum</i>	
poison ivy	<i>Toxicodendron radicans</i>	
Phylum Cryptophyta		
	<i>Cryptomonas</i> sp.	
Phylum Cyanobacteria		
cyanobacteria	<i>Merismopedia</i> sp.	
filamentous cyanobacteria	<i>Oscillatoria</i> sp.	
cyanobacteria	<i>Phormidium lyngbyaceum</i>	
spriulina	<i>Spirulina major</i>	
Phylum Dinoflagellata		
	<i>Ceratium hircus</i>	
	<i>Peridinium</i> sp.	
	<i>Prorocentrum redfeldi</i>	
Phylum Euglenozoa		
	<i>Eutreptia</i> sp.	
Phylum Heterokontophyta		
	<i>Amphiprora alata</i>	
	<i>Asterionella japonica</i>	
	<i>Bacillaria paradoxa</i>	
	<i>Chaetoceros</i> sp.	
	<i>Corethron hystrix</i>	
	<i>Cyclotella</i> sp.	
	<i>Cylindrotheca closterium</i>	
	<i>Cymbella</i> sp.	
	<i>Gyrosigma</i> sp.	
	<i>Mallomonas</i> sp.	
	<i>Nitzschia seriata</i>	
	<i>Nitzschia vermicularia</i>	

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	<i>Olishodiscus</i> sp.	
	<i>Skeletonema costatum</i>	
	<i>Thalassionema nitzchioides</i>	
	<i>Thalassinsira pseudonana</i>	
	<i>Pennates</i> sp.	

Birds

Cooper's hawk	<i>Accipiter cooperii</i>	
sharp-shinned hawk	<i>Accipiter striatus</i>	
spotted sandpiper	<i>Acitis macularia</i>	
red-winged blackbird	<i>Agelaius phoeniceus</i>	
wood duck	<i>Aix sponsa</i>	
saltmarsh sharp-tailed sparrow	<i>Ammodramus caudacutus</i>	
grasshopper sparrow	<i>Ammodramus savannarum</i>	
northern pintail	<i>Anas acuta</i>	
American wigeon	<i>Anas americana</i>	
northern shoveler	<i>Anas clypeata</i>	
green-winged teal	<i>Anas crecca carolinensis</i>	
blue-winged teal	<i>Anas discors</i>	
mottled duck	<i>Anas fulvigula</i>	
mallard	<i>Anas platyrhynchos</i>	
anhinga	<i>Anhinga anhinga</i>	
limpkin	<i>Aramus guarana</i>	SSC
ruby-throated hummingbird	<i>Archilochus colubris</i>	
great egret	<i>Ardea alba</i>	
great blue heron	<i>Ardea herodias</i>	
ruddy turnstone	<i>Arenaria interpres</i>	
lesser scaup	<i>Aythya affinis</i>	
redhead	<i>Aythya americana</i>	
ring-necked duck	<i>Aythya collaris</i>	
canvasback	<i>Aythya valisineria</i>	
cedar waxwing	<i>Bombycilla cedrorum</i>	
great horned owl	<i>Bubo virginianus</i>	
red-tailed hawk	<i>Buteo jamaicensis</i>	
red-shouldered hawk	<i>Buteo lineatus</i>	
broad-winged hawk	<i>Buteo platypterus</i>	
green heron	<i>Butorides virescens</i>	
sanderling	<i>Calidris alba</i>	
dunlin	<i>Calidris alpina</i>	
red knot	<i>Calidris cantus</i>	
white-rumped sandpiper	<i>Calidris fuscicollis</i>	
semipalmated sandpiper	<i>Calidris pusilla</i>	
western sandpiper	<i>Calidris mauri</i>	
least sandpiper	<i>Calidris minutilla</i>	
chuck-will's widow	<i>Caprimulgus carolinensis</i>	
northern cardinal	<i>Cardinalis cardinalis</i>	
American goldfinch	<i>Carduelis tristis</i>	
turkey vulture	<i>Cathartes aura</i>	
hermit thrush	<i>Catharus guttatus</i>	
willet	<i>Catoptrophorus semipalmatus</i>	
belted kingfisher	<i>Ceryle alcyon</i>	
chimney swift	<i>Chaetura pelagica</i>	

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Southeastern snowy plover	<i>Charadrius alexandrinus tenuirostris</i>	ST
piping plover	<i>Charadrius melodus</i>	FT
semipalmated plover	<i>Charadrius semipalmatus</i>	
killdeer	<i>Charadrius vociferus</i>	
Wilson's plover	<i>Charadrius wilsonia</i>	
black tern	<i>Chilodoniast niger</i>	
lark sparrow	<i>Chondestes grammacus</i>	
common night hawk	<i>Chordeillus minor</i>	
Marian's marsh wren	<i>Cistothorus palustris marianae</i>	SSC
mangrove cuckoo	<i>Coccyzus minor</i>	
northern "yellow-shafted" flicker	<i>Colaptes auratus</i>	
northern bobwhite	<i>Colinus virginianus</i>	
common ground-dove	<i>Colubina passerina</i>	
black vulture	<i>Coragyps aura</i>	
American crow	<i>Covus brachyrhyncos</i>	
fish crow	<i>Corvus ossifragus</i>	
smooth-billed ani	<i>Crotophaga ani</i>	
blue jay	<i>Caynocitta cristata</i>	
yellow-rumped warbler	<i>Dendroica coronata</i>	
prairie warbler	<i>Dendroica discolor</i>	
yellow-throated warbler	<i>Dendroica dominica</i>	
palm warbler	<i>Dendroica palmarum</i>	
yellow warbler	<i>Dendroica petechia</i>	
bobolink	<i>Dolichonyx oryzivorus</i>	
pileated woodpecker	<i>Dryopus pileatus</i>	
gray catbird	<i>Dumetella carolinensis</i>	
little blue heron	<i>Egretta caerulea</i>	SSC
reddish egret	<i>Egretta rufescens</i>	SSC
snowy egret	<i>Egretta thula</i>	SSC
tricolored heron	<i>Egretta tricolor</i>	SSC
swallow-tailed kite	<i>Elanoides fortificatus</i>	
white ibis	<i>Eudocimus albus</i>	SSC
merlin	<i>Falco columbarius</i>	
peregrine falcon	<i>Falco peregrinus</i>	
southeastern American kestrel	<i>Falco sparverius paulus</i>	ST
magnificent frigatebird	<i>Fregata magnificens</i>	
American coot	<i>Fulica americana</i>	
Wilson's snipe	<i>Gallinago delicata</i>	
common moorhen	<i>Gallinula chloropus</i>	
common loon	<i>Gavia immer</i>	
gull-billed tern	<i>Gelohelidon nilotica</i>	
common yellowthroat	<i>Geothlypis trichas</i>	
American oystercatcher	<i>Haematopus palliatus</i>	SSC
American bald eagle	<i>Haliaeetus leucocephalus</i>	
black-necked stilt	<i>Himantopus mexicanus</i>	
barn swallow	<i>Hirundo rustica</i>	
Baltimore oriole	<i>Icterus galbula</i>	
loggerhead shrike	<i>Lanius ludovicianus</i>	
herring gull	<i>Larus argentatus</i>	
laughing gull	<i>Larus atricilla</i>	
ring-billed gull	<i>Larus delawarensis</i>	
lesser black-backed gull	<i>Larus fuscus</i>	

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great black-backed gull	<i>Larus marinus</i>	
Bonaparte's gull	<i>Larus philadelphia</i>	
American herring gull	<i>Larus smithsonianus</i>	
short-billed dowitcher	<i>Limnodromus griseus</i>	
long-billed dowitcher	<i>Limnodromus scolopaceus</i>	
marbled godwit	<i>Limosa fedoa</i>	
hooded merganser	<i>Lophodytes cucullatus</i>	
red-bellied woodpecker	<i>Melanerpes carolinus</i>	
black scoter	<i>Melanitta americana</i>	
swamp sparrow	<i>Melospiza georgiana</i>	
common merganser	<i>Mergus merganser</i>	
red-breasted merganser	<i>Mergus serrator</i>	
stilt sandpiper	<i>Micropalmama himantopus</i>	
northern mockingbird	<i>Mimus polyglottos</i>	
black-and-white warbler	<i>Mniotilta varia</i>	
brown-headed cowbird	<i>Molothrus ater</i>	
wood stork	<i>Mycteria americana</i>	FE
great crested flycatcher	<i>Myiarchus crinitus</i>	
long-billed curlew	<i>Numenius americanus</i>	
whimbrel	<i>Numenius phaeopus</i>	
yellow-crowned night heron	<i>Nyctanassa violacea</i>	
black-crowned night heron	<i>Nycticorax nycticorax</i>	
eastern screech owl	<i>Otus asio</i>	
ruddy duck	<i>Oxyura jamaicensis</i>	
osprey	<i>Pandion haliaetus</i>	
northern parula	<i>Parul americana</i>	
savannah sparrow	<i>Passerculus sandwichensis</i>	
painted bunting	<i>Passerina ciris</i>	
American white pelican	<i>Pelecanus erythrorhynchos</i>	
brown pelican	<i>Pelecanus occidentalis</i>	SSC
double-crested cormorant	<i>Phalacrocorax auritus</i>	
Wilson's phalarope	<i>Phalaropus tricolor</i>	
greater flamingo	<i>Phenicopterus ruber</i>	
downy woodpecker	<i>Picoides pubescens</i>	
hairy woodpecker	<i>Picoides villosus</i>	
eastern towhee	<i>Pipilo erythrophthalmus</i>	
roseate spoonbill	<i>Platalea ajaja</i>	SSC
glossy ibis	<i>Plegadis falcinellus</i>	
black-bellied plover	<i>Pluvialis squatarola</i>	
horned grebe	<i>Podiceps auritus</i>	
pie-billed grebe	<i>Podilymbus podiceps</i>	
blue-gray gnatcatcher	<i>Poliottila caerulea</i>	
sora	<i>Porzana carolina</i>	
purple martin	<i>Progne subis</i>	
prothonotary warbler	<i>Protonotaria citrea</i>	
boat-tailed grackle	<i>Quiscalus major</i>	
common grackle	<i>Quiscalus quiscula</i>	
king rail	<i>Rallus elegans</i>	
Virginia rail	<i>Rallus limicola</i>	
clapper rail	<i>Rallus longirostris</i>	
Florida clapper rail	<i>Pallus longirostris scotti</i>	
American avocet	<i>Recurvirostra americana</i>	

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ruby-crowned kinglet	<i>Regulus calendula</i>	
black skimmer	<i>Rynchops niger</i>	SSC
eastern phoebe	<i>Sayornis phoebe</i>	
American redstart	<i>Setophaga ruticilla</i>	
eastern bluebird	<i>Sialia sialis</i>	
common eider	<i>Somateria mollissima</i>	
yellow-bellied sapsucker	<i>Sphyrapicus varius</i>	
least tern	<i>Sterna antillarum</i>	ST
Caspian tern	<i>Sterna caspia</i>	
roseate tern	<i>Sterna dougalii</i>	FT
Forster's tern	<i>Sterna forsteri</i>	
common tern	<i>Sterna hiundo</i>	
royal tern	<i>Sterna maxima</i>	
sandwich ten	<i>Sterna sandwicensis</i>	
ringed turtle-dove	<i>Streptopelia risoria</i>	
barred owl	<i>Strix varia</i>	
eastern meadowlark	<i>Sturnella magna</i>	
tree swallow	<i>Tachycineta bicolor</i>	
Carolina wren	<i>Thryothorus ludovicianus</i>	
brown thrasher	<i>Toxostoma rufum</i>	
lesser yellowlegs	<i>Tringa flavipes</i>	
solitary sandpiper	<i>Tringa solitaria</i>	
greater yellowlegs	<i>Tringa melanoleuca</i>	
house wren	<i>Troglodytes aedon</i>	
American robin	<i>Turdus migratorius</i>	
gray kingbird	<i>Tyrannus dominicensis</i>	
eastern kingbird	<i>Tyrannus tyrannus</i>	
common barn owl	<i>Tyto alba</i>	
black-whiskered vireo	<i>Vireo altiloquus</i>	
white-eyed vireo	<i>Vireo solitarius</i>	
blue-headed vireo	<i>Vireo solitarius</i>	
white-winged dove	<i>Zenaida asiatica</i>	
mourning dove	<i>Zenaida macroura</i>	

Mammals

Virginia opossum	<i>Didelphis virginiana</i>	
river otter	<i>Lutra canadensis</i>	
bobcat	<i>Lynx rufus</i>	
white-tailed deer	<i>Odocoileus virginianus</i>	
marsh rice rat	<i>Oryzomys palustris</i>	
raccoon	<i>Procyon lotor</i>	
Big Cypress fox squirrel	<i>Sciurus niger avicennia</i>	ST
hispid cotton rat	<i>Sigmodon hispidus</i>	
insular cotton rat	<i>Sigmodon hispidus insulicola</i>	
marsh rabbit	<i>Syvilagus palustris</i>	
Florida manatee (West Indian)	<i>Trichechus manatus latirostris</i> (<i>Trichechus manatus</i>)	FE
bottlenose dolphin	<i>Tursiops truncatus</i>	
Florida black bear	<i>Ursus americanus floridanus</i>	

Reptiles

Florida cottonmouth	<i>Agkistrodon piscivorus conanti</i>	
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American alligator	<i>Alligator mississippiensis</i>	FT(S/A)
green anole	<i>Anolis carolinensis carolinensis</i>	
Florida softshell turtle	<i>Apalone ferox</i>	
Atlantic loggerhead turtle	<i>Caretta caretta caretta</i>	FT
Atlantic green turtle	<i>Chelonia mydas mydas</i>	FE
Florida snapping turtle	<i>Chelydra serpentina</i>	
southern black racer	<i>Coluber constrictor priapus</i>	
American crocodile	<i>Crocodylus acutus</i>	FT
Florida chicken turtle	<i>Deirochelys reticularia chysea</i>	
leatherback turtle	<i>Dermochelys coriacea</i>	FE
southern ringnecked snake	<i>Diadophis punctatus punctatus</i>	
Atlantic hawksbill turtle	<i>Eretmochelys imbricata imbricata</i>	FE
striped mud turtle	<i>Kinosternon baurii palmarum</i>	
Florida mud turtle	<i>Kinosternon subrubrum stenindachneri</i>	
Kemp's ridley turtle	<i>Lepidochelys kempii</i>	FE
diamondback terrapin	<i>Malaclemys terrapin</i>	
mangrove terrapin	<i>Malaclemys terrapin rhizophorum</i>	
ornate diamondback terrapin	<i>Malaclemys terrapin macrospilota</i>	
mangrove saltmarsh snake	<i>Nerodia clarkii compressicauda</i>	
Florida banded water snake	<i>Nerodia fasciata pictiventris</i>	
brown water snake	<i>Nerodia taxispilota</i>	
peninsular cooter	<i>Pseudemys floridana peninsularis</i>	
Florida redbelly turtle	<i>Pseudemys nelsoni</i>	
dusky pigmy rattlesnake	<i>Sistrurus miliarius barbouri</i>	
ribbon snake	<i>Thamnophis sauritus sackeni</i>	

Amphibians

Florida cricket frog	<i>Acris gryllus dorsalis</i>	
oak toad	<i>Bufo quercicus</i>	
southern toad	<i>Bufo terrestris</i>	
eastern narrowmouth toad	<i>Gastrophryne carolinensis</i>	
green treefrog	<i>Hyla cinerea</i>	
pinewoods treefrog	<i>Hyla femoralis</i>	
squirrel treefrog	<i>Hyla squirela</i>	
Florida chorus frog	<i>Pseudacris nigrita verrucosa</i>	
little grass frog	<i>Pseudacris ocularis</i>	
bull frog	<i>Rana catesbeiana</i>	
pig frog	<i>Rana grylio</i>	
southern leopard frog	<i>Rana turicularia</i>	
eastern spadefoot	<i>Scaphiopus holbrookii</i>	

Fishes

Class Actinopterygii (ray finned fishes)

scrawled cowfish	<i>Acanthostracion quadricornis</i>	
lined sole (L, A)	<i>Achirus lineatus</i>	
diamond killifish	<i>Adinia xenica</i>	
bonefish	<i>Albula vulpes</i>	
orange filefish	<i>Aluterus schoepfii</i>	
yellow bullhead	<i>Ameiurus natalis</i>	
brown bullhead	<i>Ameiurus nebulosus</i>	
fringed pipefish	<i>Anarchopterus criniger</i>	

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striped anchovy (E, L, J, A)	<i>Anchoa hepsetus</i>	
bay anchovy (E, L, J, A)	<i>Anchoa mitchilli</i>	
anchovy (E, L)	<i>Anchoa</i> spp.	
anchovy (E, L)	<i>Ancylosetta quadrocellata</i>	
sheepshead (L, J, A)	<i>Archosargus probatocephalus</i>	
sea bream	<i>Archosargus rhomboidalis</i>	
hardhead sea catfish	<i>Ariopsis felis</i>	
southeastern stargazer (J, A)	<i>Astroscopus y-graecum</i>	
trumpet fish	<i>Aulostomus maculatus</i>	
gafftopsail catfish	<i>Bagre marinus</i>	
silver perch (L, J, A)	<i>Bairdiella chrysoura</i>	
frillfin goby (L, A)	<i>Bathygobius soporator</i>	
twospot flounder	<i>Bothus robinsi</i>	
gulf menhaden	<i>Brevoortia patronus</i>	
menhaden (L, A)	<i>Brevoortia</i> spp.	
grass porgy	<i>Calamus arctifrons</i>	
jolthead porgy	<i>Calamus bajonado</i>	
whitebone porgy	<i>Calamus leucosteus</i>	
knobbed porgy	<i>Calamus nodosus</i>	
sheepshead porgy	<i>Calamus penna</i>	
orangespotted filefish	<i>Cantherhines pullus</i>	
blue runner	<i>Caranx crysos</i>	
crevalle jack	<i>Caranx hippos</i>	
horse-eye jack	<i>Caranx latus</i>	
common snook	<i>Centropomus unidecimalis</i>	
rock sea bass	<i>Centropristis philadelphica</i>	
black sea bass	<i>Centropristis striata</i>	
Atlantic spadefish (L, A)	<i>Chaetodipterus faber</i>	
Florida blenny (L, J, A)	<i>Chasmodes saburrae</i>	
striped burrfish (J, A)	<i>Chilomycterus schoepfi</i>	
Atlantic bumper (L, J, A)	<i>Chloroscombrus chrysurus</i>	
spotted whiff	<i>Citharichthys macrops</i>	
herring (E, L)	<i>Clupea</i> spp.	
blue croaker	<i>Corvula batabana</i>	
darter goby	<i>Ctenogobius boleosoma</i>	
freshwater goby	<i>Ctenogobius shufeldti</i>	
emerald goby	<i>Ctenogobius smaragdus</i>	
sand seatrout (E, L, A)	<i>Cynoscion arenarius</i>	
spotted seatrout (E, L, A)	<i>Cynoscion nebulosus</i>	
sheepshead minnow	<i>Cyprinodon variegatus</i>	
Irish pompano	<i>Diapterus auratus</i>	
balloonfish	<i>Diodon holocanthus</i>	
sand perch	<i>Diplectrum formosum</i>	
spottail pinfish	<i>Diplodus holbrookii</i>	
fat sleeper	<i>Dormitator maculatus</i>	
threadfin shad	<i>Dorosoma petenense</i>	
sharksucker	<i>Echeneis naucrates</i>	
whitefin sharksucker	<i>Echeneis neucratoides</i>	
Everglades pygmy sunfish	<i>Elassoma evergladei</i>	
ladyfish	<i>Elops saurus</i>	
goliath grouper	<i>Epinephelus itajara</i>	
red grouper	<i>Epinephelus morio</i>	

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lake chubsucker	<i>Erimyzon sucetta</i>	
chain pickerel	<i>Esox niger</i>	
swamp darter (L, A)	<i>Etheostoma fusiforme</i>	
fringed flounder	<i>Etropus crossotus</i>	
spotfin mojarra	<i>Eucinostomus argenteus</i>	
mojarra, silver jenny	<i>Eucinostomus gula</i>	
tidewater mojarra (J, A)	<i>Eucinostomus harengulus</i>	
slender mojarra	<i>Eucinostomus jonesii</i>	
mojarra (L, J)	<i>Eucinostomus spp.</i>	
striped mojarra	<i>Eugerres plumieri</i>	
drum (L)	<i>Equetus spp.</i>	
bluespotted comettfish	<i>Fistularia tabacaria</i>	
goldspotted killifish	<i>Floidichthys carpio</i>	
golden topminnow	<i>Fundulus chrysotus</i>	
marsh killifish	<i>Fundulus confluentus</i>	
gulf killifish	<i>Fundulus grandis</i>	
mummichog	<i>Fundulus heteroclitus</i>	
striped killifish	<i>Fundulus majalis</i>	
Seminole killifish	<i>Fundulus seminolis</i>	
longnose killifish	<i>Fundulus similis</i>	
killifish (L)	<i>Fundulus spp.</i>	
mosquitofish	<i>Gambusia affinis</i>	
eastern mosquitofish	<i>Gambusia holbrooki</i>	
yellow fin mojarra	<i>Gerres cinereus</i>	
stippled clingfish	<i>Gobiesox punctulatus</i>	
skilletfish (E, L, J, A)	<i>Gobiesox strumosus</i>	
sharptail goby	<i>Gobionellus hastatus</i>	
highfin goby	<i>Gobionellus oceanicus</i>	
naked goby	<i>Gobiosoma bosc</i>	
twoscale goby	<i>Gobiosoma longipala</i>	
code goby (L, J, A)	<i>Gobiosoma robustum</i>	
goby (L)	<i>Gobiosoma spp.</i>	
ocellated morray	<i>Gymnothorax saxicola</i>	
tomtate	<i>Haemulon aurolineatum</i>	
white grunt	<i>Haemulon plumierii</i>	
blue-striped grunt	<i>Haemulon sciurus</i>	
slippery dick	<i>Halichoeres bivittatus</i>	
scaled sardine (L, A)	<i>Harengula jaguana</i>	
bluntnose jack	<i>Hemicaranx amblyrhynchus</i>	
jewelfish	<i>Hemichromis bimaculatus</i>	
least killifish	<i>Heterandria formosa</i>	
lined seahorse (J, A)	<i>Hippocampus erectus</i>	
dwarf seahorse (J, A)	<i>Hippocampus zosterae</i>	
zebratail blenny	<i>Hypleurochilus caudovittatus</i>	
crested blenny	<i>Hypleurochilus geminatus</i>	
reef silverside	<i>Hypoatherina harringtonensis</i>	
false silverstripe halfbeak	<i>Hyporhamphus meeki</i>	
halfbeak	<i>Hyporhamphus spp.</i>	
common (silverstripe) halfbeak (L, A)	<i>Hyporhamphus unifasciatus</i>	
feather blenny	<i>Hypsoblennius hentz</i>	
blenny (L, J)	<i>Hypsoblennius spp.</i>	
channel catfish	<i>Ictalurus punctatus</i>	

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flagfish	<i>Jordanella floridae</i>	
brook silverside	<i>Labidesthes sicculus</i>	
hogfish	<i>Lachnolaimus maximus</i>	
trunkfish	<i>Lactophrys trigonus</i>	
smooth puffer	<i>Lagocephalus laevigatus</i>	
pinfish (L, J, A)	<i>Lagodon rhomboides</i>	
spot croaker (J, A)	<i>Leiostomus xanthurus</i>	
spotted gar	<i>Lepisosteus oculatus</i>	
longnose gar	<i>Lepisosteus osseus</i>	
Florida gar	<i>Lepisosteus platyrhincus</i>	
warmouth	<i>Lepomis gulosus</i>	
bluegill	<i>Lepomis macrochirus</i>	
dollar sunfish	<i>Lepomis marginatus</i>	
redecor sunfish	<i>Lepomis microlophus</i>	
spotted sunfish	<i>Lepomis punctatus</i>	
sunfishes (L, A)	<i>Lepomis</i> spp.	
tripletail	<i>Lobotes surinamensis</i>	
crested goby	<i>Lophogobius cyprinoides</i>	
bluefin killifish	<i>Lucania goodei</i>	
rainwater killifish	<i>Lucania parva</i>	
highfin blenny (L, A)	<i>Lupinoblennius nicholsi</i>	
mutton snapper	<i>Lutjanus analis</i>	
schoolmaster	<i>Lutjanus apodus</i>	
mangrove (gray) snapper	<i>Lutjanus griseus</i>	
lane snapper	<i>Lutjanus synagris</i>	
tarpon	<i>Megalops atlanticus</i>	
rough silverside (L, J, A)	<i>Membras martinica</i>	
inland (tidewater) silverside	<i>Menidia peninsulae</i>	
silversides (L, A)	<i>Menidia</i> spp.	
southern kingfish	<i>Menticirrhus littoralis</i>	
northern kingfish	<i>Menticirrhus saxatilis</i>	
kingfish (E, L)	<i>Menticirrhus</i> spp.	
clown goby (J, A)	<i>Microgobius gulosus</i>	
goby (L)	<i>Microgobius</i> spp.	
green goby	<i>Microgobius thalassinus</i>	
Atlantic croaker	<i>Micropogonias undulatus</i>	
largemouth bass	<i>Micropterus salmoides</i>	
fringed filefish	<i>Monacanthus ciliatus</i>	
planehead filefish	<i>Monacanthus hispidus</i>	
striped mullet	<i>Mugil cephalus</i>	
white mullet	<i>Mugil curema</i>	
whirlgig (fantail) mullet	<i>Mugil gyrans</i>	
red goatfish	<i>Mullus auratus</i>	
black grouper	<i>Mycteroperca bonaci</i>	
gag grouper	<i>Mycteroperca microlepis</i>	
speckled worm eel (A, L)	<i>Myrophis punctatus</i>	
emerald parrotfish	<i>Nicholsina usta</i>	
taillight shiner	<i>Notropis maculatus</i>	
coastal shiner	<i>Notropis petersoni</i>	
polka-dot batfish	<i>Ogcocephalus cubifrons</i>	
leatherjack (E, L, J, A)	<i>Oligoplites saurus</i>	
Atlantic thread herring (L, A)	<i>Opisthonema oglinum</i>	

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gulf toadfish	<i>Opsanus beta</i>	
pigfish (L, J, A)	<i>Orthopristis chrysoptera</i>	
gulf flounder	<i>Paralichthys albigutta</i>	
broad flounder	<i>Paralichthys squamilentus</i>	
gulf butterfish	<i>Peprilus burti</i>	
sailfin molly	<i>Poecilia latipinna</i>	
black drum	<i>Pogonias cromis</i>	
bluefish	<i>Pomatomus saltatrix</i>	
leopard searobin	<i>Prionotus scitulus</i>	
bighead searobin	<i>Prionotus tribulus</i>	
searobin (E, L)	<i>Prionotus</i> spp.	
mangrove rivulus	<i>Rivulus marmoratus</i>	SSC
Spanish sardine (L, A)	<i>Sardinella aurita</i>	
redfish, red drum (L, A)	<i>Sciaenops ocellatus</i>	
Spanish mackerel	<i>Scomberomorus maculatus</i>	
king mackerel	<i>Scomberomorus cavalla</i>	
lookdown	<i>Selene vomer</i>	
pygmy sea bass	<i>Serraniculus pumilio</i>	
pufferfish	<i>Sphoeroides maculatus</i>	
southern puffer (J, A)	<i>Sphoeroides nephelus</i>	
least puffer (J)	<i>Sphoeroides parvus</i>	
bandtail puffer	<i>Sphoeroides spengleri</i>	
puffer (L, J)	<i>Sphoeroides</i> spp.	
great barracuda	<i>Sphyraena borealis</i>	
planehead filefish	<i>Stephanolepis hispidus</i>	
Atlantic needlefish	<i>Strongylura marina</i>	
redfin needlefish	<i>Strongylura notata</i>	
needlefishes	<i>Strongylura</i> spp.	
timucu	<i>Strongylura timucu</i>	
shoal (dusky) flounder	<i>Syacium papillosum</i>	
blackcheek tonguefish (L, A)	<i>Symphurus plagiosa</i>	
dusky pipefish (J, A)	<i>Syngnathus floridae</i>	
chain pipefish (J, A)	<i>Syngnathus louisianae</i>	
gulf pipefish (J, A)	<i>Syngnathus scovelli</i>	
inshore lizardfish (L, A)	<i>Synodus foetens</i>	
Florida pompano	<i>Trachinotus carolinus</i>	
permit	<i>Trachinotus falcatus</i>	
hogchoker (E, L, A)	<i>Trinectes maculatus</i>	
southern hake	<i>Urophycis floridana</i>	
<i>Class Chondrichthyes (sharks, skates, & rays)</i>		
spotted eagle ray	<i>Aetobatus narinari</i>	
smalltooth sawfish	<i>Pristis pectinata</i>	FE
bullshark	<i>Carcharhinus leucas</i>	
blacktip shark	<i>Carcharhinus limbatus</i>	
southern stingray	<i>Dasyatis americana</i>	
Atlantic stingray	<i>Dasyatis sabina</i>	
bluntnose stingray	<i>Dasyatis say</i>	
nurse shark	<i>Ginglymostoma cirratum</i>	
smooth butterfly ray	<i>Gymnura micrura</i>	
lemon shark	<i>Negaprion brevirostris</i>	
cownose ray	<i>Rhinoptera bonasus</i>	

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bonnethead shark	<i>Sphyrna tiburo</i>	
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Invertebrates

Phylum Mollusca

striate barrel-bubble	<i>Acetocina bullata</i>	
Cande's barrel-bubble	<i>Acetocina candeii</i>	
paper mussel	<i>Amygdalum papyria</i>	
greedy dove shell	<i>Anachis avara</i>	
dovesnail	<i>Anachis translirata</i>	
bloody ark	<i>Anadara ovalis</i>	
transverse ark	<i>Anadara transversa</i>	
sea hares	<i>Anaspidea</i> spp.	
pointed venus	<i>Anomalocardia cuneimeris</i>	
Atlantic jingle	<i>Anomia simplex</i>	
Wilcox's sea hare	<i>Aplesia wilcox</i>	
Adam's miniature ark	<i>Arcopsis adamsi</i>	
calico scallop	<i>Argopecten gibbus</i>	
bay scallop	<i>Argopecten irradians</i>	
white-beaded ark	<i>Barbita candida</i>	
West Indian false cerith	<i>Batillaria minima</i>	
impressed odostoma	<i>Boonea impressa</i>	
scorched mussel	<i>Brachidontes exustus</i>	
hooked mussel	<i>Brachidontes recurvus</i>	
common Atlantic bubble	<i>Bulla striata</i>	
common West Indian bubble	<i>Bulla striata occidentalis</i>	
teardrop marginella	<i>Bullata ovaliformis</i>	
ragged sea hare	<i>Bursatella leachii pleii</i>	
lightning whelk	<i>Busycon contrarium</i>	
pear whelk	<i>Busycon spiratum</i>	
Green's miniature cerith	<i>Cerithiopsis greeni</i>	
awl miniature cerith	<i>Cerithiopsis subulata</i>	
ivory cerith	<i>Cerithium eburneum</i>	
fly-specked cerith	<i>Cerithium muscarum</i>	
variable cerith	<i>Cerithium variable</i>	
cross-barred venus	<i>Chione cancellata</i>	
Conrad's false mussel	<i>Congerina leucophaeata</i>	
jasper cone	<i>Conus jaspideus stearnsi</i>	
contracted corbula	<i>Corbula contracta</i>	
oyster	<i>Crassostrea virginica</i>	
slipper limpet	<i>Crepidula fornicata</i>	
spotted slipper shell	<i>Crepidula maculosa</i>	
eastern white slipper shell	<i>Crepidula plana</i>	
sharp-ribbed drill	<i>Eupleura sulcidentata</i>	
true tulip snail	<i>Fasciolaria tulipa</i>	
teardrop marginella	<i>Gibberulina oviliformis</i>	
Antilles glassy-bubble	<i>Haminoea antillarum</i>	
elegant glassy-bubble	<i>Haminoea elegans</i>	
variable bittium	<i>Ittibittium oryza</i>	
bubble shell	<i>Japonactaeon punctostiatum</i>	
common egg cockle	<i>Laevicardium laevigatum</i>	
periwinkle	<i>Littorina</i> sp.	
Loliginidae squids	<i>Loliginidae</i> spp.	

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glassy lyonsia	<i>Lyonsia hyalina</i>	
waxy macoma	<i>Macoma cerina</i>	
sunray venus clam	<i>Macrocallista nimbosa</i>	
gold-line marginella	<i>Marginella aureotincta</i>	
no common name	<i>Melanella lubrica</i>	
crown conch	<i>Melongena corona</i>	
cherrystone clam	<i>Mercenaria campechiensis</i>	
lunar dove-shell	<i>Mitrella lunata</i>	
Atlantic ribbed mussel	<i>Modiolus demissus</i>	
lace murex	<i>Murex dilectus</i>	
lateral musculus	<i>Musculus lateralis</i>	
common eastern nassa	<i>Nassarius vibex</i>	
olive nerite	<i>Neritina reclivata</i>	
lettered olive	<i>Oliva sayana</i>	
tiny dwarf olive	<i>Olivella pusilla</i>	
nudibranch	<i>Phidiana lynceus</i>	
moon snails	<i>Polinices</i> sp.	
common Atlantic marginella	<i>Prunum apicinum</i>	
plicate mangelia	<i>Pyrgocythara plicosa</i>	
no common name	<i>Rissoina chesneli</i>	
no common name	<i>Rissoina multicastrata</i>	
rose-petal tellin	<i>Tellina lineata</i>	
black-lined triphora	<i>Triphora nigrocincta</i>	
suffuse trivia	<i>Trivia suffusa</i>	
Conrad's turbonille	<i>Turbonilla conradi</i>	
Dall's turbonille	<i>Turbonilla dalli</i>	
Atlantic oyster drill	<i>Urosalpinx cinerea</i>	
West Indian worm snail	<i>Vermicularia spirata</i>	
smooth risso	<i>Zebina browniana</i>	

Phylum Arthropoda

Subphylum Chelicerata

horseshoe crab	<i>Limulus polyphemus</i>	
sea spider	<i>Pycnogonida</i> spp.	

Subphylum Crustacea

Calanoid copepod	<i>Acartia tonsa</i>	
crab	<i>Albunia</i> sp.	
bay snapping shrimp	<i>Alpheus heterochaelis</i>	
snapping shrimp	<i>Alpheus normani</i>	
snapping shrimp (L, J, A)	<i>Alpheidae</i> spp.	
night shrimp (L, A)	<i>Ambidexter symmetricus</i>	
opossum shrimp, mysid	<i>Americamysis almyra</i>	
opossum shrimp, mysid	<i>Americamysis bahia</i>	
opossum shrimp, mysid	<i>Americamysis stucki</i>	
mangrove tree crab	<i>Aratus pisonii</i>	
striped barnacle	<i>Balanus amphitrite</i>	
ivory barnacle	<i>Balanus eburneus</i>	
opossum shrimp, mysid	<i>Bowmaniella dissimilis</i>	
twoclaw shrimp	<i>Brachycarpus biunguiculatus</i>	
opossum shrimp, mysid	<i>Brasilomysis castroi</i>	
ghost shrimp (L)	<i>Callinassa</i> spp.	

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swimming crab	<i>Callinectes ornatus</i>	
blue crab (L, J, A)	<i>Callinectes sapidus</i>	
lesser blue crab	<i>Callinectes similis</i>	
Cyclopoid copepod	<i>Cyclops</i> sp.	
Diastylis	<i>Diastylis</i> sp.	
mole crab (L)	<i>Emerita</i> sp.	
olivepit porcelain crab (L)	<i>Eucерamus praelongus</i>	
flatback mud crab (L, A)	<i>Eurypanopeus depressus</i>	
Harpacticoid copepod	<i>Euterpina acutifrons</i>	
cladoceran	<i>Pseudevadne tergestina</i>	
pink shrimp (L, J, A)	<i>Farfantepenaeus duorarum</i>	
false zostera shrimp	<i>Hippolyte pleuracanthus</i>	
zostera shrimp (L, J, A)	<i>Hippolyte zostericola</i>	
sargassum shrimp (L, A)	<i>Latreutes parvulus</i>	
red-algae shrimp (J, A)	<i>Leander paulensis</i>	
Palaemonid shrimps	<i>Leander</i> spp.	
sand crab (L)	<i>Lepidopa</i> sp.	
combclaw shrimp (J)	<i>Leptocheila serratorbita</i>	
longnosed spider crab (L, J, A)	<i>Libinia dubia</i>	
prawn (J, A)	<i>Lucifer faxoni</i>	
cleaner shrimp (L)	<i>Lysmata</i> sp.	
Ohio shrimp	<i>Macrobrachium ohione</i>	
Florida stone crab (L, A)	<i>Menippe mercenaria</i>	
stone crabs	<i>Menippe</i> spp.	
mysid shrimp	<i>Mysidopsis bigelowi</i>	
Packard's mud crab	<i>Neopanope packardi</i>	
mud crab	<i>Neopanope texana</i>	
ghost crab	<i>Ocypode quadrata</i>	
estuarine longeye shrimp (L)	<i>Ogyrides alphaerostris</i>	
Cyclopoid copepod	<i>Oithona</i> sp.	
hermit crab	<i>Pagurus bonariensis</i>	
flat-clawed hermit crab	<i>Pagurus pollicaris</i>	
long-clawed hermit crab (L, J)	<i>Pagurus longicarpus</i>	
Florida grass shrimp (L, J, A)	<i>Palaemon floridanus</i>	
brackish grass shrimp	<i>Palaemonetes intermedius</i>	
riverine grass shrimp	<i>Palaemonetes paludosus</i>	
daggerblade grass shrimp (J, A)	<i>Palaemonetes pugio</i>	
Palaemonetes grass shrimps (L, J, A)	<i>Palaemonetes</i> spp.	
marsh grass shrimp (J, A)	<i>Palaemonetes vulgaris</i>	
mud crab (L, A)	<i>Panopeus herbstii</i>	
Calanoid copepod	<i>Paracalanus</i> sp.	
cryptic teardrop crab	<i>Pelia mutica</i>	
pink shrimp	<i>Penaeus duorarum</i>	
grass shrimp	<i>Penaeus monodon</i>	
cladoceran	<i>Penilia avirostris</i>	
mud crab	<i>Penopeus</i> sp.	
American grass shrimp (L, J, A)	<i>Periclimenes americanus</i>	
longtail grass shrimp (L, J, A)	<i>Periclimenes longicaudatus</i>	
crab (L)	<i>Persephona</i> sp.	
green porcelain crab (L, J, A)	<i>Petrolisthes armatus</i>	
pea crab (L, J)	<i>Pinnixa sayana</i>	

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pea crab (L, A)	<i>Pinnixa</i> spp.	
pea crab (L)	<i>Pinnotheres hemphilli</i>	
squatter pea crab (L)	<i>Pinnotheres maculatus</i>	
pea crab (L)	<i>Pinnotheres</i> spp.	
oval urn crab	<i>Pitho anisodon</i>	
iridescent swimming crab	<i>Portunus gibbesii</i>	
blotched swimming crab	<i>Portunus spinimanus</i>	
Portunus (swimming) crabs (L)	<i>Portunus</i> spp.	
Bermuda night shrimp	<i>Processa bermudensis</i>	
night shrimp	<i>Processa hemphilli</i>	
Calanoid copepod	<i>Pseudodiaptomus coronatus</i>	
Harris mud crab (L)	<i>Rhithropanopeus harrisii</i>	
roughneck shrimp	<i>Rimapenaeus constrictus</i>	
marsh crab (L)	<i>Sesarma cinereum</i>	
marsh crab (L)	<i>Sesarma reticulatum</i>	
marsh crab (L)	<i>Sesarma</i> spp.	
hardback rock shrimp	<i>Sicyonia laevigata</i>	
Sicyonia rock shrimp	<i>Sicyonia parri</i>	
kinglet rock shrimp	<i>Sicyonia typica</i>	
rough manis shrimp (A, L)	<i>Squilla empusa</i>	
opossum shrimp, mysid	<i>Taphromysis bowmani</i>	
Manning grass shrimp (L, J, A)	<i>Thor manningi</i>	
arrow (stick) shrimp (L, J, A)	<i>Tozeuma carolinensis</i>	
sand fiddler crab	<i>Uca pugilator</i>	
fiddler crab (L)	<i>Uca</i> spp.	
mud shrimp (L, J)	<i>Upogebia</i> spp.	

Insects

mosquito	<i>Aedes</i> spp.	
white peacock	<i>Anartia jatrophae</i>	
mosquito	<i>Anopheles</i> spp.	
Gulf fritillary	<i>Argaulis vanilla</i>	
great southern white	<i>Ascia monuste</i>	
mosquito	<i>Coquillettidia perturbans</i>	
mosquito	<i>Culex</i> sp.	
queen butterfly	<i>Danaus gilippus</i>	
monarch butterfly	<i>Danaus plexippus</i>	
mosquito	<i>Deinocerites cancer</i>	
zebra butterfly	<i>Heliconius charitonius</i>	
viceroi butterfly	<i>Limnitis archippus</i>	
mosquito	<i>Mansonia</i> sp.	
mosquito	<i>Orthopodomyia signifera</i>	
mangrove skipper (L, A)	<i>Phocides pigmalion</i>	
orange-barred sulphur	<i>Phoebis philea</i>	
buckeye	<i>Precis lavinia</i>	
mosquito	<i>Psorophora</i> sp.	
water striders	<i>Rheumatobates</i> spp.	
mosquito	<i>Toxorhynchites</i> sp.	
mosquito	<i>Uranotaenia</i> sp.	
mosquito	<i>Wyeomyia</i> sp.	

Common Name	Species Name	Status
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Legend: FT = Federally and State-Designated Threatened • FE = Federally-and State-Designated Endangered • ST = State-Designated Threatened • SE = State-Designated Endangered • SSC = State Species of Special Concern • (S/A) = listed due to similarity of appearance • CE= commercially exploited • E = egg • L = larval • J = juvenile • A = adult

Other Invertebrates

Phylum Bryozoa

Bryozoans (moss-like animals)	<i>Bryozoa</i> spp.
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Phylum Chaetognatha

arrow worm	<i>Ferrosagitta hispida</i>
arrow worm	<i>Flaccisagitta enflata</i>
arrow worm	<i>Sagitta fenuis</i>
arrow worm	<i>Sagitta</i> sp.

Phylum Chordata

lancelets	<i>Amphioxus</i> spp.
colonial tunicate	<i>Didemnum</i> spp.
sandy-skin tunicate	<i>Molgula occidentalis</i>
tunicate, sea grape	<i>Molgula</i> sp.
leathery tunicate (sea squirt)	<i>Styela plicata</i>

Phylum Cnidaria (jellyfish, hydroids, etc.)

moon jellyfish	<i>Aurelia aurita</i>
Bougainvillia (hydromedusa)	<i>Bougainvillia</i> sp.
upside-down jellyfish	<i>Cassiopea xamachana</i>
sea nettle	<i>Chrysaora quinquecirrha</i>
Clytia (hydromedusa)	<i>Clytia</i> sp.
Eutima (hydromedusa)	<i>Eutima</i> sp.
Hydroid	<i>Hydrozoa</i> spp.
Liriope (hydromedusa)	<i>Liriope tetraphylla</i>
comb jelly (ctenophore)	<i>Mnemiopsis mccradyi</i>
Obelia (hydromedusa)	<i>Obelia</i> sp.
jellyfish	<i>Rhopilema verrilli</i>

Phylum Echinodermata

starfish	<i>Echinaster</i> sp.
sea cucumber	<i>Leptosynapta parvipitina</i>
nine-armed sea star	<i>Luidia senegalensis</i>

Phylum Platyhelminthes

flatworms	<i>Platyhelminthes</i> spp.
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Class Polychaeta

polychaete worms	<i>Eunicidae-Eunice</i>
clam polychaete worms	<i>Nereidae-Nereis</i>
trumpet worm	<i>Pectinaria gouldii</i>
paddle polychaete worm	<i>Phyllodoceidae-Phyllodoce</i>
mud worm	<i>Polydora websteri</i>
syllid polychaete worms	

Phylum Porifera

sponges	<i>Porifera</i> spp.
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B.4.2 / Invasive Non-native and Problem

Common Name	Species Name	Plants (FLEPPC* Category) Others (Invasive Status)
Plants		
sheep's wool	<i>Acanthophora spicifera</i>	
alligator weed	<i>Alternanthera philoxeroides</i>	II
water hyacinth	<i>Eichhornia crassipes</i>	I
Gracilaria	<i>Gracilaria</i> spp.	
graceful red seaweed	<i>Gracilaria tikvahiae</i>	
hook weed	<i>Hypnea musciformis</i>	
Laurencia	<i>Laurencia intricata</i>	
Laurencia	<i>Laurencia</i> spp.	
sea lettuce	<i>Ulva lactuca</i>	
Ulva	<i>Ulva prolifera</i>	
Ulva	<i>Ulva</i> spp.	
Birds		
cattle egret	<i>Bubulcus ibis</i>	
muscovy duck	<i>Cairina moschata</i>	
rock pigeon	<i>Columba livia</i>	
house sparrow	<i>Passer domesticus</i>	
Eurasian collared-dove	<i>Streptopelia decaocto</i>	
European starling	<i>Sturnus vulgaris</i>	
Mammals		
raccoon	<i>Procyon lotor</i>	
feral hog	<i>Sus scrofa</i>	
Reptiles		
Cuban brown anole	<i>Anolis sagrei sagrei</i>	
Amphibians		
greenhouse frog	<i>Eleutherodactylus planirostris</i>	
Cuban treefrog	<i>Osteopilus sptentrionalis</i>	
Fishes		
oscar	<i>Astronotus ocellatus</i>	
black acara	<i>Cichlasoma bimaculatum</i>	
Mayan cichlid	<i>Cichlasoma urophthalmus</i>	
armored catfish/brown hoplo	<i>Holpsterium littorale</i>	
suckermouth catfish	<i>Hypostomus plecostomus</i>	
blue tilapia	<i>Oreochromis aureus</i>	
blackchin tilapia	<i>Sarotherodon melanotheron</i>	
spotted tilapia	<i>Tilapia mariae</i>	
unknown tilapia	<i>Tilapia</i> sp.	
Mollusks and Crustaceans		
Asian green mussel	<i>Perna viridis</i>	

*Florida Exotic Pest Plant Council (FLEPPC) categorizes invasive exotic plants as Category I (plants that are altering native plant communities by displacing native species, changing community structures or ecological functions, or hybridizing with natives) or Category II (plants that have increased in abundance or frequency but have not yet altered Florida plant communities to the extent shown by Category I species).

Public Involvement

C.1 / Advisory Committee

The following appendices contain information about who serves on the Advisory Committee, when meetings were held, copies of the public advertisements for those meetings, and summaries of each meeting.

C.1.1 / List of Members and Their Affiliations

Agency / Organization	Title	POC - Name	Contact Phone	Email
State & Federal				
Estero Bay Aquatic Preserve	Manager	Heather Stafford	239-463-3240	Heather.Stafford@dep.state.fl.us
Charlotte Harbor National Estuary Program	Director	Lisa Beever	239-338-2556 x235	lbeever@swfrpc.org
Estero Bay Preserve State Park	Park Manager	Robert Brooks	239-947-5255	Robert.Brooks@dep.state.fl.us
Florida Gulf Coast University	Chairperson and Professor	Michael Savarese	239-590-7165	msavares@fgcu.edu
Lovers Key State Park	Park Manager III	Gloria Beauchamp	239-463-4588	Gloria.Beauchamp@dep.state.fl.us
Estero Bay Agency on Bay Management	Aquatic Ecologist	David Ceilley	239-590-1359	dceilley@fgcu.edu
Florida Fish and Wildlife Conservation Commission	FWRI Charlotte Harbor Field Lab Research Administrator	Philip Stevens	941-613-0945	Philip.Stevens@myfwc.com
Southwest Florida Regional Planning Council	Principal Planner	Jim Beever	239-338-2550 x224	jbeever@swfrpc.org
County				
Lee County Board of County Commissioners	District 5 Commissioner	Frank Mann	239-533-2225	Dist5@leegov.com
Lee County Natural Resources	Marine Services Operations Manager	Steve Boutelle	239-533-8128	boutelsj@leegov.com
Local-Govt.				
City of Bonita Springs	Environmental Specialist	Michael Kirby	239-444-6142	michael.kirby@cityofbonitaspringscd.org
Town of Fort Myers Beach	Environmental Sciences Coordinator	Keith Laakkonen	239-765-0202 x136	keith@fortmyersbeachfl.gov
Local-Private				
Conservancy of Southwest Florida	Research Manager	Jeff Schmid	239-403-4225	jeffs@conservancy.org
Estero Bay Buddies	Vice President	Terry Cain	239-432-2158	caintb@leegov.com
Fish-Tale Marina	Owner	Al Durrett	239-463-3600	ftmarina@aol.com
Good Times Charters & Tours	Owner	Christina Denegre	239-405-2060	beachbumm11@hotmail.com

PLACE: Florida Transportation Commission, 605 Suwannee Street, MS #9, Room 176, Tallahassee, Florida 32399

GENERAL SUBJECT MATTER TO BE CONSIDERED: Florida Transportation Commission Teleconference. The teleconference number may be obtained by contacting the Transportation Commission, (850)414-4105.

A copy of the agenda may be obtained by contacting the Transportation Commission, (850)414-4105.

Pursuant to the provisions of the Americans with Disabilities Act, any person requiring special accommodations to participate in this workshop/meeting is asked to advise the agency at least 48 hours before the workshop/meeting by contacting the Transportation Commission, (850)414-4105. If you are hearing or speech impaired, please contact the agency using the Florida Relay Service, (800)955-8771 (TDD) or (800)955-8770 (Voice).

For more information, you may contact: The Transportation Commission, 605 Suwannee Street, MS #9, Room 176, Tallahassee, Florida 32399, (850)414-4105.

BOARD OF TRUSTEES OF INTERNAL IMPROVEMENT TRUST FUND

The Florida Department of Environmental Protection, Office of Coastal and Aquatic Managed Areas announces a public meeting to which all persons are invited.

DATE AND TIME: Monday, May 6, 2013, 6:00 p.m. – 7:30 p.m.

PLACE: Lee County Parks & Recreation Support Services Facility at Rutenberg Park, 6490 South Pointe Blvd., Fort Myers, FL 33919

GENERAL SUBJECT MATTER TO BE CONSIDERED: The purpose is to receive public comment on the draft Estero Bay Aquatic Preserve Management Plan. A copy of the draft plan will be available for viewing starting Friday, April 5, 2013 at www.dep.state.fl.us/coastal/. The Estero Bay Aquatic Preserve Advisory Committee will be participating.

A copy of the agenda may be obtained by contacting: Aquatic Preserve Manager, Heather Stafford, by e-mail: Heather.Stafford@dep.state.fl.us, by phone: (239)463-3240 or by mail: 700-1 Fishermans Wharf, Fort Myers Beach, FL 33931.

Pursuant to the provisions of the Americans with Disabilities Act, any person requiring special accommodations to participate in this workshop/meeting is asked to advise the agency at least 5 days before the workshop/meeting by contacting: Heather Stafford, (239)463-3240. If you are hearing or speech impaired, please contact the agency using the Florida Relay Service, (800)955-8771 (TDD) or (800)955-8770 (Voice).

BOARD OF TRUSTEES OF INTERNAL IMPROVEMENT TRUST FUND

The Florida Department of Environmental Protection, Office of Coastal and Aquatic Managed Areas announces a public meeting to which all persons are invited.

DATE AND TIME: Tuesday, May 7, 2013, 9:00 a.m. – 4:00 p.m.

PLACE: Lee County Parks & Recreation Support Services Facility at Rutenberg Park, 6490 South Pointe Blvd., Fort Myers, FL 33919

GENERAL SUBJECT MATTER TO BE CONSIDERED: The purpose is for the members of the Estero Bay Aquatic Preserve Advisory Committee to discuss revising the draft Estero Bay Aquatic Preserve Management Plan.

A copy of the agenda may be obtained by contacting: Aquatic Preserve Manager, Heather Stafford, by e-mail: Heather.Stafford@dep.state.fl.us, by phone: (239)463-3240 or by mail: 700-1 Fishermans Wharf, Fort Myers Beach, FL 33931.

Pursuant to the provisions of the Americans with Disabilities Act, any person requiring special accommodations to participate in this workshop/meeting is asked to advise the agency at least 5 days before the workshop/meeting by contacting: Heather Stafford, (239)463-3240. If you are hearing or speech impaired, please contact the agency using the Florida Relay Service, (800)955-8771 (TDD) or (800)955-8770 (Voice).

EXECUTIVE OFFICE OF THE GOVERNOR

The Governor's Commission on Community Service (Volunteer Florida) announces a telephone conference call to which all persons are invited.

DATE AND TIME: Tuesday, April 9, 2013, 8:00 a.m. until all business is complete

PLACE: (888)670-3525 passcode 3822432866#.

GENERAL SUBJECT MATTER TO BE CONSIDERED: Commission Committee meetings at times noted below:

Communications 9:00 a.m. – 10:00 a.m.

Emergency Management & Volunteer Services 10:00 a.m. -11:00 a.m.

Finance & Audit 11:00 a.m. – 12:00 p.m.

Legislative 1:00 p.m. – 2:00 p.m.

National Service Programs 2:00 p.m. – 3:00 p.m.

Executive 3:00 p.m. – 4:00 p.m.

A copy of the agenda may be obtained by contacting: Nicole Elliott at (850)414-0092 or nicole@volunteerflorida.org.

Pursuant to the provisions of the Americans with Disabilities Act, any person requiring special accommodations to participate in this workshop/meeting is asked to advise the agency at least 3 days before the workshop/meeting by contacting: Nicole Elliott at (850)414-0092 or

Advisory Committee Meeting Attendees

Steve Boutelle	Sherry Furnari	Becky Prado
Terry Cain	Penny Isom	Mike Savarese
Cheryl P. Clark	Keith Laakkonen	Jeff Schmid
Cristina Denegre	Jonathan Meyer	Heather Stafford
Al Durrett	Katie Moses	Philip Stevens
Stephanie Erickson	Earl Pearson	

**Florida Department of Environmental Protection Coastal and Aquatic Managed Areas (CAMA)
Estero Bay Aquatic Preserve Draft Management Plan Advisory Committee Meeting**

May 7, 2013, 9:00 a.m.

**Lee County Parks & Recreation Support Services Facilities at Rutenberg Park
6490 South Pointe Boulevard, Fort Myers, Florida**

Agenda

- Welcome and Introductions
- Recap of Public Meeting
- Discussion on Revisions to Draft Management Plan
- Next Steps in Management Plan Review Process
- Closing

Summary of verbal comments received by the advisory committee at the meeting

Issue 1: Water Quality

Penny read the public comment list from May 6th.

Mike commented that the Issues section doesn't explain the types of data being collected, and there is a need to explain the types of projects and prioritize (consider how comprehensive water quality monitoring efforts are).

Heather noted that the aquatic preserve can prioritize certain areas or programs.

Heather then explained the different monitoring programs that the aquatic preserve is involved in.

Mike stated that critically thinking about what kind of monitoring is being done is helpful.

Steve commented that it is worthwhile to define a question and target monitoring to answer that question.

Al explained that his marina has been taking water quality samples to fulfill permit requirements, but doesn't know what else to do with the data. Where does it go and what happens to it?

Heather explained that it goes to the DEP South District office, and it helps to make sure that his business is meeting water quality standards.

Mike commented that there is a lot of monitoring going on among groups, but it doesn't necessarily mean that the data gets shared.

Keith suggested that perhaps water quality data should be in STORET.

Heather explained that all of the aquatic preserve water quality data is uploaded into STORET, except for datasonde data.

Mike discussed two possible program pitfalls: whether the monitoring has a Quality Assurance/Quality Control (QA/QC) program, and collecting data that are never analyzed. He then recommended identifying a portion of the data that is needed to answer a pertinent question, and then having a plan to analyze that data.

Mike also suggested making sure to have the right water quality parameters at the right site, measured at the right time of year.

Issue 2: Coastal and Watershed Development

Penny read the public comment list from May 6th.

Cristina questioned if expanding the aquatic preserve into San Carlos Bay might be difficult, with the outflow of the Caloosahatchee right there.

Heather responded that it depends on the strength of the initiative to start it.

Keith stated that he would support it.

Keith further added that he was pleased to see that Minimum Flows and Levels (MFLs) were discussed in the management plan.

Mike commented that there are certain watersheds that are of greater concern than others, and questioned whether these "hot spots," although addressed earlier in the plan, should be specifically identified in the Issues

portion of the management plan. He continued that most users of the plan will probably have limited time and refer to just the Issues chapter, which is very general. The background section, he noted, was very specific.

Mike then recommended targeting specific “hot spots” that are of greatest importance to the aquatic preserve.

Heather responded that CAMA is revamping the future plan layout for other aquatic preserve management plans.

Mike suggested that Table 5 on page 52 may help to identify water quality issues of greatest importance.

Mike then noted that Darren Rumbold is a national leader on mercury toxicity and is studying the area. He further added that Mr. Rumbold may be sampling areas of Estero Bay where mercury is creating an impairment issue.

Heather commented that the Charlotte Harbor National Estuary Program (CHNEP) is involved with Mote on a grant to sample tributaries, from fresh water to salt water.

Philip added that Mote is looking at nutrients in the creeks, both in pristine locations as well as others (some locations in Estero Bay).

Issue 3: Submerged Resources

Penny read the public comment list from May 6th.

Terry stated that the public meeting comments included how to get data out to the public.

Mike asked who conducts the seagrass transect monitoring and how often it is conducted.

Heather replied that the aquatic preserve does the monitoring twice a year.

Jeff suggested that analyses of the data should be put on the preserve website.

Mike asked what kinds of trends were being seen.

Heather responded that, in general, the Charlotte Harbor Aquatic Preserve office looks at the deep edges of seagrass beds for both Estero Bay and Charlotte Harbor.

Mike commented that James Douglass is a new Marine Ecology teacher at FGCU and has started monitoring some locations in Estero Bay with his classes.

Heather responded that Cheryl and Mindy have a meeting set up with him. She added that the aquatic preserve would like more coordination with FGCU.

Cheryl furthered that it would be nice to know what FGCU efforts are being done in Estero Bay.

Heather commented that the aquatic preserve also participates in annual training/QA efforts with most everyone doing seagrass monitoring in the area.

Mike stated that oysters are not included in this particular Issue section. He added that FGCU is doing lots of oyster work, so the aquatic preserve might be able to capitalize on how oyster beds are doing from other people.

Mike continued that he thinks that FGCU is still monitoring/looking at oyster reef resources in at least three locations in Estero Bay. He specified Hendry and Mullock Creeks, Estero River and Imperial River.

Heather asked if they are looking at natural oyster beds or monitoring oyster restoration.

Mike answered that he is not sure, but thinks that there is little effort going into monitoring of created/restored reefs. He specified Aswani Voley as the contact person.

Heather stated that the aquatic preserve has a CAMA website, the Estero Bay Buddies (EBB) website, a Facebook page and a Twitter account.

Keith asked if it is possible to get Shapefiles converted to KMZ files for Google Earth, for those without access to GIS.

Sherry answered that it is possible to make KMZ files from ArcMap. She added that EBB just hired a new person for their website, so the aquatic preserve could approach the new web master to do something like that.

Becky Prado stated that the Tallahassee office is working on similar efforts and explained some of those efforts.

Mike commented that FGCU has a program called Project E.A.R.T.H. that is working on developing spatial/temporal databases for educational purposes by taking ArcView/ArcGIS files and making them more user friendly. He added that Margarete Forest is the contact person.

Mike furthered that they would like to have useable databases in Estero Bay and would appreciate data on submerged aquatic vegetation (SAV), oyster, water quality data, etc.

Jeff stated that he has provided Margarete with his seagrass layers.

Steve commented that Google Earth also has a timeline feature, so you can view mapping data and see trends over time.

Heather asked if Google Earth is the best place to put the information to get it out to the public.

Steve responded that everyone loves Google Earth.

Al asked about the possibility of creating a yearly documentary (10-15 minutes) to show and discuss the status of resources in the bay. He continued that the aquatic preserve could get 4-5 people to talk for 4-5 minutes each on what the findings have been for the past year, and then update it every year.

Mike suggested that YouTube shorts linked to the website would be relatively cost free.

Al added that CDs don't cost much to produce and could be handed out to different groups.

Cristina commented that that type of material would be more understandable to the general public.

Heather asked if that is something that the aquatic preserve is allowed to do.

Becky responded that yes, it is, and added that there is a CAMA communications call on how to do it.

Keith asked if CAMA has a social marketing plan.

Becky responded that the Tallahassee office is getting into this now and that they have targeted strategies for this year. She then explained how aquatic preserves are starting to look into social marketing to increase visibility.

Heather added that aquatic preserve strategic planning has just begun and that social marketing is a big aspect of that.

Philip commented that the more partners you can have, the better, because it can take a long time to get approval for things.

Mike suggested using EBB.

Becky responded that that does not put the CAMA "face" on the product so there is still a lack of awareness. She furthered that the aquatic preserve should try to do things for YouTube internally.

Katie asked if the aquatic preserve had reached out to any of the local TV stations.

Heather responded that the office has worked with WGCU. She added that Paradise TV on FOX showcases local groups and locations, and that utilizing this resource would be a good idea.

Katie offered to send Heather the contact information for Paradise TV.

Keith commented that Rosemary Emery with WGCU is always looking for environmental educational show ideas.

Mike commented to be sure to get proprietary rights for all video footage, so that it can be used again internally in other ways. He furthered that it should include both raw and edited footage so that the aquatic preserve could use it, distribute it, or upload it.

Katie stated that there are a lot of grants available for environmental education through social media.

Issue 4: Wading and Diving Colonial Nesting Birds

Penny read the public comment list from May 6th.

Steve commented that the idea of marking rookery islands and designating them as Critical Wildlife Areas was stressed early in the management plan document, but he was not convinced that it needed to be done. He furthered that it should be decided how marking and designating the islands would make a difference, and whether it is worthwhile doing. If so, it should then be listed as one of the objectives in Issue 4.

Mike asked how many rookeries are located within the No Internal Combustion Motor (NICM) zones.

Cheryl responded that none of the zones have been implemented as of yet.

Heather provided background information on the NICM zones. She added that Parks has the ability to establish zones, but CAMA does not.

AI asked for clarification concerning the implementation of the zones.

Heather and Steve explained the implementation process as it relates to the Noticed General Permit (NGP).

AI commented that he had his customers all psyched up for the NICM zones a couple of years back. He added that everyone thought that it was a good thing for Estero Bay.

Philip inquired if there was another way to implement the zones.

Mike asked if the areas could be annexed to Parks.

Heather responded that Parks' authority is only for their boundary and within 500 feet of their boundary.

Mike commented that with the possible exception of one, none of the rookeries are located within the NICM zones. He then asked if it would be possible to get no-motor zones around bird rookery sites and added that it would be a good thing.

AI asked why the NICM zone process stopped.

Steve responded that the county has already utilized the NGP with several projects, but that to date none have been located within an aquatic preserve. He added that the county has found that the NGP has not been as helpful as once thought because they still have to go through the federal permitting process. He continued that some of the specifications stipulated in the NGP are no longer adequate. Specifically, the 20 foot depth limit given for the area at New Pass would no longer fix the problem.

Heather asked if there was something that the aquatic preserve could do. She further inquired if the NICM zones would help with the smalltooth sawfish requirement.

Steve responded that since the zones don't increase sawfish habitat, they would not help.

Mike asked if there was any indication that rookery use by birds is affected by motorized traffic.

Cheryl responded that disturbance has been documented by tour boats, but that a lot of the disturbance is from kayakers and photographers. She continued that the aquatic preserve is only interested in marking rookery islands with high levels of inappropriate use, not all 21 islands, as the islands do not contain an appropriate buffer area and the signs would cause sign pollution. She furthered that FWC will not enforce camping and other inappropriate activities on the islands since they are not posted.

Jonathan commented that Parks' islands are not posted either, but that FWC does enforce those areas.

It was then commented that Parks uses Section 62D for their authority to enforce their islands.

Katie inquired if it was possible for CAMA to get a 62-D type rule for authority.

Becky responded that CAMA has to be strategic as to when the rule is opened, because other sections of the rule could then be changed, too. She suggested, however, that language possibly be drafted in case the rule has to be opened in the next 1-2 years. She also added that CAMA management plans cannot be more restrictive than the current rule allows.

Heather stated that language in the management plan should be changed to "may," "might" or "proposed" so it doesn't sound like the NICM zones are definitely happening.

Steve commented that the NGP states that the zones must be posted if dredging occurs. He then asked whether the rule stated if the zones could only be posted if dredging occurred. He continued that the rule gives the authority for the zones to go in, but does not say how far in advance the zones have to be marked.

Mike commented that the map and management plan should clarify that the NICM zones are approved but not yet implemented.

Keith commented that FWC already has the authority to write tickets for prop scarring.

AI stated that the zones should contain an access channel.

Heather responded that there were conversations with stakeholders during the NGP process concerning access.

Steve commented that adding an access channel to the existing NICM zones would require a rule change and that would likely not happen.

It was then noted that the conversation no longer pertained to Issue 4.

Philip asked if there are places people can camp and not disturb birds.

Terry responded that yes, people can camp on Bowtie Island behind Big Hickory island.

Terry furthered that it was good that all historic nesting islands are shown on Map 17, not just pertinent ones from today.

Keith commented that rookery data should go to Charlie or Brian Ahern (reviewers) so that the data could be cloaked, but still available to other people.

Issue 5: Public Use and Access

Penny read the public comment list from May 6th.

Katie commented that Lover's Key State Park has had illegal geocaches and has tracked them down through the geocache websites and contacted them. She added that they now require an agreement for people to establish a geocache in the park, and that they remove old derelict caches after a specified time frame.

Jonathan stated that the Estero Bay Preserve State Park has something similar, but that they also go out with people that want to establish geocaches within the preserve to look at the proposed location.

Heather commented that it is easier to do that on land than in the aquatic preserve, which is below mean high water.

Cheryl expressed concern that the geocaches located within the aquatic preserve do not specify what type of vessel should be used to access the cache.

Katie responded that this type of information can be added as a comment on the geocaching website, as long as the user registers with the geocaching website. She also added that the park may have a volunteer that can help the aquatic preserve.

Cheryl asked if the comment had to be left by the person who set up the cache.

It was answered that, no, anyone can leave a comment.

Terry asked if the park regulates what can be put into the cache.

Katie answered that it is part of the agreement that they developed.

Keith commented that sites like www.geocaching.com do have ethical standards for caches. He added that the website can be searched for cache sites in Estero Bay, and the aquatic preserve can add comments with additional information or comment on others' comments.

Mike commented that greater specificity is needed. He then asked if there are certain issues that the aquatic preserve wants to deal with, or specific rules or ordinances that the aquatic preserve would like to be employed/enforced. He furthered that Goal 1, Objectives 1 and 2 could be more specific since they are very general.

Keith commented that the county should pass a requirement for certification of eco-tour operators.

Terry responded that Florida SEE addresses this topic and is a vehicle to do that.

AI commented that he owns a tour boat and has never heard of it.

Cheryl offered to provide AI with the contact information.

Mike commented that certification doesn't turn people away, just adds to business.

Heather responded to Mike's earlier comment by stating that the aquatic preserve did not have any specific rules or ordinances in mind when the management plan was written.

Keith commented that he would like to see the encouragement of NICM zones mentioned in the Issue 5 text.

Mike suggested perhaps that language could be specified in Goal 1, Objective 2.

Steve commented that the county is concerned with increasing pressure to drive out public access, and that the aquatic preserve is charged with encouraging public access. He pointed out that other than the ramps at Lover's Key, Imperial River and Koreshan, eventually all other ramps and access points (such as those at street ends on Fort Myers Beach) could go away, so preserve them or they'll diminish.

Keith stated that the Town of Fort Myers Beach receives lots of complaints concerning kayak launches at the end of neighborhood streets. He furthered that the Town is currently going after TDC grants so that they can create small parking spots and launches, as neighborhoods have encroached on public launching spots.

Keith added that the Mound House also has a kayak launch that needs to be added to Map 21.

Heather questioned if all marinas with access should be added to the map.

Steve commented that what is available now should be solidified with partnerships, and that property owners could be paid to provide public access on their property (buy public rights to access).

Keith asked if the proposed EbbTide development on San Carlos Island includes any public ramps.

Steve responded that no, the existing ramp would be private.

Mike asked if there are a lot of people that have to traverse Fort Myers Beach to get to a public boat ramp.

Steve responded that there are not a lot, but that there are a lot that utilize the Lover's Key public boat ramp.

It was then stated that the Salty Sam's ramp location is no longer public and should be removed from Map 21.

Heather stated that a marina is proposed to be developed (Sugar Mountain, LLC/Estero Bay Marina) at the old Weeks Fishcamp location.

Keith observed that most of the boat trailer traffic is coming from the south (Bonita) to launch at Lover's Key.

Heather speculated that the Estero Bay Marina will be a big access point.

Cheryl added that the owner did state that it will remain public.

Steve suggested that it should be added during the development process that the marina will maintain a certain level of public boat access in perpetuity.

Steve commented that under Goal 2, educating the public is important (regarding the public knowing about the Sugar Mountain marina).

Public Interest Suggestions

Penny read the public comment/suggestion list from May 6th.

Heather informed the advisory committee that the aquatic preserve does have a public interest list, but that this list is to add more.

Becky provided background information on what public interest is.

Keith stated that the equipment listed on page 105 is dated and that the office location is sometimes an issue. He suggested that expensive equipment or a new office location may be beneficial if, in the future, a huge project is proposed.

Mike asked whether equipment needs (especially larger ones) should be mentioned in the plan. He also suggested adding anything needed for restoration projects and for monitoring efforts, as having them written into the plan would help to justify their need.

Mike commented that FGCU has fallen out of the reef restoration business, and asked if there was still an interest at the aquatic preserve.

Heather responded that the aquatic preserve is still interested and is looking at different techniques and exact, appropriate locations for oyster restoration. She added that restoration efforts are a great event for the public to be able to come and help place oyster bags in the water, but that perhaps a more focused effort is needed, along with updated methodologies.

AI asked if the oyster restoration done in Estero Bay a few years prior worked.

Heather answered that Aswani Volety would be the person to ask.

Mike commented that there is a big need for determining that, as reefs have been put in but not demonstrated if

they are effective. He added that the reefs in the Estero River and Horseshoe Keys areas were looked at and are both doing remarkably well.

Cheryl asked if success was determined from oyster recruitment or as from other organisms living on them.

Mike commented that there has been successful recruitment and growth.

Heather commented that any lessons learned from any efforts would be good for the aquatic preserve to know.

Mike stated that looking at restoration effectiveness would be a good thing to add to the appropriate Issue section. He added that FGCU students would be good to utilize in this matter.

Steve commented that the Public Interest list needs to be prioritized.

Mike asked if anyone knew of areas where tidal flow interruption is affecting mangrove die-off, such as at Big Hickory.

Terry responded that the hydrology is changing, turning from mangrove forest into salt tern, and it's happening in many areas around the preserve.

Mike state that he believes that it is from sea level rise.

Keith commented that sometimes money is spent on these mangrove forest die-offs, but that these changing areas might actually be providing habitat for other species not able to find suitable habitat otherwise.

Steve asked if anyone has looked at doing culverts under the road to improve flow in locations (like at Squaw Creek by the water tower) affected by causeway development. He added that it is not a simple question to evaluate the costs and benefits of reconnecting the flowways.

Mike stated that those areas may have since developed oyster reefs.

Penny then explained the next steps that will be taken in the Management Plan development process.

C.2 / Formal Public Meeting

The following Appendices contain information about the Formal Public Meeting which was held in order to obtain input from the public about the Estero Bay Aquatic Preserve Draft Management Plan.

C.2.1 / Florida Administrative Register Posting

Florida Administrative Register

Volume 39, Number 62, March 29, 2013

PLACE: Florida Transportation Commission, 605 Suwannee Street, MS #9, Room 176, Tallahassee, Florida 32399

GENERAL SUBJECT MATTER TO BE CONSIDERED: Florida Transportation Commission Teleconference. The teleconference number may be obtained by contacting the Transportation Commission, (850)414-4105.

A copy of the agenda may be obtained by contacting the Transportation Commission, (850)414-4105.

Pursuant to the provisions of the Americans with Disabilities Act, any person requiring special accommodations to participate in this workshop/meeting is asked to advise the agency at least 48 hours before the workshop/meeting by contacting the Transportation Commission, (850)414-4105. If you are hearing or speech impaired, please contact the agency using the Florida Relay Service, (800)955-8771 (TDD) or (800)955-8770 (Voice).

For more information, you may contact: The Transportation Commission, 605 Suwannee Street, MS #9, Room 176, Tallahassee, Florida 32399, (850)414-4105.

BOARD OF TRUSTEES OF INTERNAL IMPROVEMENT TRUST FUND

The Florida Department of Environmental Protection, Office of Coastal and Aquatic Managed Areas announces a public meeting to which all persons are invited.

DATE AND TIME: Monday, May 6, 2013, 6:00 p.m. – 7:30 p.m.

PLACE: Lee County Parks & Recreation Support Services Facility at Rutenberg Park, 6490 South Pointe Blvd., Fort Myers, FL 33919

GENERAL SUBJECT MATTER TO BE CONSIDERED: The purpose is to receive public comment on the draft Estero Bay Aquatic Preserve Management Plan. A copy of the draft plan will be available for viewing starting Friday, April 5, 2013 at www.dep.state.fl.us/coastal/. The Estero Bay Aquatic Preserve Advisory Committee will be participating.

A copy of the agenda may be obtained by contacting: Aquatic Preserve Manager, Heather Stafford, by e-mail: Heather.Stafford@dep.state.fl.us, by phone: (239)463-3240 or by mail: 700-1 Fishermans Wharf, Fort Myers Beach, FL 33931.

Pursuant to the provisions of the Americans with Disabilities Act, any person requiring special accommodations to participate in this workshop/meeting is asked to advise the agency at least 5 days before the workshop/meeting by contacting: Heather Stafford, (239)463-3240. If you are hearing or speech impaired, please contact the agency using the Florida Relay Service, (800)955-8771 (TDD) or (800)955-8770 (Voice).

BOARD OF TRUSTEES OF INTERNAL IMPROVEMENT TRUST FUND

The Florida Department of Environmental Protection, Office of Coastal and Aquatic Managed Areas announces a public meeting to which all persons are invited.

DATE AND TIME: Tuesday, May 7, 2013, 9:00 a.m. – 4:00 p.m.

PLACE: Lee County Parks & Recreation Support Services Facility at Rutenberg Park, 6490 South Pointe Blvd., Fort Myers, FL 33919

GENERAL SUBJECT MATTER TO BE CONSIDERED: The purpose is for the members of the Estero Bay Aquatic Preserve Advisory Committee to discuss revising the draft Estero Bay Aquatic Preserve Management Plan.

A copy of the agenda may be obtained by contacting: Aquatic Preserve Manager, Heather Stafford, by e-mail: Heather.Stafford@dep.state.fl.us, by phone: (239)463-3240 or by mail: 700-1 Fishermans Wharf, Fort Myers Beach, FL 33931.

Pursuant to the provisions of the Americans with Disabilities Act, any person requiring special accommodations to participate in this workshop/meeting is asked to advise the agency at least 5 days before the workshop/meeting by contacting: Heather Stafford, (239)463-3240. If you are hearing or speech impaired, please contact the agency using the Florida Relay Service, (800)955-8771 (TDD) or (800)955-8770 (Voice).

EXECUTIVE OFFICE OF THE GOVERNOR

The Governor's Commission on Community Service (Volunteer Florida) announces a telephone conference call to which all persons are invited.

DATE AND TIME: Tuesday, April 9, 2013, 8:00 a.m. until all business is complete

PLACE: (888)670-3525 passcode 3822432866#.

GENERAL SUBJECT MATTER TO BE CONSIDERED: Commission Committee meetings at times noted below:

Communications 9:00 a.m. – 10:00 a.m.

Emergency Management & Volunteer Services 10:00 a.m. -11:00 a.m.

Finance & Audit 11:00 a.m. – 12:00 p.m.

Legislative 1:00 p.m. – 2:00 p.m.

National Service Programs 2:00 p.m. – 3:00 p.m.

Executive 3:00 p.m. – 4:00 p.m.

A copy of the agenda may be obtained by contacting: Nicole Elliott at (850)414-0092 or nicole@volunteerflorida.org.

Pursuant to the provisions of the Americans with Disabilities Act, any person requiring special accommodations to participate in this workshop/meeting is asked to advise the agency at least 3 days before the workshop/meeting by contacting: Nicole Elliott at (850)414-0092 or

Florida Department of Environmental Protection • Office of Coastal & Aquatic Managed Areas



Estero Bay Aquatic Preserve Management Plan

Public Meeting

Monday, May 6, 2013

6:00 pm - 7:30 pm

Lee County Parks & Recreation Support
Services Facilities @ Rutenberg Park
6490 South Pointe Boulevard
Fort Myers, FL 33919

The draft plan can be found at:
www.dep.state.fl.us/coastal/sites/estero/

The Florida Department of Environmental Protection's Office of Coastal and Aquatic Managed Areas (CAMA) is responsible for the management of Florida's 41 aquatic preserves, 3 National Estuarine Research Reserves, a National Marine Sanctuary, and the Coral Reef Conservation Program. These protected areas comprise more than 4 million acres of the most valuable submerged lands and select coastal uplands in Florida. CAMA is updating these management plans, and is currently seeking input on the draft Estero Bay Aquatic Preserve management plan.

Meeting objectives:

1. Review purpose and process for revising the Estero Bay Aquatic Preserve management plan.
2. Present current draft plan with a focus on issues, goals, objectives and strategies.
3. Receive input on the draft management plan.

The information from the meeting will be compiled and used by CAMA in the revision of the draft management plan.

Please contact Heather Stafford, (239) 463-3240 | Heather.Stafford@dep.state.fl.us or visit our website at www.dep.state.fl.us/coastal/sites/estero/ for more information or to request a written copy of the plan. Written comments are welcome and can be submitted by fax: (850) 412-0505, Attn: Estero; or email FloridaCoasts@dep.state.fl.us on or before May 20, 2013.

Pursuant to the provisions of the Americans with Disabilities Act, any person requiring special accommodations to participate in this workshop/meeting is asked to advise the agency at least 5 days before the workshop/meeting by contacting Heather Stafford at (239) 463-2340 or Heather.Stafford@dep.state.fl.us. If you are hearing or speech impaired, please contact the agency using the Florida Relay Service, (800) 955-8771 (TDD) or (800) 955-8770 (Voice).

This publication funded in part through a grant agreement from the Florida Department of Environmental Protection, Florida Coastal Management Program by a grant provided by the Office of Ocean and Coastal Resource Management under the Coastal Zone Management Act of 1972, as amended, National Oceanic and Atmospheric Administration (NOAA) Award No. NA11NOS4190073-CM227. The views, statements, findings, conclusions, and recommendations expressed herein are those of the author(s) and do not necessarily reflect the views of the State of Florida, NOAA, or any of its subagencies. April 2013.



THE NEWS-PRESS
*Published every morning
Daily and Sunday
Fort Myers, Florida*
Affidavit of Publication
STATE OF FLORIDA
COUNTY OF LEE

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APR 24 2013

ESTERO BAY
AQUATIC PRESERVE

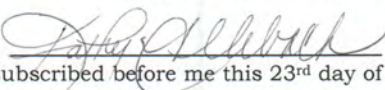
Before the undersigned authority, personally appeared **Kathy Allebach** who on oath says that he/she is the **Legal Assistant** of the News-Press, a daily newspaper, published at Fort Myers, in Lee County, Florida; that the attached copy of advertisement, being a

Notice of Meeting

In the matter of:
Meeting on May 6, 2013
In the court was published in said newspaper
in the issues of

April 23, 2013

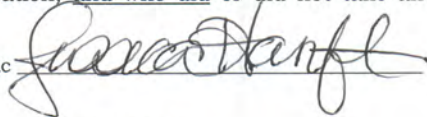
Affiant further says that the said News-Press is a paper of general circulation daily in Lee, Charlotte, Collier, Glades and Hendry Counties and published at Fort Myers, in said Lee County, Florida and that said newspaper has heretofore been continuously published in said Lee County, Florida, each day, and has been entered as a second class mail matter at the post office in Fort Myers in said Lee County, Florida, for a period of one year next preceding the first publication of the attached copy of the advertisement; and affiant further says that he/she has neither paid nor promised any person, firm or corporation any discount, rebate, commission or refund for the purpose of securing this advertisement for publication in the said newspaper.



Sworn to and subscribed before me this 23rd day of April, 2013.

by **Kathy Allebach**
personally known to me

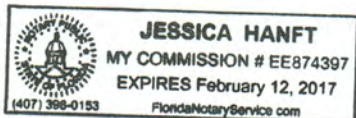
as identification, and who did or did not take an oath.

Notary Public 

Print Name: **Jessica Hanft**
My commission Expires: **February 12, 2017**

NOTICE OF MEETING
The Florida Department of Environmental Protection, Office of Coastal and Aquatic Managed Areas announces a public meeting to receive comments on the Estero Bay Aquatic Preserve draft management plan. The meeting will be held in Lee County on May 6, 2013, 6:00-7:30 p.m. at Lee County Parks & Recreation Support Services Facility at Rutenberg Park, 6490 South Pointe Boulevard, Fort Myers, FL 33919. A copy of the draft plan is posted at

www.dep.state.fl.us/coastal/sites/estero/plen.htm. For the agenda, contact the preserve manager, Heather Stafford by e-mail: Heather.Stafford@dep.state.fl.us, by phone (239) 463-3240, or by mail: 700-I Fisherman's Wharf, Fort Myers Beach, FL 33931. If special accommodation is required for participation contact the manager five (5) days in advance. If you are hearing or speech impaired, please contact the agency using the Florida Relay Service, 1(800)955-8771 (TDD) or 1(800)955-8770 (Voice). No. 147204
April 23, 2013



C.2.4 / Summary of the Formal Public Meeting

Formal Public Meeting Attendees:

Terry Cain	Nancy Kilmartin	Earl Pearson
Danielle Claar	John Kiseda	Joanne Semmer
Cheryl P. Clark	Dorothy McNeill	Heather Stafford
Toby Clark	Reggie McNeill	Becky Prado
Stephanie Erickson	Jonathan C Meyer	Jim Wohlpart
Sherry Furnari	Mickey Miller	
Penny Isom	Katie Moses	

Florida Department of Environmental Protection Coastal and Aquatic Managed Areas (CAMA) Estero Bay Aquatic Preserve Draft Management Plan Public Meeting

May 6, 2013, 6:00-7:30pm

Lee County Parks & Recreation Support Services Facilities at Rutenberg Park
6490 South Pointe Boulevard, Fort Myers, Florida

Agenda

- Welcome and Introductions
- Presentation about the Aquatic Preserve- including history of the aquatic preserve, explanation of mission statements, explanation of the Management Plan process, and review of stated Issues and Goals.
- Public Comment Period- participants visited stations around the conference room which each identified a management issue. A station for Public Interest suggestions was also included. Audience comments were recorded and discussed among the group at each station.
- Next Steps in Management Plan Review Process
- Closing

Summary of verbal comments received by the public at the meeting:

Terry Cain asked who took the pictures that are in the management plan. She then commented that they are beautiful.

Issue 1: Water Quality

- Need to convey and disseminate information (TC)
- Expand Integrated Strategy 3.1 to include boat owners (TC)
- Include a third objective under Goal 1 mirroring Objective 3 under Goal 2 (JW)
- Measurable water quality goal stated in plan (RM)

Issue 2: Coastal and Watershed Development

- Investigate partnerships for landowner incentives such as the Florida Yards and Neighborhoods (FYN) program (JK)
- Investigate expanding the aquatic preserve boundary (tributaries) (JM)
- Investigate adding the San Carlos Bay area as an aquatic preserve (NK)

Issue 3: Submerged Resources

- Make data available to the public (JW)

Issue 4: Wading and Diving Colonial Nesting Birds


- Clearly define and disseminate to the public how CAMA can improve nesting island function (RM)
- Investigate distributing birding data through eBird (RM)
- Be careful with sensitive data (RM)

Issue 5: Public Use and Access

- Change Goal 2, Objective 2 to “Continue to collaborate with the Citizen Support Organization (CSO) on public education and outreach” (JW)
- Extra awesome!! (JW & KM)
- Support certification for eco-tourism (Florida Society for Ethical Ecotourism (Florida SEE)) (JK)

Public Interest Suggestions

1. Seagrass restoration in appropriate locations with manager approved techniques
2. Oyster restoration in appropriate locations with manager approved techniques

- 
3. Mangrove restoration in appropriate locations with manager approved techniques
 4. Marine debris removal
 5. Educational programs, both adult and K-12, for visitors and residents
 6. Signage about resources at specific locations
 7. Expanding and enforcing non-motorized boating areas
 8. Expanding boundaries of aquatic preserve (to include San Carlos Bay, tributaries and south to Collier County)
 9. Provide monetary support to Florida SEE and FYN, etc. to expand education and certification programs
 10. Provide incentives for companies to become certified eco-tour operators
 11. Establish incentives for retrofitting septic systems

Written comments submitted during comment period. No written comments were received from the public within the comment period, which ended May 20, 2013.

Goals, Objectives, and Strategies Table

D.1 / Current Goals, Objectives and Strategies Table

The following table provides a cost estimate for conducting the management activities identified in this plan. The data is organized by year and Management Program with subtotals for each program and year. The following represents the actual budgetary needs for managing the resources of the aquatic preserve. This budget was developed using data from the Florida Coastal Office (FCO) and other cooperating entities, and is based on actual costs for management activities, equipment purchases and maintenance, and for development of fixed capital facilities. The budget below exceeds the funds FCO has been receiving through the state appropriations process, but is consistent with the direction necessary to achieve the goals and objectives identified in the Goals, Objectives and Strategies Table in Appendix D.1. Budget categories identified correlate with the FCO Management Program Areas.

Goals, Objectives & Integrated Strategies	Management Program	Implementation Date (Planned)	Length of Initiative	Est. Avg. Yearly Cost	14 - 15	15 - 16	16 - 17	17 - 18	18 - 19	19 - 20	20 - 21	21 - 22	22 - 23	23 - 24
Issue 1: Water Quality														
Goal 1: Advance scientific understanding of the health of Estero Bay in relation to its water quality.														
Objective 1: Determine long-term water quality status and trends.														
Strategy 1: Consolidate and analyze data and information from aquatic preserve water quality monitoring programs.	Ecosystem Science	2014-2015	2 years	\$17,300	\$17,300	\$17,300	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Strategy 2: Continue collaboration with Florida Fish and Wildlife Conservation Commission (FWC), Fish and Wildlife Research Institute (FWRI) and assistance with Harmful Algal Blooms (HAB) program.	Partnering	2011-2012	Recurring	No additional cost	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Strategy 3: Collaborate with other groups collecting data within the aquatic preserve to stay informed about bay and tributary water quality status.	Partnering	1998-1999	Recurring	No additional cost	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Objective 2: Expand water quality data collection efforts and continue to enhance methodology.														
Strategy 1: Continue data sonde program at three fixed locations.	Ecosystem Science	2004-2005	Recurring	\$43,988	\$39,000	\$41,500	\$41,708	\$41,916	\$50,000	\$50,250	\$43,548	\$43,766	\$43,984	\$44,204

Goals, Objectives & Integrated Strategies	Management Program	Implementation Date (Planned)	Length of Initiative	Est. Avg. Yearly Cost	14 - 15	15 - 16	16 - 17	17 - 18	18 - 19	19 - 20	20 - 21	21 - 22	22 - 23	23 - 24
Strategy 2: Contemplate data sonde program expansion, as budget and personnel allow.	Ecosystem Science	2016-2017	Recurring	\$15,453	\$0	\$0	\$21,000	\$21,000	\$12,000	\$12,600	\$13,230	\$13,892	\$14,586	\$15,315
Strategy 3: Continue to participate and serve as local coordinator for the Charlotte Harbor Estuaries Volunteer Water Quality Monitoring (CHEVWQMN) program.	Education and Outreach	1998-1999	Recurring	\$8,111	\$7,650	\$8,000	\$8,040	\$8,080	\$8,121	\$8,161	\$8,202	\$8,243	\$8,284	\$8,326
Strategy 4: Encourage continued consistency within aquatic preserve offices regarding water quality data collection and data management techniques.	Partnering		Recurring	No additional cost	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Strategy 5: Maintain working relationship with data sonde representatives and keep abreast of the company's recommended equipment handling techniques.	Partnering	2004-2005	Recurring	No additional cost	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Strategy 6: Continue collaboration with Lee County lab and DEP's Division of Environmental Assessment and Restoration staff in the South District for tributary monitoring program, as budget and personnel allow.	Partnering	2002-2003	Recurring	\$6,587	\$6,183	\$6,500	\$6,533	\$6,565	\$6,598	\$6,631	\$6,664	\$6,697	\$6,731	\$6,765
Goal 2: Reduce potential threats to the aquatic preserve from point and non-point sources of pollution.														
Objective 1: Identify potential sources of surface water contaminants.														
Strategy 1: Employ existing information to familiarize staff regarding both point sources (such as National Pollutant Discharge Elimination System permits, golf courses, water treatment plants, septic systems, etc.) and non-point sources (such as storm water discharge locations) of pollution within the Estero Bay watershed.	Ecosystem Science	1983-1984	Recurring	no additional cost	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0

Goals, Objectives & Integrated Strategies	Management Program	Implementation Date (Planned)	Length of Initiative	Est. Avg. Yearly Cost	14 - 15	15 - 16	16 - 17	17 - 18	18 - 19	19 - 20	20 - 21	21 - 22	22 - 23	23 - 24
Strategy 2: Support research within the bay that addresses water quality changes due to surface water contamination and the resultant effects on estuarine flora and fauna.	Partnering	1996-1997	Recurring	No additional cost	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Objective 2: Encourage activities that improve water quality and discourage activities that exacerbate water quality.														
Strategy 1: Support hydrological improvement projects and restoration efforts.	Resource Management	1989-1999	Recurring	No additional cost	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Strategy 2: Support development of TMDLs, BMAPs and Numeric Nutrient Criteria.	Resource Management	1998-1999	Recurring	\$511	\$500	\$503	\$505	\$508	\$510	\$513	\$515	\$518	\$520	\$523
Strategy 3: Report water quality violations to appropriate law enforcement and permitting compliance personnel.	Partnering	1983-1984	Recurring	No additional cost	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Objective 3: Improve public understanding of direct and indirect threats to aquatic preserve water quality.														
Strategy 1: Disseminate information to volunteers and the general public through various media materials. Conduct presentations for homeowner and boater groups to inform local residence on how they can reduce their impacts on the bay.	Education and Outreach	1989-1999	Recurring	\$1,064	\$1,000	\$1,050	\$1,055	\$1,061	\$1,066	\$1,071	\$1,077	\$1,082	\$1,087	\$1,093
Strategy 2: Provide water quality data to other agencies and organizations, including the Citizen Support Organization (CSO), for dissemination to the public.	Partnering	1999-2000	Recurring	No additional cost	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Strategy 3: Support other agencies' and organizations' water quality education efforts.	Partnering	1998-1999	Recurring	No additional cost	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0

Goals, Objectives & Integrated Strategies	Management Program	Implementation Date (Planned)	Length of Initiative	Est. Avg. Yearly Cost	14 - 15	15 - 16	16 - 17	17 - 18	18 - 19	19 - 20	20 - 21	21 - 22	22 - 23	23 - 24
Issue 2: Coastal and Watershed Development														
Goal 1: Protect and improve the ecological integrity of the aquatic preserve.														
Objective 1: Preserve natural habitats within the watershed and adjacent waters in order to maintain or restore water quality and natural resources.														
Strategy 1: Engage in outreach and education opportunities with area decision-makers and the public and serve as a point of contact for information regarding the potential aquatic preserve expansion or creation process, and submerged resources and water quality in those areas.”	Education and Outreach	2012-2013	Recurring	No additional cost	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Strategy 2: Support efforts to expand Estero Bay Aquatic Preserve boundaries to include adjacent segments of Estero Bay tributaries already designated as OFWs.	Partnering	2012-2013	5 years	No additional cost	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Strategy 3: Support efforts to expand Estero Bay Aquatic Preserve boundaries to include San Carlos Bay, to connect with Pine Island Sound Aquatic Preserve and Matlacha Pass Aquatic Preserve; or support the designation of a new aquatic preserve to encompass the same area.	Partnering	2012-2013	5 years	No additional cost	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Strategy 4: Support regional land acquisition program efforts within the Estero Bay watershed.	Partnering	1983-1984	Recurring	No additional cost	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Strategy 5: Support and encourage science-based sustainable land-use strategies within the Estero Bay watershed.	Public Use	unknown	Recurring	\$511	\$500	\$503	\$505	\$508	\$510	\$513	\$515	\$518	\$520	\$523

Goals, Objectives & Integrated Strategies	Management Program	Implementation Date (Planned)	Length of Initiative	Est. Avg. Yearly Cost	14 - 15	15 - 16	16 - 17	17 - 18	18 - 19	19 - 20	20 - 21	21 - 22	22 - 23	23 - 24
Objective 2: Support local ordinances that protect the bay.														
Strategy 1: Engage in outreach and education opportunities with government and area decision makers and serve as a point of contact for information regarding the health of Estero Bay's natural resources.	Education and Outreach	1989-1999	Recurring	\$148	\$100	\$150	\$151	\$152	\$152	\$153	\$154	\$155	\$155	\$156
Strategy 2: Promote and support research of innovative environmentally sensitive development and land-use practices.	Public Use	1999-2000	Recurring	No additional cost	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Objective 3: Coordinate with local regulatory programs to reduce impacts from development within and/or adjacent to the bay and its watersheds.														
Strategy 1: Assess possible cumulative impacts to the aquatic preserve by monitoring Environmental Resource Permitting's (ERP's) online self-certification system and utilizing DEP GIS software/ website to keep abreast of permitted projects.	Resource Management	1992-1993	Recurring	\$2,128	\$2,000	\$2,100	\$2,111	\$2,121	\$2,132	\$2,142	\$2,153	\$2,164	\$2,175	\$2,185
Strategy 2: Assess possible cumulative impacts to the aquatic preserve by monitoring SFWMD's online ePermitting Records Search webpage.	Resource Management	2000-2001	Recurring	\$1,110	\$1,000	\$1,100	\$1,106	\$1,111	\$1,117	\$1,122	\$1,128	\$1,133	\$1,139	\$1,145
Strategy 3: Maintain communications and when needed, attend meetings with DEP-ERP staff regarding current and ongoing project applications that have the potential to impact the aquatic preserve.	Partnering	1989-1999	Recurring	\$300	\$250	\$300	\$302	\$303	\$305	\$306	\$308	\$309	\$311	\$312

Goals, Objectives & Integrated Strategies	Management Program	Implementation Date (Planned)	Length of Initiative	Est. Avg. Yearly Cost	14 - 15	15 - 16	16 - 17	17 - 18	18 - 19	19 - 20	20 - 21	21 - 22	22 - 23	23 - 24
Strategy 4: Maintain communications with SFWMD permitting staff regarding current and ongoing project applications that have the potential to impact the aquatic preserve, and attend monthly interagency permitting meetings, when applicable.	Partnering	2000-2001	Recurring	\$300	\$250	\$300	\$302	\$303	\$305	\$306	\$308	\$309	\$311	\$312
Strategy 5: Maintain communications with Lee County and the City of Bonita Springs staff regarding current and ongoing project applications that have the potential to impact the aquatic preserve.	Partnering	2000-2001	Recurring	No additional cost	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Strategy 6: Provide resource data for regulatory staff through routine site inspections.	Partnering	1989-1999	Recurring	\$11,140	\$10,400	\$11,000	\$11,055	\$11,110	\$11,166	\$11,222	\$11,278	\$11,334	\$11,391	\$11,448
Objective 4: Promote improvement projects that will enhance areas already developed.														
Strategy 1: Support efforts to restore and protect natural freshwater inflows (e.g., water quality, timing and quantity) to the fullest extent possible, such as through the SFWMD's Priority Waterbody List and development of Minimum Flows and Levels.	Partnering	2010-2011	Recurring	No additional cost	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Strategy 2: Facilitate knowledge and understanding of how activities in the watershed impact the bay.	Education and Outreach	1997-1998	Recurring	\$1,064	\$1,000	\$1,050	\$1,055	\$1,061	\$1,066	\$1,071	\$1,077	\$1,082	\$1,087	\$1,093
Strategy 3: Support septic tank retrofitting and connection to city sewer systems, where available, within the watershed.	Partnering	2010-2011	Recurring	No additional cost	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0

Goals, Objectives & Integrated Strategies	Management Program	Implementation Date (Planned)	Length of Initiative	Est. Avg. Yearly Cost	14 - 15	15 - 16	16 - 17	17 - 18	18 - 19	19 - 20	20 - 21	21 - 22	22 - 23	23 - 24
Issue 3: Submerged Resources														
Goal 1: Advance scientific understanding of the health of Estero Bay in relation to its submerged resources.														
Objective 1: Determine long-term SAV status and trends.														
Strategy 1: Maintain aquatic preserve seagrass monitoring program database and analyze data.	Ecosystem Science	2002-2003	Recurring	No additional cost	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Strategy 2: Compile and update a list of other agencies and organizations collecting SAV data within the bay.	Ecosystem Science	2012-2013	Recurring	No additional cost	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Strategy 3: Collaborate with other groups collecting submerged aquatic vegetation (SAV) data within the aquatic preserve to stay informed about SAV status.	Partnering	2007-2008	Recurring	\$555	\$500	\$550	\$553	\$556	\$558	\$561	\$564	\$567	\$570	\$572
Objective 2: Continue to enhance SAV monitoring methodology.														
Strategy 1: Continue bi-annual (twice per year) seagrass monitoring program at five fixed transects.	Ecosystem Science	2002-2003	Recurring	\$8,706.62	\$8,100	\$8,600	\$8,643	\$8,686	\$8,730	\$8,773	\$8,817	\$8,861	\$8,906	\$8,950
Strategy 2: Conduct algae surveys in conjunction with seagrass transect surveys.	Ecosystem Science	2013-2014	Recurring	\$555.02	\$500	\$550	\$553	\$556	\$558	\$561	\$564	\$567	\$570	\$572
Strategy 3: Encourage continued regional consistency within DEP regarding SAV data collection and recording.	Ecosystem Science	2002-2003	Recurring	\$300.46	\$250	\$300	\$302	\$303	\$305	\$306	\$308	\$309	\$311	\$312
Strategy 4: Enhance collaboration with other agencies/organizations, such as FGCU, with regard to their SAV monitoring efforts.	Partnering	2014-2015	Recurring	\$555	\$500	\$550	\$553	\$556	\$558	\$561	\$564	\$567	\$570	\$572
Objective 3: Maintain knowledge of submerged resources found within the aquatic preserve, including plant, animal and algal communities.														
Strategy 1: Map oyster bar habitat within the bay.	Ecosystem Science	2014-2015	4 years	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000	\$0	\$0	\$0	\$0	\$0	\$0

Goals, Objectives & Integrated Strategies	Management Program	Implementation Date (Planned)	Length of Initiative	Est. Avg. Yearly Cost	14 - 15	15 - 16	16 - 17	17 - 18	18 - 19	19 - 20	20 - 21	21 - 22	22 - 23	23 - 24
Strategy 2: Keep abreast of projects conducted within the aquatic preserve by other agencies and organizations.	Ecosystem Science	1997-1998	Recurring	No additional cost	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Goal 2: Preserve and protect submerged resources within the aquatic preserve.														
Objective 1: Continue and expand interagency collaboration regarding submerged resources found within the aquatic preserve.														
Strategy 1: Keep abreast of current knowledge on topics such as SAV transplanting, conservation, mapping, etc.	Ecosystem Science	1997-1998	Recurring	\$555	\$500	\$550	\$553	\$556	\$558	\$561	\$564	\$567	\$570	\$572
Strategy 2: Maintain knowledge of submerged cultural resource locations within the aquatic preserve.	Resource Management	1997-1998	Recurring	No additional cost	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Strategy 3: Collaborate with local stakeholders to generate an Estero Bay seagrass restoration and protection plan.	Partnering	2013-2014	2 years	\$2,000	\$2,000	\$2,000	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Objective 2: Continue and expand collaboration with other agencies /organizations regarding the presence and threat of invasive exotic species.														
Strategy 1: Continue expansion of Estero Bay's Asian green mussel eradication program.	Ecosystem Science	2002-2003	Recurring	\$511	\$500	\$503	\$505	\$508	\$510	\$513	\$515	\$518	\$520	\$523
Strategy 2: Encourage the public to report locations within the bay of exotic species such as the Asian green mussel.	Education and Outreach	2008-2009	Recurring	No additional cost	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Strategy 3: Collaborate with groups collecting data on exotic species within the aquatic preserve to stay informed.	Partnering	2008-2009	Recurring	No additional cost	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Objective 3: Continue interagency collaboration regarding HABs that may affect the aquatic preserve.														
Strategy 1: Keep abreast of current written information regarding HAB species and related topics.	Ecosystem Science	2011-2012	Recurring	No additional cost	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0

Goals, Objectives & Integrated Strategies	Management Program	Implementation Date (Planned)	Length of Initiative	Est. Avg. Yearly Cost	14 - 15	15 - 16	16 - 17	17 - 18	18 - 19	19 - 20	20 - 21	21 - 22	22 - 23	23 - 24
Strategy 2: Provide informational brochures and pamphlets from other agencies and organizations to public concerning natural resources within the bay, sustainable use practices, etc.	Education and Outreach	1997-1998	Recurring	No additional cost	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Strategy 3: Continue collaboration with FWC and assistance with HAB program.	Partnering	2011-2012	Recurring	No additional cost	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Strategy 4: Collaborate with groups collecting data on HABs to stay informed.	Partnering	2011-2012	Recurring	No additional cost	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Objective 4: Improve public understanding of aquatic preserve submerged resources.														
Strategy 1: Disseminate information to the general public and volunteers through various media materials.	Education and Outreach	1989-1999	Recurring	\$1,477	\$1,000	\$1,500	\$1,508	\$1,515	\$1,523	\$1,530	\$1,538	\$1,546	\$1,553	\$1,561
Strategy 2: Support other agencies' and organizations' submerged resources education efforts.	Partnering	1997-1998	Recurring	No additional cost	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Strategy 3: Provide and encourage volunteer opportunities.	Public Use	1999-2000	Recurring	\$1,477	\$1,000	\$1,500	\$1,508	\$1,515	\$1,523	\$1,530	\$1,538	\$1,546	\$1,553	\$1,561
Strategy 4: Provide SAV data to other agencies and organizations, including the CSO, for dissemination to the public.	Partnering	1997-1998	Recurring	No additional cost	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Issue 4: Wading and Diving Colonial Nesting Birds														
Goal 1: Preserve and protect wading and diving bird colonies.														
Objective 1: Determine long-term status and trends of wading and diving bird populations within the aquatic preserve.														
Strategy 1: Monitor bird nesting activity and movement of nesting colonies.	Ecosystem Science	1977-1978	Recurring	\$37,444	\$34,700	\$37,000	\$37,185	\$37,371	\$37,558	\$37,746	\$37,934	\$38,124	\$38,315	\$38,506

Goals, Objectives & Integrated Strategies	Management Program	Implementation Date (Planned)	Length of Initiative	Est. Avg. Yearly Cost	14 - 15	15 - 16	16 - 17	17 - 18	18 - 19	19 - 20	20 - 21	21 - 22	22 - 23	23 - 24
Strategy 2: Maintain up-to-date survey records throughout nesting season.	Ecosystem Science	2008-2009	Recurring	Included in monitoring bird nesting activities	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Objective 2: Improve public understanding of colonial wading birds.														
Strategy 1: Disseminate information and educate the public at environmental events.	Education and Outreach	2008-2009	Recurring	No additional cost	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Strategy 2: Create educational materials for display at public boat ramps and marinas.	Education and Outreach	2010-2011	Recurring	\$153	\$150	\$151	\$152	\$152	\$153	\$154	\$155	\$155	\$156	\$157
Strategy 3: Provide volunteer opportunities and train volunteers to assist with rookery monitoring.	Education and Outreach	2009-2010	Recurring	\$9,308	\$8,600	\$9,200	\$9,246	\$9,292	\$9,339	\$9,385	\$9,432	\$9,479	\$9,527	\$9,575
Strategy 4: Maintain current partnerships and donated display spaces at kiosks.	Partnering	2009-2010	Recurring	No additional cost	\$0	\$0	\$0	\$1	\$2	\$3	\$4	\$5	\$6	\$7
Goal 2: Preserve and protect wading bird nesting islands.														
Objective 1: Preserve and improve nesting island function.														
Strategy 1: Remove exotic vegetation from nesting islands.	Partnering	2015-2016	Recurring	\$102	\$100	\$101	\$101	\$102	\$102	\$103	\$103	\$104	\$104	\$105
Strategy 2: Conduct fishing-line and trash cleanups within the bay, in cooperation with other agencies, organizations and volunteers.	Partnering	2008-2009	Recurring	\$601	\$500	\$600	\$603	\$606	\$609	\$612	\$615	\$618	\$621	\$624
Objective 2: Preserve and improve nesting island habitat.														
Strategy 1: Coordinate with law enforcement regarding monitoring of nesting islands for harassment of wildlife.	Partnering	2011-2012	Recurring	No additional cost	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Strategy 2: Coordinate with ERP on any proposed public use activities (e.g. fireworks and building) in range of active nesting islands.	Partnering	1997-1998	Recurring	No additional cost	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0

Goals, Objectives & Integrated Strategies	Management Program	Implementation Date (Planned)	Length of Initiative	Est. Avg. Yearly Cost	14 - 15	15 - 16	16 - 17	17 - 18	18 - 19	19 - 20	20 - 21	21 - 22	22 - 23	23 - 24
Issue 5: Public Use and Access														
Goal 1: Assist federal, state and local agencies and organizations in managing public use and access while protecting natural resources.														
Objective 1: Identify specific issues that may affect the aquatic preserve and coordinate with the appropriate agency or agencies.														
Strategy 1: Work with regulatory agencies, law enforcement, U.S. Coast Guard, and other resource management entities to identify and address non-water dependent uses within the aquatic preserve such as fireworks displays, as well as activities that are potentially illegal or harmful to natural resources, such as "barge parties" that attract hundreds of boats, and other marine activities that do not currently require state regulatory approval and/or DEP's Division of State Lands authorization.	Partnering	1997-1998	Recurring	\$601	\$500	\$600	\$603	\$606	\$609	\$612	\$615	\$618	\$621	\$624
Strategy 2: Support local governments (e.g., Lee County, Town of Fort Myers Beach, and others) in their efforts to promote conservation, proper stewardship, and resource protection (e.g., seagrass and manatee protection, derelict vessel removal, etc.).	Partnering	1983-1984	Recurring	\$601	\$500	\$600	\$603	\$606	\$609	\$612	\$615	\$618	\$621	\$624
Strategy 3: Maintain effective relations with local FWC law enforcement and Lee County Sheriff's personnel, and serve as a point of contact for natural resource information.	Partnering	2000-2001	Recurring	\$601	\$500	\$600	\$603	\$606	\$609	\$612	\$615	\$618	\$621	\$624
Strategy 4: Maintain effective partnerships with, and keep abreast of potential user issues facing regional aquatic preserves and state parks.	Partnering	1997-1998	Recurring	No additional cost	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0

Goals, Objectives & Integrated Strategies	Management Program	Implementation Date (Planned)	Length of Initiative	Est. Avg. Yearly Cost	14 - 15	15 - 16	16 - 17	17 - 18	18 - 19	19 - 20	20 - 21	21 - 22	22 - 23	23 - 24
Objective 2: Support and provide input regarding legislative rules and local ordinances.														
Strategy 1: Stay abreast of potential rule changes that may affect aquatic preserves and provide input, when applicable.	Public Use	1989-1999	Recurring	No additional cost	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Strategy 2: Stay abreast of changes in local ordinances and land use policies, and provide input, when applicable.	Public Use	1989-1999	Recurring	No additional cost	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Strategy 3: Work with DEP-ERP to disseminate to applicable agencies any information concerning new legislation that may affect the aquatic preserve.	Partnering	1997-1998	Recurring	No additional cost	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Strategy 4: Work with West Coast Inland Navigation District, Lee County, FWC and DEP-ERP to mark and enforce NICMZs.	Partnering	2014-2015	1 Year	\$500	\$500	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Goal 2: Provide public education and outreach opportunities.														
Objective 1: Create and/or support programs for appropriate and compatible uses of the aquatic preserve.														
Strategy 1: Support appropriate-use activities within the aquatic preserve, such as the Great Calusa Blueway Paddling Trail.	Public Use	1997-1998	Recurring	No additional cost	\$0	\$0	\$0	\$1	\$2	\$3	\$4	\$5	\$6	\$7
Strategy 2: Examine public use activities within the aquatic preserve to proactively identify potential resource/public use conflicts.	Public Use	1997-1998	Recurring	\$615	\$500	\$600	\$603	\$606	\$609	\$612	\$615	\$618	\$621	\$624
Strategy 3: Support other agencies in their efforts to develop/update and distribute information to the public identifying potential use conflicts and methods of prevention.	Partnering	1997-1998	Recurring	No additional cost	\$0	\$0	\$0	\$1	\$2	\$3	\$4	\$5	\$6	\$7

Goals, Objectives & Integrated Strategies	Management Program	Implementation Date (Planned)	Length of Initiative	Est. Avg. Yearly Cost	14 - 15	15 - 16	16 - 17	17 - 18	18 - 19	19 - 20	20 - 21	21 - 22	22 - 23	23 - 24
Objective 2: Continue to collaborate with the CSO on public education and outreach.														
Strategy 1: Assist the CSO with various cleanup efforts.	Resource Management	1999-2000	Recurring	\$2,354	\$1,500	\$2,400	\$2,412	\$2,424	\$2,436	\$2,448	\$2,461	\$2,473	\$2,485	\$2,498
Strategy 2: Utilize CSO media to educate the public about the aquatic preserve.	Education and Outreach	1999-2000	Recurring	No additional cost	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Strategy 3: Educate the public at outreach events about the role of the CSO.	Education and Outreach	1999-2000	Recurring	No additional cost	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Strategy 4: Continue cooperation with the CSO and EBSP in order to further the mission of the CSO.	Partnering	1999-2000	Recurring	\$511	\$500	\$503	\$505	\$508	\$510	\$513	\$515	\$518	\$520	\$523
Strategy 5: Support expanded CSO use of its member database.	Partnering	2008-2009	Recurring	No additional cost	\$0	\$0	\$0	\$1	\$2	\$3	\$4	\$5	\$6	\$7
Objective 3: Increase public (resident and visitor) knowledge and awareness of the aquatic preserve, its issues and importance.														
Strategy 1: Provide a variety of formal and informal educational opportunities that foster stewardship while offering a chance to experience the coastal environment.	Education and Outreach	1983-1984	Recurring	\$4,532	\$4,000	\$4,500	\$4,523	\$4,545	\$4,568	\$4,591	\$4,614	\$4,637	\$4,660	\$4,683
Strategy 2: Disseminate information through static displays at public boat ramps and marinas.	Education and Outreach	2008-2008	Recurring	\$199	\$150	\$200	\$201	\$202	\$203	\$204	\$205	\$206	\$207	\$208
Strategy 3: Provide internships and volunteer opportunities to promote stewardship.	Public Use	1999-2000	Recurring	\$4,122	\$4,000	\$4,020	\$4,040	\$4,060	\$4,081	\$4,101	\$4,122	\$4,142	\$4,163	\$4,184
Strategy 4: Utilize local fishing guides, boat charter services and other eco-tourism groups to disseminate outreach materials regarding the aquatic preserve and its resources.	Partnering	2000-2001	Recurring	No additional cost	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0

D.2 / Budget Summary Table

The following table provides a summary of cost estimates for conducting the management activities identified in this plan.

2014-2015 Cost Estimate		2019-2020 Cost Estimate	
Ecosystem Science Subtotal	\$101,850	Ecosystem Science Subtotal	\$111,310
Resource Management Subtotal	\$5,000	Resource Management Subtotal	\$6,225
Education and Outreach Subtotal	\$23,650	Education and Outreach Subtotal	\$26,321
Public Use Subtotal	\$6,000	Public Use Subtotal	\$6,759
Partnering Subtotal	\$23,183	Partnering Subtotal	\$22,659
2014-2015 Total	\$159,683	2019-2020 Total	\$173,274
2015-2016 Cost Estimate		2020-2021 Cost Estimate	
Ecosystem Science Subtotal	\$107,303	Ecosystem Science Subtotal	\$105,480
Resource Management Subtotal	\$6,103	Resource Management Subtotal	\$6,257
Education and Outreach Subtotal	\$25,801	Education and Outreach Subtotal	\$26,452
Public Use Subtotal	\$6,623	Public Use Subtotal	\$6,794
Partnering Subtotal	\$24,203	Partnering Subtotal	\$22,776
2015-2016 Total	\$170,033	2020-2021 Total	\$167,759
2016-2017 Cost Estimate		2021-2022 Cost Estimate	
Ecosystem Science Subtotal	\$111,448	Ecosystem Science Subtotal	\$106,603
Resource Management Subtotal	\$6,133	Resource Management Subtotal	\$6,288
Education and Outreach Subtotal	\$25,930	Education and Outreach Subtotal	\$26,585
Public Use Subtotal	\$6,656	Public Use Subtotal	\$6,829
Partnering Subtotal	\$22,314	Partnering Subtotal	\$22,892
2016-2017 Total	\$172,481	2021-2022 Total	\$169,197
2017-2018 Cost Estimate		2022-2023 Cost Estimate	
Ecosystem Science Subtotal	\$111,895	Ecosystem Science Subtotal	\$107,761
Resource Management Subtotal	\$6,164	Resource Management Subtotal	\$6,319
Education and Outreach Subtotal	\$26,059	Education and Outreach Subtotal	\$26,717
Public Use Subtotal	\$6,690	Public Use Subtotal	\$6,864
Partnering Subtotal	\$22,429	Partnering Subtotal	\$23,010
2017-2018 Total	\$173,237	2022-2023 Total	\$170,671
2018-2019 Cost Estimate		2023-2024 Cost Estimate	
Ecosystem Science Subtotal	\$110,219	Ecosystem Science Subtotal	\$108,956
Resource Management Subtotal	\$6,194	Resource Management Subtotal	\$6,351
Education and Outreach Subtotal	\$26,190	Education and Outreach Subtotal	\$26,851
Public Use Subtotal	\$6,724	Public Use Subtotal	\$6,899
Partnering Subtotal	\$22,544	Partnering Subtotal	\$23,128
2018-2019 Total	\$171,871	2023-2024 Total	\$172,185

D.3 / Major Accomplishments Since the Approval of the Previous Plan

- Opened the Estero Bay Aquatic Preserve field office on San Carlos Island in 1995.
- Received three \$1 million U.S. Fish and Wildlife Service National Coastal Wetlands grants for land acquisition and restoration.
- Doubled the acreage of land within the Estero Bay State Buffer Preserve that are in preservation.
- Established fixed, long-term water quality and seagrass monitoring stations.

Other Requirements

E.1 / Acquisition and Restoration Council Management Plan Compliance Checklist

Land Management Plan Compliance Checklist Required for State-owned conservation lands over 160 acres			
Item #	Requirement	Statute/Rule	Pg#/App
Section A: Acquisition Information Items			
1	The common name of the property.	18-2.018 & 18-2.021	Ex. Sum.
2	The land acquisition program, if any, under which the property was acquired.	18-2.018 & 18-2.021	p. 2
3	Degree of title interest held by the Board, including reservations and encumbrances such as leases.	18-2.021	p. 2, 7, & 8
4	The legal description and acreage of the property.	18-2.018 & 18-2.021	Ex. Sum & p. 16-18
5	A map showing the approximate location and boundaries of the property, and the location of any structures or improvements to the property.	18-2.018 & 18-2.021	p. 2
6	An assessment as to whether the property, or any portion, should be declared surplus. <i>Provide Information regarding assessment and analysis in the plan, and provide corresponding map.</i>	18-2.021	N/A
7	Identification of other parcels of land within or immediately adjacent to the property that should be purchased because they are essential to management of the property. <i>Please clearly indicate parcels on a map.</i>	18-2.021	p. 55-56
8	Identification of adjacent land uses that conflict with the planned use of the property, if any.	18-2.021	p. 41-42
9	A statement of the purpose for which the lands were acquired, the projected use or uses as defined in 253.034 and the statutory authority for such use or uses.	259.032(10)	p. 6
10	Proximity of property to other significant State, local or federal land or water resources.	18-2.021	p. 13-15, 20-23, 39-43
Section B: Use Items			
11	The designated single use or multiple use management for the property, including use by other managing entities.	18-2.018 & 18-2.021	p. 78-82
12	A description of past and existing uses, including any unauthorized uses of the property.	18-2.018 & 18-2.021	p. 78-82
13	A description of alternative or multiple uses of the property considered by the lessee and a statement detailing why such uses were not adopted.	18-2.018	N/A
14	A description of the management responsibilities of each entity involved in the property's management and how such responsibilities will be coordinated.	18-2.018	p. 6-8, 70-76
15	Include a provision that requires that the managing agency consult with the Division of Historical Resources, Department of State before taking actions that may adversely affect archeological or historical resources.	18-2.021	App. E
16	Analysis/description of other managing agencies and private land managers, if any, which could facilitate the restoration or management of the land.	18-2.021	p. 56-58
17	A determination of the public uses and public access that would be consistent with the purposes for which the lands were acquired.	259.032(10)	p. 78-82
18	A finding regarding whether each planned use complies with the 1981 State Lands Management Plan, particularly whether such uses represent "balanced public utilization," specific agency statutory authority and any other legislative or executive directives that constrain the use of such property.	18-2.021	p. 6-8
19	Letter of compliance from the local government stating that the LMP is in compliance with the Local Government Comprehensive Plan.	BOT requirement	App. E

**Land Management Plan Compliance Checklist
Required for State-owned conservation lands over 160 acres**

Item #	Requirement	Statute/Rule	Pg#/App
20	An assessment of the impact of planned uses on the renewable and non-renewable resources of the property, including soil and water resources, and a detailed description of the specific actions that will be taken to protect, enhance and conserve these resources and to compensate/mitigate damage caused by such uses, including a description of how the manager plans to control and prevent soil erosion and soil or water contamination.	18-2.018 & 18-2.021	p. 20-25, 47-82
21	*For managed areas larger than 1,000 acres, an analysis of the multiple-use potential of the property which shall include the potential of the property to generate revenues to enhance the management of the property provided that no lease, easement, or license for such revenue-generating use shall be entered into if the granting of such lease, easement or license would adversely affect the tax exemption of the interest on any revenue bonds issued to fund the acquisition of the affected lands from gross income for federal income tax purposes, pursuant to Internal Revenue Service regulations.	18-2.021 & 253.036	N/A
22	If the lead managing agency determines that timber resource management is not in conflict with the primary management objectives of the managed area, a component or section, prepared by a qualified professional forester, that assesses the feasibility of managing timber resources pursuant to section 253.036, F.S.	18-021	N/A
23	A statement regarding incompatible use in reference to Ch. 253.034(10). *The following taken from 253.034(10) is not a land management plan requirement; however, it should be considered when developing a land management plan: The following additional uses of conservation lands acquired pursuant to the Florida Forever program and other state-funded conservation land purchase programs shall be authorized, upon a finding by the Board of Trustees, if they meet the criteria specified in paragraphs (a)-(e): water resource development projects, water supply development projects, storm-water management projects, linear facilities and sustainable agriculture and forestry. Such additional uses are authorized where: (a) Not inconsistent with the management plan for such lands; (b) Compatible with the natural ecosystem and resource values of such lands; (c) The proposed use is appropriately located on such lands and where due consideration is given to the use of other available lands; (d) The using entity reasonably compensates the titleholder for such use based upon an appropriate measure of value; and (e) The use is consistent with the public interest.	253.034(10)	p. 73-82
Section C: Public Involvement Items			
24	A statement concerning the extent of public involvement and local government participation in the development of the plan, if any.	18-2.021	App. C
25	The management prospectus required pursuant to paragraph (9)(d) shall be available to the public for a period of 30 days prior to the public hearing.	259.032(10)	N/A
26	LMPs and LMP updates for parcels over 160 acres shall be developed with input from an advisory group who must conduct at least one public hearing within the county in which the parcel or project is located. <i>Include the advisory group members and their affiliations, as well as the date and location of the advisory group meeting.</i>	259.032(10)	App. C
27	Summary of comments and concerns expressed by the advisory group for parcels over 160 acres	18-2.021	App. C
28	During plan development, at least one public hearing shall be held in each affected county. Notice of such public hearing shall be posted on the parcel or project designated for management, advertised in a paper of general circulation, and announced at a scheduled meeting of the local governing body before the actual public hearing. <i>Include a copy of each County's advertisements and announcements (meeting minutes will suffice to indicate an announcement) in the management plan.</i>	253.034(5) & 259.032(10)	App. C
29	The manager shall consider the findings and recommendations of the land management review team in finalizing the required 10-year update of its management plan. <i>Include managers replies to the teams findings and recommendations.</i>	259.036	N/A
30	Summary of comments and concerns expressed by the management review team, if required by Section 259.036, F.S.	18-2.021	N/A

**Land Management Plan Compliance Checklist
Required for State-owned conservation lands over 160 acres**

Item #	Requirement	Statute/Rule	Pg#/App
31	If manager is not in agreement with the management review team's findings and recommendations in finalizing the required 10-year update of its management plan, the managing agency should explain why they disagree with the findings or recommendations.	259.036	N/A
Section D: Natural Resources			
32	Location and description of known and reasonably identifiable renewable and non-renewable resources of the property regarding soil types. <i>Use brief descriptions and include USDA maps when available.</i>	18-2.021	p. 17-19
33	Insert FNAI based natural community maps when available.	ARC consensus	Map 10 (p. 30)
34	Location and description of known and reasonably identifiable renewable and non-renewable resources of the property regarding outstanding native landscapes containing relatively unaltered flora, fauna and geological conditions.	18-2.021	Ex Sum
35	Location and description of known and reasonably identifiable renewable and non-renewable resources of the property regarding unique natural features and/or resources including but not limited to virgin timber stands, scenic vistas, natural rivers and streams, coral reefs, natural springs, caverns and large sinkholes.	18-2.018 & 18-2.021	p.20-25, 28-33
36	Location and description of known and reasonably identifiable renewable and non-renewable resources of the property regarding beaches and dunes.	18-2.021	p. 30-31
37	Location and description of known and reasonably identifiable renewable and non-renewable resources of the property regarding mineral resources, such as oil, gas and phosphate, etc.	18-2.018 & 18-2.021	App. A.1
38	Location and description of known and reasonably identifiable renewable and non-renewable resources of the property regarding fish and wildlife, both game and non-game, and their habitat.	18-2.018 & 18-2.021	p. 28-37, App. B.4
39	Location and description of known and reasonably identifiable renewable and non-renewable resources of the property regarding State and Federally listed endangered or threatened species and their habitat.	18-2.021	p. 28-37, App. B.4
40	The identification or resources on the property that are listed in the Natural Areas Inventory. <i>Include letter from FNAI or consultant where appropriate.</i>	18-2.021	p. 28-37, App. B.4
41	Specific description of how the managing agency plans to identify, locate, protect and preserve or otherwise use fragile, nonrenewable natural and cultural resources.	259.032(10)	p. 37-38
42	Habitat Restoration and Improvement	259.032(10) & 253.034(5)	
42-A.	Describe management needs, problems and a desired outcome and the key management activities necessary to achieve the enhancement, protection and preservation of restored habitats and enhance the natural, historical and archeological resources and their values for which the lands were acquired.	259.032(10) & 253.034(5)	p. 28-39 & 83-100
42-B.	Provide a detailed description of both short (2-year planning period) and long-term (10-year planning period) management goals, and a priority schedule based on the purposes for which the lands were acquired and include a timeline for completion.	259.032(10) & 253.034(5)	App. D.1
42-C.	The associated measurable objectives to achieve the goals.	259.032(10) & 253.034(5)	App. D.1
42-D.	The related activities that are to be performed to meet the land management objectives and their associated measures. <i>Include fire management plans - they can be in plan body or an appendix.</i>	259.032(10) & 253.034(5)	App. D.1

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Item #	Requirement	Statute/Rule	Pg#/App
42-E.	A detailed expense and manpower budget in order to provide a management tool that facilitates development of performance measures, including recommendations for cost-effective methods of accomplishing those activities.	259.032(10) & 253.034(5)	App. D.1
43	***Quantitative data description of the land regarding an inventory of forest and other natural resources and associated acreage. <i>See footnote.</i>	253.034(5)	Ex Sum
44	Sustainable Forest Management, including implementation of prescribed fire management	18-2.021, 253.034(5) & 259.032(10)	
44-A.	Management needs, problems and a desired outcome (see requirement for # 42-A).	18-2.021, 253.034(5) & 259.032(10)	N/A
44-B.	Detailed description of both short and long-term management goals (see requirement for # 42-B).	18-2.021, 253.034(5) & 259.032(10)	N/A
44-C.	Measurable objectives (see requirement for #42-C).	18-2.021, 253.034(5) & 259.032(10)	N/A
44-D.	Related activities (see requirement for #42-D).	18-2.021, 253.034(5) & 259.032(10)	N/A
44-E.	Budgets (see requirement for #42-E).	18-2.021, 253.034(5) & 259.032(10)	N/A
45	Imperiled species, habitat maintenance, enhancement, restoration or population restoration	259.032(10) & 253.034(5)	
45-A.	Management needs, problems and a desired outcome (see requirement for # 42-A).	259.032(10) & 253.034(5)	p. 28-39 & 83-100
45-B.	Detailed description of both short and long-term management goals (see requirement for # 42-B).	259.032(10) & 253.034(5)	App. D.1
45-C.	Measurable objectives (see requirement for #42-C).	259.032(10) & 253.034(5)	App. D.1
45-D.	Related activities (see requirement for #42-D).	259.032(10) & 253.034(5)	App. D.1
45-E.	Budgets (see requirement for #42-E).	259.032(10) & 253.034(5)	App. D.1
46	***Quantitative data description of the land regarding an inventory of exotic and invasive plants and associated acreage. <i>See footnote.</i>	253.034(5)	p. 36-37
47	Place the Arthropod Control Plan in an appendix. If one does not exist, provide a statement as to what arrangement exists between the local mosquito control district and the management unit.	BOT requirement via lease language	N/A (No BOT lease)
48	Exotic and invasive species maintenance and control	259.032(10) & 253.034(5)	
48-A.	Management needs, problems and a desired outcome (see requirement for # 42-A).	259.032(10) & 253.034(5)	p. 36-37
48-B.	Detailed description of both short and long-term management goals (see requirement for # 42-B).	259.032(10) & 253.034(5)	App. D.1
48-C.	Measurable objectives (see requirement for #42-C).	259.032(10) & 253.034(5)	App. D.1
48-D.	Related activities (see requirement for #42-D).	259.032(10) & 253.034(5)	App. D.1
48-E.	Budgets (see requirement for #42-E).	259.032(10) & 253.034(5)	App. D.1

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Item #	Requirement	Statute/Rule	Pg#/App
Section E: Water Resources			
49	A statement as to whether the property is within and/or adjacent to an aquatic preserve or a designated area of critical state concern or an area under study for such designation. <i>If yes, provide a list of the appropriate managing agencies that have been notified of the proposed plan.</i>	18-2.018 & 18-2.021	p. 1-2
50	Location and description of known and reasonably identifiable renewable and non-renewable resources of the property regarding water resources, including water classification for each water body and the identification of any such water body that is designated as an Outstanding Florida Water under Rule 62-302.700, F.A.C.	18-2.021	p. 1-2, 20-25
51	Location and description of known and reasonably identifiable renewable and non-renewable resources of the property regarding swamps, marshes and other wetlands.	18-2.021	p. 28-34
52	***Quantitative description of the land regarding an inventory of hydrological features and associated acreage. <i>See footnote.</i>	253.034(5)	Ex. Sum
53	Hydrological Preservation and Restoration	259.032(10) & 253.034(5)	
53-A.	Management needs, problems and a desired outcome (see requirement for # 42-A).	259.032(10) & 253.034(5)	App. D.1
53-B.	Detailed description of both short and long-term management goals (see requirement for # 42-B).	259.032(10) & 253.034(5)	App. D.1
53-C.	Measurable objectives (see requirement for #42-C).	259.032(10) & 253.034(5)	App. D.1
53-D.	Related activities (see requirement for #42-D).	259.032(10) & 253.034(5)	App. D.1
53-E.	Budgets (see requirement for #42-E).	259.032(10) & 253.034(5)	App. D.1
Section F: Historical, Archaeological and Cultural Resources			
54	**Location and description of known and reasonably identifiable renewable and non-renewable resources of the property regarding archeological and historical resources. <i>Include maps of all cultural resources except Native American sites, unless such sites are major points of interest that are open to public visitation.</i>	18-2.018, 18-2.021 & per DHR's request	Ex. Sum, p. 37-38
55	***Quantitative data description of the land regarding an inventory of significant land, cultural or historical features and associated acreage.	253.034(5)	Ex. Sum, p. 37-38
56	A description of actions the agency plans to take to locate and identify unknown resources such as surveys of unknown archeological and historical resources.	18-2.021	App. D.1
57	Cultural and Historical Resources	259.032(10) & 253.034(5)	
57-A.	Management needs, problems and a desired outcome (see requirement for # 42-A).	259.032(10) & 253.034(5)	App. D.1
57-B.	Detailed description of both short and long-term management goals (see requirement for # 42-B).	259.032(10) & 253.034(5)	App. D.1
57-C.	Measurable objectives (see requirement for #42-C).	259.032(10) & 253.034(5)	App. D.1
57-D.	Related activities (see requirement for #42-D).	259.032(10) & 253.034(5)	App. D.1
57-E.	Budgets (see requirement for #42-E).	259.032(10) & 253.034(5)	App. D.1

**While maps of Native American sites should not be included in the body of the management plan, the DSL urges each managing agency to provide such information to the Division of Historical Resources for inclusion in their proprietary database. This information should be available for access to new managers to assist them in developing, implementing and coordinating their management activities.

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Item #	Requirement	Statute/Rule	Pg#/App
Section G: Facilities (Infrastructure, Access, Recreation)			
58	***Quantitative data description of the land regarding an inventory of infrastructure and associated acreage. <i>See footnote.</i>	253.034(5)	p. 103-105
59	Capital Facilities and Infrastructure	259.032(10) & 253.034(5)	
59-A.	Management needs, problems and a desired outcome (see requirement for # 42-A).	259.032(10) & 253.034(5)	p. 103-105. App. D.1
59-B.	Detailed description of both short and long-term management goals (see requirement for # 42-B).	259.032(10) & 253.034(5)	App. D.1
59-C.	Measurable objectives (see requirement for #42-C).	259.032(10) & 253.034(5)	App. D.1
59-D.	Related activities (see requirement for #42-D).	259.032(10) & 253.034(5)	App. D.1
59-E.	Budgets (see requirement for #42-E).	259.032(10) & 253.034(5)	App. D.1
60	*** Quantitative data description of the land regarding an inventory of recreational facilities and associated acreage.	253.034(5)	p. 73-82, 103-105, App. D.1
61	Public Access and Recreational Opportunities	259.032(10) & 253.034(5)	
61-A.	Management needs, problems and a desired outcome (see requirement for # 42-A).	259.032(10) & 253.034(5)	App. D.1
61-B.	Detailed description of both short and long-term management goals (see requirement for # 42-B).	259.032(10) & 253.034(5)	App. D.1
61-C.	Measurable objectives (see requirement for #42-C).	259.032(10) & 253.034(5)	App. D.1
61-D.	Related activities (see requirement for #42-D).	259.032(10) & 253.034(5)	App. D.1
61-E.	Budgets (see requirement for #42-E).	259.032(10) & 253.034(5)	App. D.1
Section H: Other/ Managing Agency Tools			
62	Place this LMP Compliance Checklist at the front of the plan.	ARC & managing agency consensus	Front & App. E.1
63	Place the Executive Summary at the front of the LMP. Include a physical description of the land.	ARC % 253.034(5)	Ex. Sum
64	If this LMP is a 10-year update, note the accomplishments since the drafting of the last LMP set forth in an organized (categories or bullets) format.	ARC consensus	App. D.3
65	Key management activities necessary to achieve the desired outcomes regarding other appropriate resource management.	259.032(10)	Ch 5 (p. 83-100)
66	Summary budget for the scheduled land management activities of the LMP including any potential fees anticipated from public or private entities for projects to offset adverse impacts to imperiled species or such habitat, which fees shall be used to restore, manage, enhance, repopulate, or acquire imperiled species habitat for lands that have or are anticipated to have imperiled species or such habitat onsite. The summary budget shall be prepared in such a manner that it facilitates computing an aggregate of land management costs for all state-managed lands using the categories described in s. 259.037(3) which are resource management, administration, support, capital improvements, recreation visitor services, law enforcement activities.	253.034(5)	App. D.1

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Item #	Requirement	Statute/Rule	Pg#/App
67	Cost estimate for conducting other management activities which would enhance the natural resource value or public recreation value for which the lands were acquired, include recommendations for cost-effective methods in accomplishing those activities.	259.032(10)	App. D.1
68	A statement of gross income generated, net income and expenses.	18-2.018	N/A

*** = The referenced inventories shall be of such detail that objective measures and benchmarks can be established for each tract of land and monitored during the lifetime of the plan. All quantitative data collected shall be aggregated, standardized, collected, and presented in an electronic format to allow for uniform management reporting and analysis. The information collected by the DEP pursuant to s. 253.0325(2) shall be available to the land manager and his or her assignee.

E.2 / Management Procedures for Archaeological and Historical Sites and Properties on State-Owned or Controlled Lands (Revised March 2013)

These procedures apply to state agencies, local governments, and non-profits that manage state-owned properties.

A. General Discussion

Historic resources are both archaeological sites and historic structures. Per Chapter 267, Florida Statutes, 'Historic property' or 'historic resource' means any prehistoric district, site, building, object, or other real or personal property of historical, architectural, or archaeological value, and folklife resources. These properties or resources may include, but are not limited to, monuments, memorials, Indian habitations, ceremonial sites, abandoned settlements, sunken or abandoned ships, engineering works, treasure trove, artifacts, or other objects with intrinsic historical or archaeological value, or any part thereof, relating to the history, government, and culture of the state."

B. Agency Responsibilities

Per State Policy relative to historic properties, state agencies of the executive branch must allow the Division of Historical Resources (Division) the opportunity to comment on any undertakings, whether these undertakings directly involve the state agency, i.e., land management responsibilities, or the state agency has indirect jurisdiction, i.e. permitting authority, grants, etc. No state funds should be expended on the undertaking until the Division has the opportunity to review and comment on the project, permit, grant, etc.

State agencies shall preserve the historic resources which are owned or controlled by the agency.

Regarding proposed demolition or substantial alterations of historic properties, consultation with the Division must occur, and alternatives to demolition must be considered.

State agencies must consult with Division to establish a program to location, inventory and evaluate all historic properties under ownership or controlled by the agency.

C. Statutory Authority

Statutory Authority and more in depth information can be found at:
<http://www.flheritage.com/preservation/compliance/guidelines.cfm>

D. Management Implementation

Even though the Division sits on the Acquisition and Restoration Council and approves land management plans, these plans are conceptual. Specific information regarding individual projects must be submitted to the Division for review and recommendations.

Managers of state lands must coordinate any land clearing or ground disturbing activities with the Division to allow for review and comment on the proposed project. Recommendations may include, but are not limited to: approval of the project as submitted, cultural resource assessment survey by a qualified professional archaeologist, modifications to the proposed project to avoid or mitigate potential adverse effects.

Projects such as additions, exterior alteration, or related new construction regarding historic structures must also be submitted to the Division of Historical Resources for review and comment by the Division's architects. Projects involving structures fifty years of age or older, must be submitted to this agency for a significance determination. In rare cases, structures under fifty years of age may be deemed historically significant. These must be evaluated on a case by case basis.

Adverse impacts to significant sites, either archaeological sites or historic buildings, must be avoided. Furthermore, managers of state property should make preparations for locating and evaluating historic resources, both archaeological sites and historic structures.



E. Minimum Review Documentation Requirements

In order to have a proposed project reviewed by the Division, certain information must be submitted for comments and recommendations. The minimum review documentation requirements can be found at: http://www.flheritage.com/preservation/compliance/docs/minimum_review_documentation_requirements.pdf .

* * *

Questions relating to the treatment of archaeological and historic resources on state lands should be directed to:

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Estero Bay Aquatic Preserve Management Plan

Estero Bay Aquatic Preserve
700-1 Fisherman's Wharf
Fort Myers Beach, FL 33931
(239) 463-3240 • www.dep.state.fl.us/coastal/sites/estero

Florida Department of Environmental Protection
Florida Coastal Office
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