St. Martins Marsh Aquatic Preserve

Management Plan

FLORIDA'S AQUATIC PRESERVES
WATERS THAT WORK. PLAY. AND LIVE

St. Martins Marsh Aquatic Preserve
3266 North Sailboat Avenue
Crystal River, FL 34428
352.228.6028 • www.dep.state.fl.us/coastal/sites/stmartins

Florida Department of Environmental Protection
Florida Coastal Office
3900 Commonwealth Blvd., MS #235,
Tallahassee, FL 32399 • www.aquaticpreserves.org

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April 2017

Right: Nurse shark swimming through a seagrass meadow off the St. Martins Keys.

Cover photo: Tidal creek winding through red mangroves at low tide.

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Limestone crevice in the exposed bedrock of St. Martins Marsh Aquatic Preserve.

Mission Statement

The Florida Coastal Office's mission statement 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's 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

St. Martins Marsh Aquatic Preserve Management Plan	
Lead Agency	Florida Department of Environmental Protection's (DEP) Florida Coastal Office (FCO)
Common Name of Property	St. Martins Marsh Aquatic Preserve (SMMAP)
Location	Citrus County, Florida
Acreage Total:	28,461
Acreage Breakdown According to Florida Natural Areas Inventory (FNAI) Natural Community Type	
FNAI Natural Communities	*Acreage according to GIS*
Hydric Hammock	1,518
Shell Mounds	Unknown
Mangrove Swamp	1,607
Salt Marsh	4,677
Consolidated Substrate	Unknown
Unconsolidated Substrate	Unknown
Mollusk Reef	49
Octocoral Bed	Unknown
Sponge Bed	Unknown
Algal Bed	Unknown
Seagrass Bed	17,705
Aquatic Caves	Unknown
Total Acreage	25,961 (This number **does not** match the "Acreage Total" above due to GIS numbers, and unmapped communities.)
Management Agency	DEP's FCO
Designation	Aquatic Preserve
Unique Features	SMMAP sits along a largely undeveloped stretch of land within one of the largest extents of salt marshes and seagrasses in the nation. Additionally, the seagrasses of SMMAP serve as a critical habitat for the Florida manatee (*Trichechus manatus latirostris*) and various sea turtle species, while also serving as important nursery grounds for several fish and invertebrate species of commercial and recreational fishing importance.
Archaeological/ Historical Sites	The Department of State's Division of Historical Resources has identified numerous archaeological sites within SMMAP. Prehistoric shell middens are the most prominent features of the area due to the abundance of food resources available in the surrounding estuary. Furthermore historical structures such as the Crystal River Old City Hall and the Yulee Sugar Mill Ruins are located adjacent to SMMAP.
Management Needs	
Ecosystem Science	Seagrass communities are vital to the health of the estuaries in SMMAP. Maintaining a strategic long-term seagrass and water quality monitoring program will be crucial in sustaining this important economic resource for future generations.
Resource Management	With little restoration measures currently required in SMMAP, management emphasis is placed on preventing new damage to resources that may occur with increased use and development. Focus is primarily on management of interconnected measures of water quality and seagrass bed conditions.

Education and Outreach	Education and Outreach programs in SMMAP are critical to the protection, conservation, and enhancement of the aquatic and coastal resources. The intent of the aquatic preserve education and outreach program is to provide and foster responsible public stewardship of aquatic preserve resources.
Public Use	Public Use in SMMAP is dominated by ecotourism, as well as commercial and recreational fishing. Common public use activities include boating, birding, camping, canoeing, kayaking, and snorkeling. Various eco-tour operators provide a way of experiencing SMMAP, with activities such as guided fishing and scalloping charters, guided kayak tours, and airboat tours.
Public Involvement:	Public support is vital to the success of conservation programs. The goal is to foster understanding of the problems facing these fragile ecosystems and the steps needed to adequately manage these important resources. SMMAP staff held public and advisory committee meetings September 28 and 29, 2016 in Crystal River to receive input on the draft management plan. An additional public meeting was held in Tallahassee April 21, 2017 when the Acquisition and Restoration Council reviewed the management plan.

FCO/Trustees Approval

FCO Approval: Jan. 5, 2017 **ARC approval date:** Apr. 21, 2017 **Trustees approval date:** Aug. 14, 2017

Comments:

Acronym List

Abbreviation	Meaning
AG:BG	Above-ground to below-ground
CH3D	Curvilinear-grid Hydrodynamic 3D (model)
CNWR	Chassahowitzka National Wildlife Refuge
COAST	COastal ASsessment Team
CRPSP	Crystal River Preserve State Park
CSO	Citizen Support Organization
DACS	Florida Department of Agriculture and Consumer Services
DEP	Florida Department of Environmental Protection
DNR	Florida Department of Natural Resources
EPA	U.S. Environmental Protection Agency
DRP	Division of Recreation and Parks
F.A.C.	Florida Administrative Code
F.A.R.	Florida Administrative Register
FCO	Florida Coastal Office
FGS	Florida Geological Survey
FMRI	Florida Marine Research Institute
FWRI	Fish and Wildlife Research Institute
FNAI	Florida Natural Areas Inventory
FLAIR	Florida Accounting Information Resource
FLEET	Florida Equipment Electronic Tracking
F.S.	Florida Statutes
FTE	Full-Time Equivalent
FTP	File Transfer Protocol
FWC	Florida Fish and Wildlife Conservation Commission
FWRI	Fish and Wildlife Research Institute
FWS	U.S. Fish and Wildlife Service
G	Global
GARI	Gulf Archaeology Research Institute
GEMS	Gulf Ecological Management Site
GIS	Geographic Information Systems
IFAS	Institute of Food and Agricultural Sciences
IRG	Inwater Research Group
NERR	National Estuarine Research Reserve
NOAA	National Oceanic and Atmospheric Administration
NWS	National Weather Service
OFW	Outstanding Florida Water
S	State
SES	Select Exempt Service
SIMM	Seagrass Integrated Mapping and Monitoring
SMMAP	St. Martins Marsh Aquatic Preserve
SWMP	System-Wide Monitoring Program
TMDL	Total Maximum Daily Load
Trustees	Board of Trustees of the Internal Improvement Trust Fund
UF	University of Florida
USDA	U.S. Department of Agriculture
USGS	U.S. Geological Survey

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Red mangrove propagules taking root in the shallow waters of St. Martins Marsh Aquatic Preserve.

Part One

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, 3 National Estuarine Research Reserves (NERRs), a National Marine Sanctuary, the Coral Reef Conservation Program, the Florida Coastal Management Program, the Outer Continental Shelf 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.

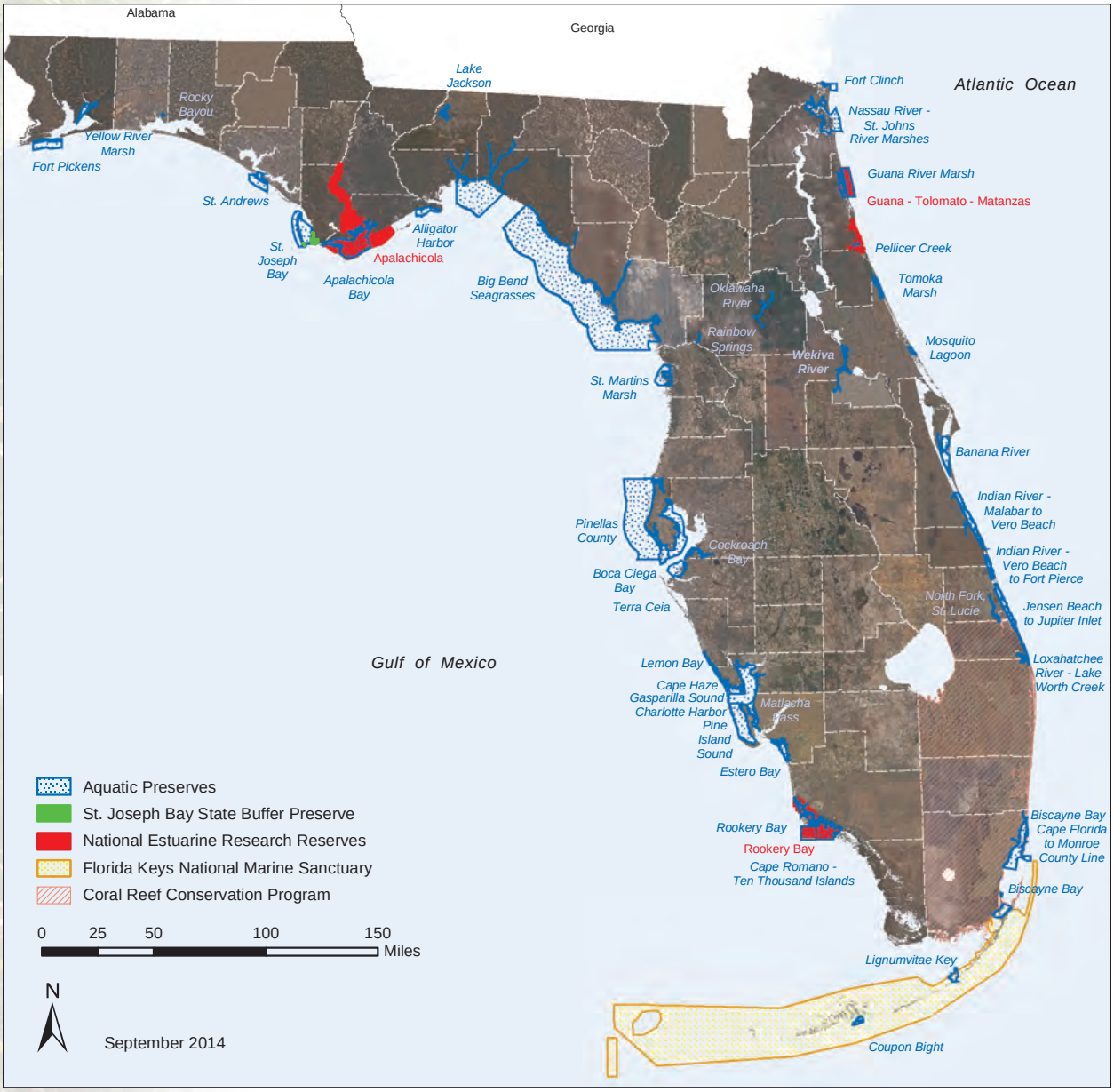
Title to submerged lands not conveyed to private landowners is held by the Board of Trustees of the Internal Improvement Trust Fund (the Trustees). The Governor and Cabinet, sitting as the Trustees, act as guardians for the people of the State of Florida (§253.03, Florida Statutes [F.S.]) and regulate 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



Map 1 / Florida Coastal Office System

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. This management plan serves as an update to the original St. Martins Marsh Aquatic Preserve Management Plan adopted on September 9, 1987 (Florida Department of Natural Resources, 1987).

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 as identified. These components are all key elements in an effective coastal management program and for achieving the mission of the sites.

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; 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.

Great blue heron utilizing the exposed karstic features at low tide.

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. All 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 (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 aquatic 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 Board of Trustees of the Internal Improvement Trust Fund 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 law enforcement 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.

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.

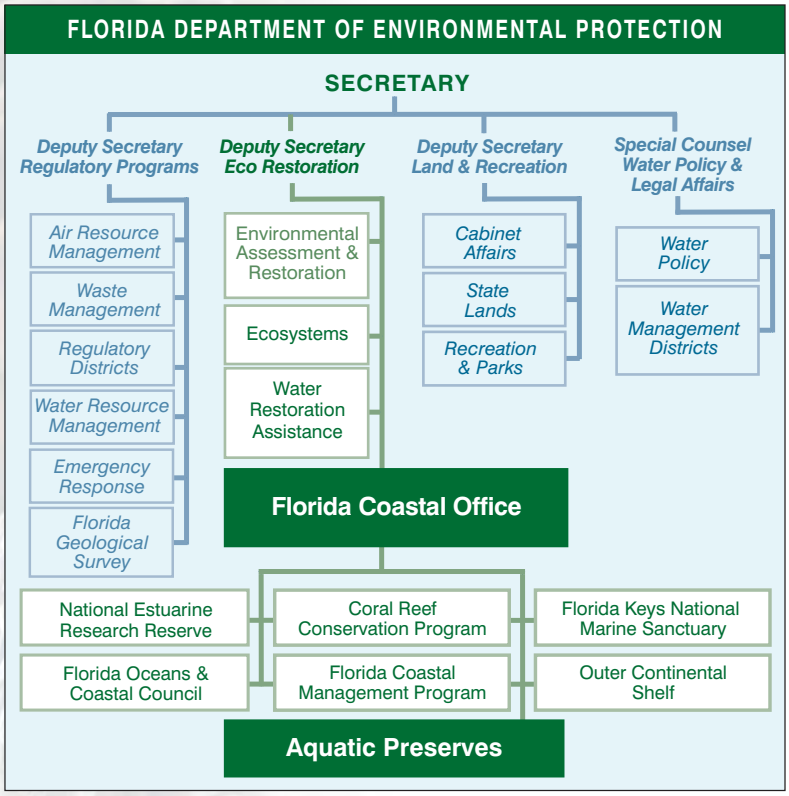


Figure 1 / State management structure.

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-managed areas is so long as to be impractical to create within the context of this management plan.

Mother dolphin and calf swimming through the seagrass beds in clear waters of the aquatic preserve.

Chapter Three

The St. Martins Marsh Aquatic Preserve

3.1 / ***Historical Background***

Human settlement of Florida can be dated back at least 12,000 years. Early inhabitants were nomadic hunters and gatherers who followed herds of large mammals. During that time period, Florida featured a much cooler climate and the land was much more expansive. As glaciers melted, sea level rose, and the climate became warmer, these native populations began to hunt smaller game, and with expansion of coastal resource use, the onset of agricultural civilizations began (Cohen, 1979). The most well-known and populous Native American tribe of North Central Florida were the Timucua. The Timucua were a loosely centralized group who once occupied an area stretching from Tallahassee to Jacksonville and down through much of central Florida. In the early 1500s, the Timucua came in contact with Spanish conquistadores in search of gold. Less than 50 years after the arrival of Spanish settlers, the Timucua were virtually wiped out (Worth, 1998). Over the next 250 years, most of Florida was ruled by the Spanish. As native populations dwindled, Lower Creek Indians from Georgia and Alabama moved in to settle the area. This group would later be known as the Seminoles (Homan & Reilly, 2001).

In 1821, Florida was formerly ceded to the United States; as a result, conflicts between settlers and natives escalated. In 1823, soon after the First Seminole War, the Treaty of Moultrie Creek established a reservation in central Florida, including present day Citrus County, for the various tribes of Florida. In 1830, the tribes were forced to Oklahoma via the Indian Removal Act of 1830, as part of what is now referred to as the Trail of Tears. The Second Seminole War would soon ensue and would prove to be the bloodiest of the three wars. Following this war, the Florida Armed Occupation Act of 1842 was passed to promote the population of Florida; and on March 3, 1845, Florida became the 27th state in the Union. Soon after, settlement began with investors focusing on the economic promises of the area. The most notable of early settlements was that of David Yulee and his family. In 1851, Yulee built a sugar plantation along the Homosassa River. This plantation would be of huge service to the state of Florida and the Confederacy during the Civil War (Bash & Pritchett, 2006; Homan & Reilly, 2001). Yulee also chartered the Florida Railroad system prior to the war, which ran from Fernandina to Cedar Key; the system would

be the first to connect the east and west coasts of Florida. During the Civil War, both the plantation and the railway system were destroyed; however, Yulee would subsequently rebuild the railway system. The remains of the sugar plantation are preserved today as a historical site in Old Homosassa. The site serves as one of the only civil war remnants in the area, as no land battles were fought in the county. Only a few 'skirmishes' along the Gulf occurred, most notably the Battle of Shell Island in 1862 (Bash & Pritchett, 2006).

In 1885, the area of Crystal River had a population of approximately 100 individuals. This would soon expand significantly, in part due to the operations of the Cedar Key Gulf Steam Boat and the continuance of the Dunnellon Short railroad in 1888 that helped bring individuals to the area. In 1903, Crystal River would form a municipal government and in 1923 would officially become the City of Crystal River. The formation of a city was coupled with the land boom of 1920s. Several climatological events, followed by the stock market crash of 1929 would bring an abrupt halt to the boom (Bash & Pritchett, 2006). The Great Depression brought severe economic downturn to the nation including Citrus County. As part of his recovery plan, newly elected President Franklin D. Roosevelt implemented the Works Progress Administration (later known as the Works Projects Administration). The Works Progress Administration would create hundreds of critical jobs in the area by financing several local projects including the construction of the Crystal River Airport, Lecanto Canning Plant, and most notably the former Crystal River City Hall building (Bash & Pritchett, 2006).

Almost from the onset of settlement in the area, two major industries dominated the economy of present day Citrus County: citrus and cedar. The Citrus County area was one of the state's biggest citrus producers, so much that the county was named after the industry upon its creation in 1887. However, the Big Freeze of 1894-95, along with several subsequent freezes, wiped out many of the groves and forced the industry further south (Homan & Reilly, 2001; Bash & Pritchett, 2006). Today, the only major grove in Citrus County is the Bellamy Grove located in Inverness. The cedar industry had a more lasting presence in the area. The local industry was part of a larger cedar industry along Florida's Gulf coast. The local industry was best represented by the Dixon Cedar Mill and its Dixon House along the Crystal River. The mill finally closed operations in the 1950s and by the 1960s, the Cedar House, which had served as the last remnant of the mill, was destroyed (Bash & Pritchett, 2006). The site is presently occupied by the Best Western Resort on Highway 19.

Around the same time of the collapse of the citrus industry, the phosphate mining industry developed; the industry would become the largest industrial boom for the county (Homan & Reilly, 2001). The industry was centered on export to Europe; however, production was greatly hampered by the World Wars, and the practice became economically unfeasible in the mid-1960s (Deuerling & MacGill, 1981). Another major industry in the area has been real estate, which has seen two major booms in production. The first was the pre Depression boom of the 1920s, followed by another in the 1970s. The 1970s boom was brought on by an influx of retirees to the population, and led to the development of waterfront property throughout Crystal River. During this time several canals were dug to create more opportunity for waterfront development, most notably in Kings Bay, where development began to depict the area as it is seen today. In 1977, the Florida Power Corporation's nuclear power plant began operations just North of Crystal River. The plant would go on to become the area's largest employer (Homan & Reilly, 2001) until its retirement was announced in 2013 (Duke Energy, 2013). The complex still operates four coal powered power plants. Presently, the area is recognized for its ecotourism industry, with kayaking, boating, fishing, scalloping, and snorkeling being the major draws to the area. The riparian area of Citrus County is surrounded by various state and federal protected areas and has many wildlife attractions (Homan & Reilly, 2001).

*3.2 / **General Description***

International/National/State/Regional Significance

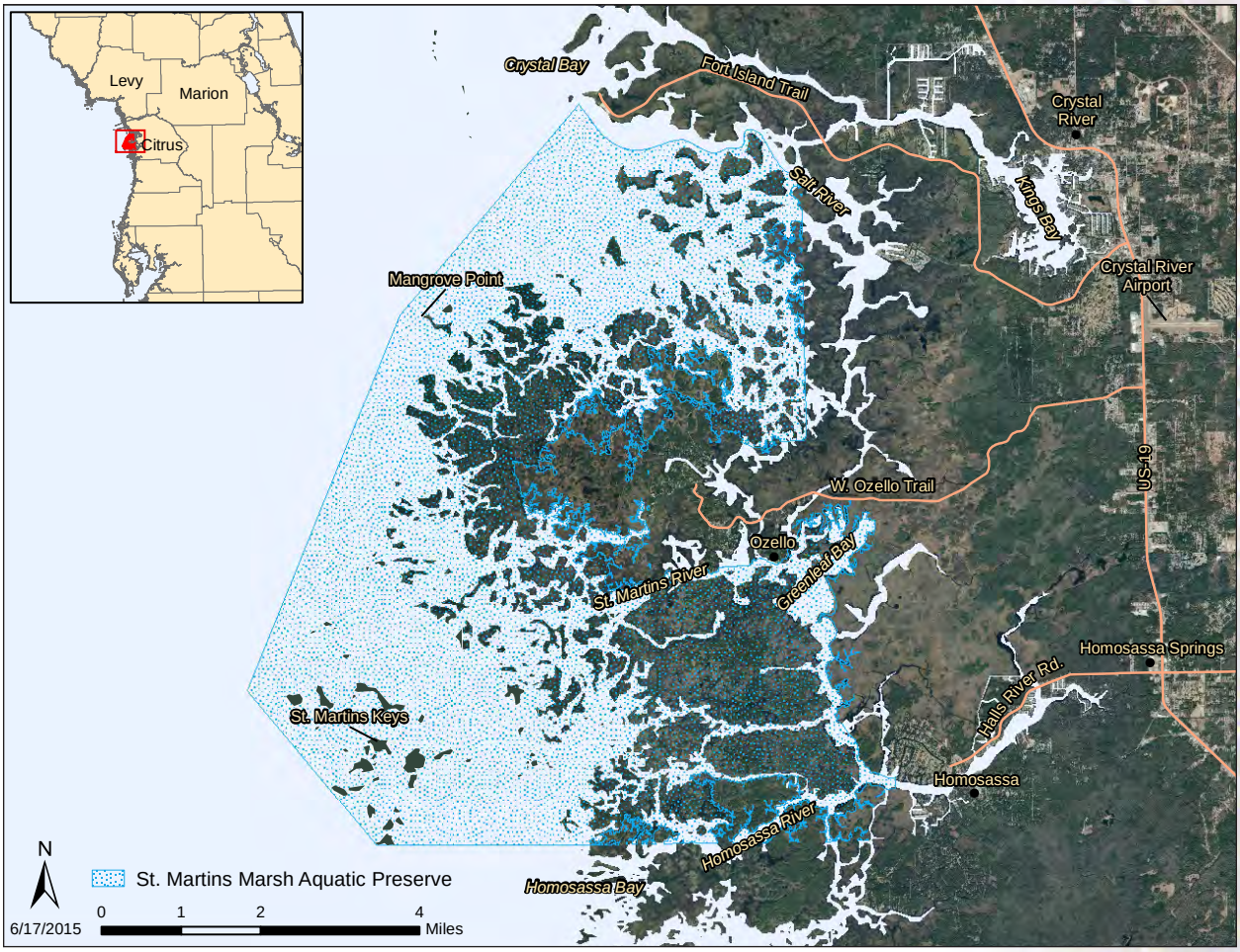
Established in October of 1969, the St Martins Marsh Aquatic Preserve (SMMAP) is one of the more pristine and undeveloped environments in Florida. Siting along Florida's Big Bend coast, SMMAP is composed of largely undeveloped areas of inlet bays, tidal rivers, mangrove swamps, seagrass beds, and salt marshes. This estuarine system provides critical nursery grounds, various fish and invertebrate species of recreational and commercial importance, as well as important rookery grounds for migratory bird species, even providing a southern terminus for some species (U.S. Fish and Wildlife Service [FWS], 2012). The salt marshes of SMMAP are part of a larger extent of marshes that dominant the transitional zone between land and estuary along the Gulf Coast. SMMAP's most well-known natural community, like the neighboring Big Bend Seagrasses Aquatic Preserve, is its seagrass beds. The seagrass beds serve as the basis for complex food webs in SMMAP, providing feeding grounds for various species including

many endangered or threatened species such as the Florida manatee (*Trichechus manatus latirostris*) and several sea turtle species.

West central Florida and Citrus County are marked by their karst geology, which has created unique features such as sinks, springs, and caverns. Springs fed by the Floridan Aquifer litter the coastline of this area, giving rise to the name of the region's watershed, Springs Coast. Springs groupings associated with the Crystal and Homosassa rivers provide direct freshwater flow into SMMAP, with both springs groups containing first magnitude springs. The Crystal River Springs Group is concentrated in Kings Bay and is home to 27 first magnitude, and 70 total springs (Florida Geological Survey [FGS], 2004; Southwest Florida Water Management District [SWFWMD], 2013). These springs discharge about 640 million gallons per day, making the springs group the second largest in the state (SWFWMD, 2000; Citrus County Board of County Commissioners, 2006). The spring discharge from these groups does not fluctuate seasonally, which helps to maintain the productive estuarine system of SMMAP.

SMMAP is part of a larger context of public conservation lands that cover the overwhelming majority of the Citrus County shoreline. With more than eight different public conservation lands located along Citrus County's coastline, and several more located inland, Citrus County has become known as 'Mother Nature's Theme Park' (Homan & Reilly, 2001). Coupled with its largely pristine and picturesque landscape, productive natural communities, and diverse species composition, the conservation lands of this county help to create a world renowned ecotourism industry. Ecotourism activities include numerous activities for individuals of all walks of life and provide unique opportunities for interactions with native wildlife (Johnson, 1998).

The most attractive component of the area's ecotourism industry is the Florida manatee. The city of Crystal River is commonly referred to as the Manatee Capital of the World. Manatees utilize the warmer spring fed waters of Citrus County, particularly Kings Bay in Crystal River, during winter months when Gulf waters slip to deadly temperatures below 20°C. Manatee aggregation for Citrus County waters reached a peak of 1016 manatees, with 706 of the total in Kings Bay, recorded on February 20, 2015 during the Statewide Synoptic Aerial Manatee Survey (J. Kleen, personal communication, June 22, 2015).



Map 2 / St. Martins Marsh Aquatic Preserve.

Along with the manatees, come thousands of tourists; about 100,000 annually, (Sorice, Shafer, & Dittion, 2005), to observe and swim with the manatee, generating millions of dollars for the local economy (Solomon, Corey-Luse, & Halvorsen, 2004).

Location/Boundaries

SMMAP is located in Citrus County between the City of Crystal River and the town of Homosassa and encompasses approximately 28,461 acres of submerged lands. SMMAP begins just south of the Crystal River and Fort Island Trail and extends southward to the northern boundary of the Chassahowitzka National Wildlife Refuge (CNWR). The eastern boundary runs along the Citrus County shore line and portions of the Crystal River Preserve State Park (CRPSP), extending westward to include a chain of small islands from Mangrove Point down to the St Martins Keys. SMMAP also includes portions of Crystal and Homosassa Bay and the entirety of Greenleaf Bay. Additionally portions of the Salt River, St. Martins, and Homosassa River along with numerous other tidal creeks and bays are also within SMMAP boundaries.

The SMMAP boundaries are located within close proximity of US Highway 98, the Crystal River Airport, the City of Crystal River and the towns of Homosassa, Homosassa Springs. Additionally SMMAP completely surrounds the town of Ozello. SMMAP is managed along with the Big Bend Seagrasses Aquatic Preserve from the office in the CRPSP at 3266 N. Sailboat Avenue in Crystal River, Florida.

*3.3 / **Resource Description***

Surrounding Population Data and Future Projected Changes

The coastal zone of the United States has seen rapid growth and development, increasing by almost 40 percent from 1970-2010 (U.S. Census Bureau, 2010). Currently, 39 percent of United States residents live in a coastal county (NOAA, 2013). In Florida, that number nearly doubled to around 75.5 percent (Florida Department of Environmental Protection [DEP], 2010). The population of Citrus County has had one of the fastest population growth rates in state from 1970-2013, increasing by about 632 percent (University of Florida [UF], 2014). That number has tapered off however in recent years, only increasing by 18.9 percent since 2000. The Citrus County population is expected to continue to slow its rate of increase as the population is expected to only grow by 8.1 percent by 2040 (UF, 2014). While Citrus County as a whole has seen much growth, the closest major city to SMMAP, Crystal River saw a 10.8 percent population decrease from 2000-2010 (U.S. Census Bureau, 2010).

The steep population growth of the last 45 years has also spawned increases in the construction and retail industries (Citrus County Board of County Commissioners, 2006). The tourism industry has also seen increases over this time period. While the industry has long been an important component of the county's economy, the formation of the Ecotourism Committee in 1993 and subsequent investment into the industry has produced a substantial growth in the ecotourism industry over the past two decades (Ross, 2001). The 2010 announcement of the retirement of the Crystal River 3 Nuclear Power Plant led to further investment in the ecotourism industry (Amrhein, 2013). In 2013, Citrus County began developing a Strategic Plan to assess the local economy and investigate possible methods for diversification of industries (Goldsmith & Company, 2013). Further development will be done with the protection of the environment in mind, as indicated by the goals of the county in its Comprehensive Plan.

Topography and Geomorphology

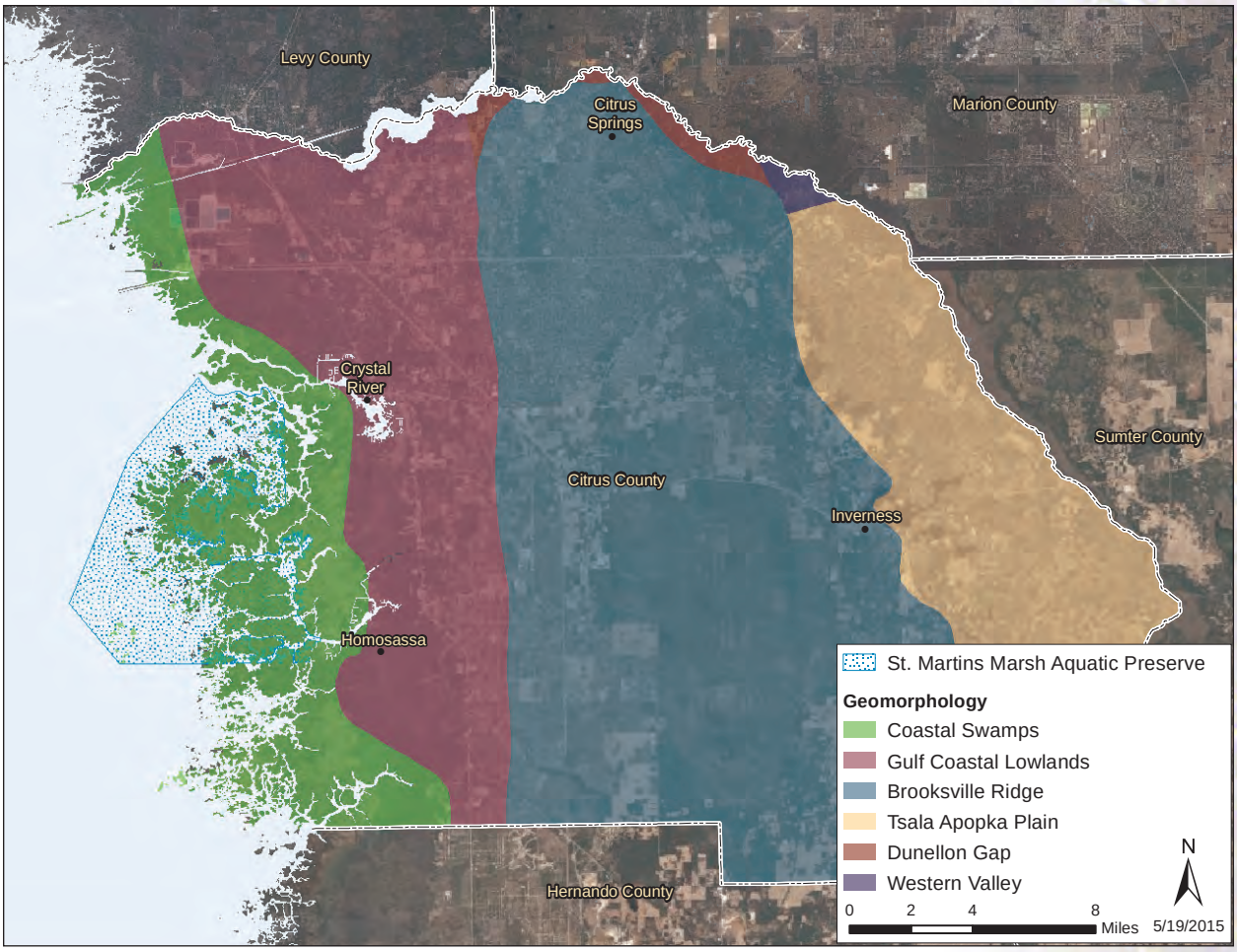
The three main physiographic features located in Citrus County are the Tsala Apopka Plain, the Brooksville Ridge, and the Gulf Coast Lowlands (Map 3). Additionally, topographical features of marine terraces, ancient dunes, bars, and sinkholes are found in the county. While the Tsala Apopka Plain and the Brooksville Ridge fall outside of the aquatic preserve boundaries, SMMAP lies on a submerged extension of the Gulf Coastal Lowlands province (White, 1970). The Gulf Coastal Lowlands are described as a low, flat seaward sloping plain extending westward and coastward from the Central Highlands. The Gulf Coastal Lowlands are located on the Pamlico Terrace. The land surface is characterized as flat and sandy with a surface slope of two to three feet per mile. This slope continues down the submarine plain offshore for more than 20 miles (Rupert, 1987). The Gulf Coastal Lowlands and the associated submarine plain are underlain by the soluble marine Ocala Group limestone of the Eocene. Dissolution of the area's limestone has developed various karstic morphologies. These morphologies include depressions, fissures, sinks, and caverns that give a more complex structure to an otherwise flat landscape.

Given its small slope and low elevation, Citrus County has historically seen extensive land level fluctuations, brought on by even modest sea level fluctuations in the Gulf of Mexico. Marine terraces

of the area provide a general depiction of major sea level fluctuations. The two main marine terraces in Citrus County are the Pamlico and the Wicomico terraces of the Pleistocene (MacNeil, 1949) (Map 4). The Wicomico Terrace extends through the Brooksville Ridge and Tsala Apopka Plain of the county. The Pamlico Terrace is the terrace that encompasses the Gulf Coastal Lowlands and SMMAP (Vernon, 1951). This terrace is the lowest of the coastal terraces in the area with a 10-20 foot escarpment. It stands as a residual shoreline from the Sangamonian interglacial stage of the Late Pleistocene and was formed through the alternative deposition and erosion of sedimentary materials as the sea level rose and fell (Spencer, 1984).

The section of the Gulf Coastal Lowlands along the western edge of Citrus County are the Coastal Swamps. The Coastal Swamp area is defined as the full extent of fresh water swamps and salt marshes along the coast (Puri & Vernon, 1964; White, 1970). The coastline itself is part of the Coastal Marsh Belt subprovince (Puri & Vernon, 1964) and is described as a low energy system with a net sand deficiency (Price, 1954; Tanner, 1960). Elevations in the Coastal Swamps is generally lower than 10 feet above sea level (Spencer, 1984). This area is described as a drowned karst coastline as the various marshes and underlying sediment layers cover the karstic features in the submerged limestone. The inlets and keys offshore in SMMAP serve as remnants of the once attached coastline prior to submergence following the glacial melting of the Holocene.

The waterways surrounding SMMAP provide for more intricate features given the close interaction between surface and groundwater systems. This tight interaction has helped to form many of the karstic features in the area. The three major rivers that impact the water system of SMMAP are the Withlacoochee, Crystal, and Homosassa. All three receive contributions from spring discharge associated with the Floridan Aquifer System. The Crystal and Homosassa rivers receives discharge from first magnitude springs, among others, and the Withlacoochee from a second magnitude spring. Smaller rivers and creeks such as the Salt River, St. Martins River, Little Homosassa River, and Fish Creek are important draining features in the SMMAP boundary (Rupert, 1987). These surface waters, along with other karstic features, form portions of the expansive drainage basins of the area.



Map 3 | Geomorphology of St. Martins Marsh Aquatic Preserve.

Exposed karst outcroppings amongst the mangroves at low tide in the estuary.

Geology

The Florida Peninsula is the exposed portion of the Florida Plateau that first emerged in the late Oligocene. The plateau's basement is composed of Precambrian to Cambrian igneous, Ordovician to Devonian sedimentary, and Triassic to Jurassic volcanic rocks. During the Cenozoic Era, the peninsula began to take its current shape (HAQ, 1987). Over the next 40 million years, a shallow warm tropical sea covered the plateau which led to the formation of limestone through marine organism deposition. These limestone formations would form the base of the Tertiary System, which includes the majority of exposed geology in Citrus County. The Ocala Platform, stretching from west central Florida up through the Panhandle, serves as the most prominent structure of the Florida peninsula (Scott, 1988). The formation, formed in the early Miocene, is described as a gentle curvature with a northwest-southeast trending crest that developed in the Tertiary sediments (Vernon, 1951).

The present geological structure of Citrus County is that of extensive soluble limestone. This, coupled with the vast array of karstic features, play an important role in the hydrogeological framework of the area by creating a tight, interconnection between the Floridan Aquifer and surface waters. The surface of the county is predominately limestone with vast areas of undifferentiated sediments occurring in the central portion of the county along the Brooksville Ridge. These sediments range in age from Miocene to Holocene and are predominately sand and clay that have a varying thickness given the karst features of the surrounding limestone (Spencer, 1984). The eastern edge of the Brooksville Ridge is dominated by undifferentiated Quaternary sediments. The sediments consist of non-carbonate, poorly to moderately consolidated clays and sands, as well as organics, and some freshwater carbonates (FGS, 2001). Undifferentiated Tertiary-Quaternary non-carbonate sediments are also present in the Brooksville Ridge. These sediments are differentiated from the first group of sediments based on their elevation and their role as a part of the Surficial Aquifer System (FGS, 2001). Additionally Miocene sediments, referred to as Undifferentiated Hawthorn Group sediments are dominant along the northeastern and central to south central portion of the Brooksville Ridge. The sediments are poorly to moderately consolidated clay-like sands, silty clays, and relatively pure clays and are the remnants of the Hawthorn Group that once covered the Ocala Platform (Pirkle, 1956; Brooks, 1966). The sediments are currently an intermediate confining unit for the Floridan Aquifer System and provide an aquitard in areas not perforated by karst features (FGS, 2001).

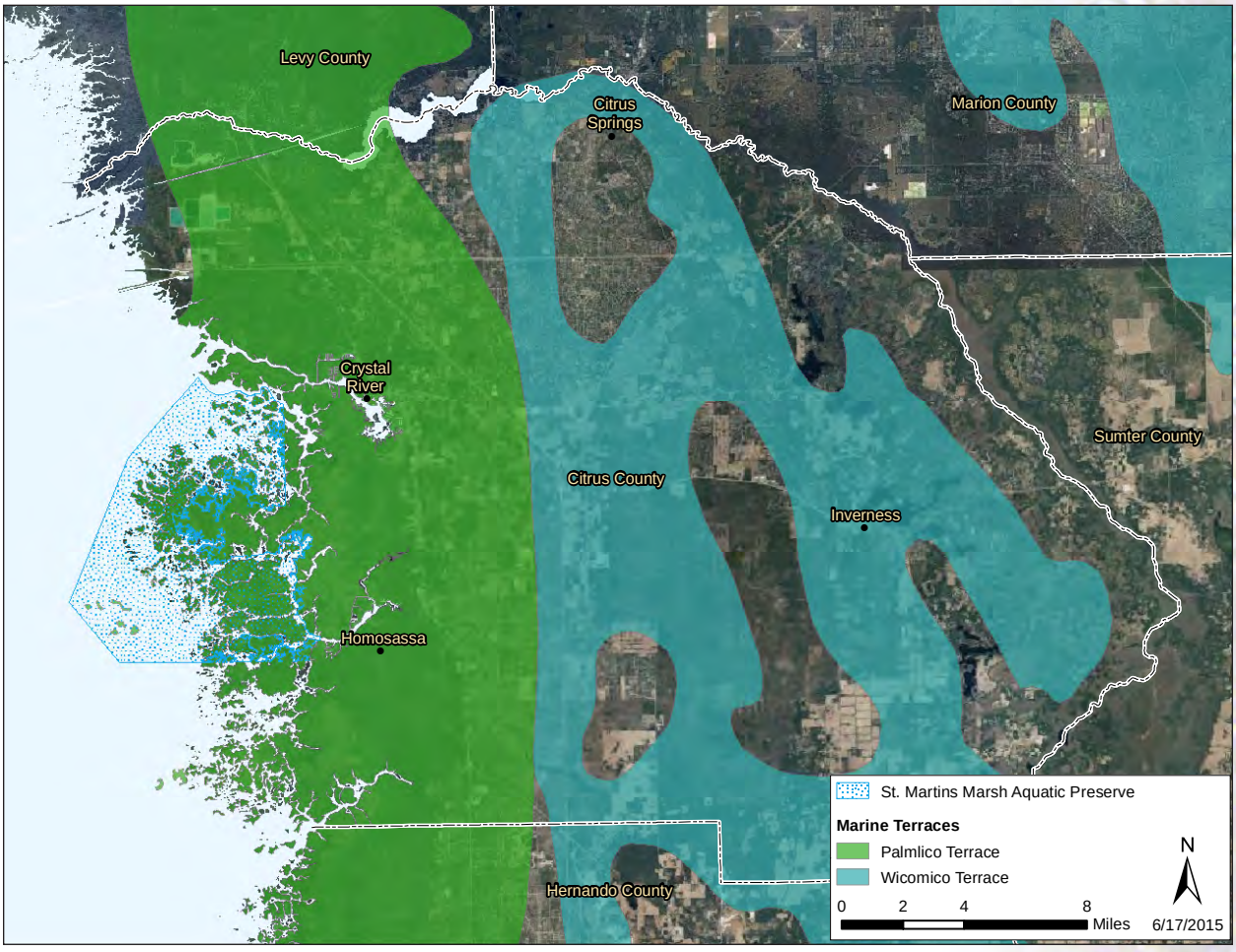
Suwannee Limestone is an Oligocene formation found in south central Citrus County, as well as in small areas around Lecanto and Citrus Hills. The formation lies unconformably upon the Crystal River

Formation of the Ocala Group, running 120 feet thick, with exposures occurring in road cuts, quarries, and sinkholes (Spencer, 1984). The limestone is poorly to well indurated, fossiliferous grainstone and packstone, with partially to completely dolomitized rock (FGS, 2001). Suwannee Limestone also contains areas of silicified limestone, otherwise known as chert. Present fossils include mollusks, foraminifera, corals and echinoids (Spencer, 1984; FGS, 2001).

The Ocala Group limestone formations are predominantly composed of pure limestone with occasional dolostones and serve as the dominant surface feature of the Tsala Apopka Plain, Gulf Coastal Lowlands, and the Coastal Marshes. It is the dominant surface feature of the entire SMMAP. The formation is known for its extensive karstic features providing for a high level of permeability and thus making the formation an integral component of the Floridan Aquifer System (Miller, 1986). The Ocala Group is further classified into three distinct sub formations, in descending order: Crystal River Formation, Williston Formation, and the Inglis Formation.

The Crystal River Formation of the late Eocene was named after its exposure in the Crystal River Rock Quarry (Puri, 1953). Additional exposures can be found in the coastal region as well as the south-central area of Citrus County. The formation is approximately 108 feet thick (Spencer, 1984) and is composed of moderately indurated packstone and wackestone that is heavily fossiliferous, as well as chert (FGS, 2001). The formation contains fossils of bryozoan, echinoids, and mollusks; however is most often identified by its common occurrences of the foraminifera genus *Lepidocyclina* (Spencer, 1984). The Crystal River Formation is conformably underlain by the Williston Formation.

The Williston Formation is a fossiliferous limestone composed of grainstone and calcarenite. The average thickness of the formation is approximately 30 feet with exposures found in the western regions near the coast, in the northern portion along the Withlacoochee River, as well as in the southeastern portion of the Tsala Apopka Plain, in abandoned phosphate quarries in Citrus County (Spencer, 1984; Vernon, 1951). The formation includes fossilized echinoids, mollusks and several species of foraminifera, most notably miliolid foraminifera (Spencer, 1984). The Williston Formation conformably overlays the Inglis Formation, where the former has not eroded away.



Map 4 | Marine terraces.

The Inglis Formation is a fossiliferous partially to completely dolomitized limestone composed of poorly to moderately indurated grainstone and packstone (FGS, 2001). The formation is approximately 50 feet thick with exposures occurring in the northeast along the Withlacoochee River, along the coastal area, as well a quarry near Inglis. Fossilized organisms in the formation include mollusks, echinoids, and foraminifera (Spencer, 1984).

The oldest exposed geological unit in Florida is the Avon Park Formation, formed in the upper middle Eocene (FGS, 2001). The only exposures in Citrus County are found north of SMMAP near the Withlacoochee River and Lake Rousseau. The formation is composed of poorly indurated to well indurated, varyingly fossiliferous grainstone, packstone, wackestone, and occasional mudstone (FGS, 2001). The limestone also exhibits varying degrees of dolomization (Spencer, 1984). The Avon Park Formation provides a non-conformal base for the Ocala Group formation, with exposures occurring where the younger limestone has eroded away. Additionally, the formation serves as a sub-regional confining unit within the Floridan Aquifer System (Miller, 1986). Fossil groups include foraminifera, echinoids, mollusks, bryozoan, corals, algae, and carbonized plant material (Spencer, 1984; FGS, 2001).

Mineral Resources

While there are no mining operations immediately within the SMMAP boundaries, historically there have been four mineral resources mined in the uplands of Citrus County: stone, sand, clay, and phosphate. Stone mining in Citrus County focuses on limestone and dolomite. Stone mining occurs in the northwestern portion of Citrus County, just south of the town of Inglis, as well as the Lecanto area due east of Crystal River. Formations from which limestone is extracted include late Middle Eocene age Avon Park Limestone, late Eocene Ocala Group Limestone, and the Oligocene Suwannee Limestone (Schmidt et al., 1979). The primary uses of limestone are: road base, fertilizer, soil conditioner, rip rap, and concrete and asphalt aggregate (Spencer, 1984). Sand and clay mining occurs in the central portion of Citrus County just east of Homosassa Springs. The mined sand deposits of Citrus County are largely limited to the Brooksville Ridge, as deposits in the Gulf Coastal Lowlands are too fine grained for economic feasibility. The sands of the Brooksville Ridge range in age from Miocene to Holocene, and are a poorly sorted mix of fine to medium grain quartz. The primary purpose for mined sand is construction related uses including: concrete aggregate, road base, construction fill, and asphalt mixture (Spencer, 1984). Fuller's earth is a type of clay mined in near Lecanto of Citrus County. Fuller's earth is a general term used to describe clays with high surface area and high sorption rates which give them binding, thickening, and/or decolorizing abilities (Pickering & Heivilin, 2006). Phosphate was the major mineral mined in the area until it reached levels of economic infeasibility in 1966. The origin of phosphate in the area is believed to come from phosphoric acid in water that replaced the carbonate of limestone to form calcium phosphate, otherwise known as hard rock phosphate (Sellards, 1913). Phosphatic clays were discarded as waste materials from the height of the industry, and were often left in previous mined pits. These clays have been processed in recent years for use as animal feed and direct application fertilizer (Spencer, 1984).

Soils

The soils of SMMAP are primarily sandy and poorly drained. With little urban development and a large amount of marshlands, the soil is largely uniform in many characteristics. The four main soil complexes of significance in SMMAP are Rock Outcrop-Homosassa-Lacoochee, Hallandale-Rock Outcrop, Weekiwachee-Durbin Mucks, and Homosassa-Mucky Fine Sandy Loam (Map 5).

The most expansive complex in SMMAP is the Rock Outcrop-Homosassa-Lacoochee Complex. Found in tidal marshes and some offshore islands, most of the soil is flooded daily with island soil being flooded by extreme high tides and storm tides (U.S. Department of Agriculture [USDA], 1988). The primary component of this complex are the rock outcrops which are largely flat surfaces pitted with solution holes. However, areas near Ozello are highly fractured and partially dissolved along the fractures. The second major component of the complex is Homosassa soil. The surface of the Homosassa soil is black, murky fine sandy loam which is about five inches thick. The next layer is a dark grayish brown fine sand which runs to about 21 inches deep and is underlain by a hard limestone bedrock. The third major component of this complex is Lacoochee soil, which has a light gray fine sandy loam surface layer of about five inches in thickness. This is underlain by a grayish brown fine loamy sand to a depth of about eight inches followed by a yellowish brown fine loamy sand which reaches approximately 21 inches in depth. The bottom layers consist of a white soft limestone bedrock which reaches a depth of about 21 inches, and the subsequent hard white limestone bedrock. The water capacity for the Homosassa and Lacoochee soils ranges from high to moderate with decreasing depth (USDA, 1988).

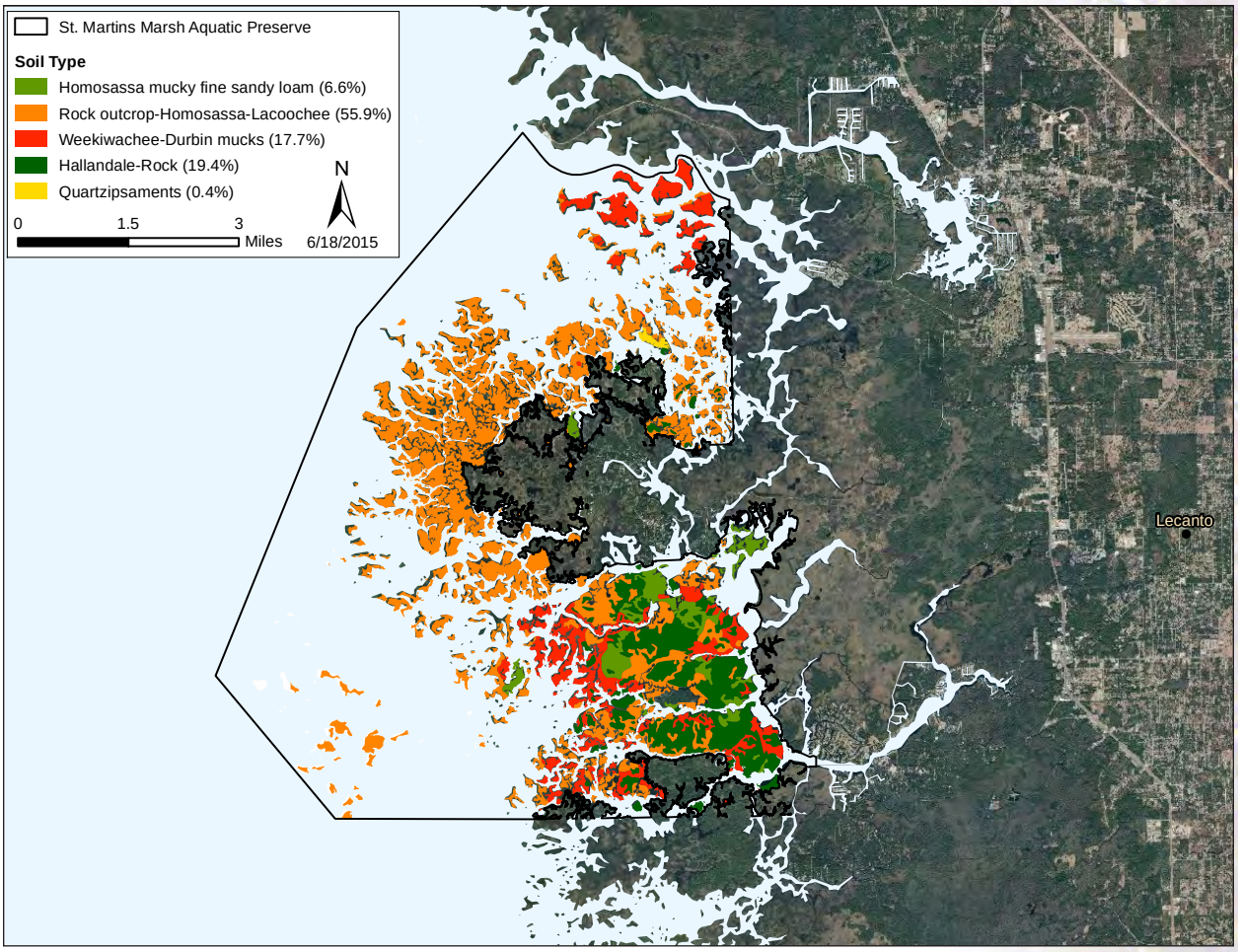
The second largest complex in SMMAP is the Hallandale-Rock Outcrop Complex. The complex is marked by its high water table, moderate to moderately slow permeability, and strongly acidic to mildly

alkaline surface and medium acidic to moderately alkaline underlying layers (USDA, 1988). The major component of this complex is Hallandale soil and is found along the coastline, adjacent to fresh and salt water swamps. The soil is also found on some offshore islands. The surface layer of this soil is a black fine sand that is two inches thick and is followed by a grayish brown fine sand which runs to about six inches in depth. The underlying layer is a yellowish brown fine sand which runs about 10 inches deep, followed by a hard limestone bedrock. The rock outcrop of this complex is randomly scattered, but can range up to 50 feet in length (USDA, 1988).

The Weekiwachee-Durbin Mucks are the third largest complex in SMMAP and are characterized by their well decomposed soils, which contain sulfur, as well as its high water capacity and moderately rapid permeability. The complex is found in salt marshes and is flooded on average of twice daily by high tides (USDA, 1988). There are two main soil types in the complex: Weekiwachee and Durbin. Weekiwachee soil is the dominant component of the complex and is often found adjacent to mineral soils or rock outcroppings. The surface layer of this soil is a black muck that is about 34 inches thick. This is underlain by about four inches of gray fine sand, followed by a layer of white soft limestone bedrock which runs about 41 inches deep and is ultimately followed by a hard limestone bedrock. Durbin soil is exposed to open water and has a surface layer of dark gray muck, about seven inches thick. This is underlain by a black muck which runs about 80 inches deep (USDA, 1988).

The Homosassa Mucky Fine Sandy Loam complex is the fourth largest in SMMAP and is found in tidal marshes where it experiences daily tidal flooding. The complex is marked by its high water capacity near the soil surface, and medium capacity in lower layers, as well as its slightly acidic to mildly alkaline pH (USDA, 1988). The surface layer of the soil is a dark gray mucky fine sandy loam, about 10 inches thick followed by another eight inches of dark grayish brown mucky fine sandy loam. This is underlain by a grayish brown loamy fine sand which runs about 31 inches deep and is followed by four inches of soft limestone bedrock and ultimately a hard limestone bedrock (USDA, 1988).

A small amount of Quartzipsamments (0-5 percent slope) can also be found in SMMAP. Quartzipsamments is commonly found near urban lands but can occur throughout the area (USDA,



Map 5 | Soils of St. Martins Marsh Aquatic Preserve.

1988). The soil is characterized by its variable but generally rapid permeability and its generally low water capacity. The surface layer is a mottled brownish yellow and pale brown fine sand which runs about 54 inches in thickness, followed by a layer of thick dark grey fine sand and a brownish yellow fine sand, running 80 inches deep (USDA, 1988).

Hydrology and Watershed

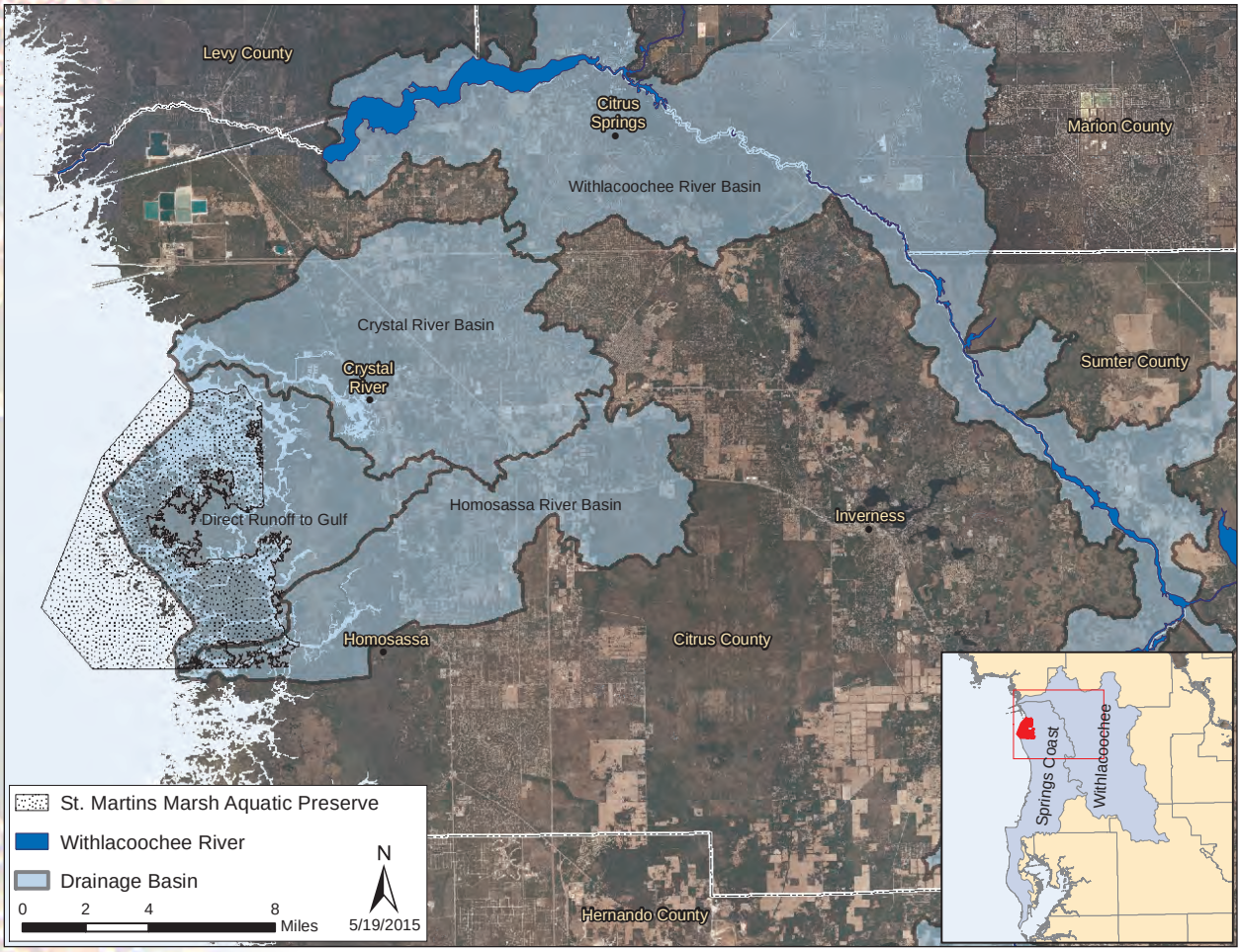
Surface Water

SMMAP is a complex system of inlet bays, salt marshes, and tidal creeks and rivers that form an expansive estuarine system along the coast of Citrus County. The three major rivers that influence the waters of SMMAP are the Crystal, Homosassa, and Withlacoochee. These rivers are incorporated into two main watersheds that impact SMMAP, the Withlacoochee River, and Springs Coast watersheds. These watersheds drain into the estuaries and bays of the area before flowing into the Gulf of Mexico.

Withlacoochee River Drainage Basin

The Withlacoochee River is a coastal river that begins in the Green Swamp of northern Polk County, flowing northwest 157 miles to Withlacoochee Bay and the Gulf of Mexico. The river is one of only two that flows north in the State of Florida. The river's flow is derived from runoff, seepage, and springs discharge. The Withlacoochee Bay drainage area covers approximately 2,067 square miles and includes portions of Citrus, Sumter, Marion, Hernando, Polk, and Lake counties.

The major tributaries to the Withlacoochee River include Gator Creek, Little Withlacoochee River, Jumper Creek, Gum Creek, Pond Creek, Grass Creek, Mattress Drain, Cumbee Drain, Cross Creek, Devils Creek, Gum Slough, Rainbow River, Turner Creek, and Bell Branch. The river also receives flow from Lake Panasoffkee and the Tsala-Apopka Lake Complex. Little Jones Creek and Shady Brook discharge into Lake Panasofkee and the outlet river on Lake Panasoffee discharges into the South Withlacoochee. Many springs also discharge into the Withlacoochee River and its tributaries including A. Wayne Lee Spring, Beltons Millpond Head Spring 1, Gum Spring #2, Beltons Millpond Head Spring 2A, Rainbow Spring, Rainbow Spring #8, Gum Spring #3, Gum Spring #1, Big Hole Spring, Shady Brook Head



Map 6 | Drainage basins of St. Martins Marsh Aquatic Preserve.

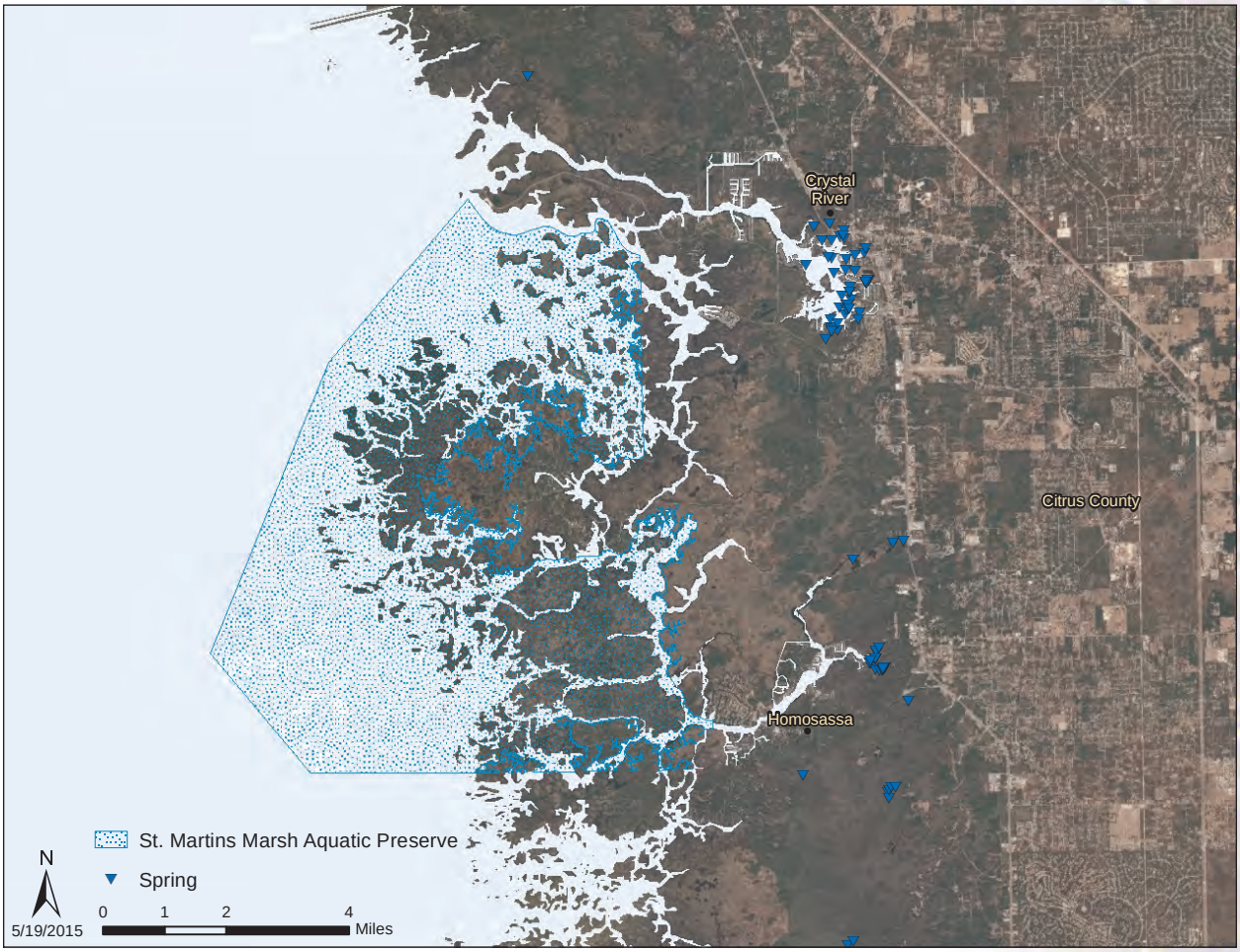
Spring #4, Nichols Spring, Henry Green Spring, Beltons Millpond Head Spring 4, Beltons Millpond Head Spring 2B, Shady Brook Head Spring #3, Indian Creek #1 Spring, Alligator Spring , Maintenance Spring, Rainbow Bridge Seep South, Gum Spring #4, Beltons Millpond Head Spring 2, Shady Brook Spring #2, Beltons Millpond Head Spring 3, Rainbow Bridge Seep North, Rainbow Seep #1, Rainbow Spring #1, Indian Creek #3 Spring, Wilson Head Spring, Rainbow Spring North, Rainbow Spring #6, Indian Creek #2 Spring, Rainbow Unnamed Swamp Spring, Gum Spring Main, Rainbow Spring #2, Rainbow Spring #4, Rainbow Spring #5, Bubbling Spring, Rainbow Springs #7, Rainbow Cave Spring, Citrus Blue Spring, Rainbow Spring #3, Rainbow East Seep, Waterfall Springs, Indian Creek #4 Spring, Fenney Spring, Canal 485 Spring 5, Canal 485A Spring 1B, Dobes Hole Spring, Canal 485A Spring 2, Sumter Blue Spring and Riverdale Spring.

The Withlacoochee River discharges at the mouth of the river in Yankeetown and the western portion of the Cross Florida Barge Canal, an important hydrologic alteration of the river that changed the pattern of outflow. The current operating schedule allows flows below 1,540 cubic feet per second (cfs) to go through the bypass canal to the lower Withlacoochee River. Outflows above 1,540 cfs are discharged through the Inglis Dam to the barge canal (The Amy H. Remley Foundation, 2010). Lake Rousseau, an impoundment located 11 miles upstream of the river's mouth and the eastern point of termination for the unfinished barge canal, also contributes to the altered flow of the Withlacoochee River.

The Withlacoochee Bay is a large and shallow estuary at the mouth of the Withlacoochee River with an area of 81 square miles (DeHaven, 2004). It has an average depth of 7.35 feet, ranging from about 3-20 feet within the barge canal. Tides are semidiurnal with two unequal high and low tides daily and an average tide height of 3.6 feet. The basin opens to the southwest and mixing occurs with tidal exchange, wind, and near shore currents resulting in exchange of more than 50 percent of the bay's volume twice daily. The average salinity of the bay is 19 parts per thousand (ppt) and the temperature averages 23°C.

Springs Coast Drainage Basin

The Springs Coast Basin covers approximately 1,052 square miles. Bound by the Brooksville Ridge to the east and the Gulf of Mexico to the west, the basin encompasses parts of Citrus, Hernando, Pasco,



Map 7 | Karst features of and nearby St. Martins Marsh Aquatic Preserve.

and Pinellas counties. The northern portion of the basin is heavily influenced by spring fed rivers including the Crystal, Homosassa, Chassahowitzka, and Weeki Wachee rivers. These tidally influenced rivers are relatively short in distance, spanning only a few miles and are all fed by first magnitude springs (100 cfs). The southern portion of the basin is primarily influenced by direct runoff to the Gulf aside from the contributions of the Pithlachascotee River (SWFWMD, 2001a).

There are three sub basins of the Springs Coast Watershed that impact the waters of SMMAP: the Crystal River Drainage Basin, the Homosassa River Drainage Basin, and an unnamed drainage basin. The unnamed basin spans 52 square miles, encompassing much of SMMAP, and culminating in direct runoff to the Gulf.

Crystal River Drainage Basin

The Crystal River Drainage Basin spans approximately 69 square miles, encompassing the Crystal River, Kings Bay, and the City of Crystal River. The eastern portion of the watershed is internally drained, limiting the surface water discharge into the Crystal River (SWFWMD, 2000). The Crystal River begins in Kings Bay and runs northwest through the town of Crystal River before terminating in Crystal Bay, spanning about seven miles in total length. Kings Bay includes a complex of 70 springs (SWFWMD, 2013), which supply the river with fresh water from the Floridan Aquifer System. The surface area of the bay is approximately 600 acres with a combined spring discharge of about 640 million gallons per day, making the Crystal River Springs Group the second largest in the state (SWFWMD, 2000; Citrus County Board of County Commissioners, 2006). The most notable springs in the Crystal River/Kings Bay Springs Group include: Black Springs, Catfish Corner Spring, Hunters Spring, Idiot's Delight Spring, Jurassic Spring, Kings Bay Spring #1, King Spring, Little Hidden Spring, Little Spring, Millers Creek Spring, Manatee Sanctuary Spring Tarpon Hole Spring, and Three Sisters Springs among others (FGS, 2004).

Homosassa River Drainage Basin

The Homosassa River Drainage Basin spans approximately 56 square miles and encompasses the Homosassa River and the town of Homosassa Springs. The Homosassa River is headed by the Homosassa Springs Group and continues approximately six miles west before terminating in Homosassa Bay. The most notable springs in the Homosassa Springs Group include: Abdoney Springs, Alligator Spring, Banana Spring, Bear Spring, Belcher Spring, Bluebird Springs, Blue Hole Spring, Hidden River Springs, Homosassa Spring #1, Homosassa Spring #2, Homosassa Spring #3, Totter Main Spring, and Trotter Spring #1 among others (FGS, 2004; DEP, 2014).The Halls River Springs also supply the Halls River, a tributary of the Homosassa River (FGS, 2004).

Ground Water

The karst geology of west central Florida plays an important role in the hydrological framework of the area.

The ground water system of west central Florida is composed of three units: the Surficial Aquifer System, the Intermediate Aquifer System, and the Floridan Aquifer System. In Citrus County, small portions of the Surficial Aquifer System can be found in the Brooksville Ridge while the Intermediate Aquifer System is largely absent (SWFWMD, 2001a).

The Surficial Aquifer System is the uppermost aquifer system. The aquifer is unconfined and composed primarily of clay and unconsolidated sands. The Surficial Aquifer System is found mostly in the Brooksville Ridge as this province still possesses the Hawthorn Group clay layer. This layer, given its low permeability, slows the movement of water into the Floridan Aquifer System and acts as the base of the Surficial Aquifer System and the upper confining layer of the Floridan Aquifer System.

The Floridan Aquifer System is the principle aquifer system of Citrus County. The aquifer is further divided into the Upper Floridan Aquifer and Lower Floridan Aquifer. The Upper Floridan Aquifer contains potable water used for direct consumption as well as agriculture, and industrial purposes. The thickness of the Upper Floridan Aquifer varies from 600-1,800 feet. Throughout much of the Springs Coast and Withlacoochee watersheds, the Upper Floridan Aquifer is present at or near the land surface (SWFWMD, 2001a; SWFWMD, 2001b). The Middle Confining Unit of west-central Florida is that of dolomite and dolomitic limestone in the Avon Park Formation. The unit has a low permeability that acts as a confining unit for the bottom of the Upper Floridan Aquifer, as evidenced by the mineralized water of the unit (Miller, 1986). The Lower Floridan Aquifer lies below the Middle Confining Unit and extends down to Paleocene and Cretaceous formations, containing largely non potable water (Miller, 1986).

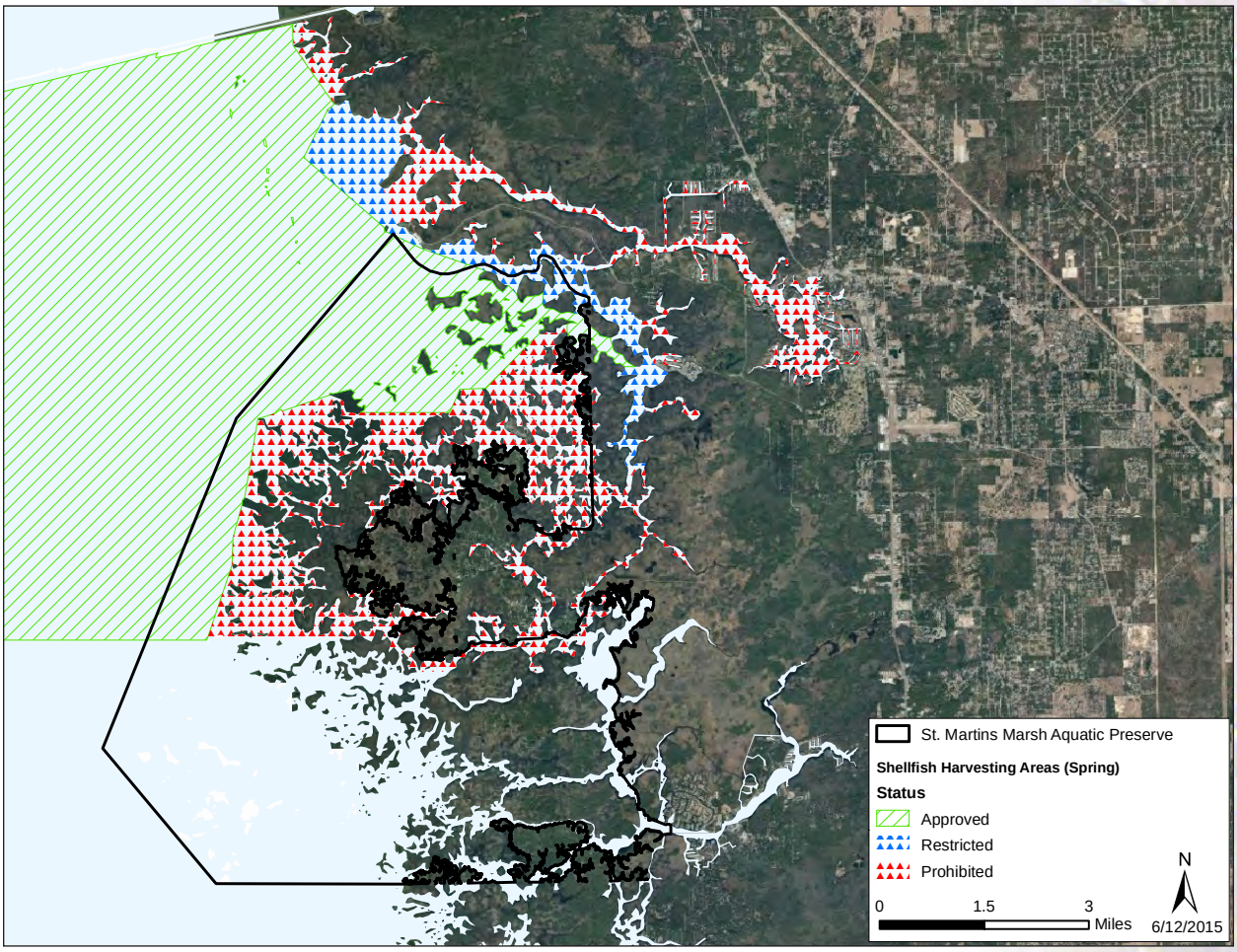
Groundwater recharge in Citrus County varies across geomorphic providences. The Gulf Coastal Lowlands province and Coastal Swamps subprovince are categorized as 'none to moderate' recharge (Stewart, 1980; Copeland, Scott, & Lloyd, 1991), with rates ranging from a net loss of nine inches per year to a gain of 12 inches per year. Recharge rates are generally higher in the Tsala Apopka Plain, which is classified as 'low to moderate' (Copeland et al., 1991), with rates ranging from five to 21 inches per

year (SWFWMD, 2000). The Brooksville Ridge has the highest recharge rate, classified as 'moderate to high,' annual rates range from 14 to 22 inches per year. The high recharge rate of the province is tied to the combination of the province's abundant karst features, generally well drained surface, deep water table, and lack of permanent surface waters (streams, wetlands, creeks, etc.) (SWFWMD, 2000).

Surface Water Quality Classification

Waters of SMMAP are classified as Outstanding Florida Waters (OFWs). OFWs are defined as waters designated by the state as worthy of special protection due to their natural attributes (§403.061(27), Florida Statutes [F.S.]). These waters are afforded special protection by DEP due to their high quality, recreational or ecological significance, or their location within state or federally owned lands. This designation is intended to preserve the ambient water quality at the time of the designation. Stringent standards are applied regarding proposed alterations or potentially damaging activities to prevent any degradation of water quality.

As required by the Clean Water Act, all surface waters in the state have been classified by DEP according to their designated use. Florida has six classes with associated designated uses, which are arranged in order of degree of protection required. All of the waters within SMMAP are designated as Class II - for shellfish propagation or harvesting area. Class II water standards are more stringent concerning bacteriological quality than any other class; shellfish can concentrate pathogens in quantities significantly higher than the surrounding waters, and can therefore be harmful if consumed. Approximately, every 12 years, the Florida Department of Agriculture and Consumer Services (DACS) conducts regular microbial pollution source surveys (i.e. to enumerating fecal coliform concentrations, identifying point and non-point sources of water pollution, assessing toxic marine plankton, etc.) of shellfish harvesting areas to identify all known and potential sources of pollution and determine water quality in shellfish waters. Based upon these surveys, all Class II waters are classified by the department as 'approved,' 'conditionally approved,' 'restricted,' 'conditionally restricted' or 'prohibited' for shellfish harvest (Maps 8 & 9). When environmental conditions (i.e. specific rainfall, river level, etc.) exceed the shellfish harvest area's management plan, the area is closed. Emergencies such as harmful algal



Map 8 | Spring shellfish harvesting zones of St. Martins Marsh Aquatic Preserve.

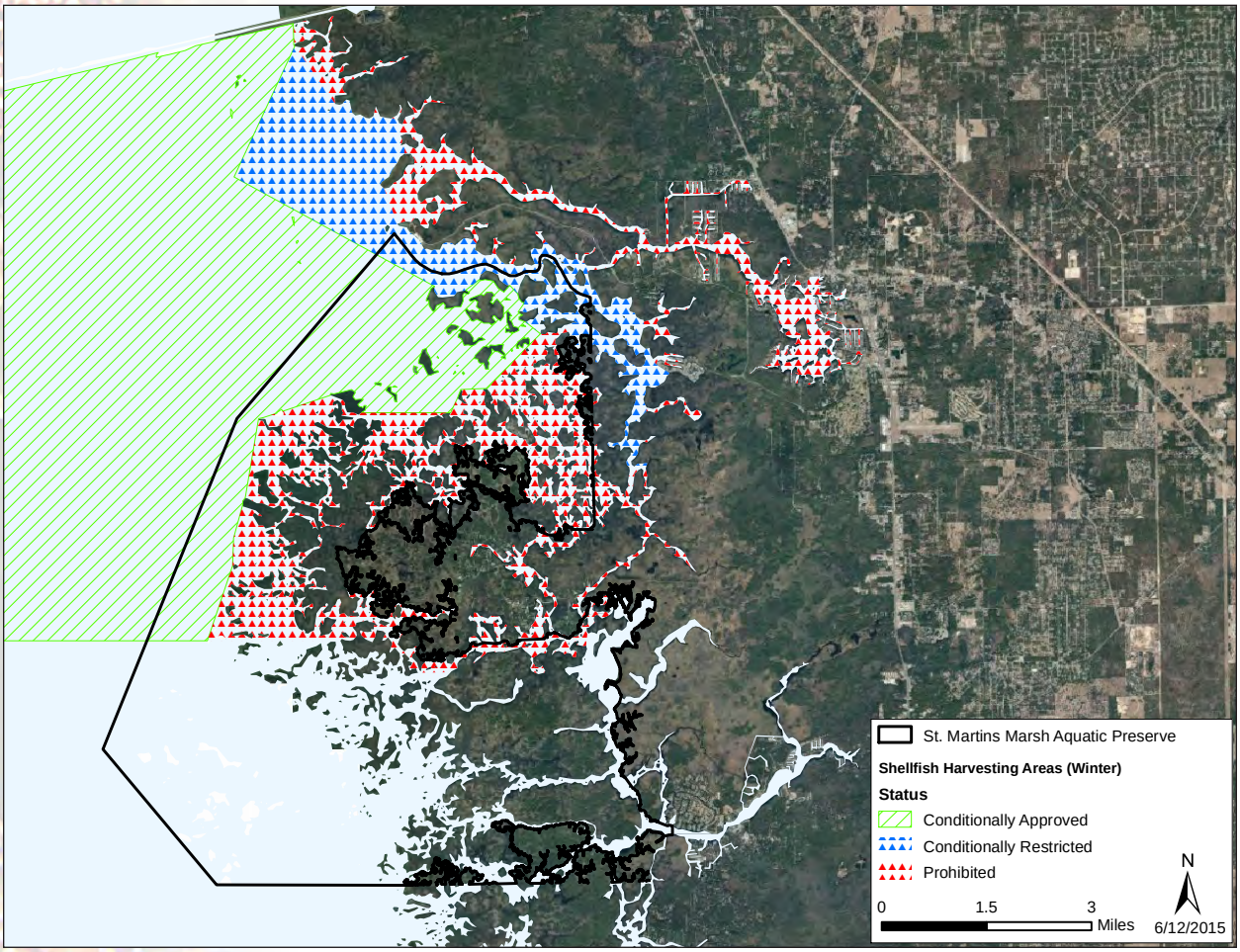
blooms, hurricanes, tropical storms, or sewage spills may trigger precautionary closures as well. In the case of rain or river stage closing a shellfish harvesting area, the area is reopened once bacteriological water quality meets National Shellfish Sanitation Program guidelines (U.S. Food and Drug Administration, 2013).

The Crystal, Homosassa, and Withlacoochee rivers are designated as Class III water bodies as well as Special Waters OFWs. Special Waters are classified as such because they demonstrate exceptional recreational or ecological significance. For a more complete description of surface water quality standards, refer to DEP Chapter 62- 302 (Florida Administrative Code): Surface Water Quality Standards. In addition, Crystal River and the Homosassa River have been designated Surface Water Improvement and Management (SWIM) priority water bodies. Under the Surface Water Improvement and Management Act of Florida, each water management district identifies a list of priority water bodies within their boundaries and implements plans to improve them.

In addition, SMMAP is designated by the U.S. Environmental Protection Agency as a Gulf Ecological Management Site (GEMS). GEMS are geographic areas that have special ecological significance to the continued protection of fish, wildlife, and other natural resources or that represent unique habitat. The GEMS program is an initiative of the U.S. Environmental Protection Agency Gulf of Mexico Program, and the five Gulf of Mexico states that provides a framework for protection of ecologically important Gulf habitat.

Climate

Citrus County is characterized as a sub-tropical region with high mean annual temperatures and rainfall. The mean annual temperature is 71°F. Summer temperatures peak in the low to mid 90s and the area receives frequent cooling from thunderstorms. The hottest month, on average, is August, when the average temperature is around 82°F (National Oceanic and Atmospheric Administration [NOAA], 2014). Winters are mild, yet more variable due to the frequency of cold fronts. Cold fronts generally last two to three days with temperatures rarely remaining below freezing during the day (Wolfe, 1990). The coldest month on average is January with an average temperature of 62°F (NOAA, 2014).



Map 9 | Winter shellfish harvesting zones of St. Martins Marsh Aquatic Preserve.

Rainfall varies seasonally and annually. Average annual rainfall is around 54 inches. However, records show fluctuations as low as 36 inches and as high as 86 inches. Citrus County is defined as exhibiting a bi-modal precipitation with rainfall peaks in the summer and winter. Summer rainfall is driven by warming of air in the interior of the peninsula which rises, creating a low pressure system of moist air from the Gulf. These storms are known as convective storms. Winter rainfall is caused mostly by low pressure systems brought in from jet stream air masses offshore.

El Niño and La Niña are large scale climate interactions that are linked to periodic changes in sea surface temperatures and precipitation. El Niño leads to wetter and colder conditions along the Gulf, while La Niña results in the opposite effect in the Gulf.

A water spout that formed over the St. Martins Keys.

During the months of June through November, extreme weather events such as hurricanes and tropical storms can also have a pronounced effect on weather. Florida is a region that is highly prone to hurricane threats. Since 1842, Citrus County has endured 27 major storms, of which 24 were classified as tropical depressions or higher. The No Name Storm of 1993, also referred to as the "Storm of the Century," was one of the most intense mid-latitude cyclones ever observed along the east coast of the United States (Armstrong, 2013). The storm made landfall along the west coast of Florida on March 13 with hurricane strength wind speeds. Swells of up to 12 feet hit shore causing massive flooding and drowning casualties. The storm spawned 15 tornados across Florida's west coast before moving northward up the eastern seaboard causing the most impactful blizzard on record for the region (NOAA, 2012). In Citrus County, wind speeds registered approximately 80 mph, and storm surges of six feet hit land. Residents were left without power while evacuation routes flooded. The storm would cause extensive damage across the nation, with Florida receiving the brunt. The state would see more than 18,000 homes damaged and 44 casualties, as 21 counties had federal disasters declared. The severity of the storm and the damage that followed encouraged changes in protocol and monitoring for the National Weather Service (NOAA, 1993; NOAA, 2012).

NATURAL COMMUNITIES

The natural community classification system used in this plan was developed by the Florida Natural Areas Inventory (FNAI) and the Florida Department of Natural Resources, now the Florida Department of Environmental Protection (DEP), and updated in 2010. The community types are defined by a variety of factors, such as vegetation structure and composition, hydrology, fire regime, topography and soil type.

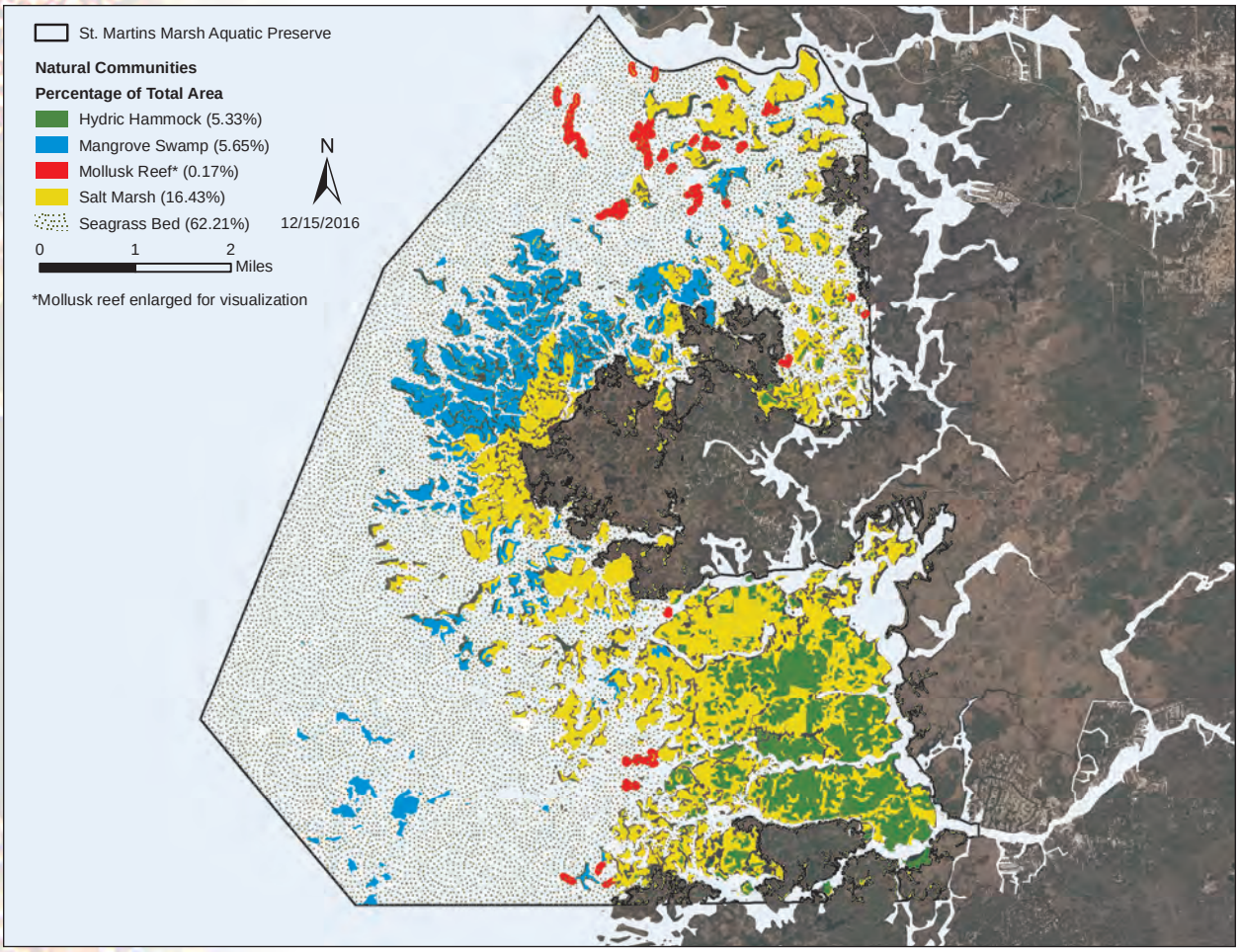
The community types are named for the most characteristic biological or physical feature (FNAI, 2010). FNAI also assigns Global (G) and State (S) ranks to each natural community and species that FNAI tracks. These ranks reflect the status of the natural community or species worldwide (G) and in Florida (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 Florida Cooperative Land Cover (CLC) Version 3.0 (2014) was used to produce a map delineating the major natural community types found on SMMAP. This data was developed through a partnership between the Florida Fish and Wildlife Conservation Commission (FWC) and Florida Natural Areas

Inventory (FNAI) to develop ecologically-based statewide land cover from existing sources and expert review of aerial photography. These data are not always based on comprehensive or site-specific field surveys, and no additional fieldwork was conducted for purposes of producing this map. The descriptions of the natural community types found in SMMAP have been adapted from the Guide to the Natural Communities of Florida (FNAI, 2010).

Hydric Hammock

(Synonyms: wet hammock, Gulf hammock) Hydric hammock is an evergreen and/or palm closed-canopy forest where palms and ferns are commonly found in moist soils and occur in low, flat, wet sites. Limestone is often found near the surface of the soil. High soil moisture is maintained throughout the year due to rainfall accumulation and periodic flooding from rivers, springs, and seepage on poorly drained soils. The canopy generally consists of swamp laurel oak (*Quercus laurifolia*) and live oak (*Q. virginiana*). Cabbage palm (*Sabal palmetto*), American elm (*Ulmus americana*), sweetbay (*Magnolia virginiana*), red cedar (*Juniperus virginiana*), red maple (*Acer rubrum*), sugarberry (*Celtis laevigata*), sweetgum (*Liquidambar styraciflua*), and water oak (*Q. nigra*) are also commonly found. The open understory is composed of numerous small trees and shrubs, including American hornbeam (*Carpinus caroliniana*), swamp dogwood (*Cornus foemina*), small-leaf viburnum (*Viburnum obovatum*), common persimmon (*Diospyros virginiana*), swamp bay (*Persea palustris*), wax myrtle (*Myrica cerifera*), dwarf palmetto (*Sabal minor*), American beautyberry (*Callicarpa americana*), and needle palm (*Rhapidophyllum hystrix*). Vines are also typically found, with species such as eastern poison ivy (*Toxicodendron radicans*), peppervine (*Ampelopsis arborea*), rattan vine (*Berchemia scandens*), trumpet creeper (*Campsis radicans*), climbing hydrangea (*Decumaria barbara*), yellow jessamine (*Gelsemium sempervirens*), greenbriers (*Smilax* spp.), summer grape (*Vitis aestivalis*), and muscadine (*Vitis rotundifolia*). Graminoids and ferns are frequent and diverse; typical species are sedges (*Carex* spp.), woodoats (*Chasmanthium* spp.), smooth elephants foot (*Elephantopus nudatus*), Carolina scalystem (*Elytraria caroliniensis*), woodsgrass (*Oplismenus hirtellus*), maiden ferns (*Thelypteris* spp.), cinnamon fern (*Osmunda cinnamomea*), royal fern (*Osmunda regalis* var. *spectabilis*), toothed midsorus fern (*Blechnum serrulatum*), netted chain fern (*Woodwardia areolata*), and Virginia chain fern (*Woodwardia virginica*) (FNAI, 2010).



Map 10 / St. Martins Marsh Aquatic Preserve Florida Natural Areas Inventory natural communities.

One of many tidal creeks winding up into Crystal River Preserve State Park from the Gulf of Mexico.

Species diversity and composition is primarily determined by flooding patterns. Environments that are saturated and frequently flooded typically contain hydrophytic trees such as swamp tupelo (*Nyssa sylvatica* var. *biflora*). The frequency of floods and depths at which they occur have a prominent effect on oak canopy composition; saturated soils support mostly swamp laurel oak, whereas environments that experience less flooding are more abundant with live oak. The SMMAP hydric hammocks occur within and adjacent to CRPSP. According to the park biologist, this natural community is in good condition.

Variation: Coastal Hydric Hammock

Areas of hammock immediately bordering salt marsh or other coastal areas. Species composition is limited by salinity: Predominant species are cabbage palm, live oak, and red cedar.

Shell Mounds

(Synonyms: midden, Indian mound, tropical hammock, maritime hammock, coastal hammock.) Shell mounds are small hills elevated entirely by mollusk shells that were discarded by Native Americans several centuries ago. These mounds support a diverse hardwood, closed-canopy forest with the rich calcareous soil composed of shell fragments. If hammock vegetation is not available, a sparse shrubby community has been known to develop. Shell mounds tend to host tropical plant species which is in constant flux. It is natural for species to be eliminated by freezes and re-colonized via bird dispersal. Typical plants include gumbo-limbo (*Bursera simaruba*), cabbage palm, false mastic (*Sideroxylon foetidissimum*), red cedar, snowberry (*Chiococca alba*), live oak, Florida swampprivet (*Forestiera segregata*), coral bean (*Erythrina herbacea*), marlberry (*Ardisia escallonioides*), saffron plum (*Sideroxylon celastrinum*), smallflower mock buckthorn (*Sageretia*

FNAI Natural Community Type	Acres	Percent of Area	Federal Rank	State Rank
Hydric Hammock	1,518	5.33%	G4	S4
Shell Mounds			G2	S2
Mangrove Swamp	1,607	5.65%	G3	S3
Salt Marsh	4,677	16.43%	G4	S4
Consolidated Substrate			G3	S3
Unconsolidated Substrate			G5	S5
Mollusk Reef	49	0.17%	G3	S3
Octocoral Bed			G2	S1
Sponge Bed			G2	S2
Algal Bed			G3	S2
Seagrass Bed	17,705	62.21%	G2	S2
Aquatic Caves			G3	S2

Table 1 / St. Martins Marsh Aquatic Preserve Florida Natural Areas Inventory natural communities.

minutiflora), and coontie (*Zamia pumila*), among others (FNAI, 2010). The SMMAP shell mounds occur within and adjacent to CRPSP. According to the park biologist, this natural community is in good to fair condition. Erosion, by boat wake and tidal surge, is the primary cause for concern relating to shell mounds in the area.

Salt Marsh

(Synonyms: salt marsh, brackish marsh, coastal wetlands, coastal marshes, tidal wetlands.) Salt marsh occurs in coastal zones that are greatly affected by tides and seawater. These herbaceous communities are protected by large waves 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. It is not uncommon for salt marsh to have distinct zones of vegetation, with each zone dominated by a single plant species. Salt marsh cordgrass (*Spartina alterniflora*) dominates the areas that are most frequently flooded, the seaward edge and borders of tidal creeks. Needle rush (*Juncus roemerianus*) dominates higher, less frequently flooded areas. Carolina sea lavender (*Limonium carolinianum*), perennial salt marsh aster (*Symphyotrichum tenuifolium*), wand loosestrife (*Lythrum lineare*), marsh fimbry (*Fimbristylis spadicea*), and shoreline seapurslane (*Sesuvium portulacastrum*) can also be found in that zone. The landward edge of the marsh is influenced by freshwater influx from the uplands and may be colonized by a mixture of high marsh and inland species, including needle rush, sawgrass (*Cladium jamaicense*), saltmeadow cordgrass (*Spartina patens*), Gulf cordgrass (*Spartina spartinae*), and sand cordgrass, among others. A border of salt-tolerant shrubs, such as groundsel tree (*Baccharis halimifolia*), saltwater falsewillow (*B. angustifolia*), marshelder (*Iva frutescens*), and christmasberry (*Lycium carolinianum*), often marks the transition to upland vegetation or low berms along the seaward marsh edge (FNAI, 2010).

Salt marshes are one of the most biologically productive natural communities in the world due to the tidal fluctuations that cycle nutrients and allow marine and estuarine fauna to access the marsh. Salt marshes are also extremely important because of their storm buffering capacity and their pollutant filtering actions. The dense roots and stems hold the unstabilized soils together, reducing the impact of storm wave surge. The plants, animals, and soils filter, absorb, and neutralize many pollutants before they can reach adjacent marine and estuarine communities. These factors make salt marshes extremely valuable as a natural community. The SMMAP salt marshes occur within and adjacent to CRPSP. According to the park biologist, this natural community is in good condition.

Variation: Salt Flat

Salt flats are slightly elevated areas within the salt marsh. It floods only from storm tides or extreme high tides. Due to the isolation from freshwater, these communities are very saline and are dominated by species that can only tolerate increased salinities. This includes succulents such as saltwort (*Batis maritima),* perennial glasswort (*Sarcocornia ambigua*), annual glasswort (*Salicornia bigelovii*), and bushy seaside oxeye (*Borrichia frutescens*), or short grasses, such as saltgrass (*Distichlis spicata*), seashore paspalum (*Paspalum vaginatum*), and shoregrass (*Monanthochloe littoralis*). Some salt flats are too elevated and become too saline and are unable to sustain much plant life. Vegetation is limited to a very sparse and stunted cover of succulents and/or shoregrasses with much bare ground.

Mangrove Swamp

(Synonyms: mangrove forest, mangrove swamp, and mangrove islands.) Mangrove swamp is a dense forest that can be found along flat marine and estuarine shorelines with low wave energy. These communities occur in flat coastal areas along saline or brackish portions of rivers, along the edges of low-energy estuaries, and along the seaward fringes of salt marshes and rockland hammocks. Soils are generally anaerobic and are saturated with brackish water at all times, becoming inundated during high tides. Mangrove swamp occurs on a wide variety of soils, ranging from sands and mud to solid limestone rock. Mangrove swamps predominately consist of red mangrove (*Rhizophora mangle*), black mangrove (*Avicennia germinans),* white mangrove (*Laguncularia racemosa*), and buttonwood (*Conocarpus erectus*). These species can be found together in mixed stands or separated in monospecific zones that reflect varying degrees of tidal influence, levels of salinity, and types of substrate. In the lowest, deep water zone, red mangrove tends to dominate, black mangrove is most likely to be found in the intermediate zone, followed by white mangrove and buttonwood in the highest, least tidally-influenced zone.

Mangroves can range considerably within the mangrove swamp. Mangroves can typically be found in dense stands but it is not uncommon to find them in sparse patches, especially in upper tidal zones where salt marsh species dominate. The range of the mangroves varies from 80 foot tall trees to dwarf shrubs that thrive on limestone rock. Usually, the mangroves average about 10 to 20 feet tall. Mangrove

Red mangroves are one of three mangrove species found in St. Martins Marsh Aquatic Preserve.

swamps often exist with no understory, although shrubs such as seaside oxeye and vines including gray nicker (*Caesalpinia bonduc*), coinvine (*Dalbergia ecastaphyllum*), and rubbervine (*Rhabdadenia biflora*), and herbaceous species such as saltwort, shoregrass, perennial glasswort, and giant leather fern (*Acrostichum danaeifolium*), where present, occur most commonly in openings and along swamp edges (FNAI, 2010). Mangrove swamp communities are important because they provide homes for Florida's commercially and recreationally significant fish and shellfish. These natural communities are also the breeding grounds for substantial populations of wading birds, shorebirds, and other animals. The continuous shedding of mangrove leaves and other plant components produce as much as 80 percent of the total organic material available in the aquatic food web. Additionally, mangrove swamps help protect other inland communities by absorbing the brunt of tropical storms and hurricanes. This natural community is currently in good/stable condition in SMMAP.

Consolidated Substrate

(Synonyms: hard bottom, rock bottom, limerock bottom, coquina bottom, relic reef.) Marine and estuarine consolidated substrates are mineral based natural communities generally characterized as expansive, relatively open areas of subtidal, intertidal and supratidal zones which lack dense populations of sessile plant and animal species. Consolidated substrates are solidified rock or shell conglomerates and include coquina, limerock or relic reef materials. These communities may be sparsely inhabited by sessile, planktonic, epifaunal, and pelagic plants and animals but house few infaunal organisms (i.e., animals living within the substrate).

The three kinds of consolidated substrate communities occurring in Florida are of limited distribution. Coquina, which is a limestone composed of broken shells, corals and other organic debris, occurs primarily along the east coast, in marine areas in the vicinity of St. Johns and Flagler counties. Limerock substrates occur as outcrops of bedded sedimentary deposits consisting primarily of calcium carbonate. This consolidated substrate is more widespread than coquina substrate and can be found in a patchy distribution under both marine and estuarine conditions from north Florida to the lower-most keys in Monroe County, including in SMMAP. Relic reefs, the skeletal remains of formerly living reefs, are more limited in distribution than limerock outcrops but more common than coquina substrate (FNAI, 2010).

Consolidated substrates are important in that they form the foundation for the development of other marine and estuarine natural communities when conditions become appropriate. Consolidated substrate communities are easily destroyed through siltation or placement of fill, and deliberate removal by actions

such as blasting or non-deliberate destruction by forces such as vehicular traffic. This natural community is currently in good/stable condition in SMMAP. The limerock substrate type is the prevalent consolidated substrate of SMMAP.

Unconsolidated Substrate

(Synonyms: beach, shore, sand bottom, shell bottom, sand bar, mud flat, tidal flat, soft bottom, coralgal substrate, marl, gravel, pebble, calcareous clay.) Marine and estuarine unconsolidated substrates are mineral based natural communities generally 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 unsolidified material and include coralgal, 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 (e.g., tube worms, sand dollars (Clypeasteroida), mollusks, isopods, amphipods, burrowing shrimp (Thalassinidea), and an assortment of crabs).

In general, marine and estuarine unconsolidated substrate communities are the most widespread communities in the world. However, unconsolidated substrates vary greatly throughout Florida, based on surrounding parent material. Unconsolidated sediments can originate from organic sources, such as decaying plant tissues (e.g., mud) or from calcium carbonate depositions of plants or animals (e.g., coralgal, marl and shell substrates). Marl and coralgal substrates are primarily restricted to the southern portion of the state. The remaining four kinds of unconsolidated substrate, mud, mud/sand, sand, and shell, are found throughout the coastal areas of Florida. While these areas may seem relatively barren, the densities of infaunal organisms in subtidal zones can reach the tens of thousands per meter square, making these areas important feeding grounds for many bottom feeding fish, such as red drum or redfish (*Sciaenops ocellatus*), spot (*Leiostomus xanthurus*), and sheepshead (*Archosargus probatocephalus*). The intertidal and supratidal zones are extremely important feeding grounds for many shorebirds and invertebrates (FNAI, 2010).

Unconsolidated substrates are important in that they form the foundation for the development of other marine and estuarine natural communities when conditions become appropriate. Unconsolidated substrate communities are associated with and often grade into beach dunes, salt marshes, mangrove swamps, seagrass beds, coral reefs, mollusk reefs, worm reefs, octocoral beds, sponge beds, and algal beds.

Mollusk Reef

(Synonyms: oyster bar, oyster reef, oyster bed, oyster rock, oyster grounds, mussel reef, worm shell reef, Vermetid reef.) Marine and estuarine mollusk reefs are faunal based natural communities typically 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 Eastern oyster (*Crassostrea virginica*). Less common are mollusk reefs dominated by mussels and others dominated by Vermetid worm shells. Numerous other sessile and benthic invertebrates live among, attached to, or within the collage of mollusk shells. Most common are burrowing sponge (Hadromerida), anemones, mussels, clams, oyster drill (*Urosalpinx* spp.), lightning whelk (*Busycon sinistrum*), polychaetes, oyster leech (*Stylochus* spp.), barnacles, blue crab (*Callinectes sapidus*), mud crab (Xanthidae), stone crab (*Menippe mercenaria*), pea crab (Pinnotheridae), amphipods, and starfish (Asteroidea). Several fish also frequently occur near or feed among mollusk reefs, including cownose ray (*Rhinopter bonasus*), Gulf menhaden (*Brevoortia patronus*), gafftopsail catfish (*Bagre marinus*), pinfish (*Lagodon rhomboides*), spotted seatrout (*Cynoscion nebulosus*), spot, black drum (*Pogonias cromis*) and striped mullet (*Mugil cephalus*). Mollusk reefs that are exposed during low tides are frequented by a multitude of shorebirds, wading birds, raccoons and other vertebrates. One of the United States' largest wintering populations of American oystercatchers (*Haematopus palliates*) is situated in the heart of the Cedar Keys. The success of this rookery can be attributed to the oyster reefs located here, which are an excellent and tremendously important food source. Also, successful nesting pairs of American oystercatchers are monitored annually on local spoil islands just north of the SMMAP boundary.

Reef-building mollusks require a hard (consolidated) substrate on which the planktonic larvae (i.e., spat) settle and complete development. The spat dies if it settles on soft (unconsolidated) substrates, such as mud, sand or grass. Hard substrates include rocks, limestone, wood and other mollusk shells. Hard substrates are often limited in estuarine natural communities because of the large amounts of silt, sands and muds that are deposited around river mouths. Once established, however, mollusk reefs can generally persist and often expand by building upon themselves.

The most common kind of mollusk reef, oyster mollusk reefs, occur in water salinities from just above fresh water to just below full strength sea water, but develop most frequently in estuarine water with salinities between 15 and 30 ppt. Their absence in marine water is largely attributed to the many

Oyster reefs are important in this area as they improve water quality and help slow storm surge from impacting the coastline.

predators, parasites, and diseases of oysters that occur in higher salinities. Prolonged exposure to low salinities (less than two ppt) is also known to be responsible for massive mortality of oyster reefs. Thus, significant increases or decreases in salinity levels through natural or unnatural alterations of freshwater inflow can be detrimental to oyster mollusk reef communities. Mollusk reefs occupy a unique position among estuarine invertebrates and have been an important human food source since prehistoric times. They present a dynamic community of estuarine ecology, forming refugia, nursery grounds, and feeding areas for a myriad of other estuarine organisms.

The major threats to mollusk reefs continue to be pollution and substrate degradation due, in large part, to upland development. Mollusks are filter feeders, filtering up to 100 gallons of water a day. In addition to filtering food, they also filter and accumulate toxins from polluted waters. Sources of these pollutants can be from considerably distant areas, but are often more damaging when nearby. Substrate degradation occurs when silts, sludge and dredge spoils cover and bury the mollusk reefs. Declining oyster and other mollusk reef populations can be expected in coastal waters that are being dredged or are receiving chemicals mixed with rainwater flowing off the land, or from drainage of untreated residential or industrial sewage systems.

Reported declines in oyster bars are likely due to a departure from historical norms, and stems from multiple factors. Extended periods of high salinity are likely stressors of oyster populations, particularly on offshore bars, to the extent that the physical structure of bars are affected by both mortality of older oysters, and the loss of significant recruitment. Once the structure of bars is weakened, bars became less resilient to wave action, particularly during storm events. Evidence suggest that the primary mechanism is reduced survival and recruitment as a result of decreased freshwater inputs, thus causing existing bars to be vulnerable to wave action and sea level rise; once bar substrate becomes unconsolidated, the breakdown of the bar may not be reversible. Emerging threats such as sea level rise, increasing storm intensity, and changes to ocean chemistry are much less understood partly because these threats occur at very broad spatial scales and partly because oyster community response to these stressors may be locally confounded with other stressors such as dredging or overharvest. Evidence suggests that increasing human uses of freshwater inland may be an important factor resulting in habitat loss (FNAI, 2010).

Understanding the resilience of oyster reef communities in the Gulf to these and other threats is important for developing effective conservation, management, and restoration plans for this species and

Staff commonly find sea stars in the seagrass and on rock piles in the aquatic preserve.

this globally significant habitat. Planning for the conservation of oyster habitat in the Gulf should include scenarios that encompass the interaction of global change and local anthropogenic stressors. This natural community in SMMAP is currently in fair condition. Restoration or enhancement efforts may be necessary in the future.

Octocoral Bed

(Synonyms: gorgonians, sea fans, sea feathers, sea fingers, sea pansies, sea plumes, sea rods, sea whips, soft corals.) Marine and estuarial octocoral beds are characterized by their large populations of sessile invertebrates including Class Anthozoa, Subclass Octocorallia, Orders Gorgonacea and Pennatulacea. The dominant animal species are soft corals such as gorgonians, sea fans (Gorgonacea), sea feathers and sea plumes (*Pseudopterogorgia* spp.), sea fingers (*Briareum asbetinum*), sea pansies (*Renilla* spp.), sea rods (*Plexaura* spp.), and sea whips (*Leptogorgia* spp.). This community is confined to the subtidal zone and organisms are likely to dry out if not completely saturated. Sea anemones (Actiniaria) are also typically occurring in these communities.

An assortment of non-sessile benthic and pelagic invertebrates and vertebrates [e.g., sponges, mollusks, tube worms, burrowing shrimp (Thalassinidea), crabs, isopods, amphipods, sand dollars (Clypeasteroida), and fishes] are associated with octocoral beds. Species include flamingo tongue snail (*Cyphoma gibbosa*) and the giant basket starfish (*Astrophyton muricatum*). Sessile and drift algae can also be found scattered throughout octocoral beds.

Octocoral beds require hard bottom (consolidated) substrate (i.e., coquina, limerock, relic reefs) on which to anchor. Hard bottom substrate occurs sparsely throughout Florida in marine and estuarine areas; however, soft corals prefer the warmer waters of the southern portion of the state, severely limiting the distribution. This natural community in SMMAP is currently in good/stable condition.

Octocoral beds may grade into other marine and estuarine hard bottom subtidal, intertidal, and supratidal communities (i.e., consolidated substrate, sponge bed, coral reef, mollusk reef, worm reef, lithophytic algal bed) as well as soft bottom communities (i.e., unconsolidated substrate, psammophytic algal bed, seagrass bed, salt marsh, mangrove swamp) (FNAI, 2010).

Sponge Bed

(Synonyms: branching candle sponge, Florida loggerhead sponge, sheepswool sponge.) Marine and estuarine sponge beds are soft faunal based natural communities characterized as dense populations

of sessile invertebrates of the phylum Porifera, Class Demospongiae. The dominant animal species are sponges such as branching candle sponge (*Verongia longissima*), Florida loggerhead sponge (*Spheciospongia vesparium*), and sheepswool sponge (*Hippiospongia lachne*). Although concentrations of living sponges can occur in marine and estuarine intertidal zones, sponge beds are confined primarily to subtidal zones. Other sessile animals typically occurring in association with these sponges are stony corals (Scleractinia), sea anemones (Actiniaria), mollusks, tube worms, isopods, amphipods, burrowing shrimp (Thalassinidea), crabs, sand dollars (Clypeasteroida), and fishes. Sessile and drift algae can also be found scattered throughout sponge beds.

Sponge beds require hard bottom (consolidated) substrate (i.e., coquina, limerock, relic reefs) on which to anchor. Hard bottom substrate occurs sparsely throughout Florida in marine and estuarine areas; however, sponges prefer the warmer waters of the southern portion of the state, significantly limiting the distribution severely. This natural community in SMMAP is currently in good/stable condition.

Sponge beds may grade into other marine and estuarine hard bottom subtidal, intertidal and supratidal communities (i.e., consolidated substrate, sponge bed, coral reef, mollusk reef, worm reef, and lithophytic algal bed) as well as soft bottom communities (i.e., unconsolidated substrate, ammophytic algal bed, seagrass bed, salt marsh, mangrove swamp) (FNAI, 2010).

Algal Bed

(Synonyms: algal mats, periphyton mats.) Marine and estuarine algal beds are floral based natural communities characterized as large populations of nondrift macro or micro algae. The dominant vegetative species include the following genera: *Anadyomene*, *Argardhiella, Avrainvellea, Batophora, Bryopsis, Calothrix, Caulerpa, Chondria, Cladophora, Dictyota, Digenia, Gracilaria, Halimeda, Laurencia, Oscillatoria*, *Penicillus*, *Rhipocephalus*, and *Sargassum*. This community may occur in subtidal, intertidal, and supratidal zones on soft and hard bottom substrates. Vascular plants (e.g., seagrasses) may occur in algal beds associated with soft bottoms. Sessile animals associated with algal beds will vary based on bottom type. For algal beds associated with hard bottom substrate (lithophytic), faunal populations will be similar to populations associated with octocoral beds and sponge beds. Those associated with soft bottom substrate (psammophytic) may have similar benthic and pelagic species in addition to infauna species. Recent research has shown that algal beds provide critical habitat for juvenile spiny lobsters (*Panulirus argus*), a species of great commercial importance (FNAI, 2010).

Lithophytic algal beds are thought to be less widespread within Florida than psammophytic algal beds. The precise distribution of both kinds is not known; however, the distribution is thought to be less than for marine and estuarine seagrass beds.

Marine and estuarine algal beds may grade into seagrass beds, salt marsh, mangrove swamp, or many of the other marine or estuarine natural communities. Supratidal algal beds such as periphyton beds (e.g., blue-green algal mats) may grade into various coastal palustrine and terrestrial natural communities.

Distribution information for algal beds is lacking. The location of major beds must be determined before this natural community can be managed adequately. Existing state dredge and fill laws provide specific protection for marine and estuarine seagrass beds but not for algal beds. The correction of this deficiency could prove to be the most effective management tool available.

The primary threat to marine and estuarine algal beds are dredging and filling activities which physically remove or bury the beds. Other damage occurs from increased turbidity in the water column which reduces available light; pollution, particularly from oil spills; and damage from boats (FNAI, 2010). This natural community in SMMAP is currently in good/stable condition.

Seagrass Bed

(Synonyms: seagrass meadows, grass beds, grass flats.) Marine and estuarine seagrass beds are floral based natural communities typically characterized as expansive stands of vascular plants. This community occurs in subtidal (rarely intertidal) zones, in clear, coastal waters where wave energy is moderate. Seagrasses are not true grasses (Poaceae). The three most common species of seagrasses in Florida are turtle grass (*Thalassia testudinum*), manatee grass (*Syringodium filiforme*), and shoal grass *(Halodule wrightii*). Nearly pure stands of any one of these species can occur, but mixed stands are also common. Species of *Halophila* may be intermingled with the other seagrasses, but species of this genus are considerably less common than turtle grass, manatee grass and shoal grass. Widgeon grass (*Ruppia maritima*) can also be found occurring with the previously listed seagrasses although they occur primarily under high salinities while widgeon grass occurs in areas of lower salinity.

Attached to the seagrass leaf blades are numerous species of epiphytic algae and invertebrates. Together, seagrasses and their epiphytes serve as important food sources for manatees, marine turtles, and many fish, including spotted sea trout, spot, sheepshead and red drum. The dense seagrasses also serve as shelter or nursery grounds for many invertebrates and fish, including marine snails, clams, bay scallops (*Argopecten irradians*), polychaete worms, pink shrimp (*Farfantepenaeus duorarum*), blue crab, starfish (Asteroidea), sea urchins (Echinoidea), tarpon (*Megalops atlanticus*), seahorses (*Hippocampus* spp.), Florida pompano (*Trachinotus carolinus*), permit (*T. falcatus*), striped mullet, great barracuda (*Sphyraena barracuda*), and long-horned cowfish *(Lactoria cornuta*).

Marine and estuarine seagrass beds occur most frequently on unconsolidated substrates of marl, muck or sand, although they may also occur on other unconsolidated substrates. The dense blanket of leaf blades reduces the wave-energy on the bottom and promotes settling of suspended particulates. The settled particles become stabilized by the dense roots and rhizomes of the seagrasses. Thus, marine and estuarine seagrass beds are generally areas of soil accumulation. Other factors affecting the establishment and growth of seagrass beds include water temperature, salinity, wave-energy, tidal activity and available light. Generally, seagrasses are found in waters with temperatures ranging from between 68°- 86 °F (20° and 30 °C). Seagrasses occur most frequently in areas with moderate current velocities, as opposed to either low or high velocities. Although marine and estuarine seagrass beds are most commonly submerged in shallow subtidal zones, they may be exposed for brief periods of time during extreme low tides.

One of the more important factors influencing seagrass communities is the amount of solar radiation reaching the leaf blades. In general, the water must be fairly clear because turbidity blocks essential light necessary for photosynthesis. The rapid growth rate of seagrass under optimum conditions rivals that of most intensive agricultural practices, without energy input from man.

Seagrass beds are often associated with and grade into unconsolidated substrate, coral reefs, mangrove swamps, and salt marshes, but may also be associated with any other marine and estuarine natural community.

Seagrass beds are extremely vulnerable to human impacts. Many have been destroyed through dredging and filling activities or have been damaged by sewage outfalls and industrial wastes. In these instances, the seagrasses are either physically destroyed or succumb as a result of decreased solar radiation resulting from increased water turbidity. Seagrass beds are also highly vulnerable to oil spills. Low concentrations of oil are known to greatly reduce the ability of seagrasses to photosynthesize. Extreme high temperatures also have adverse impacts on seagrass beds. The area surrounding power plant outfalls, where water temperatures may exceed 95 °F (35 °C), has been found to be lethal to seagrasses. Seagrass beds are susceptible to long term scarring cuts from boat propellers, anchors and trawls. Such gouges may require many years to become revegetated. When protected from disturbances, seagrasses have the ability to regenerate and recolonize areas. Additionally, some successful replantings of seagrass beds have been conducted. However, the best management is to preserve and protect seagrass beds in their natural state (FNAI, 2010). This natural community in SMMAP is currently in good/stable condition.

Aquatic Caves

(Synonyms: cave, cavern grotto, chamber, chimney, sink, swallow hole, spring rise.) A cave system is classified as cavities below the surface of the ground in karst areas. All caves develop under aquatic conditions, therefore terrestrial caves can be considered dry aquatic caves. Aquatic caves vary from shallow pools that are highly susceptible to disturbance, to more stable systems that are completely submerged. At cave entrances, dense vegetation from the surrounding natural community may be present. Within the cave, vegetation densities drop rapidly due to the decreased illumination levels. Within the limits of light penetration, species of algae, moss, liverworts, and ferns may grow. Beyond light penetration, plant species are generally absent besides the occasional fungi that grow on guano or other organic debris. Troglobites are organisms that are specially evolved to survive in complete darkness in deep cave habitats. Blind cave crayfish, blind cave salamander, cave amphipods, cave shrimp, cave snail, and cave isopods are typical troglobites in aquatic caves. The dependence of troglobites on detrital inputs and other nutrients imported from the surface generally limits the distribution of well-developed aquatic cave communities to karst areas with surface connections.

The dissolution and corrosion of limestone play active roles in enlarging cave passageways. These forces differ primarily in the slopes of the passageways which result. Since limestone caves initially develop in the aquifer, they are frequently associated with aquifer-related surface features. Thus, a spring run stream issues from an aquatic cave, while sinkhole lakes and occasionally blackwater streams lead into aquatic caves.

Generally, cave waters are clear and deep water appears bluish. Water can become stained brown from tannins leached from decaying matter nearby and transported in via rainwater. The water may also become milky white if fine limestone mud on the bottom of the cave is disturbed and becomes suspended. Waters are generally circumneutral to alkaline with a high mineral content (particularly calcium bicarbonate and magnesium) and with constant temperature. Flowing waters within a cave generally have a lower pH, is often unsaturated due to carbonates, and is relatively richer in fauna. Pools that are fed by seepage or dripping water have a relatively high pH, high concentration of dissolved carbonates, low amounts of organic matter suitable for food, and little to no fauna. Cave water characteristics may also vary seasonally because of fluvial inputs from interconnected surface streams, or because of detrital pulses and other surface inputs during periods of substantial aquifer recharge. In general, however, aquatic caves are very stable environments with relatively constant physical and chemical characteristics (FNAI, 2010).

Aquatic caves occur within SMMAP in the form of the numerous spring vents in the bays of the aquatic preserve.

NATIVE SPECIES

The subtropical climate, diverse vegetation, and habitat variety of SMMAP allow its waters and surrounding lands to support a wide variety of wildlife.

More than 40 species of mammals have been documented in SMMAP and surrounding lands. Notable mammal species include the two marine mammals: Florida manatee and the bottlenose dolphin (*Tursiops truncates*), as well as the Florida black bear (*Ursus americanus floridanus*), the North American river otter (*Lontra canadensis*), and the Homosassa shrew (*Sorex longirostris eionis*).

More than 190 species of birds inhabit SMMAP and its surrounding areas during some portion of the year. This area supports permanent residents, as well as migratory species, with the marshes and coastal hammocks of the area serving as a southern terminus for some species. Notable species include American oystercatcher, bald eagle (*Haliaeetus leucocephalus*), brown pelican (*Pelecanus occidentalis*), white pelican (*P. erythrohynchos*), great blue heron (*Ardea alba*), peregrine falcon (*Falco peregrinus*), roseate spoonbill (*Platalea ajaja*), Scott's seaside sparrow (*Ammodramus maritimus peninsulae*), snowy egret (*Egretta thula*), white ibis (*Eudocimus albus*), and the wood stork (*Mycteria americana*).

Upwards of 40 reptile and 30 amphibian species are present in and around SMMAP, including several snake, lizard, turtle, and frog species. Notable species include the American alligator (*Alligator mississippiensis*), the ornate diamondback terrapin (*Malaclemys terrapin macrospilota*), eastern indigo snake (*Drymarchon corais couperi*), loggerhead sea turtle (*Caretta caretta*), green sea turtle (*Chelonia mydas*), Kemp's ridley sea turtle (*Lepidochelys kempi*), leatherback sea turtle (*Dermochelys coriacea*), eastern diamondback rattlesnake (*Crotalus adamanteus*), and the southern leopard frog (*Lithobates sphenocephalus*).

SMMAP supports a variety of fish and invertebrate species throughout various life stages in its seagrass beds, mangrove forests, oyster bars, and salt marshes. These habitats often offer protection and nursery grounds for juveniles. Notable species inhabiting SMMAP include grouper, snapper species (*Lutjanus* spp.), red drum, sheepshead, sand tiger shark (*Carcharias taurus*), eastern oyster, pink shrimp, and stone crab.

For a complete list of native species found in SMMAP, see Appendix B.3.

LISTED SPECIES

SMMAP provides refuge to several species currently listed on state or federal levels. These classifications range from state levels ranging in order of severity from 'species of special concern' to 'threatened,' to 'endangered.' Federal listing include 'threatened' and 'endangered.' A species designation is based on its status and the threat it faces.

Threats to listed species are numerous and can include human related activities such as watercraft collision, entanglement in manmade structures, overfishing, vandalism, consumption of human litter, habitat degradation, and habitat loss. Additionally species such as the Florida manatee face threats from disease, temperature fluctuations, and algal blooms (Florida Fish and Wildlife Conservation Commission [FWC], 2016).

For more information on listed species within SMMAP see below and Appendix B.3.

Roseate Spoonbill

Roseate spoonbills *(Platalea ajaja)* are the only spoonbill species native to the Western Hemisphere. Physical characteristics for this species include white heads, necks and backs with pinkish legs and feet.

Roseate spoonbills are a migratory species that utilize St. Martins Marsh Aquatic Preserve during the winter months.

Roseate spoonbills have no feathers on their heads and necks and appear completely pink inflight due to the feather coloration of the undersides of their wings and bellies. As their name suggests, this bird has a wide, spoon shaped bill that is used for foraging. Historically, this bird was hunted by people for its unique feathers. Threats today include fluctuating habitat regimes that affect both prey availability and roosting sites (Bjork & Powell, 1996).

Piping Plover

The piping plover (*Charadrius melodus*) is a small white bellied shorebird with bright yellow-orange legs, and a bi-colored bill and inhabits open, sandy beaches and tidal mudflats along the Atlantic and Gulf coasts. The species winters along the coast before returning to the Midwest to breed (FNAI, 2001). The biggest threat to the piping plover is the removal of nesting and feeding grounds via commercial, residential, and recreational development. Additionally, excessive disturbance via foot and vehicle traffic can negatively affect breeding success. The species also experiences predation from the influx of urbanized species such as raccoons, skunks, foxes, and feral and domestic pets (FWS, 2014). The species is listed as federally threatened.

Bald Eagle

The adult bald eagle – a large brown bird with a white head and tail, and yellow bill - is one of the most distinctive birds in the United States. Florida has one of the densest populations of nesting bald eagles in the southern United States – an estimated 1,500 nesting pairs. In Florida, the primary prey of bald eagles is various fish and waterfowl species. As a result, nearly all bald eagle nests in Florida are built within 1.8 miles of water. There are seven nests within that range of SMMAP as of the last survey which was conducted in 2014. The bald eagle was delisted from the Endangered Species Act in 2007, and delisted from the Florida Fish and Wildlife Conservation Commission Imperiled Species in 2008. However, it remains protected by the Bald and Golden Eagle Protection Act as well as the Migratory Bird Act (FWC, n.d.).

Wood Stork

The wood stork is a large, long-legged wading bird that nests in mixed hardwood swamps, sloughs, mangroves, and cypress domes/strands in Florida. The species is the only stork species that breeds in the United States (FWC, 2016). Wood storks are highly social in nesting habitats, with colonies containing 100 to 500 nests. A major threat to wood storks is the drainage of cypress stands. This

prevents the wood stork from nesting, and promotes predation from raccoons (FWC, 2016). While nesting is not prevalent within SMMAP, wood storks utilize the expansive salt marsh areas during migration throughout the winter months (FWS, n.d.-b). The species is listed as federally threatened.

Florida Manatee

The Florida manatee is a large gray aquatic mammal that commonly reaches a body length of nine to ten feet and a weight of 1,000 pounds; however, it can grow to more than 13 feet and weight up to 3,500 pounds (FWC, 2016). The species is known for its low reproductive rate, producing one calf every three to five years on average (FWC, 2016). The main causes of manatee death are human-related such as watercraft collisions, entanglement in flood gates or canal locks, habitat destruction and deaths caused from monofilament line, litter, vandalism, culverts and other man-made structures. Other causes of manatee death are natural causes such as cold water temperatures, red tide, disease and calving difficulties (Save the Manatee Club, 2010). The species is listed as federally endangered.

Eastern Indigo Snake

The Eastern indigo snake is a glossy bluish-black, smooth scaled snake that inhabits the southeastern United States. These thick bodied snakes can grow more than eight feet in length, making them the largest native snake species in North America (Johnson & McGarrity, 2015). Inhabitants of pine forests, hardwood hammocks, scrubby flatwoods, and wetlands, the species faces threats from habitat degradation and loss (Grosse, n.d.). Eastern indigo snakes are listed as federally threatened.

Sea Turtles

The main threat to sea turtles at sea is entanglement in fishing gear such as longlines, monofilament fishing line, nets, and crab trap lines. On land, increased beach development is an ongoing threat for sea turtles as development can cause degradation of the habitat, and limit the amount of nesting sites available. Coastal development also increases artificial lighting which can cause hatchlings to migrate towards the lights instead of the ocean. Other threats include increased predation on eggs, hits by watercraft, and habitat degradation from contaminants and pollutants (ex. oil spills) (FWC, 2016). Sea turtle nesting occurs in all coastal counties except those in the Big Bend area of Florida. SMMAP's shoreline is dominated by coastal marsh and lacks the sea turtles' preferred nesting habitat of sand (FWC, 2016). Instead, sea turtles use SMMAP as a forage area. The hawksbill, Kemp's ridley, and leatherback sea turtles are listed as federally endangered, while the green and loggerhead are listed as federally threatened.

INVASIVE NON-NATIVE AND/OR PROBLEM SPECIES

Florida ranks as one of highest in the United States in terms of invasive species. The abundance of invasive species has caused extensive ecological and economic damages statewide. The semi tropical climate of central Florida and SMMAP provides favorable conditions for potential invasive species. This is shown by the habitation of the area by several non-native species, including more than 45 plant species. Additionally, six non-native bird species, nine non-native mammal species, and six non-native invertebrate species have been documented in SMMAP. The infamous, invasive lionfish (*Pterois volitans*) and green mussel (*Perna viridis*) are potential threats to the area. Listed below are a few of the prominent invasive and problem species found within SMMAP's boundary. For a comprehensive list of invasive and problem species, refer to Appendix B.3.

Brazilian Pepper

Native to Argentina, Brazil, and Paraguay, Brazilian pepper (*Schinus terebinthifolius*) is an evergreen, shrub-like tree that grows 15 to 30 feet in height. This species is considered the most widespread of Florida's invasive plants and has invaded both terrestrial and aquatic habitats covering more than 700,000 acres across the state (UF, n.d.-b). The tree produces dense canopies that shade out native vegetation, and is considered poor habitat for native wildlife species (FWC, 2015b). The berries of the species are known to cause death in native bird species, when consumed in high amounts (Morton, 1978). This species is listed as a prohibited plant and a noxious weed by DACS.

Chinese Tallow

Native to Southeast Asia, Chinese tallow (*Sapium sebiferum*) is a tree species that can grow up to 52 feet in height and is marked by a rapid rate of growth maturation, occurring in three to five years. This species is remarkably adaptive, as it can inhabit dry and wet soils, as well as, areas near fresh or salt water bodies. The Chinese tallow's fast rate of maturity, coupled with its general hardiness, allows it to outcompete several terrestrial and aquatic tree species (FWC, 2015b). The species can also alter local fire regimes as the species is fire resistant (UF, n.d.-a). Chinese tallow is listed as a noxious weed by DACS.

Juvenile and adult sea turtles can be seen swimming across the seagrass meadows year round.

Green Mussel

Native to the Indo-Pacific, green mussels are a potential threat to SMMAP as an invasive species. Green mussels are believed to have been introduced to the Tampa area in the late 1990s via larval transportation from ship ballast water (Benson, Marelli, Frischer, Danforth, & Williams, 2001). While species observations have been made in the Atlantic, as far north as Charleston, South Carolina, there have been no observations to date in Citrus County or SMMAP (FWC, 2015a). The species causes ecological damage in invaded areas by outcompeting local shellfish and also by causing potential shifts in trophic flow of an ecosystem, driving the system to be more benthic oriented. The species also causes economic damage by clogging water intake pipes for hatcheries and power plants, attaching to and sinking floating structures such as buoys, as well as causing increased resistance on boat hulls (FWC, 2015a).

Lionfish

Native to the Indo-Pacific, the lionfish is a red, brown, and white striped fish known for its 18 venomous spines and fast rate of reproduction. Averaging 12 to 15 inches in length, this species is a predatory reef fish, known to predate on more than 70 marine fish and invertebrate species. The lionfish also competes with native predatory species such as grouper and snapper, and can disrupt a reef system by removing important ecological roles, such as algal suppressors (FWC, 2015c). More recently, lionfish have been observed increasingly at areas of more variable salinities, including fresher waters (Jud, Nichols, & Layman, 2014) thus increasing the risk of potential invasion in SMMAP.

Wild Hog

Wild hogs (*Sus scrofa*) in Florida include escaped domesticated livestock, Eurasian wild boar, and hybrids, with all three being classified as one species. Domesticated wild stock are believed to have been introduced to Florida in the early 1500s by either Ponce de Leon or Hernando de Soto during their explorations of the area. Eurasian wild boar is believed to have been introduced to the state in the early 1900s as a form of new game (Giuliano, 2013). Size of the species is variable with adult males reaching weights in excess of 200 pounds and three feet in height. Wild hogs reach sexual maturity at one year of age and sows can produce two litters per year, ranging from 1-13 piglets each (Giuliano, 2013). The species typically inhabit forested upland areas. However, they are also found in swamps and marshes, using the waters as a means of thermoregulation. This behavior causes extensive damage by uprooting and weakening native vegetation.

Staff partner with Crystal River Preserve State Park to treat invasive plant species, like Australian pine and Brazilian pepper, on many islands in the aquatic preserve.

ARCHAEOLOGICAL AND HISTORICAL RESOURCES

With numerous archeological sites documented by the Florida Department of State Division of Historical Resources (Appendix B.5), the area of SMMAP is recognized as a major center of aboriginal activity in Florida. Evidence of human presence in the area is dated back to approximately 10,000 years ago with the presence of small bands of nomadic Paleoindians. These peoples were hunter gathers who followed big game animals. At that time, the climate of the area was cooler and drier, and the shoreline extended approximately 60-100 miles further west than it does today. The warming of the climate and receding of the shoreline marked the beginning of the Archaic period of human activity. Archaic people adapted to the changing climate by hunting smaller game, collecting plants, fishing, and shellfish harvesting. With this lifestyle came the onset of more permanent settlements. The best documented evidence of settlement in Citrus County dates back 2,500 years ago to the Deptford Culture settlements, of the Formative stage, along the matured Crystal River System. Groups of the Formative stage are distinguished from Archaic groups by the presence of ceramics. The type of ceramics additionally serves to distinguish Formative groups from each other. Along with late Archaic groups, the Deptford Culture settlements are responsible for the area's most well-known archaeological sites, shell middens. Shell middens are former dump sites of these cultures, named for their most common remnant, shellfish. It should be noted that archaeological sites and historical resources are protected (Chapter 267, Florida Statutes) and are not to be disturbed unless prior permission is granted from the Department of State's Division of Historical Resources.

The most well-known site, believed to have been occupied from Deptford through the Late Fort Walton period, lies in the Crystal River Archaeological State Park. Known as the Crystal River Indian Mounds, the site was first discovered by C.B. Moore in 1903, and is considered one of the longest continually occupied sites in Florida (Pluckhahn, Thompson, & Weisman, 2010). The site is a mound complex with four shell and sand platforms, two burial mounds, and an extensive shell midden. Additional mounds from the same time period are found on the small island of Mullet Key. Both the Crystal River Site and Mullet Key are listed on the National Register of Historic Places. The shell middens, among archaeological sites of Citrus County and SMMAP, presently face issues of erosion brought on by changes in sea level. This poses a threat to the sites, not just in terms of their importance as historical resources, but also their importance as habitat communities they provide SMMAP (G. Ellis, personal communication, May 6, 2015).

The end of the Fort Walton period marks the beginning of Spanish contact, or the Leon-Jefferson period. During this time, it is believed that Hernando De Soto marched through present day Citrus County on his quest for gold in La Florida. Upon landing in the Tampa area, De Soto and his troops marched northward, eventually crossing through the present day city of Inverness before crossing the Withlacoochee River and moving further northwest. This trail is marked via the De Soto Trail of Florida, with parts of the trail occurring along the Withlacoochee State Trail in Inverness (De Soto Trail, n.d.). Through contact with Spanish conquistadores, the majority of the native Timucua people were wiped out (Worth, 1998). This paved way for other groups of Native Americans, later known as the Seminoles, to reoccupy the land. With the further southern progressions of American settlements, came conflicts with the Seminoles. These conflicts would result in three separate wars, known as the Seminole Wars (1817-1818, 1835-1842, and 1855-1858). Soon after the First Seminole War, Spain ceded control of Florida to the United States in 1821. In 1830, the Indian Removal Act was passed in an effort to encourage population by American settlers by removing Native American tribes from the land. This would bring about the Second Seminole War, the deadliest of the three, which would include battles in eastern Citrus County. Fort Cooper State Park is a historic site named in honor of Major Mark Anthony Cooper, the commander of the 380 First Georgia Battalion Volunteers. In 1836, Major Cooper built a fort to serve as a stockade to protect the sick and wounded soldiers left behind by General Winfield Scott. The major was ordered to hold his position and await relief troops who were nine days away. During this period, the fort received constant attack from the Seminoles before finally receiving relief 16 days later (DEP, n.d.-a). Fort Cooper was listed on the National Register of Historic Places in 1972.

Following the Armed Occupation Act of 1845, and the acceptance of Florida as a state in 1845, the establishment of American settlements in the area began to grow. In 1851, David Levy Yulee, the first senator of Florida and first Jewish U.S. senator, would build the Yulee Sugar Mill in present day Homosassa. The site, along with Yulee's railroad system, would become important tools for the Confederate Army after Florida's secession from the Union in 1861. The mill would serve as a supplier of sugar for the Confederate Army with the accompanied mansion serving as a stockpile (Bash & Pritchett, 2006). Yulee's compound and railroad were destroyed by the Union Army during the Civil War. Following the conclusion of the war, Yulee was imprisoned for a year, accused of aiding the escape of Confederate President Jefferson Davis. After his release from prison, Yulee rebuilt the Florida Railroad, however the mansion and sugar mill were never repaired. The Yulee Sugar Mill Ruins have since been partially restored and now serve as a landmark of Old Homosassa in the Yulee Sugar Mill Ruins Historic State Park, and are listed on the National Register of Historic Places.

In 1903, Crystal River formed a municipal government, and by 1923 became a city. The formation of the city, coincided with the real estate boom of the 1920s and its steep decline leading into the Great Depression. It was during the Depression that newly elected president Franklin D. Roosevelt implemented the Works Progress Administration (later known as Works Projects Administration). The Works Progress Administration was a major component of the New Deal and provided millions of jobs through public works projects (Morris & Morris, 1996). Several projects were performed in Citrus County with the most notable ones being the Lecanto Canning Plant, Crystal River Airport, and the Old Crystal River City Hall. The Crystal River Airport is the only structure of the three that is still in active, originally purposed use. The Crystal River City Hall remained in use until 1970 and is currently listed on the National Register of Historic Places. The building currently houses the Coastal Heritage Museum.

*3.4 / **Values***

Natural Values

SMMAP houses several critical habitat communities that provide a structural matrix for many commercially, recreationally, and ecologically important species of the area. Among the habitats within SMMAP, the most notable are seagrass beds, salt marshes, and mangrove swamps. Additionally, warmer spring fed waters of the Homosassa and Crystal rivers bring the endangered Florida manatee eastward, through SMMAP, as they travel towards warmer, springhead waters during winter months.

The seagrasses of SMMAP are part of a larger community of seagrass beds in the Big Bend region, stretching from Apalachee Bay to Tarpon Springs. Seagrass beds are an essential component of local ecosystems, often serving as the basis for complex food webs. Seagrasses serve as feeding grounds for several species of finfish, birds and many other marine animals, including several endangered or threatened species such as the Florida manatee and various species of sea turtle. Seagrass meadows also serve as a nursery ground for juvenile species of fish and invertebrates (Heck & Valentine, 2006), including blue crabs and bay scallops (Orth & van Montfrans, 1987). In addition, seagrass beds provide a host of other ecological services including the improvement of coastal water quality by oxygenating

the water column, stabilizing sediments, and recycling nutrients (Perillo, Wolanski, Cahoon, & Brinson, 2009). They are considered essential to the ecological integrity and health of Florida's estuarine ecosystems, and can be used as an environmental indicator of overall water quality (Mattson, Frazer, Hale, Blitch, & Ahijevych, 2007).

The salt marshes of SMMAP are part of a larger context of salt marshes that dominant the coastline of Apalachicola Bay to Tampa Bay, and are an integral component of the local estuarine system. The salt marshes of the area serve as a transitional zone between the uplands to the east and estuaries and Gulf to the west. As a transitional zone, salt marshes serve to protect uplands from salt water intrusion, waves and storm surges, while also protecting estuaries by trapping pollutants flowing into the waterway (Perillo et al., 2009; Doody, 2008). The plants associated with this community also serve as habitat for various bird, invertebrate, and finfish species. Many finfish species use the area as a nursery grounds, as the area provides shelter from larger predators at high tides. It is estimated that salt marshes and nearby estuaries of the Florida Gulf Coast provide a nursery environment for at least 70 percent of the area's recreational and commercial fishery species (UF, n.d.-c).

Moving further westward of SMMAP's salt marshes, mangrove swamps begin to dominate the emergent landscape, with red and black mangroves being the dominant species of the area. Red mangroves are more prevalent in the eastern portion of SMMAP, while black mangroves dominate the St. Martins Key in the western portion. Additionally, Levy and Citrus counties serve as the northern terminus of red mangrove extent along the Gulf Coast (FWS, 2012). The fringe forest mangrove swamps of SMMAP provide an important protective barrier between storm and wave energy and the immediate coastline while also improving water quality from excess nutrients and pollutants (Ewel, Twiley, & Eong Ong, 1998). Mangrove propagules and pneumatophores trap nutrients and sediments, in turn creating a highly productive environment. These propagules and pneumatophores also provide protection and serve as nursery grounds for several species of juvenile fish and invertebrates (Manson, Loneragan, Skilleter, & Phinn, 2005). Mangrove swamps also serve as an important rookery, and feeding sites for several bird species in SMMAP (FWS, 2012).

Economic Values

SMMAP and its surrounding waters have long had important economic ties to the surrounding land areas. The fishing and tourism industries are heavily dependent on these waters. Both commercial and recreational fisheries are present in Citrus County waters. The area has long been known for its recreational fishing, which once attracted the likes of professional baseball players: Babe Ruth, Ted Williams, and Dazzy Vance (Homan & Reilly, 2001). Today recreational fishing charters are commonplace, offering tourists the opportunity to fish for red drum, cobia (*Rachycentron canadum*), sheepshead, spotted seatrout, grouper, snook (*Centropomus undecimalis*), and mackerel (*Scomberomorus* spp.) among other species. The waters of SMMAP are also home to bay scallops. Following the reopening of Citrus County waters to recreational scallop harvesting in 2002, the industry has provided an economic boost to the county. In 2003, a year after the reopening of the recreational scalloping season, it was estimated that approximately $982,253 was added to the local economy from the industry (Stevens, Adams, Hodges, & Mulkey, 2004). The commercial fishing industry has diminished considerably since its pre Great Depression heights, yet still remains an industry of some importance in the area. In 2013, total finfish landings of 346,519 pounds and 864,739 pounds of invertebrate landings were reported for the industry. (FWC, 2015d).

The tourism industry has developed significantly over the past 30 years (Citrus County Board of County Commissioners, 2006), particularly with the county's investment in ecotourism over the past two decades (Ross, 2001). The ecotourism industry is tied to the aesthetic values provided by the county's numerous springs, crystal clear waters, migratory bird species, and perhaps most notably the Florida manatee. Proclaimed the manatee capital of the world, Crystal River, and nearby Homosassa, attract visitors from across the globe, for what has been described as one of the top ten United States adventures (Hetter, 2013). SMMAP and its surrounding waters provide a necessary refuge for the Florida manatee when Gulf waters dip below 68°F (20°C) (Kleen & Breland, 2014). A 2004 study by Solomon et al. estimated the total economic value of the Florida manatee in Citrus County to be $8,667,120.

While county specific tourism studies are limited in the area, the Florida State Park System uses the National Park Service's Money Generation Model (Stynes, 2011) to assess the economic impact a state park has on the local economy. The two largest state parks located near SMMAP include the CRPSP and the Ellie Schiller Homosassa Springs State Park (henceforth referred to as Homosassa Springs for this section). These state parks are largely centered on nature based activities, providing a measure of ecotourism value for the area. CRPSP manages almost all emergent lands directly within, or bordering SMMAP, providing the best estimate of ecotourism value for SMMAP, but it still excludes numerous public and private access points used for boating, fishing, scalloping and other recreational activities.

Homosassa Springs meanwhile represents the most visited state park in Citrus County. During the 2012-2013 fiscal year, CRPSP had an attendance of more than 169,000 that contributed a direct economic impact estimated at $7,568,861 to the local economy, while supporting an estimated 121 jobs (DEP, 2013). During the same fiscal year Homosassa Springs had an attendance of more than 314,000 that supported 243 jobs and directly contributed an estimated $15,188,954 to the local economy, making it one of the top 20 profit makers in the Florida State Park System (DEP, 2013). Two smaller state parks located near SMMAP, Crystal River Archaeological State Park and Yulee Sugar Mill Ruins Historic State Park, are centered on the historical and cultural resources. These state parks provide an estimate of the economic value of cultural resources located near SMMAP. While significantly smaller in size than Homosassa Springs and CRPSP, these parks still saw a combined attendance of more than 47,000 that supported 36 jobs and had a direct economic impact estimated at $10,492,728 (DEP, 2013).

Scientific Values

The seagrass of SMMAP is an important component of the area's estuarine system and serves as one of the system's most productive natural communities. The seagrasses of SMMAP fall within a greater extent of beds along the Big Bend which provide abundant opportunities for scientific study of seagrass habitat. The unique ecological processes and relationships within the seagrass and salt marsh habitats provide invaluable information on a relatively undisturbed ecosystem. The first region-wide survey of seagrasses in the Big Bend was conducted during the mid- and late 1970s (Iverson & Bittaker, 1986). Despite numerous investigations that have followed, there still remain innumerable questions that could be answered utilizing this unique setting (Mattson et al., 2007).

The waters of SMMAP are home to five of the seven species of Florida seagrass: manatee grass, shoal grass, star grass (*Halophila engelmannii*), turtle grass, and widgeon grass. SMMAP seagrass beds have been monitored annually by staff since 1997. Over the years, various governmental agencies, universities, and nonprofit groups have performed or assisted in performing studies relating to seagrasses in SMMAP. Such groups include FWC's Fish and Wildlife Research Institute (FWRI), UF, and the Gulf Archeological Research Institute (GARI), of which UF and GARI have been the most active in recent years. GARI, is an independent, not for profit, scientific research group based in Crystal River. GARI has performed extensive archeological work in the area, however, has also served to assist in natural and physical science research in the area. Most recently, GARI partnered with SMMAP staff to perform a pilot study of mollusk and sediment analysis for seagrass communities in SMMAP. UF is the largest academic institution in the area and has performed many wildlife and wetlands related studies, including many in SMMAP. The most recent studies in SMMAP have focused on the effects that nutrient loading and biomass accumulation have on seagrass communities.

Additional academic institutions' staff and students frequently contact SMMAP staff to request information on specific locations and associated resources within SMMAP. SMMAP staff reviews and comments on proposed projects, assists with ecological sampling efforts; provides site access; and supplies data to facilitate scientific research within SMMAP on a regular basis. For more information regarding research and monitoring in SMMAP, see Chapter 4.

Social and Cultural Values

The communities near SMMAP are heavily dependent on their surrounding waters. The tight-knit bond between people and water resources in the area date back to the Late Archaic peoples who inhabited the area. The presence of more than 95 currently documented archeological sites in SMMAP substantiates the historical connection between humans and the coastal environment. The most famous of the documented archaeological sites near SMMAP is the Crystal River Indian Mounds inhabited by Deptford peoples more than 2,500 years ago (Pluckhahn et al., 2010). The site served many ceremonial purposes over time as indicated by the remains of burial mounds and a temple platform. These structures are shell middens composed mainly of shellfish, highlighting the important cultural connection between early inhabitants and the coastal resources. The site is located within the Crystal River Archeological State Park, which also houses a museum with additional artifacts on display.

Today, local communities still have a special relationship with the Gulf and its resources. This relationship brings together people through a shared appreciation of the environment and their shared interdependence on its resources. Throughout Citrus County, various social events are organized throughout the year in celebration of the natural beauty and bountiful resources provided by the local waters. Such events include: the Scallop Festival, the Florida Manatee Festival, the Homosassa Seafood Festival, and the Stone Crab Jam, etc. The Florida Manatee festival is perhaps the most well-known of the local events, occurring every January and attracting thousands of visitors to downtown Crystal River. The festival features food, live music, crafts, and most importantly, Florida manatees.

The pristine coastline of SMMAP and surrounding lands also offers unique aesthetic value. The scenic panoramas of undeveloped coastal marshes, mangrove swamps, and calm, crystal clear, spring-fed waters create a uniquely peaceful and sacred environment in which people can connect with nature. The aesthetic values of the area are commonly appreciated by participating in recreational activities such as biking, boating, canoeing, fishing, hiking, kayaking, picnicking, snorkeling, wildlife viewing, and even simply communing. Given the many recreational opportunities of the area, the coastline offers locals and tourists alike boundless opportunities for enjoyment and the ability to relax and escape from potential societal pressures.

Environmental outreach is another unique and important cultural value to the region. Every year in the "manatee season" of November to March, hundreds of manatees seek refuge from the harmful temperatures of Gulf waters by swimming up into the warmer springs areas of Citrus County. Annually, thousands of tourist come to see and interact with the aggregating manatees, often through guided tours. This opportunity for wildlife viewing has the ability to increase knowledge and awareness regarding the local wildlife of the area (Schänzel & McIntosh, 2000), and has the ability to lead individuals to adopt more environmentally friendly behaviors (Kals, Schumacher, & Montada, 1999). Thus, the manatee-centric ecotourism industry can be used to highlight and raise awareness for the environmental perils that the area faces, as well as to foster responsible environmental practices and beliefs among visitors.

*3.5 / **Citizen Support Organization***

The SMMAP does not currently have a "Friends Group" or Citizen Support Organization (CSO). However, the Friends of the Crystal River State Parks, Inc. supports the SMMAP on occasion. The CSO has provided funds for research, management, and outreach efforts through fund raising activities. The CSO also serves as a means to accept donations of funds or equipment from individuals, corporations, or community organizations desiring to contribute to the restoration or management of public lands and/or waters. The recently organized statewide CSO, the Aquatic Preserve Society, Inc., may provide support to SMMAP as well.

*3.6 / **Adjacent Public Lands and Designated Resources***

The overwhelming majority of Citrus County's coastline is classified as public conservation lands. This network of managed conservation land adjacent to SMMAP, helps protect the water quality, habitats, and species of SMMAP from degradation. SMMAP staff regularly participates in land management reviews, land acquisition projects, and federal and state management planning. Managing agencies for conservation lands near SMMAP are predominantly state and federal and include DACS' Florida Forest Service, DEP, FWC, SWFWMD, and FWS (Map 11).

Federally Managed Lands and Waters

Crystal River National Wildlife Refuge

Established in 1983, Crystal River National Wildlife Refuge is located in Citrus County. Lying east of the northern border of the SMMAP, Crystal River National Wildlife Refuge serves to preserve the last undeveloped and unspoiled spring habitat in Kings Bay. The refuge was created specifically for the protection of the Florida manatee, and is the only refuge created for such purpose. The refuge manages 177 total acres including 40 acres of winter manatee sanctuaries within Kings Bay. These sanctuaries are managed by the refuge to prevent undue stress on crowded manatee populations in the springs. Additionally, sanctuaries can be expanded and other public areas can be closed if the manatee populations become too crowded (FWS, n.d.-a).

Chassahowitzka National Wildlife Refuge

CNWR is located in Citrus and Hernando counties, 60 miles north of St. Petersburg. The refuge was established in 1943 to provide wintering habitat for migratory birds. CNWR currently consists of 30,842 acres of saltwater bays, estuaries, brackish marshes, and hardwood swamps and is home to approximately 200 species of bird, 50 species of mammal, and at least 30 species of reptile (FWS, 2012). The estuarine waters of CNWR receive freshwater flow from the spring fed Chassahowitzka River, located in southern Citrus County. The CNWR serves as the southern boundary for the SMMAP. CNWR is only accessible by boat, offering recreational activities that include fishing, kayaking, canoeing, and boating (FWS, 2012).

State Managed Lands and Waters

Crystal River Preserve State Park

Acquired by the state in 1984, CRPSP contains more than 27,000 acres of upland, wetland, and coastal areas. Management of the property was transferred from the Florida Coastal Office (formerly known as the Coastal and Aquatic Managed Areas) to the Florida Park Service in 2004. CRPSP stretches from the northern border of Citrus County, through the City of Crystal River, down to the mouth of the Homosassa River. The park includes the majority of the terrestrial land inside and along the boundaries of SMMAP, including much of the immediate uplands (DEP, 2004). For recreational activities, the park offers biking and hiking trails, boat tours, canoe and kayak launches, designated fishing areas, and several wildlife viewing opportunities (DEP, n.d.-b.). The park is jointly administered with Crystal River Archaeological State Park and Yulee Sugar Mill Ruins Historic State Park.

Crystal River Archaeological State Park

Acquired in 1962 and located in Crystal River, Crystal River Archaeological State Park currently contains approximately 62 acres of land and is registered as a National Historic Landmark. The park is known for its historically significant archaeological resources. The park houses temple, burial, shell and sand mounds that form a complex ceremonial center and burial site and is believed to be one of the longest occupied human settlements in Florida, dating back to the Deptford Culture of 2,000 years ago (DEP, 2008a). The park is jointly administered with CRPSP and Yulee Sugar Mill Ruins Historic State Park.

Ellie Schiller Homosassa Springs State Park

Acquired in 1988 and located in Homosassa Springs, Ellie Schiller Homosassa Springs State Park is located east of the southern portion of SMMAP. The park currently contains more than 195 acres designated for resource-based, public, outdoor recreation, and other park uses (DEP, 2005). The park contains natural communities of hydric hammock, dome swamp, depression marsh, upland mixed forest, and mesic flatwoods and also contains springs of the Homosassa Springs Group. The park houses several native wildlife enclosures and is the most visited state park in Citrus County (DEP, 2013).

Yulee Sugar Mill Ruins Historic State Park

Acquired in 1953 and located in Old Homosassa, the Yulee Sugar Mill Ruins Historic State Park serves as a historical conservation area as well as a recreational park. The site is that of the former sugar mill of David Levy Yulee, citrus pioneer, railroad magnate, and state politician. The park is currently 4.6 acres and located east of the southern portion of SMMAP. The site includes a picnic area and offers guided tours of the ruins. The park is jointly administered with CRPSP and Crystal River Archeological State Park (DEP, 2008c).

Withlacoochee State Forest

Acquired in the late 1930s, the Withlacoochee State Forest is managed by DACS' Florida Forest Service and is the third largest state forest in Florida (DACS, 2013). The state forest houses more than 150,000 acres of land, through seven noncontiguous tracts stretching through Citrus, Hernando, Pasco, Polk, and Sumter counties. The tract closest to SMMAP is the Homosassa Wildlife Management Area, an area of more than 5,600 acres south of the Homosassa River and north of the Chassahowitzka River. The state forest serves purposes of forestry, natural resource management, and recreational activities. The state forest is home to 18 different natural communities, and many rare or endangered species. Withlacoochee State Forest also contains more than 67,300 acres of sandhill, a rapidly disappearing ecosystem in the southeast (DACS, 2014). Recreational activities are enhanced through boat ramps, picnic tables, pavilions, canoe launches, docks, camping sites, and trails used for birding, hiking, horseback riding, off-highway vehicles, and biking (DACS, 2013).

Southwest Florida Water Management District

SWFWMD is one of Florida's five water management districts and is responsible for the management of ground and surface waters in all or part of 16 counties in west central and southcentral Florida. SWFWMD manages the Chassahowitzka River and Coastal Swamps property housed in Citrus and Hernando counties. Purchased in the early 1990s, the property is an area of over 5,600 acres, located two miles south of Homosassa Springs and includes a portion of the Chassahowitzka River. The site consists primarily of hydric hammock, accounting for almost 90 percent of the management area (SWFWMD, 2005). Salt marshes, as well as upland habitats, are also present. The management area serves purposes of wildlife and habitat management, water quality management, and recreation. Recreational activities in the area include biking, bird watching, boating, canoeing, camping, fishing, and hiking, among others (SWFWMD, 2005).

Additionally, SWFWMD maintains an important presence in Kings Bay, the headwaters of the Crystal River. In 1988, SWFWMD designated Crystal River and Kings Bay as a SWIM priority and developed a SWIM plan

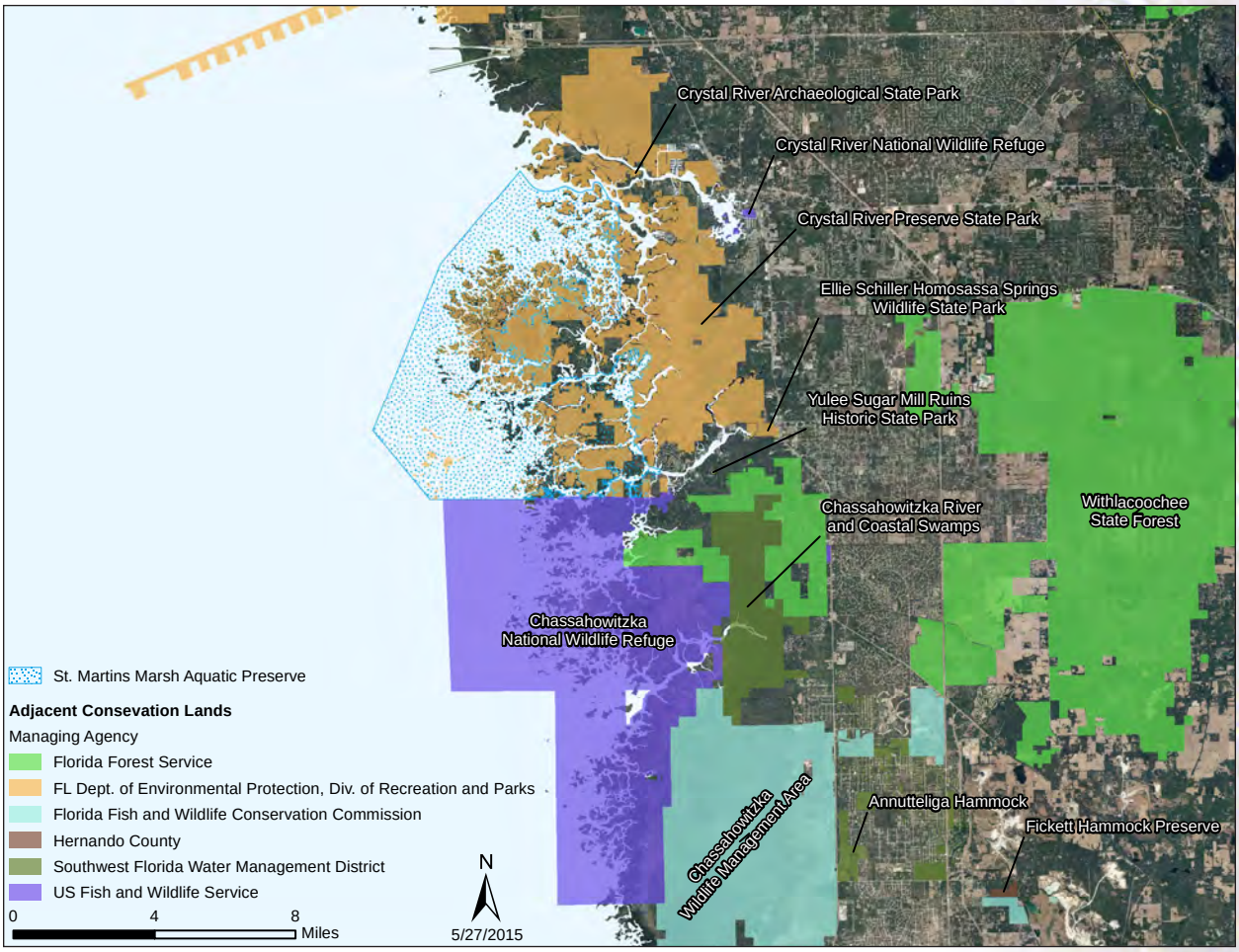
by 1989. A 2000 plan update established four goals for improvements to water quality, focusing mainly on submerged aquatic vegetation and sedimentation management. Projects are proposed and funded by the district with these goals in mind. In 2003, SWFWMD and DEP formed an interagency group for Kings Bay and Crystal River, the group is now known as the Kings Bay Working Group. In 2010, SWFWMD purchased a 30 percent share of Three Sisters Springs, a primary water source for Kings Bay and an important refuge for the Florida manatee. In 2013, SWFWMD completed the final design plans for a treatment wetland for Three Sisters Springs, designed to intercept and treat stormwater that is discharging directly into the canal system (SWFWMD, 2013). The Kings Bay Technical Working Group has finalized updates to the SWIM plan. The document was made available to the public March 2016.

*3.7 / **Surrounding Land Use***

SWFWMD's 2011 Land Use Map for the Springs Coast Watershed in Citrus County was used to examine the land use surrounding SMMAP. Land use categories include agriculture, disturbed lands, infrastructure, natural, urban, water, and wetlands (Map 12).

Citrus County was once an economy dominated by agriculture; however, agricultural land use has declined with Citrus County's decrease in agricultural workforce and a transition from predominantly rural to a more populated suburban area (Citrus County Board of County Commissioners, 2006). Additionally, over the last century, freezes have driven out the county's name sake crop: citrus (Homan & Reilly, 2001). Presently, agricultural lands account for nearly 10 percent of land use in the Springs Coast Watershed within Citrus County, with the two biggest subcategories being cropland/pastureland and tree plantations.

Disturbed lands account for nearly two percent of Springs Coast land use. The biggest faction of disturbed lands is extractive land use, or mining. Similar to agriculture, extractive land use represents a historic economic sector that has seen steep decline over the years. Citrus County has historically housed several mining operations, with the most successful being the phosphate mining industry. Centered largely on the east side of the county, the industry originated in the area in the late 1800s and



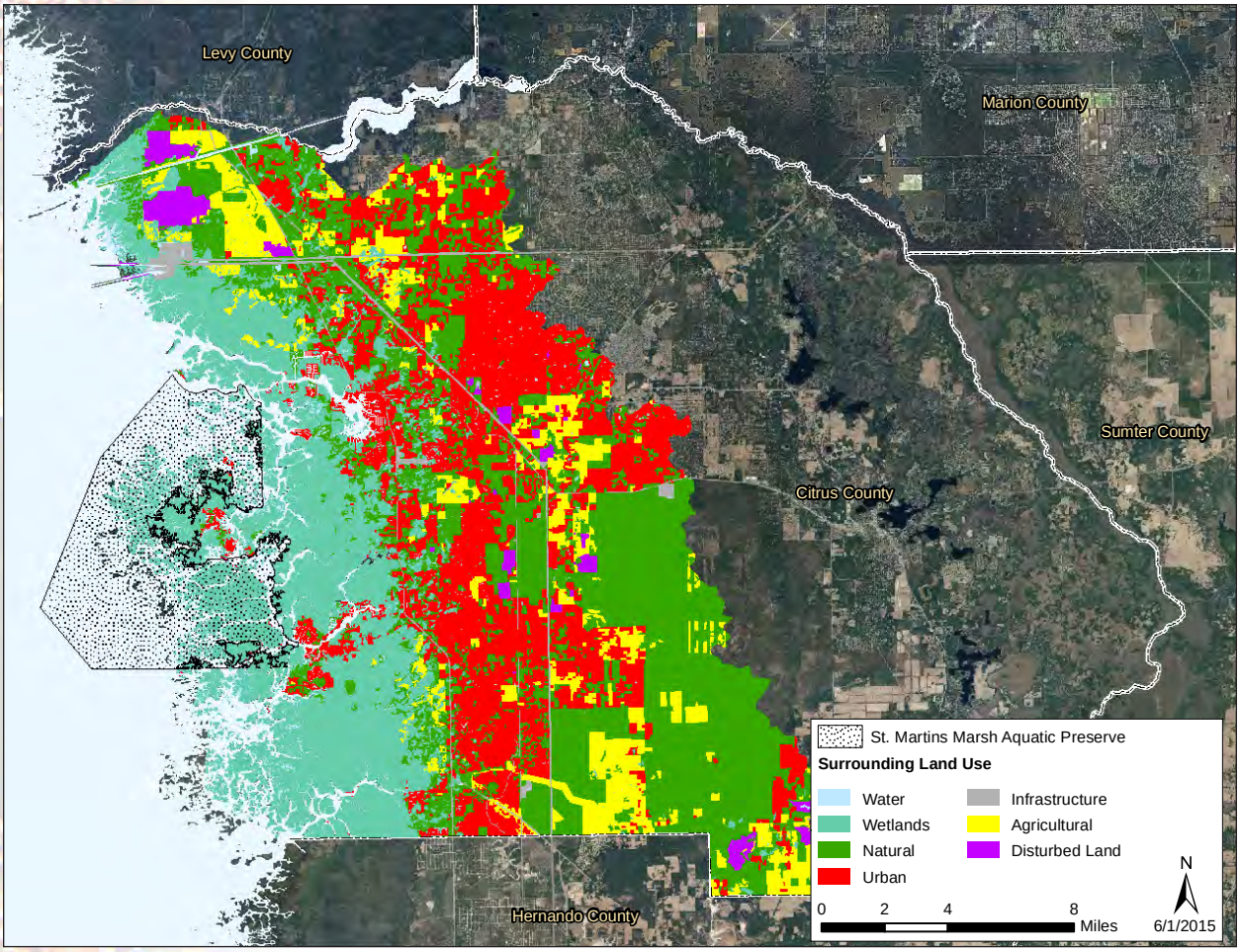
Map 11 / Public conservation lands adjacent to St. Martins Marsh Aquatic Preserve.

brought a quick economic boom. With the regression of phosphate operations in Citrus County during the 1960s, the county has experienced steep declines in mining lands. From 1995 to 2004, Citrus County saw a 96.44 percent decrease in mining land use (Citrus County Board of County Commissioners, 2006). Current mining operations are located in the northwest and central portions of the county and concentrate on limestone, sand, and clay.

Infrastructure accounts for nearly two percent of Springs Coast land use and is composed of transportation, communications, and utility use, with utilities representing the greatest land use. The largest utility land use near SMMAP is the Crystal River Energy Complex. The complex is home to four coal-fired steam units and a recently decommissioned nuclear power plant. Following the decommissioning of the nuclear power plant, Duke Energy announced plans to build a combined-cycle natural gas plant on 400 acres in the eastern portion of the Crystal River Energy Complex. The site received initial approval from the state in 2015 and plans to commence energy operations in 2018 (Duke Energy, 2015).

Urban areas account for about 25 percent of the Springs Coast Watershed land use. Urban land use is subdivided into residential units (with densities of low, medium, and high), commercial and services, industrial, institutional, recreational, and golf courses. Citrus County and its neighboring counties along Florida's west-central coast are marked by relatively low populations and relatively undeveloped lands. As a result, the majority of urban land use is low density residential (defined as less than two dwelling units per acre), accounting for 18 percent of the total Springs Coast land use, and 81 percent of total residential land use. Conversely, high density residential land use (defined as greater than five dwelling units per acre) accounts for less than one percent of Springs Coast land use and two percent of total residential use. While the majority of lands surrounding SMMAP are conservation lands, there are four population centers nearby: Ozello, Homosassa, Homosassa Springs, and Crystal River. Ozello is a small unincorporated community located directly east of SMMAP with limited development.

West central Citrus County is moderately developed containing the city of Crystal River, one of two relatively large centralized population centers in the county with a current population of 3,089. The



Map 12 | Land use surrounding St. Martins Marsh Aquatic Preserve.

other major population is the city of Homosassa Springs with a population of approximately 13,791 (USCB, 2016). The remaining areas of west central Citrus County remain relatively undeveloped due the public trust land holdings like Crystal River Preserve State Park and Chassahowitzka National Wildlife Refuge. This has enabled the region to remain relatively pristine and wild in character. The coastal communities in the area depend largely on the estuarine resources for economic development. Activities like ecotourism, recreational fishing and the annual recreational harvest of bay scallops generate a substantial amount of revenue and jobs in Citrus County each year.

The populations of Homosassa and Homosassa Springs are found along the Homosassa River sub basin of the Springs Coast Watershed. Urban land use in the sub basin accounts for about 20 percent of the 89.8 square miles in the sub basin (DEP, 2008b). The majority of development for Homosassa is focused along the water front. While Homosassa Springs has the county's largest population, development impacts along the waterfront from Homosassa Springs are buffered by the Homosassa

Springs State Park. Additionally, neither Homosassa nor Homosassa Springs possess a town-wide sewage system, leading to potential harm from improperly installed, outdated, and damaged septic tanks (DEP, 2008b).

The City of Crystal River is one of two incorporated cities in Citrus County and is located in the Crystal River sub basin of the Springs Coast Watershed. Urban land use in the Crystal River sub basin accounts for more than 35 percent of the sub basin's total land use (DEP, 2008b). Development along the Crystal River and Kings Bay has been linked to water quality issues and has spawned several water quality enhancement projects from the SWFWMD, most recently a stormwater treatment system completed in 2009, as well as a water reclamation project completed in 2015.

Land Use Type	Acreage	Percent
Agriculture	20,007	9.5%
Disturbed Land	3,866	1.8%
Infrastructure	3,675	1.7%
Natural	67,753	32.1%
Urban	52,114	24.7%
Water	5,809	2.7%
Wetlands	58,108	27.5%
Total	**211,332**	**100%**

Table 2 / Land use surrounding St. Martins Marsh Aquatic Preserve.

Natural areas, wetlands, and water make up the remaining 62 percent of the Springs Coast Watershed. Natural areas consist of undeveloped, natural upland habitats and are the most dominant feature of the Springs Coast Watershed, accounting for approximately 32 percent of land use. Wetlands include various types of swamps and marshes among other habitats, accounting for about 27 percent of land use in the basin. Additionally, wetlands are the dominant form of land use for the Citrus County coastline and SMMAP. Much of the natural, wetland, and water areas are protected as public conservation lands. In total, more than 30 percent of Citrus County lands are classified as conservation lands. These lands include almost all of Citrus County's coastline. Between the various state and federally managed conservation lands, only a fraction of the coastline is classified for other land uses. This serves to provide a natural barrier for SMMAP from potentially harmful uses of upland lands.

This sea turtle's shell allows it to camouflage with the sea floor as it rests.

Part Two

Management Programs and Issues

Chapter Four

The Florida Coastal Office's Management Programs and Issues

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.

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 have 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 St. Martins Marsh Aquatic Preserve (SMMAP) 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 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, SMMAP 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 should 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. Large, beneficial projects, outside the current capacity of St. Martins Marsh Aquatic Preserve's funding and staffing, are identified in Appendix D.4, in case opportunities become available to support those projects in the ten-year span of this management plan.

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 St. Martins Marsh Aquatic Preserve***

A relatively small amount of ecosystem science activities have occurred in the region, when compared to the large body of scientific research, monitoring data, maps, and models that more urbanized areas of the state have compiled. However, the pristine conditions of the Springs Coast makes it an ideal location to conduct this type of research and is continuously gaining momentum. The following section highlights some of the mapping, modeling, and monitoring efforts that have been conducted in SMMAP and associated Springs Coast.

Mapping

In order to effectively manage resources within SMMAP, it is imperative to conduct routine mapping of these resources. This allows for the identification of areas within SMMAP where increased research, monitoring, and management emphasis is necessary. Habitat mapping within SMMAP has, for the most part, been focused on seagrass habitat. Mapping efforts have suffered from a lack of consistency in methodologies that makes comparative analysis between mapping efforts difficult.

- In 1977, U.S. Geological Survey (USGS) mapped the extent of saltwater intrusion in coastal Citrus County.
- In 1997, SMMAP staff did a comparative study on prop scarring focusing on changes in area and degree of impact since 1995, when they were evaluated by Florida Marine Research Institute (FMRI, now Fish and Wildlife Research Institute [FWRI]). An aerial reconnaissance of the area was conducted.
- In 2007, the Southwest Florida Water Management District (SWFWMD) collected digital imagery for Florida Springs Coast (70 mile stretch of coastline north of Tampa Bay) in April 2007 for the purpose of mapping the extensive seagrass beds of this region.
- In 2007, Florida Fish and Wildlife Conservation Commission's (FWC) FWRI developed the Seagrass Integrated Mapping and Monitoring (SIMM) program to protect and manage seagrass resources in Florida by providing a collaborative vehicle for seagrass mapping, monitoring, and data sharing. This is the first comprehensive effort to provide both mapping and monitoring information for seagrasses throughout Florida's coastal waters.
- In 2009, Crystal River Preserve State Park (CRPSP) staff began an extensive Invasive Vegetation Mapping Effort. The primary species of focus is Brazilian pepper and the effort is ongoing. Updated infestation maps are created after each field assessment.

Modeling

Computational models support scientific analyses and provide scientist and resource managers better information, which ultimately supports management decisions and policies. Models increase the level of understanding about natural systems and the way in which they react to varying conditions.

- In 1979, USGS collected hydrologic and water quality data in Citrus County to evaluate modeling results. Current and predicted waste loading of the estuary was simulated by use of a two-dimensional steady-state, intertidal-condition model.
- USGS investigated the position of the saltwater-freshwater interface in the upper part of the Floridan Aquifer in 1979. The position of the saltwater-freshwater transition zone in the Floridan Aquifer along coastal southwest Florida is depicted by the 250 milligram per liter line of equal chloride concentration in the upper producing zone of the aquifer. Knowledge about the position and movement of the 250 milligram per liter line is significant in the effective management of the ground-water resources of coastal areas; moreover, the present position of the line will be used as a basis for detecting future movement of the saltwater-freshwater interface.
- USGS modelled groundwater resources of coastal Citrus, Hernando, and southwestern Levy counties in 1983. Computer models are presently available to help predict the extent of influence of ground-water withdrawals in an area. These may be used as management tools in planning ground-water development of the area.
- USGS developed a digital groundwater flow model to approximate steady-state predevelopment flow conditions in the Upper Floridan Aquifer of coastal west-central Florida in 1988.
- Dr. Y. Peter Sheng developed a Curvilinear-grid Hydrodynamic 3D model (CH3D) at the Aeronautical Research Associates of Princeton, Inc. Since 1989, Dr. Sheng's Advanced Coastal Environmental Simulations Lab at the University of Florida (UF) has enhanced processes, algorithms, and coding of the model through studies on shallow estuaries with complex shorelines and bathymetry. A fully integrated modeling system (IMS), CH3D-IMS has been developed and includes circulation, wave, sediment transport, water quality, light attenuation, and seagrass models. Additional processes such as surface water ground water interaction, atmospheric processes, contaminant transport are being added to the model suite. Another integrated modeling system for storm surge and coastal inundation has been developed and can produce high resolution inundation simulations.
- In 1996, USGS investigated the tidal-flow, circulation, and flushing characteristics of Kings Bay in Citrus County. Kings Bay is a unique estuarine system with no significant in flowing rivers or streams. As much as 99 percent of the freshwater entering the bay originates from multiple spring vents at the bottom of the estuary. The circulation and flushing characteristics of Kings Bay were evaluated by applying SIMSYS2D, a two-dimensional numerical model. Simulation results indicate that all of the open waters of Kings Bay are flushed by the spring discharge.
- In 1996, USGS mapped elevation differences on the order of 10 cm within Florida's marsh system influence on major variations in tidal flooding and in the associated plant communities. This low elevation gradient combined with sea level fluctuation of five to 10 cm over long periods can generate significant alteration and erosion of marsh habitats along the Gulf Coast. Analysis included use of the GEOID93 model with a least squares network adjustment and reference to the National Geodetic Reference System. Knowledge of precise and accurate elevations in the marsh is critical to the efficient monitoring and management of these habitats. These new positions provide sufficient vertical accuracy to achieve the project objectives of tying marsh surface elevations to long-term water level gauges recording sea level fluctuations along the coast.
- In 2001, USGS investigated the hydrology of the coastal spring's ground-water basin and adjacent parts of Pasco, Hernando, and Citrus counties. The coastal springs in Citrus County consist of two first-order magnitude springs and numerous smaller springs, which are points of substantial ground-water discharge from the Upper Floridan Aquifer. Spring flow is proportional to the water-level altitude in the aquifer and is affected primarily by the magnitude and timing of rainfall. Water budgets were constructed for small ground-water basins that form the Coastal Springs Ground-Water Basin. The collection of hydrologic data from index sites could provide much needed information to assess the hydrologic factors affecting the quantity and quality of spring flow in the Coastal Springs Ground-Water Basin.

Monitoring and Research

Considerable water quality and scientific monitoring data has been collected in SMMAP during the last 30 years. Although, most water quality studies have been restricted to waters near the upstream extent of tidal influence. Below are some of the historical water quality and monitoring studies that have been conducted in the Springs Coast region. Water quality studies conducted as part of the Florida

Department of Environmental Protection's (DEP) watershed management approach for protecting water resources and addressing Total Maximum Daily Load (TMDL) requirements. These studies primarily have focused on freshwater portions of the region.

- SWFWMD has monitored the potentiometric surface of the Upper Florida Aquifer 1978-1982, and again in 2007. This monitoring effort allows experts to observe changes in the level of the aquifer in the low lying areas of coastal Citrus County.
- In 1978, USGS conducted a preliminary evaluation of how coastal springs and seeps discharge as much as a billion gallons of water per day to low-lying coastal swamps and estuarine marshes along the Gulf Coast of Citrus and Hernando counties.
- The Department of Agriculture and Consumer Services (DACS) assesses microbiological conditions (fecal coliform and toxic marine plankton) of coastal waters to reduce the risk of shellfish-borne illness. Sanitary surveys are conducted to identify waters where contaminants may be present in amounts that present a human health hazard, and thus should not be open to harvest. DACS began monitoring the shellfish harvesting areas of the Crystal River region in 1981 and Withlacoochee Bay in 1983.
- In 1992, USGS examined the effects of tidal stage and ground-water levels on the discharge and water quality of springs in coastal Citrus County.
- In 1997, SMMAP staff did a comparative study on prop scarring focusing on changes in area and degree of impact since 1995, when they were evaluated by FMRI. An aerial reconnaissance of the area was conducted.
- Dr. Tom Frazer of UF began a long term water quality monitoring study in 1997 to present in the Crystal River, Homosassa River, and Withlacoochee River estuaries.
- FWC's FMRI, now the FWRI, conducted an Inshore Marine Monitoring and Assessment Program that sampled areas within SMMAP in 2004 and Withlacoochee Bay in 2001. These sampling events provided a snapshot of the water quality within these systems.
- Coordinated through UF's Institute of Food and Agricultural Sciences/School of Forest Resources & Conservation's Fisheries and Aquatic Sciences, the LAKEWATCH program has been in existence since 1986. The program has coordinated water quality sampling at more than 600 lakes, rivers and coastal sites in more than 40 counties. Data has been collected in Citrus County since 2004.
- In 2007, FWC's FWRI developed the SIMM program to protect and manage seagrass resources in Florida by providing a collaborative vehicle for seagrass mapping, monitoring, and data sharing. This is the first comprehensive effort to provide both mapping and monitoring information for seagrasses throughout Florida's coastal waters.
- Since 2009, CRPSP has surveyed remote islands in SMMAP to quantify the extent and location of non-native invasive plant infestations, including Brazilian pepper. Areas are resurveyed on a 24-month maximum rotation. Accurate survey information allows Florida Park Service staff to prioritize chemical treatments and contract work to aid in the overall control strategy for different invasive species within SMMAP.
- In July 2009, SWFWMD investigated the spatial distribution of benthic macroinvertebrates in the Crystal River-Kings Bay System with emphasis on relationships with salinity. Particular emphasis was given to the analysis of relationships between univariate biological metrics and chemical parameters that are known to influence macroinvertebrate spatial distribution and are known to be affected by water flow (e.g., salinity).
- From 2010-2012, UF conducted research linking seagrass performance measures to water quality. The environmental conditions along Florida's central Gulf Coast present a unique opportunity for integrated monitoring of water quality and seagrasses. Such monitoring can identify undesirable trends, trigger and guide actions to stop or reverse such trends, and document the success of efforts to manage the region's natural resources sustainably. This project made valuable progress toward developing a rigorous and efficient long-term monitoring program that will yield early warning of detrimental changes to seagrasses and provide natural resource managers with a means of evaluating changes in water quality as a driver of such impacts.
- In August 2012, University of Georgia researchers collected seawater and seagrass samples to evaluate them for chelonid fibropapilloma-associated herpesvirus, the etiologic agent of sea turtle fibropapilloma tumors. DNA samples were examined using quantitative PCR (polymerase chain reaction) analysis, and all samples collected were negative for the virus.
- Inwater Research Group (IRG) has been conducting sea turtle research in SMMAP and surrounding waters since 2012. Efforts in 2012 included vessel based visual transect surveys to document sea turtle abundance and distribution. That work revealed a sea turtle assemblage dominated by green turtles (67 percent), followed by Kemp's ridleys (26 percent), and loggerheads (7 percent). Work in 2013 and 2014 included capture and tagging efforts, which documented the size class distributions

of all species and also documented an unexpectedly high prevalence of fibropapillomatosis among green turtles. Sea turtle abundance in the waters of SMMAP was among the highest of any site IRG has studied, and IRG plans to continue to work in the area with the hopes of establishing SMMAP as an "in-water index site" for long term population monitoring.

- UF PhD candidates conducted research that monitored morphological characteristics and patterns of biomass allocation of turtle grass in relation to nutrient regimes off Florida's Gulf Coast in August 2013. Monitoring occurred across two coastal systems (Crystal River and Homosassa River) at existing water quality monitoring stations. At each location, replicate plots were marked for production and cores were taken for biomass analysis.
- In 2014, Gulf Archaeology Research Institute (GARI) received a grant to study mollusks and sediments from seagrass habitats within the SMMAP.
- In 2014, UF PhD candidates investigated the resilience of seagrass to shading driven by biomass allocation strategy along a productivity gradient. Researchers examined how seagrasses exhibit differing above-ground to below-ground (AG:BG) biomass ratios along the Springs Coast. This pattern largely tracks water quality patterns off the coast and is of interest to ecologists and mangers because it may affect seagrass resilience. This project examined the role of AG:BG biomass ratio in the resilience of turtle grass to reductions in light availability.
- In 2015, University of South Florida researchers conducted a study to quantify the magnitude of oyster reef change by reconstructing prehistoric oyster size distributions and growth rates using midden shells from an archaeological site in Crystal River, and comparing these demographics with the extant population.

4.1.2 / ***Current Status of Ecosystem Science at St. Martins Marsh Aquatic Preserve***

Research and monitoring are crucial components of resource and ecosystem management. Data obtained from monitoring programs provide staff with information to make effective resource management decisions. Monitoring efforts allow for the creation of baseline data, as well as, recognizing short and long term variation of environmental conditions. In the past, research and monitoring goals and objectives have included conducting the necessary research and monitoring activities to understand the ecological functioning of SMMAP so it can be managed and used in an ecologically sound manner, and restored and maintained in its natural condition for future generations. While these same goals continue to be relevant to the management of SMMAP, the program has grown to include a more ecosystem-based management approach to protecting the biological and physical aspects of the ecosystem and focuses on the unique attributes and challenges of SMMAP. SMMAP's research and monitoring programs are developed and implemented based on current and potential impacts to the resources within the system.

Staff conduct monthly water quality sampling in the three river systems that feed St. Martins Marsh Aquatic Preserve.

Major management issues that SMMAP faces include: changes in water quality, health of seagrass beds, land use changes, and critical/sensitive habitat protection. Florida is rapidly growing and development pressures on habitats are growing just as quickly. Therefore, sound resource management practices, public education and outreach, system-wide monitoring and research, and interagency and volunteer cooperation are vital in maintaining and protecting the natural resources within SMMAP. Current Ecosystem Science Programs within SMMAP and the future needs of the program are discussed in the following sections.

St. Martins Marsh Aquatic Preserve Water Quality Monitoring

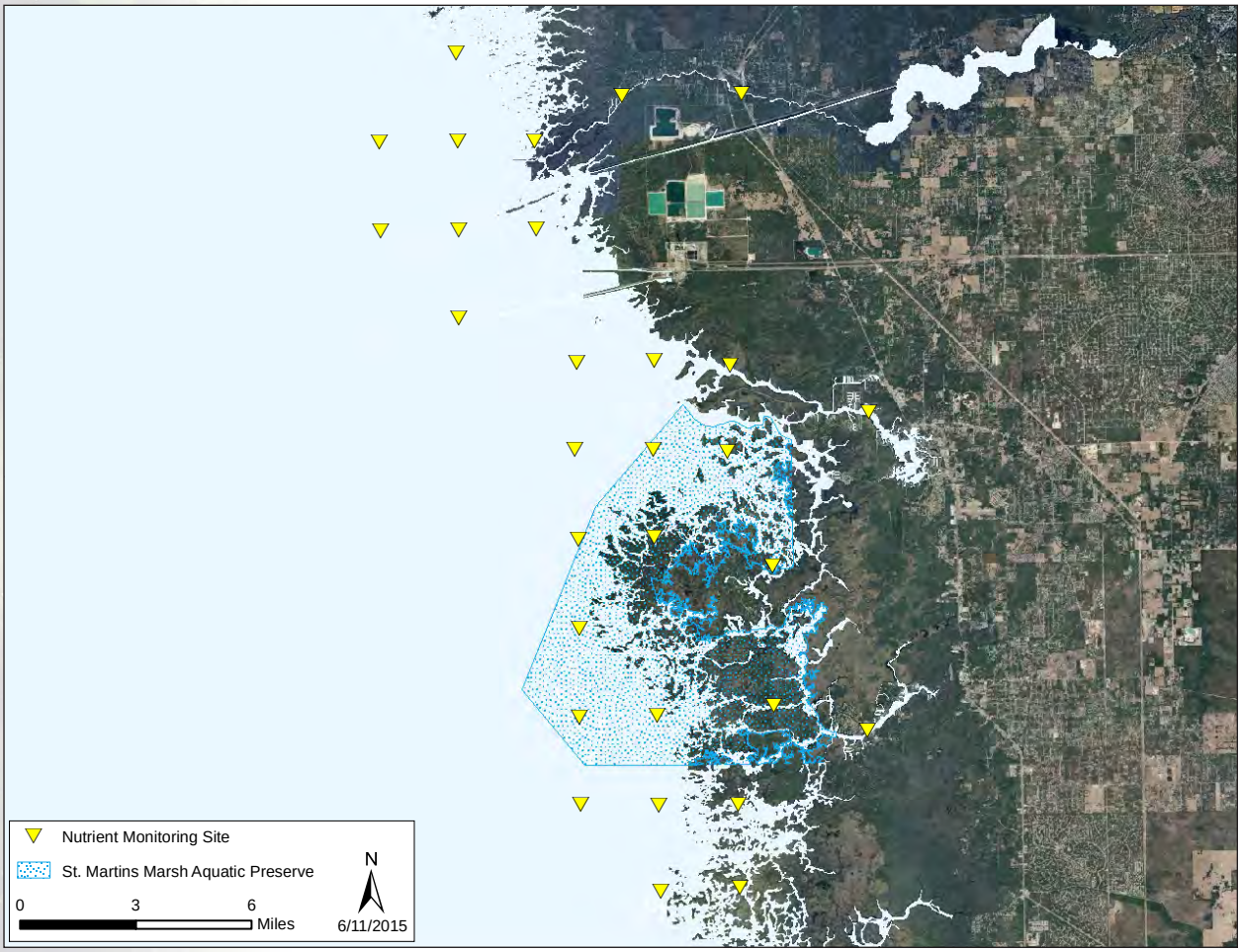
SMMAP's water quality program is comprised of several different programs, methods, and techniques used to monitor short and long term variation and trends within the waters of SMMAP. Staff works with a variety of partners to investigate water quality trends in estuaries throughout the Springs Coast region.

The partnerships pool resources, allowing important data to be collected and ultimately disseminated to other scientist and decision makers. The data collected by SMMAP and its partners has been used to help establish Minimum Flows and Levels and TMDLs (total maximum daily loads) for the Kings Bay system and support is being provided in the establishment of the TMDLs for the Homosassa Springs system. The following sections will discuss water quality monitoring programs conducted by SMMAP staff and other agencies that monitor water quality parameters in SMMAP.

Project COAST

SMMAP began a partnership in 1997, with UF, conducting an extensive water quality monitoring program called Project COAST (**CO**astal **AS**sessment **T**eam). Staff collect field samples at 30 fixed sites within the St. Martins area. Sampling occurs within the Withlacoochee, Crystal, and Homosassa river systems (Map 13). Examples of parameters collected include light attenuation through the water column, temperature, salinity, pH, Secchi depth, and dissolved oxygen. Water samples are also filtered and processed for chlorophyll assessments and surface water grab samples are taken for nitrogen and phosphorous analysis. All COAST samples are processed by UF, and data is stored in an electronic database which is available to the public upon request.

Project COAST has established a baseline data set which allows resource managers to effectively assess changes in nutrient concentrations and eutrophication, with a focus on shifts in water quality that may negatively affect seagrass beds (Frazer, Notestein, Keller & Jacoby, 2006). Staff plan on continuing this partnership with UF on the Project COAST Program to further develop this baseline data and determine both short and long term trends in coastal water quality within SMMAP as long as funding allows.



Map 13 | Project COAST nutrient monitoring locations.

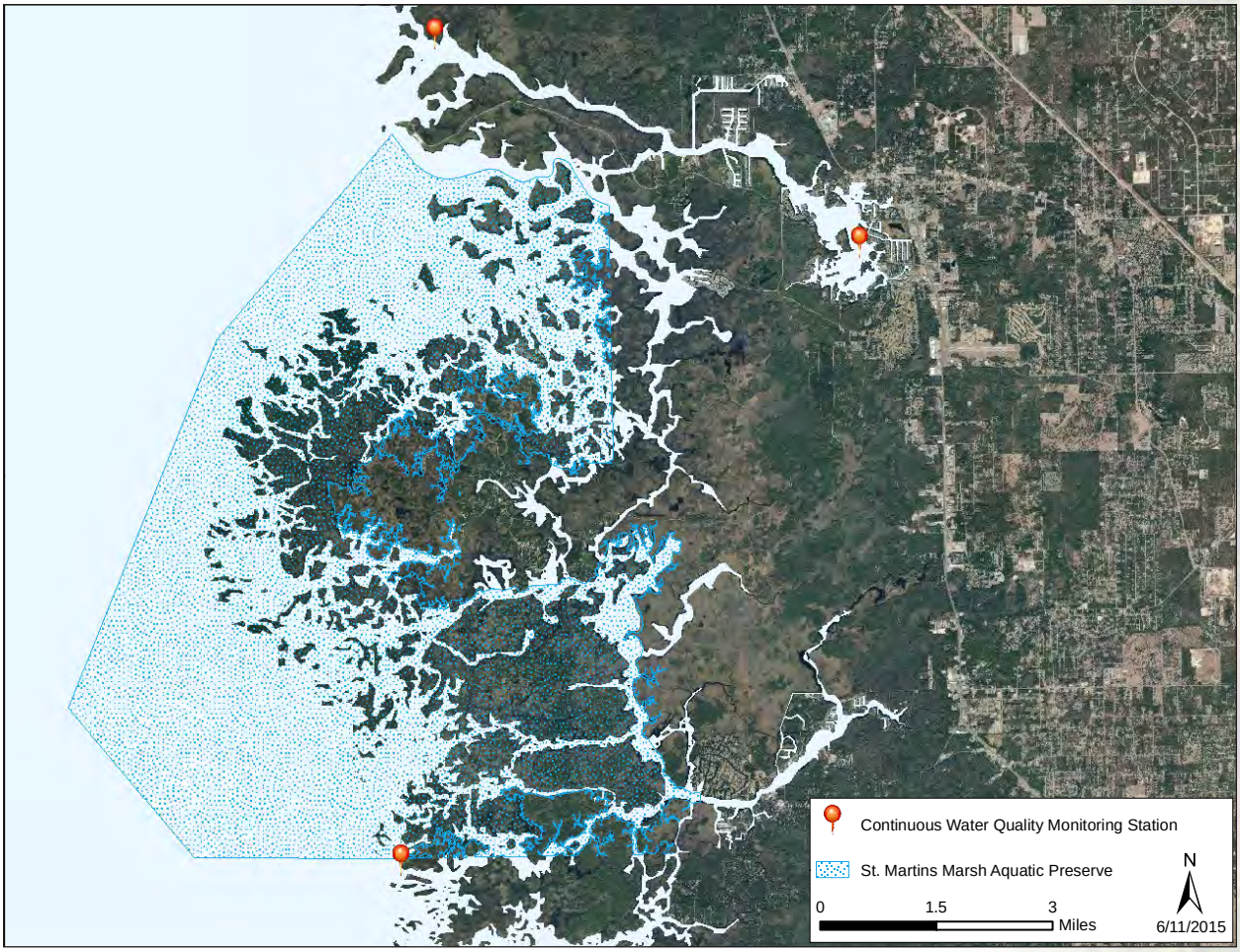
Continuous Water Quality Monitoring

Continuous water quality monitoring in SMMAP began in 2004. Using both YSI 600 and 6600 series datalogger equipment, SMMAP's water quality monitoring program was developed and modeled after the National Estuarine Research Reserve's (NERR's) System-Wide Monitoring Program (SWMP) which follows standardized methods to ensure continuity and accuracy of data collection. In 2004, five water quality monitoring stations were established in Citrus County, three near SMMAP. Two stations were established within or immediately adjacent to SMMAP at the mouth of the Homosassa River and the mouth of the Crystal River, while one was established just outside SMMAP boundaries in Kings Bay (Map 14). The selection of these locations allows for comparison between relatively pristine, undeveloped areas versus more urbanized drainage basins, as well as fresh versus marine salinity regions within the systems that feed into SMMAP. The primary objective of these efforts is to establish baseline data for scientific comparison, measure short and long term changes in SMMAP's contributing systems, and assess the impacts both human and natural events may have on SMMAP.

Site Name	ID Code	Lat. / Long.	Description
Crystal River	CR	N28 55.502 W82 41.227	Sand/mud bottom, adjacent to oyster bars, near mouth of the Crystal River
Homosassa	HS	N28 46.224 W82 41.783	Sand/mud/shell bottom, near mouth of the Homosassa River
Kings Bay	KB	N28 53.000 W82 35.986	Sand/rock bottom, near residential developments, high tourism activity

Table 3 / Continuous water quality monitoring stations.

All five sites were outfitted with YSI 600 OMS dataloggers at the time of establishment which record time, temperature, specific conductivity and salinity every 30 minutes [currently every 15 minutes], 24 hours per day, 365 days per year. All but the Kings Bay location are still equipped with these sondes. In 2006, the Kings Bay location was upgraded to a YSI 6600 EDS datalogger, which is setup to record additional parameters including: pH, dissolved oxygen, turbidity, and depth. This model incorporates a specially



Map 14 / Continuous water quality monitoring stations of St. Martins Marsh Aquatic Preserve.

designed wiper apparatus attached to the turbidity probe that reduces fouling on the external probes, ultimately improving the quality of collected data. From 2004 to 2006, data was collected sporadically due to lack of staff, however, continuous monitoring has occurred since mid-2006. Data is retrieved from the equipment approximately every two to four weeks, processed and edited, and monthly and annual graphs are created by SMMAP staff to quantify data and assess trends. All data is stored on a local server and is backed up to a file transfer protocol (FTP) site for file sharing.

St. Martins Marsh Aquatic Preserve Resource Monitoring

In 1997, SMMAP began monitoring 25 fixed seagrass sites in Citrus County, with an additional 100 sites added throughout the Big Bend region starting in 2002. The objective of this effort is to quantify the spatial/temporal variability and trends of seagrass abundance and distribution (e.g. establish baseline data) within SMMAP. Identification and assessment of seagrass and macroalgae is completed using the Braun-Blanquet scale. The Braun-Blanquet study method is used for measuring the submerged aquatic vegetation. This involves identifying all vegetative species represented and percent coverage within a one meter square "quadrat." Presence or absence of bay scallops and green sea urchins *(Lytechinus variegatus)*, epiphyte densities, sediment type and sediment depths are also recorded. Staff examine site-intensive monitoring data to determine trends in species composition, abundance, and distribution of seagrasses within SMMAP. This information can also be used to determine species composition, abundance and distribution of seagrasses within a particular area. Seagrass and water quality data provides state entities with helpful information which can be used to help address resource management issues within this highly diverse ecosystem.

SMMAP staff are also assisting UF with research projects that focus on the productivity and trends in growth rates of seagrasses in SMMAP. In addition, SMMAP also has an ongoing partnership with GARI to study different sediment regimes in which seagrasses grow and the different species of mollusks that live in those areas.

Staff also have several programs to educate the public on the importance of seagrasses and why this critical habitat needs protection. Kiosks containing information about SMMAP, seagrasses, and prop scarring, have been placed at boat ramps throughout SMMAP. The signs promote seagrass awareness and the importance of poling in shallow water to avoid prop scarring.

Seagrass Monitoring Program

The surrounding lands of SMMAP is comprised mostly of developed interior areas, buffered by federal and state conservation lands. These conservation areas, comprised of salt marsh, hammock islands, and pine flatwoods, play a critical role in the health of coastal estuarine communities by acting as a filter from inland surface runoff. "The low wave energy and shallow depths combined with low sediment loads and generally high contributions of clear groundwater from the Floridan Aquifer System in the rivers draining to the region, create a physical environment highly conductive to the survival and growth of seagrasses in the Big Bend" (Mattson, 2000). "The broad shallow coastal shelf along the Springs Coast permits the development of an extensive seagrass area and is geologically characterized as drowned karst with limestone at or near the surface" (Kolasa & Craw, 2009). These pristine and relatively undisturbed waters make ideal habitat for seagrasses.

In collaboration with other state agencies, FWC collected data from existing monitoring inventories and mapping databases to create more accurate estimates on spatial coverage and species composition of seagrasses for the SIMM program (Yarbro & Carlson, 2011). This program aims to integrate seagrass mapping and monitoring across Florida. There are approximately 2.2 million acres of seagrasses that have been mapped in Florida's coastal waters (Carlson & Madely, 2007). The entire Springs Coast region, which includes areas outside of SMMAP, contains approximately 379,000 acres of mapped seagrass habitat. This estimate does not include the deep water seagrass acreage, which is unknown due to the technical difficulty of mapping these deep areas. According to FWC's 2007 SIMM report (Yarbro & Carlson, 2011), there are approximately 94,000 acres of seagrass beds between SMMAP's northern and southern boundaries, which includes shallow waters west of SMMAP.

There are five different types of seagrasses found in SMMAP: manatee grass, shoal grass, star grass, turtle grass, and widgeon grass. Manatee, shoal, and turtle grass are the most prominent species in the shallow waters of SMMAP, which has an average depth of eight feet or less. Star grass and shoal grass are found in the deeper areas of SMMAP, and are especially adapted to the low light levels and are found down to at least 98 feet and 22 miles offshore, well outside of SMMAP boundaries. Shoal grass, which has narrow, short leaves (.04 inches by 6 inches) and shallow root system, and is thought to be a pioneer species in succession in the development of grass beds in the Gulf (Woodward-Clyde Consultants & Continental Shelf Associates, Inc., 1985) can be found throughout SMMAP. Shoal grass is more

Staff conduct annual seagrass monitoring at 25 fixed site locations throughout the aquatic preserve.

tolerant to low light conditions than other grasses and can be found in a wide range of salinity regimes. Widgeon grass is a euryhaline freshwater angiosperm and is confined to low salinity areas such as river mouths (Iverson & Bittaker, 1986). Since widgeon grass can be found in shallow estuarine waters, it is an important food source for many wading and migratory birds. Distribution of these grasses is largely dependent upon water clarity, water depth, and salinity.

Seagrass beds are highly productive ecosystems that support an abundance of fish and invertebrate species. These shallow seagrass beds act as nursery grounds for many of the Gulf of Mexico's offshore commercial and recreational fisheries, by acting as a food source and providing cover from larger predators. The Springs Coast region of Florida is especially important for commercial and recreational fisheries, and Crystal River supports the largest population of wintering manatees in the state. The seagrass beds and hard bottom areas in this region provide vital habitat that is host to many sport fish such as red drum, speckled sea trout, and grouper.

Commercial usages include stone crab, blue crab, oysters, shrimp and mullet. "The Big Bend region accounts for between 25 percent and 33 percent of the total commercial blue crab landings in Florida and supports the largest recreational scallop fishery in the state" (Mattson et al., 2007). "Approximately 2.2 million acres of seagrass have been mapped in estuarine and nearshore Florida waters, and they provide ecological services worth over 40 billion each year" (Carlson & Yarbro, 2009).

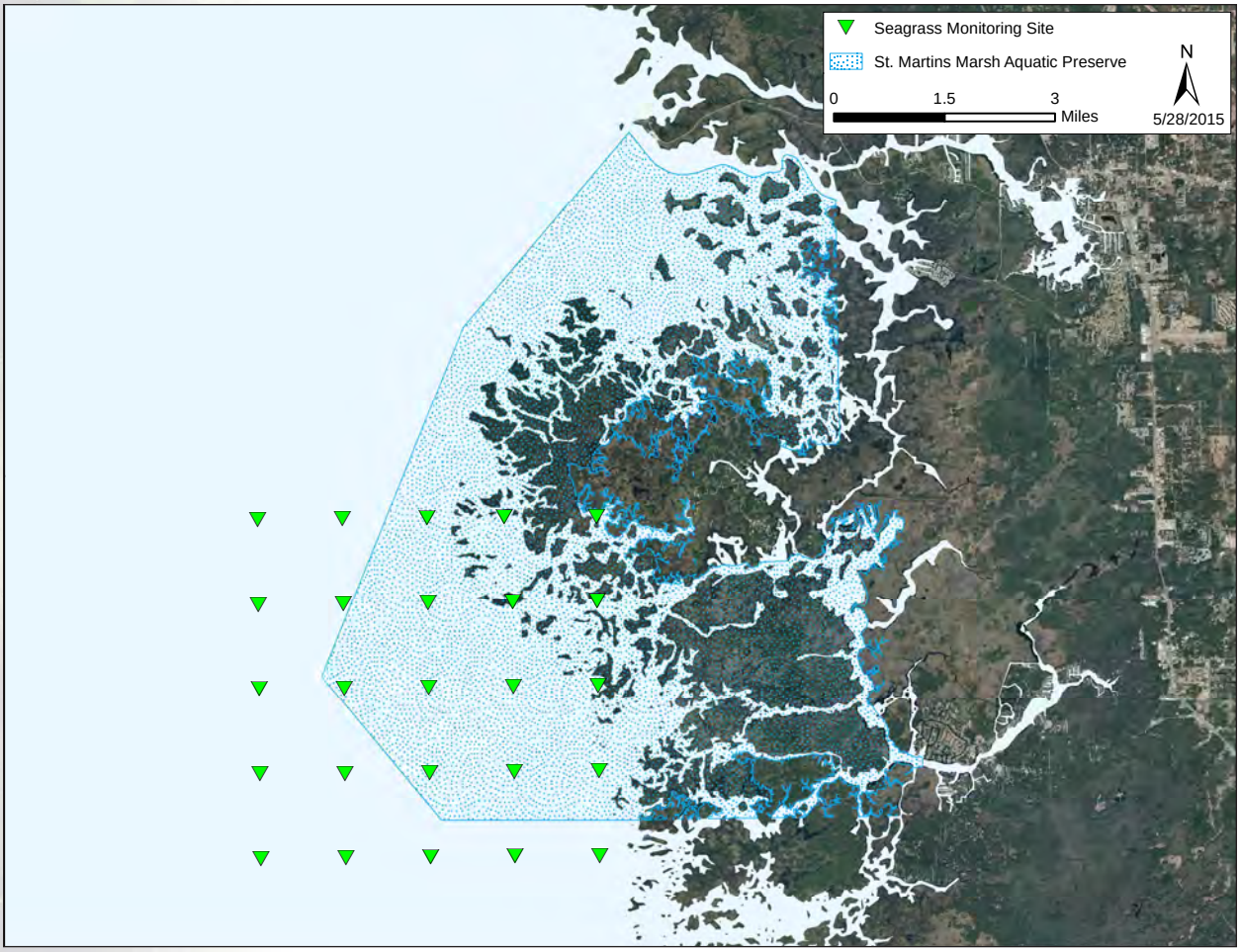
Coastal dredge and fill activities, shoreline and watershed development, drainage alterations, changes in stream and river flow, and vessel prop scarring contribute to seagrass distribution and composition changes and loss. When loss of seagrass habitat occurs, there are also other resource impacts associated with the loss, such as decreased water quality and decreased refuge and the availability of food. The ultimate consequence of seagrass habitat loss is alterations in the food chain which lowers availability of commercial and recreational fish and shellfish, in turn, directly affecting the general public. Most of the early losses of seagrass in Florida were caused by dredge and fill activities. In Florida, 60,000 acres of estuarine habitat had been filled by 1985 (Durako, Phillips, & Lewis, 1987). Even if the fill is not placed directly on top of seagrass beds, mortality may result from increased water turbidity. Unconsolidated particles of fill may be continually re-suspended into the water column, inhibiting re-colonization of seagrasses. Excessive nutrients from point and non-point pollutants can cause phytoplankton blooms

or dramatic epiphytic algal growth, which may shade seagrasses causing a reduction of productivity and eventual loss. Vessel propeller scarring can create an immediate reduction in seagrass coverage that can be expounded by constant scouring. Since primary reproduction of seagrasses is via rhizomes, re-colonization of disturbed areas is relatively slow or nonexistent depending on the degree of impact. As the Springs Coast's shallow estuarine waters become impacted by development, it is important to collect baseline conditions within SMMAP for post impact comparisons and to identify any habitat restoration or watershed management activities.

Seagrass coverage in SMMAP appears to be stable or increasing slightly, based on a rough comparison of the seagrass coverage in 2007 to that in 1999 that was completed using the footprint of the 1999 mapping area as the common base. Seagrass species composition is diverse, with turtle grass most frequently observed. Manatee grass, shoal grass, and star grass are less common but occur throughout the region, along with a diverse mix of macroalgae. Since 1997, SMMAP staff have monitored 25 sites each year nearshore in the St. Martins Keys, west of Homosassa (Map 15). Turtle grass occurred in about 70 percent of quadrats surveyed, and manatee grass was found in 40–50 percent of quadrats. Shoal grass has shown more variation over time and occurred more frequently during 1999–2003. Star grass and widgeon grass had very low occurrence; no widgeon grass was observed in 2012, and this species was observed very infrequently in 2013. The occurrence of bare quadrats was also very low.

A diverse community of macroalgae can be found on hard bottom dominated areas with the green algae *Caulerpa prolifera* and the calcareous green genera *Penicillus* being the most common macroalgae observed. In addition to macroalgaes, a variety of species of sponges and corals can be found on these lime rock outcroppings.

The health of seagrass beds can be affected by many different stressors including: nutrients, phytoplankton, and turbidity, which in turn affect light available to seagrasses. These were elevated after the 2004 and 2005 hurricane seasons, but they since returned to background levels. In the fall of 2012 and 2013, optical water quality and clarity data show that conditions were excellent for seagrass communities within the Springs Coast region. Although seagrass meadows can be found throughout the Springs Coast



Map 15 / Seagrass monitoring sites of St. Martins Marsh Aquatic Preserve.

region, species distribution, density, and the overall health of the beds can be affected greatly by water quality and quantity. Seagrasses need sunlight in order for photosynthesis to occur. Particulate matter and high levels of chlorophyll-a suspended in the water column can affect the amount of light attenuation in a particular area. Shoal grass, star grass and a mixture of macroalgaes are the dominant species in areas of SMMAP where water clarity is reduced. Based on all available data, the occurrence of seagrasses in SMMAP has been remarkably stable during the 18–year monitoring program.

University of Florida Seagrass Research

UF conducted research linking seagrass performance measures to water quality from 2010-2012. Elevated nutrient concentrations in the water column favor the growth of epiphytic microalgae and phytoplankton, which also require less light than seagrasses to support their growth. The enhanced competitive abilities of algae and phytoplankton are a major threat to seagrass health. The environmental conditions along Florida's central Gulf Coast present a unique opportunity for integrated monitoring of water quality and seagrasses. Such monitoring can identify undesirable trends, trigger and guide actions to stop or reverse such trends, and document the success of efforts to manage the region's natural resources sustainably. This project made valuable progress toward developing a rigorous and efficient long-term monitoring program that will yield early warning of detrimental changes to seagrasses and provide natural resource managers with a means of evaluating changes in water quality as a driver of such impacts.

UF PhD candidates conducted research that monitored productivity rates of turtle grass in August 2013. Monitoring occurred across two coastal systems (Crystal River and Homosassa River) at existing seagrass monitoring stations. At each location, replicate plots were marked for production and cores were taken for biomass analysis. In 2014, the same graduate candidate investigated how seagrasses exhibit differing AG:BG biomass ratios along the Springs Coast. This pattern largely tracks water quality patterns off the coast and is of interest to ecologists and mangers because it may affect seagrass resilience. This project examined the role of AG:BG biomass ratio in the resilience of turtle grass to reductions in light availability.

In partnership with the Gulf Archaeology Research Institute, staff collect field samples to analyze in the laboratory as part of a seagrass-sediment-mollusk study.

Seagrass-Sediment-Mollusk Study

Knowledge about the molluscan species composition from seagrass habitats and their sediments, the relationship between the various seagrass species, and growing environment, and sediments, is deficient across the vast Big Bend region of shallow Gulf waters. The purpose of the pilot study in SMMAP is to provide new information about the molluscan fauna of the seagrass habitats, benthic environment, and the sedimentology of the environments that support various seagrass communities and the mollusks that depend on them. A mollusk species list from the seagrass habitats will be a valuable tool, and the information derived from this study will be useful for the long term management of the seagrass resource and for evaluation of impacts to seagrass communities. GARI and FCO staff have collected numerous mollusk and sediment samples from established seagrass monitoring sites in SMMAP. These samples are currently being processed at the GARI laboratory. Identification of the mollusks is underway and the taxonomic work has revealed that a great diversity of species are present.

Mapping

Geographical/Geospatial Information Systems (GIS) technology is a valuable tool that allows natural resource managers to better assess the resources they are responsible for managing. GIS technology

provides managers with detailed information on the current extent, condition and management needs of resources, which facilitates the protection of Florida's aquatic preserves. As natural resource managers, there is always a need for current and accurate GIS data layers and maps to effectively assess SMMAP resources. Mapping products allow for the identification of areas within SMMAP where increased management emphasis is necessary. The maps are not only to inform resource managers as to the coverage and extent of resources, such as seagrass beds, oyster reefs, etc., but also may be used by the regulatory, research, and recreational communities. Precise bathymetric and submerged resource maps also provide valuable information for regulatory decisions on dredging, filling and construction.

4.1.3 / ***Issue One: Water Quality***

Water quality monitoring plays a major role in SMMAP's understanding of natural and human impacts on coastal waters. Researchers use water quality data to document short and long term changes within the water column in an effort to quantify the spatial and temporal variability and trends. These are applied both seasonally and as a function of tidal forcing, of the selected abiotic parameters (e.g. establish baseline data) within SMMAP. Water quality affects both people and the environment. Accordingly, it is essential to develop a proficient water quality monitoring program to recognize and prevent potential negative impacts to SMMAP.

A healthy water body contains a balanced amount of nutrients and normal fluctuations in salinity and temperature. It also has plenty of oxygen, a basic requirement for nearly all aquatic biota, and minimal suspended sediment, so that living aquatic resources can breathe or receive enough sunlight to grow. Nutrients, like nitrogen and phosphorus, occur naturally in water, soil and air. Just as nutrient fertilizers are used to promote plant growth on lawns and farm fields, nutrients in the water encourage the growth of aquatic plants and algae. Although nutrients are essential to all plant life within SMMAP, an excess of these nutrients can be harmful. This is called nutrient pollution. The two general sources of adverse impacts on water quality are point and nonpoint source pollution. Point source pollution can be traced to a single identifiable source, such as a discharge pipe. Nonpoint source pollution in Citrus County originates from various diffused sources such as, but not limited to, stormwater runoff, development, and agriculture. These sources aide in the transport of excess nutrients into the aquifer through the natural recharge process. When these nutrient sources are not managed properly, elevated nutrient levels enter the fresh water tributaries, the Crystal and Homosassa rivers, which feed SMMAP via the spring vent systems leading from the Floridan Aquifer. Increased nutrient levels, such as total nitrogen and total phosphorous, can cause habitat degradation, fish kills and closure of shellfish beds and swimming areas.

SMMAP's current water quality monitoring project utilizes several methods to examine water column characteristics. Basic water quality parameters are monitored, and this data provides information to assess the condition of biological assemblages. To properly assess water quality conditions, long-term data sets are used to develop baseline data. While routine water quality monitoring detects effects of nutrient enrichment, it is not designed to detect trace levels of toxicants or contaminants. Biological assessments, coupled with habitat assessment, such as physical and chemical measurements, will aid in identifying probable causes of impairment not detected by physical and chemical water quality analyses alone, such as nonpoint source pollution and contamination, erosion, or poor land use practices (U.S. Environmental Protection Agency [EPA], n.d.). Continued long-term water quality monitoring is necessary and essential to protect the valuable natural resources in SMMAP.

Goal One: Further develop and improve the strategic, long-term water quality monitoring program within SMMAP that will assist with identifying and addressing issues pertaining to the natural resources.

Objective One: Analyze and interpret the status and trends of SMMAP's water quality throughout the Springs Coast to identify potential impacts to natural resources and provide quality scientific data and recommendations to address such issues.

Integrated Strategy One: Maintain a strategic long-term water quality monitoring program that includes biotic and abiotic parameters, and compile analyzed data to evaluate water quality status and trends. This will be achieved through the use of YSI datalogger equipment at priority locations and the collection of continuous in-situ measurements for the following water quality parameters: temperature, specific conductivity, salinity, dissolved oxygen, pH, turbidity, and depth.

Integrated Strategy Two: Continue to monitor nutrients and water clarity in SMMAP through a partnership with the UF's Project COAST to determine total nitrogen and phosphorous, chlorophyll, and water clarity. This project requires the collection of water samples and relevant data once a month at the designated sampling sites. Monitoring efforts began in 1997 and SMMAP staff assist with sample collection in the following systems: Withlacoochee River, Crystal River, and Homosassa River.

Integrated Strategy Three: Acquire additional YSI datalogger equipment to expand water quality monitoring efforts within SMMAP. Upgrade existing equipment from YSI 6-series dataloggers to YSI EXO2 series equipment. (YSI will be discontinuing the manufacturing and support of YSI 6-series in the near future.)

Integrated Strategy Four: Upgrade site locations using standard YSI 600 equipment to YSI 6600 equipment to increase monitoring parameters and improve baseline data collection.

Goal One, Objective One – Performance Measure: Develop an annual metadata report detailing scientific results and recommendations regarding the water quality within SMMAP.

Objective Two: Identify specific current and emerging water quality issues related to nutrients, pollution, and environmental, contaminants, and with coordination from other agencies, develop a response strategy to these issues.

Integrated Strategy One: Identify point and non-point sources of pollutants and turbidity.

Goal One, Objective Two – Performance Measure: In coordination with other state agencies, identify potential pollution threats and develop a strategy to address issues, including planning, action, and prevention.

Objective Three: Ensure the sustainability of scallop, fish, salt marsh, seagrass habitat, and other concerned species and habitats through the development of a tiered approach to water quality monitoring that integrates biological assessments and multiple tools to define a core set of baseline indicators to possibly explain causes and/or sources of any impairment within SMMAP.

Integrated Strategy One: Continue to monitor the distribution and abundance of specific indicator species, including scallops and seagrass, to determine the ecological health of the bay system. As needed, staff will contribute and assist in the development of a technical report assessing the status of these resources, areas of concern, and recommendations. An annual bay scallop report that discusses the status and trends of bay scallop populations around the state is supplied by FWRI.

Integrated Strategy Two: Determine the biodiversity of SMMAP by establishing baseline data and broad scale characterizations of benthic communities which are sensible indicators of habitat quality in an aquatic environment. Acquire data and work in conjunction with other agencies to develop a biological assessment report.

Goal One, Objective Three – Performance Measure: Work with other state and federal agencies to develop associated reports and a database of all concerned species, and use water quality data and other indicators to create an approach to protect/ensure stability.

Goal Two: Provide timely and accurate water quality data and information to the public and other entities/agencies.

Objective One: Acquire a repository to store water quality data in a centralized database that is user-friendly, provides quality assurance and quality control for the data collection effort, and can be accessed via the internet to provide site specific information, generate reports, graphs, tables, and metadata for review by the public and other entities/agencies.

Integrated Strategy: Work with other entities and agencies to develop a centralized water quality storage database and website. This would involve compiling a list of all water quality monitoring efforts throughout Florida, establishing a storage database and website that provides data to the public in a timely manner, and increase data sharing throughout the water quality monitoring network.

Goal Two, Objective One – Performance Measure: Work within FCO to develop a storage database to ensure data is available to the public.

4.1.4 / Issue Two: Management and Protection of Seagrasses

Seagrass beds are one of the most productive habitats found in the world. The rich biodiversity that make up seagrass habitats plays a critical ecological and environmental role to Florida's coastal communities. Seagrasses improve water clarity by stabilizing bottom sediments and absorbing nutrients from the water column. They reduce coastal erosion by helping to diffuse wave energy during storm events. Economically, seagrass beds are of critical importance to Florida's commercial and recreational fisheries. Florida's juvenile fish and invertebrates (red drum, shrimp, bay scallops, seatrout, mullet, and stone crabs) depend on these rich nurseries for food and protection. Manatees, wading birds, and sea turtles also utilize these areas for foraging.

Seagrass monitoring is an integral part of mapping the total acreage of Florida's seagrasses. According to FWC's 2011 SIMM report for the state of Florida, there are approximately 380,000 acres of seagrass coverage in the Springs Coast region and 2.5 million acres in Florida's coastal waters (Yarbro & Carlson, 2011). The five species of seagrass found in SMMAP include shoal grass, manatee grass, turtle grass, widgeon grass, and star grass. In addition to the five seagrass species, eighteen species of green macroalgae have been documented during annual seagrass surveys in SMMAP. Macroalgae not only plays an important role in reducing nutrient loading in estuarine environments but are also pioneer species and help to stabilize prop scars from continuous scouring. Destruction of seagrass in aquatic preserves is a violation of Florida Law (§ 253.04(3)(a), Florida Statutes [F.S.]) and carries a penalty of up to $1,000. One of the major threats to seagrasses in the state is from prop scarring. Repetitive scouring of prop scars prevents re-colonization of new grass and often requires restoration. Another threat to seagrass is nutrient loading from rivers which can decrease water clarity and shade out sunlight that grasses need for photosynthesis. Natural threats, like hurricanes, can cause fragmentation of seagrass beds that can take years to heal.

Goal One: Manage seagrass communities through research and monitoring, education and outreach efforts, continued resource management and collaborative mapping efforts with other state agencies to effectively protect and maintain this habitat as a valuable, natural resource throughout SMMAP.

Objective One: Monitor the status and trends of seagrass distribution within SMMAP to determine the overall health and identify potential threats to the habitat.

Integrated Strategy One: Develop and implement a Seagrass Monitoring Plan for SMMAP that maintains a strategic, long-term seagrass monitoring project to include water quality indicators, percent coverage of seagrass and macroalgae species, macroalgae identification, density, epiphyte loading, and sediment depths.

Integrated Strategy Two: Continue collaboration with FWC and other state agencies on the SIMM report to produce a resource for seagrass monitoring, mapping, and data sharing.

Integrated Strategy Three: Utilize existing GIS technology, aerial surveys, and ground truthing to identify severely scarred areas to determine restoration needs, assess management options, and develop a seagrass restoration plan for SMMAP.

Goal One, Objective One – Performance Measure: A SMMAP Seagrass Monitoring Technical Report is developed for fiscal year (FY) 2016 and beyond. This report will include information on the project's background, status of the resources, goals, data collection methods, sampling results, areas of concern, recommendations, and conclusions on the effectiveness of the project. The report will be updated annually, and the project will be reevaluated on a five year cycle.

4.2 / The Resource Management Program

The Resource Management Program addresses how FCO manages the SMMAP and its resources. The primary concept of SMMAP Resource Management projects and activities are guided by FCO's mission statement: To conserve and restore 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. FCO managed areas 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. SMMAP 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 SMMAP are diverse. This section explains the history and current status of our Resource Management efforts.

4.2.1 / *Background of Resource Management at St. Martins Marsh Aquatic Preserve*

Over the past decade, SMMAP's Resource Management Programs have expanded. Water quality and seagrass monitoring programs were developed in–house, in conjunction with other agencies and research entities to support resources management activities. Today, many of the resource management needs have remained the same and include evaluating and documenting any changes or impacts to resources and habitats of SMMAP. Resource management activities have focused on both the impacts of an individual action, as well as the cumulative impacts of changes and actions on the natural system. SMMAP staff have been responsible for reviewing and commenting on proposed environmental regulatory permits, Minimum Flows and Levels, TMDLs, land acquisition projects and adjacent state lands management reviews. Staff provides technical support to other land managers and regulatory authorities on a regular basis. Examples of such support include: conducting field assessments, making comments and recommendations to appropriate agencies, ensuring consistency with all established rules and regulations, and notifying the appropriate regulatory agencies of violations and illegal activities. Maintaining effective communication between local, state, and federal environmental regulatory agencies is essential to protecting the resources of SMMAP. A tremendous effort has been made by state, federal, and other entities to purchase lands adjacent to SMMAP and the protection of these lands is one of the best ways to protect SMMAP's resources. Land managers and conservation groups continue to evaluate and purchase priority parcels adjacent to SMMAP.

4.2.2 / *Current Status of Resource Management at St. Martins Marsh Aquatic Preserve*

Staffing and Management Strategic Approach

Currently, SMMAP has one select exempt employee serving as manager, two full time equivalent (FTE) field positions, and one FTE administrative position. These four staff members manage SMMAP and Big Bend Seagrasses Aquatic Preserve that together total almost one million acres of submerged lands. SMMAP staff work with many different stakeholders to protect and restore resources of SMMAP. Staff often partner with other land managers, agencies, and researchers to accomplish many resource management goals within SMMAP. SMMAP strives to be efficient as possible and shares resources such as staff time, grant funding, vessels, and equipment to accomplish a common goal. The management strategy for pristine areas like SMMAP is usually proactive and preventative rather than reactive. Currently, little restoration is conducted in SMMAP, and the emphasis is placed on assessing resource impacts and preventing new damage that may occur with increased development and resource use. The current status of resource management programs within SMMAP, as well as future needs are described in the following sections.

Permitting, Enforcement, and Mitigation

SMMAP staff regularly provides technical support to many local, state, federal entities. These include: Northwest DEP, Northeast DEP, and Southwest DEP regulatory districts; DEP's Bureau of Mining and Minerals Regulation; DEP's Energy Siting Office; DEP's Bureau of Beaches and Coastal Systems; and SWFWMD; FWC; EPA; and the Federal Energy Regulatory Commission.

SMMAP often assist regulatory agencies in the form of providing permit application review and comments, mitigation planning, and public interest project options. SMMAP staff works to maintain good communications and cooperative relationships with regulatory staff. SMMAP staff is often relied on as a source of information on submerged resources and the possible impacts to ecosystem function from a proposed project. SMMAP, along with other DEP training staff, provides materials and training to regulatory staff which ensures consistent permitting and application of Chapter 18-20, Florida Administrative Code. SMMAP staff will continue to work with regulatory agencies and decision makers to ensure proper avoidance and minimization of impacts is conducted to protect water quality and resources of SMMAP.

Habitat Restoration/ Enhancement

The Society for Ecological Restoration defines ecological restoration as an "intentional activity that initiates or accelerates the recovery of an ecosystem with respect to its health, integrity and sustainability." Restoration activities should reestablish the ecological integrity of degraded ecosystems including structure, composition, and the natural processes of biotic communities and the physical environmental. Ecosystems with integrity are self-sustaining and resilient natural systems that are able to accommodate stress and change. Restoration activities should be designed to achieve ecological integrity at the greatest extent that is practical under current environmental conditions and limitations. An important step in any restoration project is to identify the causes of degradation and

eliminate or remediate those causes. Restoration efforts are likely to fail if the sources of degradation persist. Early in the planning stage, it is important to identify if the restoration project is scientifically, financially, socially, and ecologically feasible to ensure that limited fiduciary resources are used in the most appropriate manner and to increase the probability of success. Restoration projects must have clear, measurable and achievable goals to 1) help guide project implementation activities and 2) provide the standard for measuring project success. Each restoration project presents a unique set of environmental conditions, variables and project goals (EPA, n.d.). Therefore, it is important to evaluate each project on a case by case basis.

Oyster Reef

DACS conducts shell or "cultch" planting, as well as oyster relaying and transplanting which are important resource management tools for maintaining and enhancing productive oyster habitat. Depositing processed oyster shell on depleted oyster reefs and suitable bay bottom areas has been a state-managed habitat restoration practice since 1913. This practice provides resource managers within DACS the opportunity to mitigate resource losses, to enhance productivity, and to contribute direct economic benefit to the oyster fishery. Reef construction and enhancement activities are located in Florida's historically productive estuaries. This program relies heavily on hard clam shell contributions from local shellfish processing plants.

Significant acreage of productive oyster reefs in the Big Bend region are located in waters where harvesting for direct-to-market sale is prohibited to prevent public health problems associated with actual or potential pollution. Resource development projects called "relaying" take advantage of the oysters' ability to cleanse itself of contaminates (depurate) and offer a practical means to use a previously debilitated resource, making them safe for human consumption. Additionally, there are abundant stocks of juvenile oysters that grow on intertidal oyster bars. These intertidal oyster reefs are exposed at low tides, often limiting their ability to grow to legal size. Oysters which are moved from the poor growing intertidal areas are able to recover and take advantage of less stressful growing conditions and grow to a legal and marketable quality size in a short time. When seed oysters are transplanted in the summer, harvesting may begin the following season and continue as oysters grow to market size. Relaying and transplanting activities are often conducted as cooperative management programs between DACS and local oystermen's associations.

Shoreline Restoration

Extreme high tides, wave actions, strong currents, human impacts and storm events can all contribute to shoreline erosion. Storm surge and wave activity from hurricanes can have devastating erosive effects along beaches and sparsely vegetated shorelines. Also, human impacts such as bulkheads or seawalls can be poor dissipaters of wave energy. This can cause scouring of the bottom beneath seawalls and accelerated erosion, adjacent to seawalls. The use of environmentally friendly practices such as rip rap, vegetative planting and biologically manufactured logs have shown success in stabilizing eroding shorelines. Restoring and preserving shorelines is necessary for the protection of critical habitat that is home to much of Florida's wildlife. Landowners and volunteers alike can all play a role in keeping Florida in its natural state. Planting natural vegetation along shorelines can help prevent erosion, improve water quality, and improve access to the water. Along with the aesthetic appeal, natural vegetation also creates habitat for animals like wading birds, migratory birds, fish, and crabs (Northwest Florida Water Management District, 2001). SMMAP is a supporter of "Living Shorelines Initiative" that is sponsored by the U.S. Fish and Wildlife Service (FWS) to help educate the public on ecologically beneficial shoreline restoration practices.

Seagrass Restoration

SMMAP is located in one of the least developed parts of Florida. In recent years, the loss of seagrass in the Gulf of Mexico has become a serious concern to resource managers. Therefore, seagrass management and protection has been a primary focus of SMMAP's management program. Seagrass declines due to stormwater, nitrification, sedimentation, shading, prop scarring, and dredging practices are potential factors that contribute to direct, secondary, and cumulative impacts in SMMAP. Recovery and restoration time is different for each seagrass species and depends on growth rate, hydrological/water quality conditions, and sediment characteristics.

To date, staff has completed one seagrass restoration project (prop scar restoration) in SMMAP which will serve as a basis for future prop scar restoration efforts. Seagrass scarring can best be prevented through improved boater awareness, and in severe cases, enforcement. Once scarring occurs, seagrass may recolonize the scarred area over time, but depending on the width and depth of the scar and

localized currents, this may not happen. Several techniques have been tested to repair scar areas including temporary placement of bird stakes in the scarred areas to encourage re-growth through enhanced fertilization, and placing sediment-filled tubes in a prop scar to bring the substrate elevation level back to ambient grade increasing seagrass rhizome colonization.

The sediment tube technique was selected for this project because of the karstic nature of the bottom substrate. When placed at ambient grade, the tubes clearly stabilized the sediment long enough for submerged aquatic vegetation colonization. However, where they settled below ambient grade, the tubes may be accelerating the undermining of adjacent seagrass beds. Due to the sediment type and depth, many of the sediment tubes have settled 15 – 18 centimeters below ambient grade. It is recommended in future studies that enough tubes are placed in the prop scars to assure the proper grade is established. An analysis of prop scar sediment depth is recommended to be completed prior to the placement of the sediment tubes.

Invasive Non-Native Removal and Treatment

Invasive plants degrade and diminish Florida's conservation lands and waterways. Some invasive aquatic plants pose a significant threat to human welfare by impeding flood control and affecting recreational use of waterways and its associated surrounding economy. The FWC Invasive Plant Management Section is the lead agency in Florida responsible for coordinating and funding statewide programs controlling invasive aquatic and upland plants on public conservation lands and waterways throughout the state. The Section's aquatic plant management program designs, funds, coordinates and contracts invasive non-native aquatic plant control efforts in Florida's 1.25 million acres of public waters. The freshwater tributaries flowing into SMMAP contain the most problematic aquatic invasive non-native species, but those species are not a problem within SMMAP itself. SMMAP does not currently conduct regular treatments of aquatic non-native/invasive plant species, but supports appropriate permitted removal and treatment activities to protect and enhance the natural habitats found within SMMAP.

SMMAP staff work with CRPSP staff in an effort to combat invasive vegetation in and around SMMAP. The overall objective of the exotics program at CRPSP is to employ methodologies and timing of treatment appropriate to the autecology of each invasive plant in question, the size of the infestation, the maturity of the infestation, and the proximity of the infestation to other infested areas. CRPSP aims to monitor sufficiently to keep abreast of changes in populations to maintain records for Florida Park Service and to guide near term treatment decisions. Outreach will be secondary to the first two efforts, but is still critically important. Efforts in this area will be geared toward spurring action (volunteering, private property treatment, public support for programs) that will reduce the problem of non-native plants in the region.

The objective of the surveys is to establish a historical accounting of infestation and treatment in the park, evaluate effectiveness of treatment types, establish yearly goals and plans for treatment, retreatment, and monitoring efforts, and collect all available information on extent of acreage infested and location. The objective for treatment is to use contractors, volunteers, the Florida Conservation Corps, and staff effort to directly treat (kill/remove) with herbicide and other methods (mechanical, manual, and biological) the invasive plants in the preserves. Crews deployed to the field will follow the annual plan for determining treatment areas. This annual plan will draw infestations that need retreatment as a priority followed by treatment of adult plants in proximity to maintenance condition areas. Infestations targeted for treatment will be mapped in GIS and transferred to a reference map for use by staff. Florida Park Service standard treatment forms will be used in conjunction with GPS and GIS mapping to determine exact acreage and infestation number treated. This information will be entered into the statewide infestation database.

Marine Debris Removal

Lost and abandoned stone crab and blue crab traps have been identified as a problem in Florida's marine environment by various stakeholder groups. Traps that become lost or abandoned "ghost fish" (continue to trap marine organisms until traps degrade enough to allow escape), visually pollute, cause damage to sensitive habitats, and become hazards to navigation. Traps become derelict by several mechanisms including shifting during storms making them difficult to locate; they may be snagged by passing vessels and dragged to another area; or they are illegally abandoned by their owners for various reasons. The Big Bend region has blue crab trap closures July 20-29 in odd calendar years. SMMAP staff partner with regional, state, and federal agencies to conduct annual blue crab trap cleanup events. Staff has conducted derelict crab trap clean-ups in waters in and adjacent to SMMAP in 2010 (Chassahowitzka), 2013 (Crystal and Salt rivers), and 2014 (Homosassa River and Homosassa Bay). These efforts have resulted in the removal of hundreds of derelict traps and thousands of pounds of marine debris from coastal waters.

Staff conduct marine debris cleanups during winter extreme low tide events to remove various items from the aquatic preserve.

Abandoned vessels become derelict vessels quickly and then subject the boating public to safety issues, become locations for illegal activity, illegal housing, opportunities for theft and vandalism and ultimately cost the taxpayers to be removed by local, county or state authorities. Derelict vessels have the potential to discharge waste, gas and oil, and other potentially harmful substances. FWC is charged with the execution of abandoned and derelict vessel removal from pubic waters under § 376.15, F.S. SMMAP coordinates with FWC law enforcement to document and remove derelict vessels.

Historical and Cultural Management

According to GARI, at present the greatest threats to coastal cultural resources within FCO's area of management fall into three areas: 1) damage due to coastal dynamics from storms and hurricanes and surge conditions that overwhelm or disarticulate sites; 2) looting and illegal artifact hunting that destroy site contexts and weaken shore and bank lines and island structures; and 3) the effects from coastal oil spills that contaminate or corrupt sensitive archaeological and natural contexts. The west central Gulf Coast, including the Big Bend, is underlain by karst structures that will present unique problems in protecting and clean-up in the event of oil saturation (GARI, unpublished). The lands managed by SMMAP continue to be affected by sea level rise and the deleterious effects of storm and surge impacts. The dynamic nature of the coast and the fragile nature on the cultural resources inventory, particularly those located on near shore and estuarine contexts, indicates a need to continue the location, evaluation, and protection of prehistoric sites. Staff will work with the Department of State's Division of Historical Resources, GARI, and Florida Public Archeological Network to protect and identify cultural resources within SMMAP.

*4.2.3 / **Issue One continued: Water Quality***

Goal One, Objective Two continued from 4.1.3 Water Quality

Objective Two: Identify specific current and emerging water quality issues related to nutrients, pollution, and environmental, contaminants, and with coordination from other agencies, develop a response strategy to these issues.

Integrated Strategy Two: Support the development of nutrient criteria. In a collaborative effort with other state agencies, staff contributes water quality data to assist in the development of nutrient criteria.

Integrated Strategy Three: Support the development of TMDLs and a basin management action plan. Staff will contribute water quality data to assist in the development of an assessment report documenting scientific data, results, conclusions, and recommendations regarding TMDLs and a basin management action plan within SMMAP.

Goal One, Objective Two – Performance Measure: In coordination with other state agencies, identify potential pollution threats and develop a strategy to address issues, including planning, action, and prevention.

4.2.4 / Issue Two continued: Management and Protection of Seagrasses

Goal One, Objective One continued from 4.1.4 Management and Protection of Seagrasses

Objective One: Monitor the status and trends of seagrass distribution within SMMAP to determine the overall health and identify potential threats to the habitat.

Integrated Strategy Four: Establish and maintain close communication with all federal, state, and local land managers that are responsible for making resource management decisions that could affect water quality or seagrass habitat in SMMAP. Work with DEP district's and water management district's permitting and regulatory offices for input on proposed projects, site inspections, assessing potential impacts and participating in quarterly DEP Environmental Resource Permit meetings.

Integrated Strategy Five: Coordinate with stakeholders, adjacent resource managers and law enforcement to support clean-up efforts that address marine debris, derelict vessels, and/or illegal fisheries gear that could impact seagrass habitat.

Goal One, Objective One – Performance Measure: Development of a SMMAP Seagrass Monitoring Technical Report for FY 2016 and beyond. This report will include information on the project's background, status of the resources, goals, data collection methods, sampling results, areas of concern, recommendations, and conclusions on the effectiveness of the project. The report will be updated annually, and the project will be reevaluated on a five year cycle.

4.2.5 / Issue Three: Natural Resource Obstacles

SMMAP is an important part of the Springs Coast, which extends over a vast area of coastal resources and habitats. It is imperative that these areas be managed in the most effective, comprehensive manner. Having a baseline level of presence and distribution of habitats, composition and abundance of species that depend on those habitats (including salinity and temperature ranges), and updated maps to graphically represent these parameters and how they change over time are all essential tools needs to effectively manage SMMAP. Addressing issues such as marine debris is important in assessing the overall health of SMMAP. Marine debris presents a real and chronic threat to wildlife and public safety; entanglement, ingestion, and the release of toxins into the environment are issues related to debris. Additionally, the presence of debris detracts from the aesthetic value of natural landscapes. Marine debris can include paper and plastic products, construction debris, derelict vessels, and derelict aquaculture and fisheries gear. Significant change events such as sea level rise and climate change may drastically alter the status of the Springs Coast benthic community and may have a regional impact. Catastrophic events, such as hurricanes, oil disasters, and harmful algal blooms, are also major issues that could affect the health of SMMAP's natural resources.

Goal One: Assessment of impacted natural resources in SMMAP.

Objective One: Develop and implement restoration goals for impacted areas or areas of concern.

Integrated Strategy One: Work with law enforcement to ensure implementation of the seagrass law prohibiting destruction of seagrasses in SMMAP.

Integrated Strategy Two: Coordinate with other resource agencies and law enforcement to support efforts to address derelict and/or illegal fisheries gear and harvesting activities.

Integrated Strategy Three: Partner with other agencies and enlist public participation to assist in the removal of derelict and/or illegal fisheries gear from SMMAP.

Goal One, Objective One – Performance Measure: Partner with local citizens, state agencies, and federal agencies to complete annual marine debris clean up events in areas of concern to protect and restore natural resources.

Staff bring local aquatic life to outreach events to encourage sound environmental stewardship.

Objective Two: Maintain existing submerged cultural resources.

Integrated Strategy One: Document and protect submerged cultural resources within SMMAP.

Goal One, Objective Two - Performance Measure One: Collaborate with the Department of State's Division of Historical Resources, GARI, and Florida Public Archeological Network to protect and identify cultural resources within SMMAP.

Goal One, Objective Two - Performance Measure Two: Verify location and condition of submerged cultural resources.

Goal One, Objective Two - Performance Measure Three: Report the condition of and any potential threats to these cultural resources to the Division of Historical Resources. The Division of Historical Resources will also be notified for any new or potentially unrecorded sites.

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, and each represents key stakeholders and decision-makers. These efforts by the Education and Outreach Program allow SMMAP 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 St. Martins Marsh Aquatic Preserve

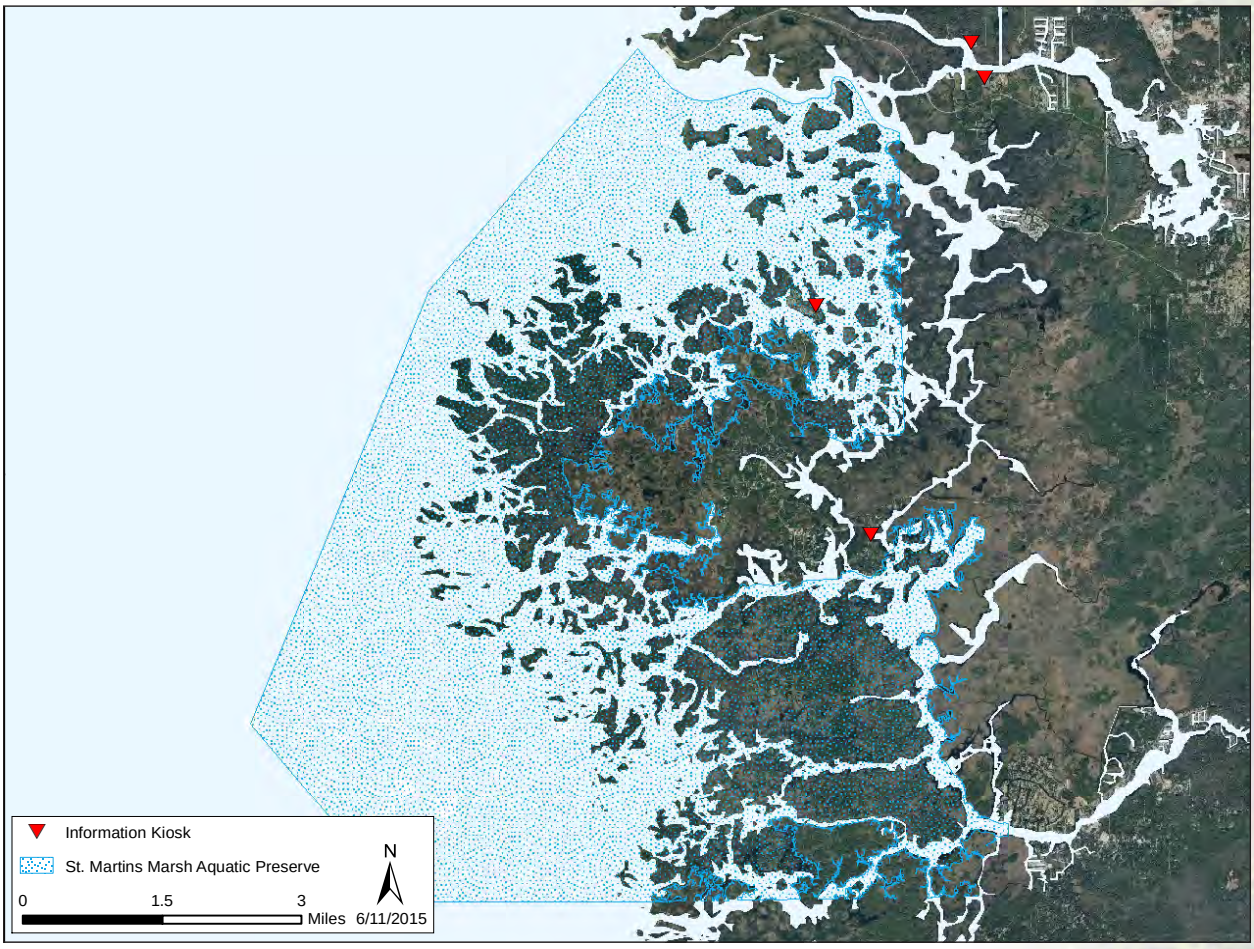
The educational and outreach practices conducted by SMMAP are geared towards promoting the goal of maintaining and restoring the aquatic preserve for future generations. By coordinating and participating in various education and outreach events, SMMAP is able to reach out to a wide and varied audience. Common target audiences for such events include landowners and developers, commercial and

recreational resource users, students of all ages, organized working groups, the general public, as well as local, regional, state, and federal government agencies. While education and outreach is extremely important, participation proves difficult at times due to budget and staff limitations.

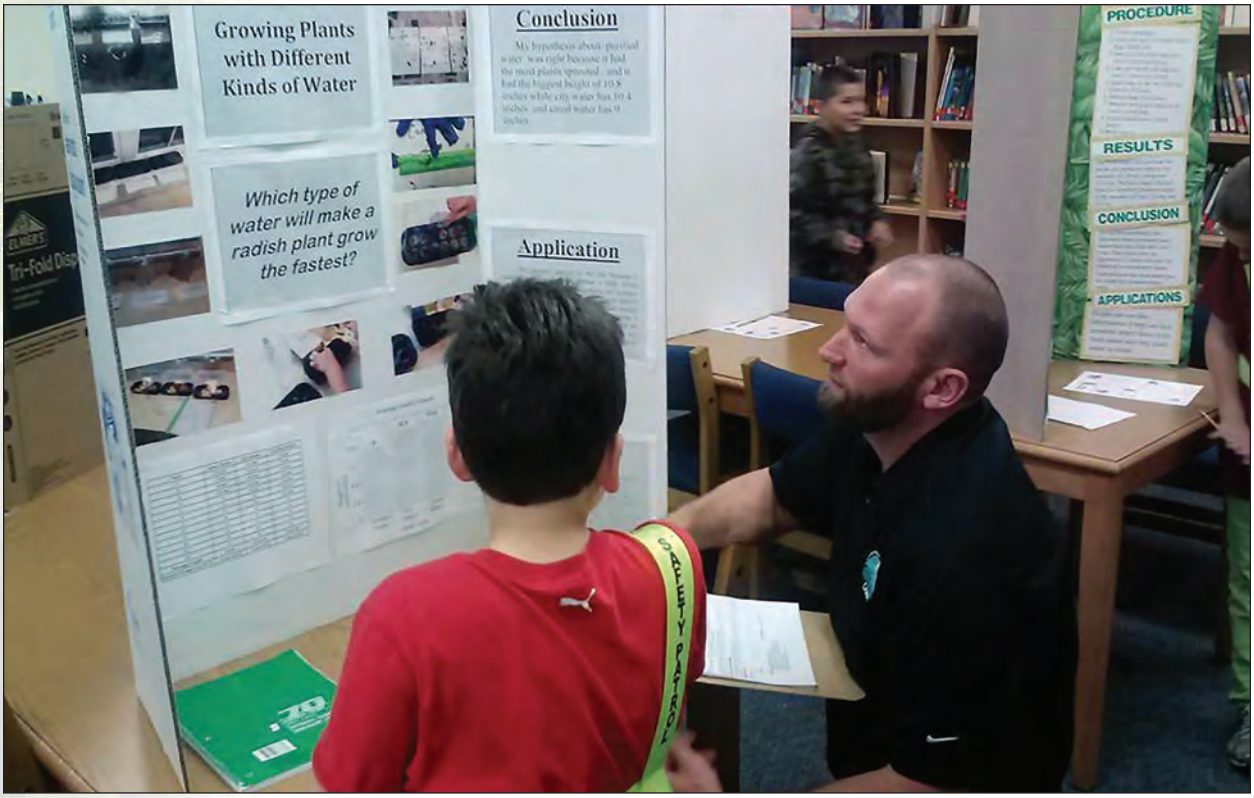
*4.3.2 / **Current Status of Education and Outreach at St. Martins Marsh Aquatic Preserve***

SMMAP strives to provide accurate and comprehendible information about the natural resources within SMMAP to the stakeholders, general public, and local, state, and federal agencies. Education and outreach play a crucial role in the management of SMMAP. A wide variety of information is available in the form of flyers, pamphlets, kiosks, educational brochures, and signage. While some of this literature is created in-house, staff also distribute educational materials from partnering agencies that are relevant to SMMAP. This literature is distributed to the public at public events throughout the year. Information about SMMAP is displayed at permanent kiosks located throughout Citrus County (Map 16).Various stakeholders and other state, local, and government agencies also distribute information regarding the aquatic preserve. Information ranges from proper uses of vessels and the various ecosystems within the aquatic preserve, to information on the Aquatic Preserve Program and FCO. An informational video featuring SMMAP is on display in the CRPSP's visitor center, as well as two living educational displays, which are maintained by aquatic preserve staff. Signage and interpretive materials are on display and literature is available to the public free of charge.

In addition to posted and distributed literature, staff also attends various local and regional meetings and participate in working groups relating to SMMAP. Involvement in these types of meetings is important to relay relevant information, such as data trends, to ensure the protection, preservation, and enhancement of the natural resources and to encourage sound decision making regarding both land use and natural resource management strategies. Furthermore, staff also participates in various local events to not only promote the aquatic preserve, but also to encourage sound environmental stewardship and address the importance of proper use and management of the natural resources. Examples of these community based events are: FWC's Kids' Fishing Clinic, National Estuaries Day, Ocean Conservancy's International Coastal Clean-Up, Save Our Waters Week, and the Florida Manatee Festival in Crystal River. Staff



Map 16 / Kiosk locations for St. Martins Marsh Aquatic Preserve.



Aquatic preserve staff are involved in various education and outreach opportunities in area schools.

partners with CRPSP to host an Earth Day celebration and with Citrus County School's Marine Science Station to host National Estuaries Day events annually.

SMMAP staff also work with local entities to provide educational programs to specific groups throughout the community. Partnerships with public libraries, elementary schools, and various non-profit organizations make it possible for scientific presentations and grade school activities that bring SMMAP to land. Numerous scientific presentations have been conducted by SMMAP staff to visitors of the Withlacoochee Gulf Preserve and varying other non-profit user groups. Staff have also created an elementary level curriculum which is used as part of the Friends of the Crystal River Parks' Summer Camp program, as well as the Sumter County Library System's Science Expo Program. Bringing SMMAP to young minds aids in accomplishing FCO's mission to conserve and restore Florida's coastal and aquatic resources for the benefit of people and the environment by getting them involved at an early age.

*4.3.3 / **Issue One, continued: Water Quality***

Goal Two: Provide timely and accurate water quality data and information to the public and other entities/agencies.

Objective Two: Utilize a variety of methods to inform the public and other entities regarding water quality conditions, the importance of water quality, and suggestions to improve water quality within SMMAP.

Integrated Strategy One: Utilize educational signage at strategic access points to SMMAP to educate the public on the ecological significance of the bay and how the public can assist in conserving natural resources.

Integrate Strategy Two: Coordinate and participate in public lectures and other events where staff can address water quality issues and discuss methods for improving water quality.

Integrated Strategy Three: Provide and/or create opportunities for the public to volunteer to assist with monitoring efforts and unique events (i.e. Earth Day).

Goal Two, Objective Two – Performance Measure One: Create new, and revise existing, informational brochures to distribute to the public. Maintain and update all SMMAP's kiosk locations as necessary.

Goal Two, Objective Two – Performance Measure Two: Track number of attendees of public lecture and outreach events relating to water quality in the area.

*4.3.4 / **Issue Two continued: Management and Protection of Seagrass***

Goal One, continued from 4.2.4 Management and Protection of Seagrasses

Goal One: Manage seagrass communities through research and monitoring, education and outreach efforts, continued resource management, and collaborative mapping efforts with other state agencies to effectively protect and maintain this habitat as a valuable natural resource throughout SMMAP.

Objective Two: Promote the importance of seagrass habitats by generating a variety of informational outlets that target recreational, commercial, and scientific user groups operating in SMMAP.

Integrated Strategy One: Update the current SMMAP brochures to include additional information on the importance of seagrass habitat, water quality, and sound user practices that can be used to prevent destruction of seagrasses.

Integrated Strategy Two: Repair, replace, or install education signage pertaining to resource protection at public and private boat ramps and marinas throughout SMMAP. Provide educational and informational materials, such as boater's guides and brochures to local businesses, marinas, and tour operators.

Integrated Strategy Three: Continue to participate in education and outreach events throughout the surrounding areas to promote the importance of seagrass and other estuarine habitats.

Goal One, Objective Two – Performance Measure One: Produce and acquire brochures and signage informing users of SMMAP's research, proper boating practices, and general information on the importance of seagrasses.

Goal One, Objective Two – Performance Measure Two: Track number of signs that are repaired and/or installed.

Goal One, Objective Two – Performance Measure Three: Track number of brochures distributed.

*4.3.5 / **Issue Three continued: Natural Resource Obstacles***

Goal Two: Educate the public about the importance of SMMAP's history, natural resources, and cultural resources.

Objective One: Partner with other agencies and/or non-governmental organizations to promote greater understanding and interpretation of resources.

Integrated Strategy One: Repair, replace, or install up to date signage and kiosks to educate the public on SMMAP and its resources.

Integrated Strategy Two: Develop an informational brochure on the current efforts employed by SMMAP's water quality, seagrass. And resource management programs. This information will be distributed at local festivals, workshops, and events. SMMAP staff is responsible for updating information as needed.

Goal Two, Objective One – Performance Measure: Develop, distribute, and track quantities of educational materials to other government entities, ecotourism businesses and the public. Update documents every five years.

Objective Two: Partner with state, county, and municipal parks to incorporate information on SMMAP history and resources into guided tours, signage, staff training, and promotional materials.

Integrated Strategy One: Provide interpretive training and literature for tour guides on natural and cultural resources.

Integrated Strategy Two: Provide training for staff of local parks and other destinations.

Goal One, Objective Two – Performance Measure: Distribute SMMAP information to appropriate outlets. This will be based on, or controlled by, the amount of brochures distributed annually. Track locations, number, and content of brochures distributed.

Goal One, Objective Two – Performance Measure: Track number of tour guides and staff of local parks trained.

*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 for public access management in FCO managed areas is to "promote and manage public use of our preserves and reserves that supports the research, education, and stewardship mission of FCO."

A group of kayakers paddling along the Salt River.

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 St. Martins Marsh Aquatic Preserve***

Historically, public use in SMMAP has been dominated by ecotourism and consumptive commercial and recreational fisheries. Boating, birding, camping, canoeing, kayaking, and snorkeling provide a unique opportunity to explore SMMAP. There are numerous eco-tour operations that provide a variety of ways to view and experience SMMAP including guided fishing and scalloping charters, airboat tours, and guided kayak trips. The aquatic preserve is home to a variety of species of migratory and wading birds including roseate spoonbills, great blue heron, osprey (*Pandion halieetus*), white pelicans, and wood storks, making SMMAP ideal for birders and photographers.

The nutrient exchange between the marshes and the Gulf of Mexico makes the salt marsh a significant area of primary production and a nursery ground for commercial and recreational fish species. Species typically harvested in SMMAP are oysters, crabs, scallops, and shrimp.

Much of the preserves boundaries are buffered by CRPSP to the east and the Chassahowitzka National Wildlife Refuge to the south. These adjacent publically owned conservation areas help preserve some of the most extensive and productive seagrass beds in the nation. These seagrass beds supports most of the commercial and recreational species that are harvested each year. Cooperative efforts between local, state, and federal agencies have been critical in maintaining the pristine qualities of SMMAP. Interagency efforts have been largely responsible for the improvement of public access, shoreline restoration, interpretive signage, data collection, and resource management within SMMAP.

Public Access

SMMAP is composed of open water, mangrove islands, several inlet bays, tidal rivers and creeks, salt marsh, and adjoins upland hammock islands. Public access to the aquatic preserve is through the use of boat ramps and kayak/canoe launches. There are 13 major public boat ramps that provide access to SMMAP (Map 17), some of which are large marine facilities. Most of the major marinas provide boat ramps, docking, fueling, dry slips and ship stores. Staff continues to post informational signs

and install kiosks at most access points to keep the public informed of pertinent issues and general information about SMMAP. Staff coordinates signage with other agencies in the region to effectively convey information.

User Groups

One of the most popular uses of SMMAP is hook and line recreational fishing. The shallow water grass flats are also attractive to the growing number of fly fisherman who travel to SMMAP for trophy fish. Species of particular interest include: snook, snapper, sheepshead, red drum, spotted seatrout, grouper, shark, bluefish (*Pomatomus saltatrix*), mackerel, and cobia. The seagrass supports most of the commercial and recreational species that are harvested each year. Commercial harvest of blue crabs, stone crabs, mullet, and shrimp provides livelihoods for many local families from fisherman, to dockworkers, to seafood houses and restaurants. Commercial and recreational shellfish harvesting of oysters is approved by DACS in areas of SMMAP (Maps 8 and 9). Please check with the Division of Aquaculture for more information. (www.floridaaquaculture.com)

Annual recreational scallop harvest attracts visitors from across the nation during the summer months, generating revenue and jobs for local communities; in company with the Steinhatchee area in the Big Bend, the coastal waters in SMMAP are considered the state's most prime scallop harvesting grounds. In 2003, University of Florida's Institute of Food and Agricultural Sciences conducted a survey with local businesses and reported that Citrus County had an increase in revenue of nearly $1.5 million during scallop season. In addition to increased revenue, the increasing popularity of scalloping has created multiple job opportunities (Stevens et al., 2004).

The extensive seagrass meadows and shallow backwater estuaries of the SMMAP provide unique opportunities for birding, fishing, snorkeling, and photography. Canoes and kayaks are excellent ways to access the remote mangrove islands and tidal marshes of the Nature Coast. The Citrus County Kayak/Canoe Trail is a great route for paddlers to explore this coastline; this trail begins in the Crystal River and follows the coastline south to the Homosassa River, and eventually the Chassahowitzka River. Additionally, the Florida Circumnavigation Saltwater Paddling Trail passes through SMMAP. This paddling trail was created by the DEP in coordination with the Office of Greenways and Trails. The 1,500 mile paddling trail runs from Big Lagoon State Park near Pensacola, through the Big Bend, around the peninsula, to Fort Clinch State Park near Jacksonville. Paddlers should be well prepared, and always file a float plan. Maps, access points, and photos of the trail can be downloaded at: (http://www.dep.state.fl.us/gwt/paddling/saltwater.htm).

4.4.2 / Current Status of Public Use at St. Martins Marsh Aquatic Preserve

SMMAP encourages sustainable use of natural resources while minimizing user impacts. Nutrient exchange between the marshes and the Gulf of Mexico makes the salt marsh a significant area of primary production and a nursery ground for commercial and recreational fish species. Public support and participation are imperative to protecting natural resources. Strong citizen support is vital to the success of SMMAP's programs. Public participation in resource management enables them to understand the important ecological and economic issues of the system.

Consumptive Use

The seagrass supports most of the commercial and recreational species that are harvested each year. The grass flats, oyster bars, and mangroves provide productive and challenging habitats for saltwater anglers; additionally, SMMAP provides critical habitat for the bay scallop. In the past, it was estimated that "approximately 1,500 people visit SMMAP each week during scallop season and generate upwards of $3 to $5 million in tourism revenue each summer" (Leary, 2001). The public's interest in scalloping continues to increase each year. The increased number of boaters increases the potential risk for damage to the natural resources, especially seagrasses.

To avoid damage to seagrass beds, boaters are encouraged to use bathymetry maps and/or consult with local vendors about the area. The draw of these recreational and commercial species fuel local economies; loss of critical habitat for these species could potentially negatively impact local economies. SMMAP staff have partnered with FWC to create and post signage at public access points (i.e. boat ramps) informing the public about proper techniques to avoid damaging the seagrasses and other natural resources. Cooperative efforts between local, state, and federal agencies have been critical in maintaining the pristine qualities of SMMAP. Interagency efforts have been largely responsible for the improvement of public access, shoreline restoration, interpretive signage, data collection, and resource management within SMMAP.

*4.4.3 / **Issue Four: Public Use***

SMMAP encourages sustainable use of natural resources while minimizing user impacts. SMMAP provides many opportunities to both recreational and commercial users. Public support and interagency participation are imperative to protecting natural resources. Public participation in resource management enables them to understand the importance of protecting the resource while encouraging recreational and commercial use.

Goal One: Maintain a safe and natural environment for SMMAP's wildlife, habitats, and user groups.

Objective One: Facilitate research to identify human use conflicts with natural resources.

Integrated Strategy One: Work with law enforcement and other resource management entities to identify and address uses within SMMAP that are not water dependent, potentially illegal, or harmful to natural resources.

Integrated Strategy Two: Partner with other agencies to develop and distribute information identifying potential use conflicts and methods of prevention.

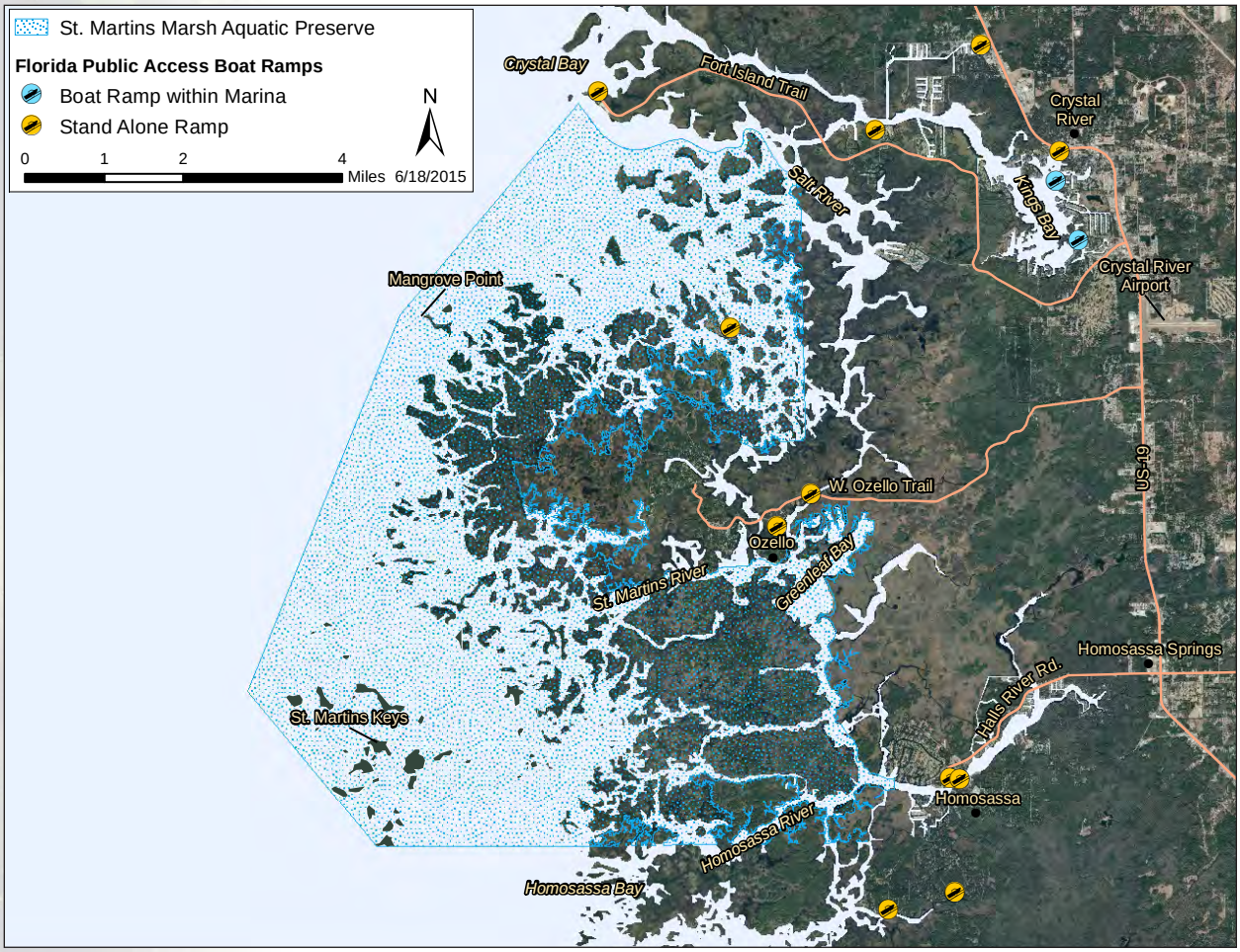
Goal One, Objective One – Performance Measure One: Maintain relationships with local law enforcement to understand, prevent, and deter potential threats to the resources.

Goal One, Objective One – Performance Measure Two: Continue to attend meetings with regulatory staff to provide updates and discuss relevant issues within SMMAP.

Goal One, Objective One – Performance Measure Three: Provide timely and accurate technical information to the appropriate agencies and offices.

Objective Two: Reduce the amount of debris, contaminants, and other resource damages associated with user group activities.

Integrated Strategy One: Understand and address consumptive use impacts from fisheries utilizing gear and methods that cause potential harm to the resource, such as shrimping, crabbing, and scalloping, while recognizing the importance to local economies.



Map 17 / Public access at St. Martins Marsh Aquatic Preserve.

Integrated Strategy Two: Promote awareness of proper boating practices to reduce prop scarring in seagrasses and benthic communities. This includes, but is not limited to, increasing or replacing legally enforceable regulatory signage as needed at various boat ramps throughout Citrus County.

Integrated Strategy Three: Coordinate and participate in projects that remove or make use of debris within SMMAP.

Integrated Strategy Four: Develop and distribute informational brochures and/or participate in local meetings to educate user groups of potential impacts to the natural resources associated with user activities.

Goal One, Objective Two – Performance Measure One: Continue to produce informational signage to address issues. Track number and content of signs produced.

Goal One, Objective Two – Performance Measure Two: Partner with local citizens, state, and federal agencies to conduct annual marine debris clean-up events. Track number of events and amount of debris removed.

Goal Two: Promote low-impact, sustainable recreational opportunities.

Objective One: Increase awareness of non-consumptive use opportunities such as paddle boarding, sailing, kayaking, canoeing, swimming, and snorkeling.

Integrated Strategy One: Identify appropriate locations for paddling launch sites and desirable destinations to access SMMAP via kayak or canoe. FWC recommends that SMMAP staff coordinate with FWC's Office of Public Access and Wildlife Viewing Services staff which has worked closely with paddling organizations in developing paddling information, trails, and wildlife viewing opportunities in Florida.

Integrated Strategy Two: Work with other resource management agencies and local vendors to educate users of the unique recreational opportunities in SMMAP. This includes providing informational kiosks and educating guides on historical locations, birding and hiking trails, and kayak and canoeing trails (i.e. the Nature Coast Canoe and Kayak Paddling Trail). http://floridabirdingtrail.com/index.php/trip/trail/Nature_Coast_Canoe_and_Kayak_Trail/

Goal Two, Objective One – Performance Measure One: Provide literature to local guides, eco-tour operators, and marinas to help educate and encourage responsible use of the resources within SMMAP. Track quantity of literature provided.

Goal Two, Objective One – Performance Measure Three: Hold regular meetings with adjacent land managers and government agencies to promote expansion of non-consumptive activities (e.g. kayaking, nature viewing).

Sunset at the mouth of the Crystal River.

Part Three

Additional Plans

Chapter Five

Administrative Plan

The success of the St. Martins Marsh Aquatic Preserve's (SMMAP's) research, education, and resource management programs depends upon effective administrative strategies. The objectives of SMMAP's administrative plan include:

1. To supervise and administer programs and maintain facilities;
2. To comply with all legal rules, contracts, agreements, and regulations;
3. To maintain all records needed for operating, budgeting, planning, and purchasing; and
4. To communicate and coordinate with all entities involved in research, education, commercial, and recreational utilization or management within SMMAP.

Staffing

SMMAP staff consists of four permanent positions that also manage the largest aquatic preserve, Big Bend Seagrasses Aquatic Preserve. The positions include one select exempt service (SES), and three full-time equivalent (FTE) positions.

Aquatic Preserve Manager (SES) - The position supervises three staff members and is responsible for insuring that work assignments and reviews are completed satisfactorily and on time. The supervisor directs project management, administration, budget, operations, and facilitates visiting investigators.

Environmental Specialist II (FTE) – The position is responsible for data collection and data management for the two aquatic preserves' seagrass monitoring programs. Works with supervisor to organize and implement annual marine debris clean up events and responsible for preventative maintenance on vehicles, vessels and vessel trailers.

Environmental Specialist I (FTE) – The position responsible for managing the two aquatic preserve's continuous water quality programs. Handles calibration, deployment, and annual metadata report for eight water quality stations. Also, plans and organizes education and outreach events to promote the aquatic preserves and the importance of conserving natural resources. Plans and implements resource monitoring activities including seagrass, water quality, and restoration activities. Enters, analyzes, and interprets all data collected during monitoring activities.

Administrative Assistant I (FTE) - Submits all purchase orders and invoices, tracks budget through QuickBooks and reconciles to Florida Accounting Information Resource (FLAIR), enters monthly reports to Florida Equipment Electronic Tracking (FLEET) management system and OCULUS (for both fuel and purchasing cards), reviews p- card transactions for staff, maintains files, answers the telephone and provides visitor services.

Each of these positions is state funded. In order to run an effective program and accomplish the goals set out in this plan, adequate staffing is critical. Given the complexity of SMMAP, additional staff may be necessary to continue adequate research and monitoring efforts within SMMAP.

Projected Staffing Needs

Over the next 10 years, as development increases throughout the Springs Coast, additional staff will be critical to ensure the quality of current and future restoration projects, research and monitoring efforts, and expanding the education and outreach program. Two and sometimes three staff members are required aboard vessels when water-based monitoring activities are initiated in the ongoing management of SMMAP to comply with proper safety procedures. As funds become available, these positions will be needed:

Education and Outreach Specialist II (FTE) - Organize and conduct natural and cultural history interpretive talks and education programs, perform speaking engagements promoting preservation of SMMAP and public awareness of the program's objectives.

Environmental Specialist II (FTE) - Perform all grant administration activities including locating vendors, processing payments to vendors, and coordinating staff for restoration projects within SMMAP. The position would work with other state, local and federal agencies on restoration projects in SMMAP and adjacent conservation lands.

Environmental Specialist I (FTE) - Full time position which would be dedicated to field operations. The position would be assisting current staff when conducting research and monitoring activities, as well as any other mission critical or necessary tasks.

Staff removing debris identified during annual seagrass monitoring off the St. Martins Keys.

Chapter Six

Facilities Plan

Facilities

The St. Martins Marsh Aquatic Preserve (SMMAP) office is housed within the Crystal River Preserve State Park facility located on the north side of the city of Crystal River at 3266 North Sailboat Avenue, Crystal River, Florida, 34428. The facility includes a visitor center, conference room, staff office space and laboratory space totaling 5,300 square feet. The complex also includes a 1,250 square foot pole barn under which vessels are stored, and a small storage shed. The facility has a boat ramp on the Crystal River for agency and staff use only.

Upon the occasion of a hurricane or major storm event, all vehicles and vessels of SMMAP will follow the procedures outlined in the SMMAP Hurricane Plan, which is updated annually.

Vehicles

SMMAP acquired one 2005 Chevrolet Silverado Hybrid in 2005 and one 2008 Ford F-150 in 2011. The current mileage on the Chevrolet is more than 120,000 miles, while the mileage on the Ford is more than 60,000 miles. Future needs will include total replacement of the Chevrolet as well as an increase in funding for fuel costs.

Vessels

18' airboat - In 1998, SMMAP acquired an 18 foot airboat and trailer that are utilized to accomplish program management goals, such as monitoring seagrass habitat in shallow areas. The trailer for this vessel was replaced in 2003. This vessel is maintained through monthly inspections performed by staff. Since its purchase, the engine has been replaced four times and the cage was replaced twice. Future

expenses over the next 10 years may include replacing the boat and/or trailer. Future expenses also include vessel and trailer maintenance, as well as fuel costs, at approximately $3,000 per year pending an increase in fuel prices.

22' Panga - In 2005, SMMAP acquired a 22 foot Panga outboard vessel and trailer, also utilized to accomplish program management goals. This vessel is maintained through monthly inspections performed by staff. The engine for this vessel was replaced in 2012. Future expenses also include vessel and trailer maintenance, as well as fuel costs, at approximately $3,000 per year pending an increase in fuel prices.

18' Wahoo – Surplus pending.

Kayaks - SMMAP acquired three kayaks - two of which are stored in SMMAP's pole barn area, and one is on loan to Rainbow Springs Aquatic Preserve.

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Appendix A

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

A.2 / ***Florida Statutes***

All the statutes can be found according to number at 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 267: Historical Resources

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 Codes***

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

Florida Administrative Code, Chapter 18-20: Florida Aquatic Preserves
www.dep.state.fl.us/legal/Rules/shared/18-20.pdf

Florida Administrative Code, Chapter 18-21: Sovereignty Submerged Lands Management
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)
www.dep.state.fl.us/legal/Rules/shared/62-302/62-302.pdf

Appendix B

Resource Data

B.1 / Glossary of Terms

References to these definitions can be found in Appendix B.2 (References).

aboriginal - the original biota of a geographical region. (Lincoln, Boxshall & Clark, 2003)

anaerobic - growing or occurring in the absence of molecular oxygen. (Lincoln et al., 2003)

aquaculture - the cultivation of aquatic organisms. (Lincoln et al., 2003)

autecology – the ecology of individual organisms and populations, including physiological ecology, animal behavior, and population dynamics. (Allaby, 2005)

codify - to arrange laws and rules systematically. (Neufeldt & Sparks, 1990)

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)

easement - a right that one may have in another's land. (Neufeldt & Sparks, 1990)

ecosystem - a community of organisms and their physical environment interacting as an ecological unit. (Lincoln et al., 2003)

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 [FWS], 2015)

endemic - native to, and restricted to, a particular geographical region. (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)

extinction - the disappearance of a species from a given habitat. (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)

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)

grainstone - a limestone consisting of grain supported particles without any mud matrix. (Allaby, 2008)

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

hydrophyte- a plant that is adapted morphologically and/or physiologically to grow in water or very wet environments. (Allaby, 2005)

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

intertidal zone - the shore zone between the highest and lowest tides; littoral. (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. (FWS, 2015)

lithophyte – a plant living on a rock surface. (Neuendorf, Mehl, & Jackson, 2011)

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 archaeology. (Lincoln et al., 2003)

mosaic - an organism comprising tissues of two or more genetic types; usually used with reference to plants. (Lincoln et al., 2003)

packstone - a limestone characterized by a grain supported texture, together with a lime-mud matrix. (Allaby, 2008)

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)

psammophyte - a plant growing or moving in unconsolidated sand. (Lincoln et al., 2003)

ruderal - pertaining to or living amongst rubbish or debris, or inhabiting disturbed sites. (Lincoln et al., 2003) (FNAI 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)

sessile - non-motile; permanently attached at the base. (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. A similar term is "species at risk," which is a general term for listed species as well as unlisted ones that are declining in population. Canada uses the term in its new "Species at Risk Act." "Imperiled species" is another general term for listed as well as unlisted species that are declining. (FWS, 2015)

sorption - to take in something through either absorption or adsorption. (Gorse & Martin, 2012)

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. (FWS, 2015)

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)

threatened species - an animal or plant species likely to become endangered within the foreseeable future throughout all or a significant portion of its range. (FWS, 2015)

turbid - cloudy; opaque with suspended matter. (Lincoln et al., 2003)

upland - land elevated above other land. (Neufeldt & Sparks, 1990)

vegetation - plant life or cover in an area; also used as a general term for plant life. (Lincoln et al., 2003)

wackestone - a limestone consisting of carbonate particles in a mud matrix supported structure. (Allaby, 2008)

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)

xeric - having very little moisture; tolerating or adapted to dry conditions. (Lincoln et al., 2003)

B.2 / ***References***

Allaby, M. (Ed.). (2005). *Oxford dictionary of ecology* (3rd ed.). Oxford, UK: Oxford University Press.

Allaby, M. (Ed.). (2008). *Oxford dictionary of earth sciences* (3rd ed.). Oxford, UK: Oxford University Press.

Amrhein, S. (2013, February 14). Florida city hopes manatees fill economic void left by retired nuclear plant. *NBC News*. Retrieved from http://usnews.nbcnews.com/_news/2013/02/14/16962212-florida-city-hopes-manatees-fill-economic-void-left-by-retired-nuclear-plant?lite

The Amy H. Remley Foundation, Inc. (2010). Restore the waters. Retrieved from www.amyhremleyfoundation.org

Armstrong, T. (2013, February 23). Superstorm of 1993 "Storm of the Century". National Oceanic and Atmospheric Administration, Silver Springs, MD. Retrieved from http://www.erh.noaa.gov/ilm/archive/Superstorm93/

Bash, E.C., & Pritchett, M.K. (2006). *A history of Crystal River, Florida*. USA: Crystal River Heritage Council.

Benson, A.J., Marelli, D.C. Frischer, M.E. Danforth, J.M., & Williams J.D. (2001). Establishment of the green mussel, *Perna viridis* (Linnaeus 1758), (Mollusca: Mytilidae) on the west coast of Florida. *Journal of Shellfish Research*, *20* (1), 21-29.

Bjork R. & Powell G.V.N., (1996). Roseate Spoonbill. In J.A. Rodgers, Jr., H.W. Kale II, and H.T. Smith (Eds.). *Rare and endangered biota of Florida, Vol. V: Birds* (295 – 308). Gainesville, FL: University Press of Florida.

Brooks, H.K. (1966). Geological history of the Suwannee River: In Miocene-Pliocene Series of the Georgia Florida area. *Southeastern Geological Society Guidebook* (Vol. 12). Tallahassee, FL: Florida Geological Survey.

Carlson, P., & Madley, K. (2007). Statewide Summary for Florida. In: Handley, L., D. Altsman, and R. DeMay, (Eds.), *Seagrass status and trends in the northern Gulf of Mexico: 1940-2002* (U.S. Geological Survey Scientific Investigations Report 2006-5287 and U.S. Environmental Protection Agency 855-R-003) (pp. 99-114).

Carlson, P., & Yarbro, L. (2009). *SIMM-Seagrass integrated mapping and monitoring for the state of Florida: inventory of recent and current seagrass mapping and monitoring programs* (Year 1 Annual Report). Tallahassee, FL: Florida Department of Environmental Protection.

Citrus County Board of County Commissioners. (2006). Citrus County comprehensive plan. Retrieved from http://www.bocc.citrus.fl.us/plandev/landdev/comp_plan/comp_plan.htm

Cohen, M. (1979). *Food crisis in prehistory: Overpopulation and the origins of agriculture*. New Haven, CT: Yale University Press.

Copeland, R., Scott, T.M., & Lloyd, J.M. (1991). *Florida's ground water quality monitoring program: Hydrogeological framework* (Special Publication, No. 32). Tallahassee, FL: Florida Geological Survey

DeHaven, M. (2004). *Comprehensive shellfish harvesting area survey of Withlacoochee Bay, Levy County, Florida*. Tallahassee, FL: Florida Department of Agriculture and Consumer Services.

De Soto Trail. (n.d.). The De Soto Trail. Retrieved from http://floridadesototrail.com/trail_info_history.html

Deuerling, R.J., & MacGill, P.L. (1981). *Environmental geology series- Tarpon Springs sheet* (Map Series, No. 99). Tallahassee, FL: Florida Geological Survey.

Doody, J.P. (2008). *Saltmarsh conservation, management, and restoration: Coastal systems and continental margins*. Netherlands: Springer.

Duke Energy. (2013, February 5). Crystal River Nuclear Plant to be retired; company evaluating sites for potential new gas-fueled generation. Retrieved from http://www.duke-energy.com/news/releases/2013020501.asp

Duke Energy. (2015). Proposed new combined-cycle natural gas plant in Citrus County, Fla. Retrieved from http://www.duke-energy.com/CitrusNaturalGas/

Durako, M., Phillips, R., & Lewis, R. III, (1987). *The restoration and creation of seagrass meadows in the southeastern United States*. (Florida Marine Research Publications #42). St. Petersburg, FL: Florida Department of Natural Resources.

Ewel, K.C., Twilley, R.R., & Eong Ong, J. (1998). Different kinds of mangrove forests provide different goods and services. *Global Ecology and Biogeography Letters*, *7*, (1), 83-94.

Florida Department of Agriculture and Consumer Services. (2013). Withlacoochee State Forest. Retrieved from www.freshfromflorida.com/Divisions-Offices/Florida-Forest-Service/Our-Forests/State-Forests/Withlacoochee-State-Forest

Florida Department of Agriculture and Consumer Services. (2014). *Withlacoochee State Forest* [Brochure]. Tallahassee, FL: Florida Department of Agriculture and Consumer Services, Florida Forest Service.

Florida Department of Environmental Protection. (2004). *Crystal River Preserve State Park unit management plan*. Tallahassee, FL: Author.

Florida Department of Environmental Protection. (2005). *Homosassa Springs Wildlife State Park unit management plan*. Tallahassee, FL: Author.

Florida Department of Environmental Protection. (2008a). *Crystal River Archaeological State Park unit management plan*. Tallahassee, FL: Author.

Florida Department of Environmental Protection. (2008b). *Water quality assessment report: Springs Coast*. Tallahassee, FL: Author.

Florida Department of Environmental Protection. (2008c). *Yulee Sugar Mill Ruins Historic State Park unit management plan*. Tallahassee, FL: Author.

Florida Department of Environmental Protection. (2010). *Florida assessment of coastal trends (FACT)*. Tallahassee, FL: Author.

Florida Department of Environmental Protection. (2013). *Economic impact assessment-Florida State Park System*. Tallahassee, FL: Author.

Florida Department of Environmental Protection. (2014). *Nutrient TMDLs for Homosassa-Trotter-Pumphouse Springs Group, Bluebird Springs, and Hidden River Springs (WBIDs 1345G, 1348A, and 1348E)*. (Draft TMDL Report). Retrieved from http://www.dep.state.fl.us/water/tmdl/docs/tmdls/draft/gp5/Homosassa-TMDL-Draft.pdf

Florida Department of Environmental Protection. (n.d.-a.). Welcome to Crystal River Preserve State Park. Retrieved from https://www.floridastateparks.org/park/Crystal-River-Preserve

Florida Department of Environmental Protection. (n.d.-b). Welcome to Fort Cooper State Park. Retrieved from https://www.floridastateparks.org/park-history/Fort-Cooper

Florida Department of Natural Resources. (1987). *St. Martins Marsh Aquatic Preserve Management Plan*. Tallahassee, FL: Author.

Florida Fish and Wildlife Conservation Commission. (2016). Florida's listed species. Retrieved from http://www.myfwc.com/wildlifehabitats/imperiled/

Florida Fish and Wildlife Conservation Commission. (2015a). Species profiles. Retrieved from www.myfwc.com/wildlifehabitats/profiles

Florida Fish and Wildlife Conservation Commission. (2015b). Weed alerts. Retrieved from www.myfwc.com/wildlifehabitats/invasiveplants/weed-alerts

Florida Fish and Wildlife Conservation Commission. (2015c). Florida's exotic fish and wildlife. Retrieved from http://www.myfwc.com/wildlifehabitats/nonnatives/

Florida Fish and Wildlife Conservation Commission. (2015d). 2013 Annual landings summary by county [Data set].. Retrieved from http://myfwc.com/research/saltwater/fishstats/commercial-fisheries/landings-in-florida/

Florida Fish and Wildlife Conservation Commission. (n.d.) Bald eagle management. Retrieved from http://myfwc.com/wildlifehabitats/managed/bald-eagle/

Florida Geological Survey. (2001). Text to accompany the geologic map of Florida (Open-File Report 80). Tallahassee, FL: Florida Department of Environmental Protection, Florida Geological Survey. Retrieved from http://sofia.usgs.gov/publications/maps/florida_geology/OFR80.pdf

Florida Geological Survey. (2004). *Springs of Florida* (Bulletin No. 66). Tallahassee, FL: Author.

Florida Natural Areas Inventory. (2010). *Guide to the natural communities of Florida: 2010 edition*. Tallahassee, FL: Author.

Frazer, T., Notestein, S., Keller, S., & Jacoby, C. (2006). *Water quality characteristics of the nearshore Gulf coast waters adjacent to Citrus, Hernando, and Levy counties: Project COAST 1997-2005*. Gainesville, FL: Department of Fisheries and Aquatic Sciences, University of Florida.

Goldsmith & Company. (2013). A five-year strategic plan for economic development in Citrus County, Florida. Citrus County Economic Development Council. Retrieved from http://citrusedc.com

Gorse, C.J., & Martin, C.P. (2012). *Dictionary of construction, surveying and civil engineering*. Oxford, UK: Oxford University Press.

Grosse, A. (n.d.). Eastern indigo snake. Retrieved from Savannah River Ecology Laboratory Herpetology Program: http://srelherp.uga.edu/snakes/drycou.htm

Giuliano, W.M. (2013). *Wild hogs in Florida: Ecology and managemen*t. Retrieved from University of Florida IFAS Extension: http://edis.ifas.ufl.edu/uw322

Haq, B., Hardenbol, J., & Vail, P. (1987). Chronology of fluctuating sea levels since the Triassic. *Science*, Vol 235, p 1156-1167.

Heck, K.L. & Valentine, J.F. (2006). Plant-herbivore interactions in seagrass meadows. *Journal of Experimental Marine Biology and Ecology*. *330* (4), 420-436.

Hetter, K. (2013, October 4). 10 ultimate U.S. adventures. *Cable News Network*. Retrieved from http://www.cnn.com/2013/10/03/travel/lonely-planet-ultimate-adventures/

Homan, L., & Reilly, T. (2001). *Images of America: Citrus County*. Mt. Pleasant, SC: Arcadia Publishing.

Iverson, R.L., & Bittaker, H.F. (1986). Seagrass distribution and abundance in eastern Gulf of Mexico waters. *Estuarine, Coastal, and Shelf Science*, *22*, 577-602.

Johnson, R. (1998, April 8). Tiny Citrus County succeeds by promoting eco-tourism. *Wall Street Journal*. Retrieved from http://www.wsj.com/articles/SB891973072389416000

Johnson, S., & McGarrity, M. (2015). "Black Snakes": Identification and ecology. Retrieved from University of Florida IFAS Extension: http://edis.ifas.ufl.edu/uw251

Jud, Z.R., Nichols, P.K., & Layman, C.A. (2014). Broad salinity tolerance in the invasive lionfish *Pterois spp*. May facilitate estuarine colonization. *Environmental Biology of Fishes*, *98* (1), 1-9. http://dx.doi.org/10.1007/s10641-014-0242-y

Kals, E., Schumacher, D., & Montada, L. (1999). Emotional affinity toward nature as a motivational basis to protect nature. *Environment and Behavior*, *31* (2), 178-202. http://dx.doi.org/10.1177/00139169921972056

Kleen, J.M., & Breland, A.D. (2014). Increases in seasonal manatee (*Trichechus manatus latirostris*) abundance within Citrus County, Florida. *Aquatic Mammals*, *40* (1), 69-80.

Kolasa, K. V., & Craw, V. (2009) *Improving Seagrass Maps of Florida's Springs Coast Through Digital Imagery*. Paper presented at the meeting of the American Society of Photogrammetry and Remote Sensing (ASPRS), Baltimore, MD.

Leary, A., (2001, April 5) Limit on Bay Scallop Harvest Settles in for Another Year. *St. Petersburg Times*.

Lincoln, R.J., Boxshall, G.A., & Clark, P.F. (2003). A *dictionary of ecology, evolution and systematics*. New York: Cambridge University Press.

MacNeil, F.S. (1949). *Pleistocene shoreline in Florida and Georgia* (U.S. Geological Survey Professional Paper: 221-F). Washington, DC: United States Government Printing Office.

Manson, F.J., Loneragan, N.R., Skilleter, G.A., & Phinn, S.R. (2005). An evaluation of the evidence for linkages between mangroves and fisheries: A synthesis of the literature and identification of research directions. *Oceanography and Marine Biology: An Annual Review*, *43*, 485-515.

Mattson, R.A. (2000). Seagrass ecosystem characteristics and research and management needs in the Florida Big Bend. In S.A. Bortone (Ed.), *Seagrasses monitoring, ecology, physiology, and management* (pp. 259-277). Boca Raton, FL: CRC Press.

Mattson, R.A., Frazer, T.K., Hale, J., Blitch, S., Ahijevych, L. (2007). Florida Big Bend. *USGS Seagrass Status and Trends in the Northern Gulf of Mexico: 1940-2002* (pp. 171-188). Reston, VA: U.S. Geological Survey.

Miller, J.A. (1986). *Hydrogeological framework of the Floridan Aquifer System in Florida and in parts of Georgia, Alabama, and South Carolina* (U.S. Geological Survey Professional Paper 1403-F). Washington, DC: United States Government Printing Office.

Morris, R.B., & Morris J.B. (Eds). (1996). *Encyclopedia of American history* (7th ed.). New York: Harper & Row.

Morton, J.F. (1978). Brazilian pepper- Its impact on people, animals, and the environment. *Economic Botany*, *32* (4), 353-359. http://www.jstor.org/stable/4253975

National Oceanic and Atmospheric Administration. (1993). NWS service assessment. Retrieved from http://www.nws.noaa.gov/om/assessments/superstorm/superstorm.pdf

National Oceanic and Atmospheric Administration. (2012, July 19). Forecasting the "Storm of the Century". Retrieved from http://celebrating200years.noaa.gov/events/storm/welcome.html

National Oceanic and Atmospheric Administration. (2013). National coastal population report: population trends from 1970-2020. Retrieved from http://stateofthecoast.noaa.gov/features/coastal-population-report.pdf

National Oceanic and Atmospheric Administration. (2014). Climatogical summaries Inverness, FL Station: Precipitation and temperature, 2003-2014 [Data set]. Retrieved from http://www.ncdc.noaa.gov/cdo-web/search

Neuendorf, K.E. Mehl, J.P., & Jackson Jr., J.A. (Eds.) (2011). *Glossary of geology* (5th Ed.). Alexandria, VA: American Geosciences Institute.

Neufeldt, V., & Sparks, A.N. (1990). *Webster's new world dictionary* (3rd ed.). Cleveland, OH: Webster's New World Dictionaries.

Northwest Florida Water Management District. (2001). *Emerging waters: Springs of northwest Florida* [Brochure]. Retrieved from http://www.nwfwmd.state.fl.us/pubs/brochures/SpringsOfNorthwestFlorida/EmergingWaters.pdf

Orth, R.J., & van Montfrans, J. (1987). Utilization of a seagrass meadow and tidal marsh creek by blue crabs, *Callinectes sapidus*. Seasonal and annual variations with emphasis on post-settlement juveniles. *Marine Ecology Progress Series*, *41*, 283-294.

Perillo, G.M.E., Wolanski, E., Cahoon, D.R., & Brinson, M.M. (2009). *Coastal wetlands: An integrated ecosystem approach*. New York: Elsevier.

Pickering Jr., S., & Heivilin, F. (2006). Fuller's Earth. Kogel, J.E., Trivedi, N.C., Barker, J.M., Krukowski, S.T. (Eds.). *Industrial Minerals & Rocks* (pp. 373-381) (7th ed.). Littleton, CO: Society for Mining, Metallurgy, and Exploration.

Pirkle, W.A. (1956). Hawthorn and Alachua formations of Alachua County, Florida: *Quarterly Journal of the Florida Academy of Sciences, 19* (4), 197-240.

Pluckhahn, T.J., Thompson, V.D., & Weisman, B.R. (2010). Towards a new view of history and process at Crystal River (8Cl1). *Southeastern Archaeology*, *29* (1), 164-181.

Price, W.A. (1954). Dynamic environments: Reconnaissance mapping, geologic and geomorphic, of continental shelf of Gulf of Mexico. *Gulf Coast Association Geological Societies Transactions*, *4*, 75-107.

Puri, H.S. (1953). Zonation of the Ocala Group in Peninsular Florida (abstract). *Journal of Sedimentary Petrology, 23*, 130.

Puri, H.S. & Vernon, R. (1964). *Summary of the geology of Florida and a guidebook to classic exposures* (Special Publication. No. 5). Tallahassee, FL: Florida Geological Survey.

Ross, J. (2001, May 2). Tourism panel set to review its role. *St Petersburg Times*. Retrieved from http://www.sptimes.com/News/050201/Citrus/Tourism_panel_set_to_.shtml

Rupert, F. (1987). *Geomorphology of the St. Martin's Marsh Aquatic Preserve* (Florida Geological Survey Report). Tallahassee, FL: Florida Geological Survey.

Save the Manatee Club. (2010). Manatee information. Retrieved from www.savethemanatee.org

Scott, T. (1988). *The Lithostratigraphy of the Hawthorn Group (Miocene) of Florida* (Florida Geological Survey Bulletin No. 59). Tallahassee, FL: Florida Geological Survey.

Schmidt, W., Hoenstine, R.W., Knapp, M.S., Lane, E., Ogden Jr., G.M., & Scott, T.M. (1979). *Limestone dolomite and coquina resources of* Florida (Report of Investment, No. 88), Tallahassee, FL: Florida Geological Survey.

Sellards, E.H. (1913). *Origin of hardrock phosphates of Florida* (Florida Geological Survey Annual Report No. 5), (pp. 23-80).

Schänzel, H.A. & McIntosh, A. (2000). An insight into the personal and emotive context of wildlife viewing at the Penguin Place, Otago Peninsula, New Zealand. *Journal of Sustainable Tourism*, *8* (1), 36-52. http://dx.doi.org/10.1080/09669580008667348

Solomon, B.D., Corey-Luse, C.M., & Halvorsen, K.E. (2004). The Florida manatee and eco-tourism: Toward a safe minimum standard. *Ecological Economics*, Vol. 50, p 101-115.

Sorice, M.G., Shafer, C.S., & Dittion, R.B. (2005). Managing endangered species within the use-preservation paradox: The Florida manatee (*Trichechus manatus latirostris*) as a tourism attraction. *Environmental Management*, *37*, (1). 69-83. http://dx.doi.org/10.1007/s00267-004-0125-7

Southwest Florida Water Management District. (2000). *Crystal River/Kings Bay surface water improvement and management plan*. Tampa, FL: Author.

Southwest Florida Water Management District. (2001a). *Springs Coast comprehensive watershed management plan*. Tampa, FL: Author.

Southwest Florida Water Management District (2001b). *Withlacoochee River comprehensive watershed management plan*. Tampa, FL: Author.

Southwest Florida Water Management District. (2005). *Plan for the use and management of the Chassahowitzka Riverine Swamp Sanctuary*. Tampa, FL: Author.

Southwest Florida Water Management District. (2013). *Surface water improvement and management program: 2013 annual report*. Tampa, FL: Author.

Spencer, S. (1984). *Geology of Citrus County, Florida* (Open File Report 5). Tallahassee, FL: Florida Geological Survey.

Stevens, T., Adams, C., Hodges, A., & Mulkey, D. (2004). *Economic impact of the re-opened scalloping area for Citrus County, Florida-2003* (FE493). Gainesville, FL: University of Florida, Department of Food and Resource Economics, University of Florida. Retrieved from http://edis.ifas.ufl.edu

Stewart, J.W. (1980). *Areas of natural recharge to the Floridan Aquifer in Florida*. Retrieved from University of Florida Digital Collections: http://ufdc.ufl.edu/UF90000358/00001/1x?vo=11

Stynes, D.J. (2011). *Economic benefits to the local communities from national park visitation and payroll, 2010* (Natural Resource Report NPS/NRSS/EQD/NRR—2011/481). Fort Collins, CO: National Park Service.

Tanner, W.F. (1960). Florida coastal classification. In W.B. Johnson (Ed.), *Gulf Coast Association Geological Societies Transactions, Vol. 10*. (pp 259-266). Jackson, MS: Gulf Coast Association of Geological Societies.

University of Florida. (2014). Florida estimates of population 2014: *Florida Population Studies* (Bulletin 168). Gainesville, FL: Author.

University of Florida. (n.d.-a). Chinese tallow. Retrieved from http://www.sfrc.ufl.edu/Extension/4h/trees/Chinese_tallow/index.html

University of Florida. (n.d.-b). Florida's most invasive plants. Retrieved from http://plants.ifas.ufl.edu/manage/why-manage-plants/floridas-most-invasive-plants

University of Florida. (n.d.-c). Gulf Coast salt marshes. Retrieved from: http://soils.ifas.ufl.edu/wetlandextension/types/gulfcoastmarsh.htm

U. S. Census Bureau. (2016). Population Data. Retrieved from website: http://quickfacts.census.gov/table/PST045215/1232400

U.S. Census Bureau. (2010). *Coastline population trends in the United States: 1960 to 2008* (P25-1139). Washington, DC: Author. Retrieved from http://www.census.gov/prod/2010pubs/p25-1139.pdf

U.S. Department of Agriculture. (1988). *Soil survey of Citrus County*. Washington, DC: Author.

U.S. Environmental Protection Agency (n.d.). Principles for the ecological restoration of aquatic resources. Retrieved from http://www.epa.gov/owow/restore/principles.html

U.S. Fish and Wildlife Service. (2012). *Chassahowitzka National Wildlife Refuge comprehensive conservation plan*. Atlanta, GA: U.S. Fish and Wildlife Service.

U.S. Fish and Wildlife Service. (n.d.-a). Crystal River National Wildlife Refuge. Retrieved from: http://www.fws.gov/refuge/Crystal_River/

U.S. Fish and Wildlife Service. (n.d.-b). Species profile for wood stork (*Mycteria americana*). Retrieved from http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B06O

U.S. Fish and Wildlife Service. (2015). Endangered species glossary. Retrieved from http://www.fws.gov/endangered/about/glossary.html

U.S. Food and Drug Administration. (2013). *Guide for the control of molluscan shellfish 2013 revision*. Retrieved from http://www.fda.gov/downloads/Food/GuidanceRegulation/FederalStateFoodPrograms/UCM415522.pdf

Vernon, R. (1951). *Geology of Citrus and Levy counties, Florida* (Geological Survey Bulletin No. 33). Tallahassee, FL: Florida Geological Survey.

White, W. (1970). *Geomorphology of the Florida peninsula* (Bulletin No. 51). Tallahassee, FL: Florida Geological Survey.

Wolfe, S.H. (Ed.). (1990). A*n ecological characterization of the Florida Springs Coast: Pithlachascotee to Waccasassa Rivers* (U.S. Fish and Wildlife Services Biological Report. Vol. 90, No. 21).

Woodward-Clyde Consultants & Continental Shelf Associates, Inc., (1985). *An Addendum and Update of the Southwest Florida Shelf Ecosystem Study Years I and II Marine Habitat Atlas* (Vol. 2.)

Worth, J. (1998). *Timucuan chiefdoms of Spanish Florida* (Volume 2: Resistance and destruction). Gainesville, FL: University Press of Florida. 280 p.

Yarbro, L.A. & Carlson, P.R., Jr. (Eds.). (2011). *Seagrass Integrated Mapping and Monitoring Program: Mapping and monitoring report No. 1* (Fish and Wildlife Research Institute Technical Report TR-17). St. Petersburg, FL: Florida Fish and Wildlife Conservation Commission, Fish and Wildlife Research Institute.

B.3.1 / Native Species List

Common Name	Species Name	Status
Legend: FT = Federally and State Designated Threatened • **FE** = Federally & 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 • **C** = commercially exploited		
Plants		
Slender threeseed mercury	*Acalypha gracilens*	
Red maple	*Acer rubrum*	
	Acetabularia crenulata	
Oppositeleaf spotflower	*Acmella oppositifolia*	
Inland giant leather fern	*Acrostichum danaeifolium*	
Brittle maidenhair fern	*Adiantum tenerum*	SE
Beach false foxglove	*Agalinis fasciculata*	
Saltmarsh false foxglove	*Agalinis maritima*	
Purple false foxglove	*Agalinis purpurea*	
Incised groove-bur	*Agrimonia incisa*	SE
Southern colicroot	*Aletris obovata*	
Common ragweed	*Ambrosia artemisiifolia*	
False indigobush	*Amorpha fruticosa*	
Peppervine	*Ampelopsis arborea*	
Stiff bluestar	*Amsonia rigida*	
	Anadyomene stellata	
Splitbeard bluestem	*Andropogon ternarius*	
Chalky bluestem	*Andropogon virginicus glaucus*	
Green silkscale	*Anthaenantia villosa*	
Devils' walking stick	*Aralia spinosa*	
Marlberry	*Ardisia escallonioides*	
Greendragon	*Arisaema dracontium*	
Wiregrass	*Aristida beyrichiana*	
Big threeawn	*Aristida condensata*	
Bottlebrush threeawn	*Aristida spiciformis*	
Virginia snakeroot	*Aristolochia serpentaria*	
Florida indian plantain	*Arnoglossum floridanum*	
Butterfly milkweed, butterflyweed	*Asclepias tubersoa*	
Whorled milkweed	*Asclepias verticillata*	
Slimleaf pawpaw, narrowleaf pawpaw	*Asimina angustifolia*	
Ebony spleenwort	*Asplenium platyneuron*	
Florida milkvetch	*Astragalus obcordatus*	
Smooth yellow false foxglove	*Aureolaria flava*	
Fernleaf yellow false foxglove	*Aureolaria pedicularia*	
Black mangrove	*Avicennia germinans*	
	Avrainvillea levis	
Common carpetgrass	*Axonopus fissifolius*	
Big carpetgrass	*Axonopus furcatus*	
Saltwater false willow	*Baccharis angustifolia*	
Silverling	*Baccharis glomulerifolia*	
Sea myrtle, eastern baccharis	*Baccharis halimifolia*	
Blue waterhyssop	*Bacopa caroliniana*	
Herb-of-grace	*Bacopa monnieri*	
Pineland wild indigo	*Baptisia lecontei*	
Saltwort	*Batis maritima*	
	Batophora oerstedi	
Tarflower	*Bejaria racemosa*	
Rattan vine, supplejack	*Berchemia scandens*	
Florida greeneyes	*Berlandiera subacaulis*	

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Beggarticks, spanish needles	*Bidens alba*	
Spanish needles	*Bidens bipinnata*	
Smooth beggarticks	*Bidens laevis*	
Smallfruit beggarticks	*Bidens mitis*	
Crossvine	*Bignonia capreolata*	
Toothed midsorus fern	*Blechnum serrulatum*	
False nettle	*Boehmeria cylindrica*	
Seaside oxeye daisy	*Borrichia frutescens*	
American bluehearts	*Buchnera americana*	
Capillary hairsedge	*Bulbostylis ciliatifolia*	
Gumbo limbo	*Bursera simaruba*	
Gray n+A421icker	*Caesalpinia bonduc*	
Scarlet calamint	*Calamintha coccinea*	
American beautyberry	*Callicarpa americana*	
Bearded grasspink	*Calopogon barbatus*	
Tuberous grasspink	*Calopogon tuberosus*	
Hedge false bindweed	*Calystegia sepium*	
Florida bellflower	*Campanula floridana*	
Trumpet creeper, trumpet vine	*Campsis radicans*	
Sandywoods sedge	*Carex dasycarpa*	
Florida paintbrush	*Carphephorus corymbosus*	
Vanillaleaf, vanilla plant	*Carphephorus odoratissimus*	
Hairy chaffhead	*Carphephorus paniculatus*	
American hornbeam	*Carpinus caroliniana*	
Water hickory	*Carya aquatica*	
Pignut hickory	*Carya glabra*	
Chinquapin	*Castanea pumila*	
Southern catalpa	*Catalpa bignonioides*	
	Caulerpa ashmeadii	
	Caulerpa cupressoides	
	Caulerpa langinosa	
	Caulerpa mexicana	
	Caulerpa pasploides	
	Caulerpa prolifera	
	Caulerpa racemosa	
New Jersey tea, redroot	*Ceanothus americanus*	
Sugarberry	*Celtis laevigata*	
Slender sandbur	*Cenchrus gracillimus*	
Coastal sandbur	*Cenchrus incertus*	
Spadeleaf	*Centella asiatica*	
Spurred butterfly pea	*Centrosema virginianum*	
Common buttonbush	*Cephalanthus occidentalis*	
Coontail	*Ceratophyllum demersum*	
Eastern redbud	*Cercis canadensis*	
Partridge pea	*Chamaecrista fasciculata*	
Sensitive pea	*Chamaecrista nictitans*	
Longleaf chasmanthium	*Chasmanthium laxum*	
Shiny woodoats	*Chasmanthium nitidum*	
Snowberry, milkberry	*Chiococca alba*	
Fringetree	*Chionanthus virginicus*	
Cottony golden aster	*Chrysopsis gossypina*	
Maryland golden aster	*Chrysopsis mariana*	
Scrubland golden aster	*Chrysopsis subulata*	

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Citrus	*Citrus* spp.	
Sawgrass	*Cladium jamaicense*	
Pine hyacinth	*Clematis baldwinii*	
Netleaf leather-flower	*Clematis reticulata*	
Butterfly pea	*Clitoria mariana*	
Tread-softly	*Cnidoscolus stimulosus*	
	Codium isthmocladum	
Whitemouth dayflower	*Commelina erecta*	
Buttonwood	*Conocarpus erectus*	
Blue mistflower, ageratum	*Conoclinium coelestinum*	
American squawroot	*Conopholis americana*	
Canadian horseweed	*Conzya canadensis*	
Florida tickseed	*Coreopsis floridana*	
Leavenworth's tickseed	*Coreopsis leavenworthii*	
Roughleaf dogwood	*Cornus asperifolia*	
Flowering dogwood	*Cornus florida*	
Swamp dogwood	*Cornus foemina*	
May haw, Michaux's hawthorne	*Crataegus michauxii*	
String-lily, seven-sisters	*Crinum americanum*	
Slender scratchdaisy	*Croptilon divaricatum*	
Pursh's rattlebox	*Crotalaria purshii*	
Rabbitbells	*Crotalaria rotundifolia*	
Silver croton	*Croton argyranthemus*	
Rushfoil, Michaux's croton	*Croton michauxii*	
Compact dodder	*Cuscata compacta*	
Bermudagrass	*Cynodon dactylon*	
Baldwin's flatsedge	*Cyperus crocerus*	
Wiry flatsedge	*Cyperus filiculmis*	
Plukenet's flatsedge	*Cyperus plukenetii*	
Pinebarren flatsedge	*Cyperus retrorsus*	
Coinvine	*Dalbergia ecastaphyllum*	
Whitetassels	*Dalea carnea*	
Cowitch vine	*Decumaria barbara*	
Hairy small-leaf ticktrefoil	*Desmodium ciliare*	
Florida ticktrefoil	*Desmodium floridanum*	
Sand ticktrefoil	*Desmodium lineatum*	
Panicledleaf ticktrefoil	*Desmodium paniculatum*	
Dixie ticktrefoil	*Desmodium tortuosum*	
Coastalplain balm	*Dicerandra linearifolia*	
Needleleaf witchgrass	*Dichanthelium aciculare*	
Variable witchgrass	*Dichanthelium commutatum*	
Cypress witchgrass	*Dichanthelium ensifolium ensifolium*	
Cypress witchgrass	*Dichanthelium ensifolium unciphyllum*	
Eggleaf witchgrass	*Dichanthelium ovale*	
Hemlock witchgrass	*Dichanthelium portoricense*	
Roughhair witchgrass	*Dichanthelium strigosum*	
Carolina ponysfoot	*Dichondra caroliniensis*	
	Dictyota sp.	
	Digenia simplex	
Slender crabgrass	*Digitaria filiformis*	
Virginia buttonweed	*Diodia virginiana*	
Common persimmon	*Diospyros virginiana*	

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Salt grass	*Distichlis spicata*	
Dwarf sundew	*Drosera brevifolia*	
Pink sundew	*Drosera capillaris*	
Oblong twinflower	*Dyschoriste oblongifolia*	
Burrhead	*Echinodorus* spp.	
Baldwin's spikerush	*Eleocharis baldwinii*	
Tall elephantsfoot	*Elephantopus elatus*	
Smooth elephants foot	*Elephantopus nudatus*	
Carolina scalystem	*Elytraria caroliniensis*	
Florida tasselflower	*Emilia fosbergii*	
Green-fly orchid	*Epidendrum conopseum*	C
Elliott's lovegrass	*Eragrostis elliottii*	
Coastal lovegrass	*Eragrostis virginica*	
Burnweed	*Erectites hieracifolia*	
Oakleaf fleabane	*Erigeron quercifolius*	
Early whitetop fleabane	*Erigeron vernus*	
Pipewort	*Eriocaulon compressum*	
Wild buckwheat	*Eriogonum tomentosum*	
Rattlesnakemaster	*Eryngium aquaticum*	
Baldwin's eryngo	*Eryngium baldwinii*	
Rattlesnakemaster, button eryngo	*Eryngium yuccifolium*	
Coralbean	*Erythrina herbacea*	
American strawberrybush	*Euonymus americanus*	
White thoroughwort	*Eupatorium album*	
Dogfennel	*Eupatorium capillifolium*	
Yankeeweed	*Eupatorium compositifolium*	
False fennel	*Eupatorium leptophyllum*	
Semaphore thoroughwort	*Eupatorium milkanoides*	
Mohr's thoroughwort	*Eupatorium mohrii*	
Common boneset	*Eupatorium perfoliatum*	
False hoarhound	*Eupatorium rotundifolium*	
Saltmarsh fingergrass	*Eustachys glauca*	
Seaside gentian	*Eustoma exaltatum*	
Flat-topped goldenrod, slender goldenrod	*Euthamia caroliniana*	
Flattop goldenrod	*Euthamia graminifolia*	
Silver dwarf morningglory	*Evolvulus sericeus*	
Marsh frimby	*Fimbristylis spadicea*	
Hairy frimby	*Fimbristylis puberula*	
Narrowleaf yellowtops	*Flaveria linearis*	
Florida privet, Florida swampprivet	*Forestiera segregata*	
White ash	*Fraxinus americana*	
Carolina ash	*Fraxinus caroliniana*	
Southern umbrellasedge	*Fuirena scirpoidea*	
Lanceleaf blanketflower	*Gaillardia aestivalis*	
Elliott's milkpea	*Galactia elliottii*	
Soft milkpea	*Galactia mollis*	
Eastern milkpea	*Galactia regularis*	
Downy milkpea	*Galactia volubilis*	
Coastal bedstraw	*Galium hispidulum*	
Stiff marsh bedstraw	*Galium tinctorium*	
Dwarf huckleberry	*Gaylussacia dumosa*	
Blue huckleberry	*Gaylussacia frondosa*	

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Carolina jessamine	*Gelsemium sempervirens*	
Rose mock vervain	*Glandularia canadensis*	
Loblolly bay	*Gordonia lasianthus*	
	Gracilaria sp.	
Rough hedgehyssop	*Gratiola hispida*	
Shaggy hedgehyssop	*Gratiola pilosa*	
Branched hedgehyssop	*Gratiola ramosa*	
Bearded skeletongrass	*Gymnopogon ambiguus*	
Chapman's skeletongrass	*Gymnopogon chapmanianus*	
Toothpetal false reinorchid	*Habenaria floribunda*	
Bog orchid	*Habenaria quinqueseta*	
Carolina silverbell	*Halesia caroliniana*	
	Halimeda incrassata	
Shoal grass	*Halodule wrightii*	
Engelmann's seagrass, star grass	*Halophila engelmannii*	
Southeastern sneezeweed	*Helenium pinnatifidum*	
Swamp sunflower	*Helianthus angustifolius*	
Rayless sunflower, stiff sunflower	*Helianthus radula*	
Seaside heliotrope, salt heliotrope	*Heliotropium curassavicum*	
Crested coralroot	*Hexalectris spicata*	
Crimsoneyed rosemallow	*Hibiscus moscheutos*	
Coastalplain hawkweed	*Hieracium megacephalon*	
Marsh pennywort	*Hydrocotyle umbellata*	
Sky flower	*Hydrolea corymbosa*	
Coastalplain St. John's-wort	*Hypericum brachyphyllum*	
Roundpod St. John's-wort	*Hypericum cistifolium*	
Peelbark St. John's-wort	*Hypericum fasciculatum*	
St. Andrew's-cross	*Hypericum hypericoides*	
Dwarf St. John's wort	*Hypericum mutilum*	
Myrtleleaf St. John's-wort	*Hypericum myrtifolium*	
Fourpetal St. John's wort	*Hypericum tetrapetalum*	
Common yellow stargrass	*Hypoxis curtissi*	
Fringed yellow stargrass	*Hypoxis juncea*	
Musky mint, clustered bushmint	*Hyptis alata*	
Carolina holly	*Ilex ambigua*	
Dahoon holly	*Ilex cassine*	
Possumhaw	*Ilex decidua*	
Gallberry, inkberry	*Ilex glabra*	
American holly	*Ilex opaca*	
Yaupon holly	*Ilex vomitoria*	
Wild indigo, Carolina indigo	*Indigofera caroliniana*	
Man-of-the-earth	*Ipomoea pandurata*	
Saltmarsh morningglory	*Ipomoea sagittata*	
Prairie iris, blueflag	*Iris hexagona*	
Virginia willow, sweetspire	*Itea virginica*	
Marshelder, sumpweed, Jesuit's bark	*Iva frutescens*	
Forked rush	*Juncus dichotomus*	
Common rush	*Juncus effusus*	
Shore rush	*Juncus marginatus*	
Manyhead rush	*Juncus polycephalos*	
Black needlerush	*Juncus roemerianus*	
Needlepod rush	*Juncus scirpoides*	

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Southern red cedar	*Juniperus virginiana*	
Wicky, hairy laurel	*Kalmia hirsuta*	
Virginia saltmarsh mallow	*Kosteletzkya pentacarpos*	
Dwarf dandelion	*Krigia virginica*	
Carolina redroot	*Lachnanthes caroliana*	
Whitehead bogbutton	*Lachnocaulon anceps*	
Small's bogbutton	*Lachnocaulon minus*	
White mangrove	*Laguncularia racemosa*	
	Laurencia sp.	
Thymeleaf pinweed	*Lechea minor*	
Pineland pinweed	*Lechea sessiliflora*	
Little duckweed	*Lemna obscura*	
Virginia pepperweed	*Lepidium virginicum*	
Narrowleaf lespedeza	*Lespedeza angustifolia*	
Hairy lespedeza	*Lespedeza hirta*	
Tall lespedeza	*Lespedeza stuevei*	
Chapman's gayfeather, Chapman's blazing star	*Liatris chapmanii*	
Pinkscale gayfeather	*Liatris elegans*	
Slender gayfeather	*Liatris gracilis*	
Few flowered gayfeather, fewflower blazing star	*Liatris pauciflora*	
Shortleaf gayfeather	*Liatris tenuifolia*	
Gopher apple	*Licania michauxii*	
Eastern glasswort	*Lilaeopsis chinensis*	
Pine lily	*Lilium catesbaei*	ST
Carolina sealavendar	*Limonium carolinianum*	
Blue toadflax	*Linaria canadensis*	
Savannah false pimpernel	*Lindernia grandiflora*	
Florida yellow flax	*Linum floridanum*	
Sweetgum	*Liquidambar styraciflua*	
Cardinal flower	*Lobelia cardinalis*	ST
Glades lobelia	*Lobelia glandulosa*	
White lobelia	*Lobelia paludosa*	
Coral honeysuckle	*Lonicera sempervirens*	
Seaside primrose-willow	*Ludwigia maritima*	
Smallfruit primrose-willow	*Ludwigia microcarpa*	
Marsh seedbox	*Ludwigia palustris*	
Creeping primrose-willow	*Ludwigia repens*	
Savannah primrose-willow	*Ludwigia virgata*	
Christmasberry, Carolina desertthorn	*Lycium carolinianum*	
Foxtail club-moss	*Lycopodium alopecuroides*	
Southern club-moss	*Lycopodium appressa*	
Slender club-moss	*Lycopodium carolinianum*	
Rose-rush	*Lygodesmia aphylla*	
Rusty staggerbush	*Lyonia ferruginea*	
Coastalplain staggerbush	*Lyonia fruticosa*	
Fetterbush	*Lyonia lucida*	
Wand lythrum	*Lythrum lineare*	
Wild bushbean	*Macroptilium lathyroides*	
Southern magnolia	*Magnolia grandiflora*	
Sweetbay	*Magnolia virginiana*	
Florida spiny pod	*Matelea floridana*	SE
Axilflower	*Mecardonia acuminata*	

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Snow squarestem	*Melanthera nivea*	
White sweetclover	*Melilotus albus*	
Climbing hempvine	*Mikania scandens*	
Littleleaf sensitive briar	*Mimosa microphylla*	
Sensitive briar	*Mimosa quadrivalvis angustata*	
Partridgeberry	*Mitchella repens*	
Lax hornpod	*Mitreola petiolata*	
Shoregrass	*Monanthochloe littoralis*	
Red mulberry	*Morus rubra*	
Hairgrass, muhly grass, hairawn muhly	*Muhlenbergia capilaris filipes*	
Wax myrtle, southern bayberry	*Myrica cerifera*	
Southern waternymph	*Najas guadalupensis*	
Tropical puff	*Neptunia pubescens*	
Swamp tupelo	*Nyssa sylvatica biflora*	
Pinebarren aster	*Oclemena reticulata*	
Cutleaf evening-primrose, willow primrose	*Oenothera laciniata*	
Clustered mile graines	*Oldenlandia uniflora*	
Woodsgrass	*Oplismenus hirtellas*	
Tuna cactus	*Opuntia ficus-india*	
Pricklypear	*Opuntia humifusa*	
	Oscillatori sp.	
Devilwood	*Osmanthus americanus*	
Cinnamon fern	*Osmunda cinnamomea*	
Royal fern	*Osmunda regalis*	
Eastern hophornbeam	*Ostrya virginiana*	
Common yellow woodsorrel	*Oxalis corniculata*	
Water cowbane, water dropwort	*Oxypolis filiformis*	
	Padina vickersiae	
Coastalplain palafox	*Palafoxia integrifolia*	
Beaked panicum	*Panicum anceps*	
Maidencane	*Panicum hemitomon*	
Redtop panicum	*Panicum rigidulum*	
Switchgrass	*Panicum virgatum*	
Pineland nailwort	*Paronychia patula*	
Virginia creeper	*Parthenocissus quinquefolia*	
Crowngrass	*Paspalum bifidum*	
Florida paspalum	*Paspalum floridanum*	
Early paspalum	*Pasaplum praecox*	
Thin paspalum	*Paspalum setaceum*	
Seashore paspalum	*Paspalum vaginatum*	
Purple passionflower	*Passiflora incarnata*	
Buckroot	*Pediomelum canescens*	
	Penicillus capitatus	
	Penicillus dumetosus	
Mayflower beardtongue	*Penstemon multiflorus*	
Red bay	*Persea borbonia*	
Swamp bay	*Persea palustris*	
Goldenfoot fern, golden polypody	*Phlebodium aureum*	
Florida false sunflower	*Phoebanthus grandiflorus*	
Red chokeberry	*Photinia pyrifolia*	
Common cane, roseau cane	*Phragmites australis*	
Fogfruit, capeweed	*Phyla nodiflora*	

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Cypresshead groundcherry	*Physalis arenicola*	
Walter's groundcherry	*Physalis walteri*	
Slenderleaf false dragonhead	*Physostegia leptophylla*	
Eastern false dragonhead	*Physostegia purpurea*	
American pokeweed	*Phytolacca americana*	
Wild pennyroyal	*Piloblephis rigida*	
Blueflower butterwort	*Pinguicula caerulea*	ST
Yellow butterwort	*Pinguicula lutea*	ST
Small butterwort	*Pinguicula pumila*	
Sand pine	*Pinus clausa*	
Slash pine	*Pinus elliottii*	
Longleaf pine	*Pinus palustris*	
Pond pine	*Pinus serotina*	
Loblolly pine	*Pinus taeda*	
Blackseed needlegrass	*Piptochaetium avenaeceum*	
Pitted stripesteed	*Piriqueta caroliniana*	
Southern plantain	*Plantago virginica*	
Yellow fringed orchid	*Platanthera ciliaris*	ST
Resurrection fern	*Pleopeltis polypodioides*	
Stinking camphorweed	*Pluchea foetida*	
Sweetscent	*Pluchea odorata*	
Rosy camphorweed	*Pluchea rosea*	
Rose pogonia	*Pogonia ophioglossoides*	ST
Baldwin's milkwort	*Polygala balduinii*	
Drumheads	*Polygala cruciata*	
Orange milkwort	*Polygala lutea*	
Candyroot	*Polygala nana*	
Racemed milkwort	*Polygala polygama*	
Coastalplain milkwort	*Polygala setacea*	
Tall jointweed	*Polygonella gracilis*	
Octoberflower	*Polygonella polygama*	
Swamp smartweed	*Polygonum hydropiperoides*	
Dotted smartweed	*Polygonum punctatum*	
Rustweed	*Polypremum procumbens*	
Pickerelweed	*Pontederia cordata*	
Hairy shadow witch	*Ponthieva racemosa*	
Eastern cottonwood	*Populus deltoids*	
Illinois pondweed	*Potamogeton illinoensis*	
Claspingleaf	*Potamogeton perfoliatus*	
Small pondweed	*Potamogeton pusillus*	
Marsh mermaidweed	*Proserpinaca palustris*	
Combleaf mermaidweed	*Proserpinaca pectinata*	
American plum	*Prunus americana*	
Chickasaw plum	*Prunus angustifolia*	
Carolina laurel cherry	*Prunus caroliniana*	
Black cherry	*Prunus serotina*	
Flatwoods plum	*Prunus umbellata*	
Heller's cudweed	*Pseudognaphalium helleri*	
Sampson's snakeroot	*Psoralea psoralioides*	
Tailed bracken	*Pteridium aquilinum pseudocaudatum*	
Blackroot, rabbit tobacco	*Pterocaulon pycnostachyum*	
Wand blackroot	*Pterocaulon virgatum*	

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Mock bishopsweed, herbwilliam	*Ptilimnium capillaceum*	
White oak	*Quercus alba*	
Chapman's oak	*Quercus chapmanii*	
Runner oak	*Quercus elliottii*	
Southern red oak	*Quercus falcata*	
Sand live oak	*Quercus geminata*	
Bluejack oak	*Quercus incana*	
Turkey oak	*Quercus laevis*	
Laurel oak	*Quercus laurifolia*	
Overcup oak	*Quercus lyrata*	
Sand post oak	*Quercus margaretta*	
Swamp chestnut oak	*Quercus michauxii*	
Dwarf live oak	*Quercus minima*	
Myrtle oak	*Quercus myrtifolia*	
Water oak	*Quercus nigra*	
Shumard's oak	*Quercus shumardii*	
Bluff oak	*Quercus sinuata*	
Virginia live oak	*Quercus virginiana*	
Wild radish	*Raphanus raphanistrum*	
Rubbervine	*Rhabdadenia biflora*	
Needle palm	*Rhapidophyllum hystrix*	C
Savannah meadowbeauty	*Rhexia alifanus*	
West indian meadowbeauty	*Rhexia cubensis*	
Yellow meadowbeauty	*Rhexia lutea*	
Pale meadow beauty	*Rhexia mariana*	
Nuttall's meadowbeauty	*Rhexia nuttallii*	
Fringed meadowbeauty	*Rhexia petiolata*	
	Rhipocephalus phoenix	
Red mangrove	*Rhizphorus mangle*	
Sweet pinxter azalea	*Rhododendron canescens*	
Indian azalea	*Rhododendron simsii*	
Swamp azalea	*Rhododendron viscosum*	
Winged sumac	*Rhus copallinum*	
Royal snoutbean	*Rhynchosia cytisoides*	
Michaux's snoutbean	*Rhynchosia michauxii*	
Dollarleaf	*Rhynchosia reniformis*	
Baldwin's beaksedge	*Rhynchospora baldwinii*	
Shortbristle beaksedge	*Rhynchospora breviseta*	
Loosehead beaksedge	*Rhynchospora chalarocephala*	
Chapman's beaksedge	*Rhynchospora chapmanii*	
Fringed beaksedge	*Rhynchospora ciliaris*	
Star-top rush, starrush whitetop	*Rhynchospora colorata*	
Short bristled horned beaksedge	*Rhynchospora corniculata*	
Curtiss' beaksedge	*Rhynchospora curtissii*	
Fascicled beaksedge	*Rhynchospora facicularis*	
Threadleaf beaksedge	*Rhynchospora filifolia*	
Globe beaksedge	*Rhynchospora globularis*	
Slender beaksedge	*Rhynchospora gracilenta*	
Gray's beaksedge	*Rhynchospora grayi*	
Pinebarren beaksedge	*Rhynchospora intermedia*	
Giant whitetop	*Rhynchospora latifolia*	
Millet beaksedge	*Rhynchospora miliacea*	

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Pineland beaksedge	*Rhynchospora perplexa*	
Plumed beaksedge	*Rhynchospora plumosa*	
Fairy beaksedge	*Rhynchospora pusilla*	
Fewflower beaksedge	*Rhynchospora rariflora*	
Swamp rose	*Rosa palustris*	
Sawtooth blackberry	*Rubus argutus*	
Sand blackberry	*Rubus cuneifolius*	
Northern dewberry	*Rubus flagellaris*	
Southern dewberry	*Rubus trivialis*	
Orange coneflower	*Rudbeckia fulgida*	
Blackeyed susan	*Rudbeckia hirta*	
Carolina wild petunia	*Ruellia caroliniensis*	
Hairyflower wild petunia	*Ruellia ciliatiflora*	
Ciliate wild petunia	*Ruellia ciliosa*	
Nightflowering petunia	*Ruellia noctiflora*	SE
Swamp dock	*Rumex verticillatus*	
Widgeongrass	*Ruppia maritima*	
Bluestem palmetto	*Sabal minor*	
Cabbage palm	*Sabal palmetto*	
Shortleaf rosegentian	*Sabatia brevifolia*	
Coastal rosegentian	*Sabatia calycina*	
Slender rosegentian	*Sabatia campanulata*	
Largeleaf rosegentian	*Sabatia macrophylla*	
Fourangle rosegentian	*Sabatia quadrangula*	
Rose of plymouth	*Sabatia stellaris*	
Sugarcane plumegrass	*Saccharum coarctatum*	
Sugarcane plumegrass	*Saccharum giganteum*	
Smallflower mock buckthorn	*Sageretia minutiflora*	
Chapman's arrowhead	*Sagittaria graminea*	
Strap-leaved sagittaria	*Sagittaria kurziana*	
Bulltongue arrowhead	*Sagittaria lancifolia*	
Awl-leaf arrowhead	*Sagittaria subulata*	
Annual glasswort	*Salicornia bigelovii*	
Perrenial glasswort	*Salicornia virginica*	
Carolina willow, coastalplain willow	*Salix caroliniana*	
Black willow	*Salix nigra*	
Azure blue sage	*Salvia azurea*	
Lyreleaf sage	*Salvia lyrata*	
Water spangles	*Salvinia minima*	
Elderberry	*Sambucus canadensis*	
American elder	*Sambucus nigra* canadenis	
Water pimpernel	*Samolus ebracteatus*	
Pineland pimpernel	*Samolus parviflorus*	
Pineland pimpernel, seaside brookweed	*Samolus valerandi*	
Canadian blacksnakeroot	*Sanicula canadensis*	
Perennial glasswort	*Sarcocornia ambigua*	
	Sargassum sp.	
Hooded pitcherplant	*Sarracenia minor*	ST
Parrot pitcherplant	*Sarracenia psittacina*	ST
Sassafras	*Sassafras albidum*	
Lizard's tail	*Saururus cernuus*	
Little bluestem	*Schizachyrium scoparium*	

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Creeping bluestem	*Schizachyrium stoloniferum*	
Slender bluestem	*Schizachyrium tenerum*	
Florida sensitive brier	*Schrankia microphylla*	
Three-square sedge	*Scirpus olneyi*	
Threesquare bulrush	*Scirpus pungens*	
Leafy sedge	*Scirpus robustus*	
Baldwin's nutrush	*Scleria baldwinii*	
Fringed nutrush	*Scleria ciliata*	
Fewflower nutrush	*Scleria ciliata pauciflora*	
Slenderfruit nutrush	*Scleria georgiana*	
Netted nutrush	*Scleria retulgris*	
Tall nutgrass	*Scleria triglomerata*	
Low nutrush	*Scleria verticillata*	
Florida scrub skullcap	*Scutellaria arenicola*	
Small's skullcap	*Scutellaria multiglandulosa*	
Maryland wild sensitive plant	*Senna marilandica*	
Saw palmetto	*Serenoa repens*	
Dixie whitetopped aster	*Sericocarpus tortifolius*	
Seapurslane	*Sesuvium portulacastrum*	
Yaupon blacksenna	*Seymeria cassioides*	
Piedmont blacksenna	*Seymeria pectinata*	
Saffron plum	*Sideroxylon celastrinum*	
False mastic	*Sideroxylon foetidissimum*	
Gum bully	*Sideroxylon lanuginosa*	
Florida bully	*Sideroxylon reclinatum*	
Starry rosinweed	*Silphium asteriscus*	
Kidneyleaf rosinweed	*Silphium compositum*	
White blue-eyed grass	*Sisyrinchium albidum*	
Narrowleaf blue-eyed grass	*Sisyrinchium angustifolium*	
Eastern blue-eyed grass	*Sisyrinchium atlanticum*	
Nash's blue-eyed grass	*Sisyrinchium nashii*	
Annual blue-eyed grass	*Sisyrinchium rosulatum*	
Hemlock waterparsnip	*Sium suave*	
Earleaf greenbrier	*Smilax auriculata*	
Saw greenbrier	*Smilax bona-nox*	
Cat greenbrier	*Smilax glauca*	
Laurel greenbrier	*Smilax laurifolia*	
Sarsaparilla vine	*Smilax pumila*	
Bristly greenbrier	*Smilax tamnoides*	
American black nightshade	*Solanum americanum*	
Florida horsenettle	*Solanum carolinense*	
Pinebarren goldenron	*Solidago fistulosa*	
Giant goldenrod	*Solidago gigantea*	
Chapman's goldenrod, anise-scented goldenrod	*Solidago odora*	
Wrinkleleaf goldenrod	*Solidago rugosa*	
Wand goldenrod	*Solidago stricta*	
Spiny sowthistle	*Sonchus asper*	
Slender indiangrass	*Sorghastrum elliottii*	
Yellow indiangrass	*Sorghastrum nutans*	
Lopsided indiangrass	*Sorghastrum secundum*	
Smooth cordgrass, oystergrass	*Spartina alterniflora*	
Saltmeadow hay, saltmeadow cordgrass	*Spartina patens*	

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Giant cordgrass, rough cordgrass	*Spartina cynosuroides*	
Gulf cordgrass	*Spartina spartinae*	
Woodland false buttonweed	*Spermacoce assurgens*	
Bog moss species	*Sphagnum* spp.	
Florida ladies tresses	*Spiranthes floridana*	SE
Spring ladies tresses	*Spiranthes vernalis*	
Common duckweed	*Spirodela polyrhiza*	
Hidden dropseed	*Sporobolus clandestinus*	
Florida dropseed	*Sporobolus floridanus*	
Pineywoods dropseed	*Sporobolus junceus*	
Seashore dropseed	*Sporobolus virginicus*	
Sweet shaggytuft	*Stenandrium dulce*	
St. Augustine grass	*Stenoaphrum secundatum*	
Water toothleaf, corkwood	*Stillingia aquatica*	
Queensdelight	*Stillingia sylvatica*	
Pink fuzzybean	*Strophostyles umbellata*	
Coastalplain dawnflower	*Stylisma patens*	
Sidebeak pencilflower	*Stylosanthes biflora*	
American snowbell	*Styrax americanus*	
Bigleaf snowbell	*Styrax grandiflorus*	
Sea blite	*Suadea linearis*	
Scaleleaf aster	*Symphyotrichum adnatum*	
Savannah aster	*Symphyotrichum chapmanii*	
Easten silver aster	*Symphyotrichum concolor*	
Rice button aster	*Symphyotrichum dumosum*	
Perennial saltmarsh aster	*Symphyotrichum tenuifolium*	
Common sweetleaf	*Symplocos tinctoria*	
Yellow hatpins	*Syngonanthus flavidulus*	
Manatee grass	*Syringodium filiforme*	
Pond-cypress	*Taxodium ascendens*	
Bald-cypress	*Taxodium distichum*	
Scurf hoarypea	*Tephrosia chrysophylla*	
Florida hoarypea	*Tephrosia florida*	
Sprawling hoarypea	*Tephrosia hispidula*	
Spiked hoarypea	*Tephrosia spicata*	
Wood sage	*Teucrium canadense*	
Turtle grass	*Thalassia testudinum*	
Widespread maiden fern	*Thelypteris kunthii*	
Widespread maiden fern	*Thelypteris normalis*	
Marsh fern	*Thelypteris palustris*	
Carolina basswood	*Tilia americana caroliniana*	
White basswood	*Tilia americana heterophylla*	
Bartram's airplant	*Tillandsia bartramii*	
Spanish moss	*Tillandsia usneoides*	
Crippled cranefly orchid	*Tipularia discolor*	ST
Coastal false asphodel	*Tofieldia racemosa*	
Eastern poison oak	*Toxicodendron pubescens*	
Poison ivy	*Toxicodendron radicans*	
Atlantic poison oak	*Toxicodendron toxicarium*	
Poison sumac	*Toxicodendron vernix*	
Climbing dogbane	*Trachelospermum difforme*	
Spiderwort	*Tradescantia* spp.	

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Small's noseburn	*Tragia smallii*	
Wavyleaf noseburn	*Tragia urens*	
Nettleleaf noseburn	*Tragia urticifolia*	
Forked bluecurls	*Trichostema dichotomum*	
Carolina fluffgrass	*Tridens carolinianus*	
Field clover	*Trifolium campestre*	
White clover	*Trifolium repens*	
Trillium	*Trillium* spp.	
Venus's lookingglass	*Triodanis perfoliata*	
Perennial sandgrass	*Triplasis americana*	
Purple sandgrass	*Triplasis purpurea*	
Winged elm	*Ulmus alata*	
American elm	*Ulmus americana*	
Little floating bladderwort	*Utricularia radiata*	
Bladderwort	*Utricularia subulata*	
Sparkleberry	*Vaccinium arboretum*	
Highbush blueberry	*Vaccinium corymbosum*	
Darrow's blueberry	*Vaccinium darrowii*	
Shiny blueberry	*Vaccinium myrsinites*	
Deerberry	*Vaccinium stamineum*	
Tapegrass	*Vallisenaria americana*	
Brazilian vervain	*Verbena brasiliensis*	
Frostweed, white crownbeard	*Verbesina virginica*	
Tall ironweed	*Vernonia angustifolia*	
Giant ironweed	*Vernonia gigantea*	
Southern arrowwood	*Viburnum dentate*	
Possumhaw	*Viburnum nudan*	
Walter's viburnum	*Viburnum obovatum*	
Rusty blackhaw	*Viburnum rufidulum*	
Fourleaf vetch	*Vicia acutifolia*	
Vetch	*Vicia* spp.	
Hairypod cowpea	*Vigna luteola*	
Common blue violet	*Viola floridana*	
Bog white violet	*Viola lanceolata*	
Early blue violet	*Viola palmata*	
Primroseleaf violet	*Viola primulifolia*	
Common blue violet	*Viola sororia*	
Prostrate blue violet	*Viola walteri*	
Summer grape	*Vitis aestivalis*	
Graybark grape	*Vitis cinerea*	
Muscadine	*Vitis rotundifolia*	
Calloose grape	*Vitis shuttleworthii*	
Southern rockbell	*Wahlenbergia marginata*	
Netted chain fern	*Woodwardia areolata*	
Virginia chain fern	*Woodwardia virginica*	
Coastal plain yellow-eyed grass	*Xyris ambigua*	
Baldwin's yellow-eyed grass	*Xyris baldwiniana*	
Carolina yellow-eyed grass	*Xyris caroliniana*	
Curtiss' yellow-eyed grass	*Xyris difformis curtissii*	
Elliot's yellow-eyed grass	*Xyris elliottii*	
Savannah yellow-eyed grass	*Xyris flabelliformis*	
Tall yellow-eyed grass	*Xyris platylelpis*	

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Spanish bayonet, aloe yucca	*Yucca aloifolia*	
Adam's needle	*Yucca filamentosa*	
Coontie	*Zamia pumila*	C
Hercules'-club, prickly ash	*Zanthoxylum clava-herculis*	
Wild lime	*Zanthoxylum fagara*	
Atamasco lily, rainlily	*Zephyranthes atamasca*	
Treat's rainlily	*Zephyranthes treatiae*	ST
Crowpoison, Osceola's plume	*Zigadenus densus*	
Annual wild rice	*Zizania aquatica*	
Birds		
Cooper's hawk	*Accipiter cooperii*	
Sharp-shinned hawk	*Accipiter striatus*	
Spotted sandpiper	*Actitis macularia*	
Red-winged blackbird	*Agelaius phoeniceus*	
Wood duck	*Aix sponsa*	
Saltmarsh sharp-tailed sparrow	*Ammodramus caudacutus*	
Henslow's sparrow	*Ammodramus henslowii*	
Leconte's sparrow	*Ammodramus leconteii*	
Scott's seaside sparrow	*Ammodramus maritimus peninsulae*	ST
Nelson's sharp-tailed sparrow	*Ammodramus nelsoni*	
Grasshopper sparrow	*Ammodramus savannarum*	
Northern pintail	*Anas acuta*	
American wigeon	*Anas americana*	
Northern shoveler	*Anas clypeata*	
Green-winged teal	*Anas crecca*	
Blue-winged teal	*Anas discors*	
Mottled duck	*Anas fulvigula*	
Mallard	*Anas platyrhynchos*	
American black duck	*Anas rubripes*	
Gadwall	*Anas strepera*	
Anhinga	*Anhinga anhinga*	
Greater white-fronted goose	*Anser albifrons*	
American pipit	*Anthus rubescens*	
Limpkin	*Aramus guarauna*	
Ruby-throated hummingbird	*Archilochus colubris*	
Great egret	*Ardea alba*	
Great blue heron	*Ardea herodias*	
Great white heron	*Ardea herodias occidentalis*	
Ruddy turnstone	*Arenaria interpres*	
Short-eared owl	*Asio flammeus*	
Burrowing owl	*Athene cunicularia*	ST
Lesser scaup	*Aythya affinis*	
Redhead	*Aythya americana*	
Ring-necked duck	*Aythya collaris*	
Greater scaup	*Aythya marila*	
Canvasback	*Aythya valisineria*	
Tufted titmouse	*Baeolophus bicolor*	
Cedar waxwing	*Bombycilla cedrorum*	
American bittern	*Botaurus lentiginosus*	
Great horned owl	*Bubo virginianus*	
Cattle egret	*Bubulcus ibis*	

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Bufflehead	*Bucephala albeola*	
Common goldeneye	*Bucephala clangula*	
Short-tailed hawk	*Buteo brachyrus*	
Red-tailed hawk	*Buteo jamaicensis*	
Red-shouldered hawk	*Buteo lineatus*	
Broad-winged hawk	*Buteo platypterus*	
Green-backed heron	*Butorides striatus*	
Green heron	*Butorides virescens*	
Sanderling	*Calidris alba*	
Dunlin	*Calidris alpina*	
Red knot	*Calidris canutus*	
Stilt sandpiper	*Calidris himantipus*	
Western sandpiper	*Calidris mauri*	
Pectoral sandpiper	*Calidris melanotos*	
Least sandpiper	*Calidris minutilla*	
Semipalmated sandpiper	*Calidris pusilla*	
Chuck-will's-widow	*Caprimulgus carolinensis*	
Whip-poor-will	*Caprimulgus vociferus*	
Northern cardinal	*Cardinalis cardinalis*	
Turkey vulture	*Cathartes aura*	
Veery	*Catharus fuscescens*	
Hermit thrush	*Catharus guttatus*	
Gray-cheeked thrush	*Catharus minimus*	
Swainson's thrush	*Catharus ustulatus*	
Willet	*Catoptrophorus semipalmatus*	
Brown creeper	*Certhia americana*	
Chimney swift	*Chaetura pelagica*	
Piping plover	*Charadrius melodus*	FT
Snowy plover	*Charadrius nivosus*	ST
Semipalmated plover	*Charadrius semipalmatus*	
Killdeer	*Charadrius vociferus*	
Wilson's plover	*Charadrius wilsonia*	
Snow goose	*Chen caerulescens*	
Black tern	*Chlidonias niger*	
Common nighthawk	*Chordeiles minor*	
Northern harrier	*Circus cyaneus*	
Marian's marsh wren	*Cistothorus palustris marianae*	ST
Sedge wren	*Cistothorus platensis*	
Long-tailed duck	*Clangula hyemalis*	
Yellow-bellied cuckoo	*Coccyzus americanus*	
Black-billed cuckoo	*Coccyzus erythropthalmus*	
Northern flicker	*Colaptes auratus*	
Northern bobwhite	*Colinus virginianus*	
Rock dove	*Columba livia*	
Common-ground dove	*Columbina passerina*	
Eastern wood-pewee	*Contopus virens*	
Black vulture	*Coragyps atratus*	
American crow	*Corvus brachyrhynchos*	
Fish crow	*Corvus ossifragus*	
Yellow rail	*Coturnicops noveboracensis*	
Blue jay	*Cyanocitta cristata*	
Tundra swan	*Cygnus columbianus*	
Black-throated blue warbler	*Dendroica caerulescens*	

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Yellow-rumped warbler	*Dendroica coronata*	
Prairie warbler	*Dendroica discolor*	
Yellow-throated warbler	*Dendroica dominica*	
Magnolia warbler	*Dendroica magnolia*	
Palm warbler	*Dendroica palmarum*	
Yellow warbler	*Dendroica petechia*	
Pine warbler	*Dendroica pinus*	
Blackpoll warbler	*Dendroica striata*	
Cape May warbler	*Dendroica tigrina*	
Black-throated green warbler	*Dendroica virens*	
Bobolink	*Dolichonyx oryzivorus*	
Pileated woodpecker	*Dryocopus pileatus*	
Gray catbird	*Dumetella carolinensis*	
Little blue heron	*Egretta caerulea*	ST
Reddish egret	*Egretta rufescens*	ST
Snowy egret	*Egretta thula*	
Tricolored heron	*Egretta tricolor*	ST
American swallow-tailed kite	*Elanoides forficatus*	
Acadian flycatcher	*Empidonax virescens*	
White ibis	*Eudocimus albus*	
Rusty blackbird	*Euphagus carolinus*	
Merlin	*Falco columbarius*	
Peregrine falcon	*Falco peregrinus tundrius*	
Southeastern American kestrel	*Falco sparverius paulus*	ST
Magnificent frigatebird	*Fregata magnificens*	
American coot	*Fulica americana*	
Wilson's snipe	*Gallinago delicata*	
Common snipe	*Gallinago gallinago*	
Common moorhen	*Gallinula chloropus*	
Common loon	*Gavia immer*	
Common yellowthroat	*Geothlypis trichas*	
Florida sandhill crane	*Grus canadensis pratensis*	ST
American oystercatcher	*Haematopus palliatus*	ST
Bald eagle	*Haliaeetus leucocephalus*	
Worm-eating warbler	*Helmitheros vermivorus*	
Black-necked stilt	*Himantopus mexicanus*	
Barn swallow	*Hirundo rustica*	
Caspian tern	*Hydroprogne caspia*	
Wood thrush	*Hylocichla mustelina*	
Yellow-breasted chat	*Icteria virens*	
Baltimore oriole, northern oriole	*Icterus galbula*	
Least bittern	*Ixobrychus exilis*	
Dark-eyed junco	*Junco hyemalis*	
Loggerhead shrike	*Lanius ludovicianus*	
Herring gull	*Larus argentatus*	
Laughing gull	*Leucophaeus atricilla*	
Ring-billed gull	*Larus delawarensis*	
Bonaparte's gull	*Larus philadelphia*	
Black rail	*Laterallus jamaicensis*	
Short-billed dowitcher	*Limnodromus griseus*	
Long-billed dowitcher	*Limnodromus scolopaceus*	
Marbled godwit	*Limosa fedoa*	

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Hooded merganser	*Lophodytes cucullatus*	
Belted kingfisher	*Megaceryle alcyon*	
Eastern screech-owl	*Megascops asio*	
Red-bellied woodpecker	*Melanerpes carolinis*	
Red-headed woodpecker	*Melanerpes erythrocephalus*	
Surf scoter	*Melanitta perspicillata*	
Wild turkey	*Meleagris gallopavo*	
Swamp sparrow	*Melospiza georgiana*	
Song sparrow	*Melospiza melodia*	
Common merganser	*Mergus merganser*	
Red-breasted merganser	*Mergus serrator*	
Northern mockingbird	*Mimus polyglottos*	
Black-and-white warbler	*Mniotilta varia*	
Brown-headed cowbird	*Molothrus ater*	
Northern gannet	*Morus bassanus*	
Wood stork	*Mycteria americana*	FT
Great crested flycatcher	*Myiarchus crinitus*	
Long-billed curlew	*Numenius americanus*	
Whimbrel	*Numenius phaeopus*	
Yellow-crowned night-heron	*Nyctanassa violacea*	
Black-crowned night-heron	*Nycticorax nycticorax*	
Connecticut warbler	*Oporonis agilis*	
Orange-crowned warbler	*Oreothlypis celata*	
Ruddy duck	*Oxyura jamaicensis*	
Osprey	*Pandion haliaetus*	
Northern parula	*Parula americana*	
House sparrow	*Passer domesticus*	
Savannah sparrow	*Passerculus sandwichensis*	
Painted bunting	*Passerina ciris*	
Indigo bunting	*Passerina cyanea*	
American white pelican	*Pelecanus erythrorhynchos*	
Brown pelican	*Pelecanus occidentalis*	
Bachman's sparrow	*Peucaea aestivalis*	
Wilson's phalarope	*Phalaropus tricolor*	
Double-crested cormorant	*Phalocrocorax auritis*	
Rose-breasted grosbeak	*Pheucticus ludovicianus*	
Downy woodpecker	*Picoides pubescens*	
Hairy woodpecker	*Picoides villosus*	
Rufous-sided towhee, eastern towhee	*Pipilo erythrophthalmus*	
Scarlet tanager	*Piranga olivacea*	
Summer tanager	*Piranga rubra*	
Roseate spoonbill	*Platalea ajaja*	ST
Glossy ibis	*Plegadis falcinellus*	
Black-bellied plover	*Pluvialis squatarola*	
Horned grebe	*Podiceps auritus*	
Pied-billed grebe	*Podilymbus podiceps*	
Carolina chickadee	*Poecile carolinensis*	
Blue-gray gnatcatcher	*Polioptila caerulea*	
Vesper sparrow	*Pooecetes gramineus*	
Purple gallinule	*Porphyrio martinicus*	
Sora	*Porzana carolina*	
Purple martin	*Progne subis*	

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Prothonotary warbler	*Protonotaria citrea*	
Boat-tailed grackle	*Quiscalus major*	
Common grackle	*Quiscalus quiscula*	
King rail	*Rallus elegans*	
Virginia rail	*Rallus limicola*	
Clapper rail	*Rallus longirostris*	
American avocet	*Recurvirostra americana*	
Ruby-crowned kinglet	*Regulus calendula*	
Golden-crowned kinglet	*Regulus satrapa*	
Bank swallow	*Riparia riparia*	
Black skimmer	*Rynchops niger*	ST
Eastern phoebe	*Sayornis phoebe*	
American woodcock	*Scolopax minor*	
Ovenbird	*Seiurus aurocapilla*	
Northern parula	*Setophaga americana*	
Florida prairie warbler	*Setophaga discolor paludicola*	
American redstart	*Setophaga ruticilla*	
Eastern bluebird	*Sialia sialis*	
White-breasted nuthatch	*Sitta carolinensis*	
Brown-headed nuthatch	*Sitta pusilla*	
Yellow-bellied sapsucker	*Sphyrapicus varius*	
American goldfinch	*Spinus tristis*	
Chipping sparrow	*Spizella passerina*	
Field sparrow	*Spizella pusilla*	
Northern rough-winged swallow	*Stelgidopteryx serripennis*	
Least tern	*Sternula antillarum*	ST
Forster's tern	*Sterna forsteri*	
Common tern	*Sterna hirundo*	
Barred owl	*Strix varia*	
Eastern meadowlark	*Sturnella magna*	
Tree swallow	*Tachycineta bicolor*	
Royal tern	*Thalasseus maximus*	
Sandwich tern	*Thalasseus sandvicensis*	
Carolina wren	*Thryothorus ludovicianus*	
Brown thrasher	*Toxostoma rufum*	
Lesser yellowlegs	*Tringa flavipes*	
Greater yellowlegs	*Tringa melanoleuca*	
Willet	*Tringa semipalmata*	
Solitary sandpiper	*Tringa solitaria*	
House wren	*Troglodytes aedon*	
Winter wren	*Troglodytes troglodytes*	
American robin	*Turdus migratorius*	
Gray kingbird	*Tyrannus dominicensis*	
Eastern kingbird	*Tyrannus tyrannus*	
Common barn owl	*Tyto alba*	
Bachman's warbler	*Vermivora bachmanii*	FE
Yellow-throated vireo	*Vireo flavifrons*	
White-eyed vireo	*Vireo griseus*	
Red-eyed vireo	*Vireo olivaceus*	
Solitary vireo, blue-headed vireo	*Vireo solitarius*	
White-winged dove	*Zenaida asiatica*	
Mourning dove	*Zenaida macroura*	
White-throated sparrow	*Zonotrichia albicollis*	

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Mammals		
Everglades short-tailed shrew	*Blarina peninsulae*	
Rafinesque's big-eared bat	*Corynorhinus rafinesquil*	
Least shrew	*Cryptotis parva*	
Virginia opossum	*Didelphis virginiana*	
Big brown bat	*Eptescius fuscus*	
Southeastern pocket gopher	*Geomys pinetis*	
Southern flying squirrel	*Glaucomys volans*	
Red bat	*Lasiurus borealis*	
Hoary bat	*Lasiurus cinereus*	
Yellow bat	*Lasiurus intermedius*	
Seminole bat	*Lasiurus seminolus*	
River otter	*Lontra canadensis*	
Bobcat	*Lynx rufus*	
Striped skunk	*Mephitis mephitis*	
Pine vole	*Microtus pinetorum*	
House mouse	*Mus musculus*	
Florida long-tailed weasel	*Mustella frenata peninsulae*	
Southeastern myotis	*Myotis austroriparius*	
Round-tailed muskrat	*Neofiber alleni*	
Wood rat	*Neotoma floridana*	
Florida mink	*Neovison vison lutensis*	
Evening bat	*Nycticeius humeralis*	
Golden mouse	*Ochrotomys nuttalli*	
White-tailed deer	*Odocoileus virginianus*	
Marsh rice rat	*Oryzomys palustris*	
Cotton deermouse	*Peromyscus gossypinus*	
Old field mouse	*Peromyscus polionotus*	
Eastern pipistrelle	*Pipistrellus austrorparius*	
Florida mouse	*Podomys floridanus*	
Raccoon	*Procyon lotor*	
Eastern harvest mouse	*Reithrodontomys humulis*	
Eastern mole	*Scalopus aquaticus*	
Gray squirrel	*Sciurus carolinesis*	
Sherman's fox squirrel	*Sciurus niger shermani*	SSC
Cotton rat	*Sigmodon hispidus*	
Southeastern shrew	*Sorex longirostris*	
Homosassa shrew	*Sorex longirostris eonis*	SSC
Eastern spotted skunk	*Spilogale putorius*	
Eastern cottontail	*Sylvilagus floridanus*	
Marsh rabbit	*Sylvilagus palustris*	
Brazilian free-tailed bat	*Tadarida brasiliensis*	
Florida manatee	*Trichechus manatus latirostris*	FE
Atlantic bottle-nosed dolphin	*Tursiops truncatus*	
Gray fox	*Urocyon cinereoargenteus*	
Florida black bear	*Ursus americanus floridanus*	
Red fox	*Vulpes vulpes*	
Amphibians		
Florida cricket frog	*Acris gryllus dorsalis*	
Mole salamander	*Ambystoma talpoideum*	
Tiger salamander	*Ambystoma tigrinum tigrinum*	

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Two-toed amphiuma	*Amphiuma means*	
One-toed amphiuma	*Amphiuma pholeter*	
Oak toad	*Bufo quercicus*	
Southern toad	*Bufo terrestris*	
Southern dusky salamander	*Desmognathus auriculatus*	
Greenhouse frog	*Eleutherodactylus planirostris planirostris*	
Dwarf salamander	*Eurycea quadridigitata*	
Eastern narrow-mouthed toad	*Gastrophryne carolinensis*	
Cope's gray treefrog	*Hyla chrysoscelis*	
Green treefrog	*Hyla cinerea*	
Pine woods treefrog	*Hyla femoralis*	
Barking treefrog	*Hyla gratiosa*	
Squirrel treefrog	*Hyla squirella*	
Florida gopher frog	*Lithobates capito*	
Striped newt	*Notophthalmus perstriatus*	
Central newt	*Notophthalmus viridescens louisianensis*	
Peninsula newt	*Notophthalmus viridescens piaropicola*	
Spring peeper	*Pseudacris crucifer bartramiana*	
Southern chorus frog	*Pseudacris nigrita nigrita*	
Florida chorus frog	*Pseudacris nigrita verrucosa*	
Little grass frog	*Pseudacris ocularis*	
Ornate chorus frog	*Pseudacris ornata*	
Narrow-striped dwarf siren	*Pseudobranchus axanthus axanthus*	
Gulf hammock dwarf siren	*Pseudobranchus striatus lustricolus*	
Slender dwarf siren	*Pseudobranchus striatus spheniscus*	
Rusty mud salamander	*Pseudotriton montanus floridanus*	
Bullfrog	*Rana catesbeiana*	
Bronze frog	*Rana clamitans clamitans*	
Pig frog	*Rana grylio*	
River frog	*Rana heckscheri*	
Southern leopard frog	*Lithobates sphenocephalus*	
Eastern spadefoot toad	*Scaphiopus holbrooki holbrooki*	
Eastern lesser siren	*Siren intermedia intermedia*	
Greater siren	*Siren lacertina*	
Reptiles		
Florida cottonmouth	*Agkistrodon piscivorous conanti*	
American alligator	*Alligator mississippiensis*	FT (s/a)
Green anole	*Anolis carolinensis carolinensis*	
Six-lined racerunner	*Aspidoscelis sexlineata*	
Loggerhead sea turtle	*Caretta caretta caretta*	FT
Florida scarlet snake	*Cemophora coccinea coccinea*	
Green sea turtle	*Chelonia mydas*	FT
Florida snapping turtle	*Chelydra serpentina osceola*	
Southern black racer	*Coluber constrictor priapus*	
Eastern diamondback rattlesnake	*Crotalus adamanteus*	
Florida chicken turtle	*Deirochelys reticularia chrysea*	
Eastern chicken turtle	*Deirochelys reticularia reticularia*	
Leatherback sea turtle	*Dermochelys coriacea*	FE
Southern ringneck snake	*Diadophis punctatus punctatus*	
Eastern indigo snake	*Drymarchon corais couperi*	FT
Corn snake	*Elaphe guttata guttata*	

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Rat snake	*Elaphe obsoleta*	
Yellow rat snake	*Elaphe obsoleta quadrivittata*	
Gray rat snake	*Elaphe obsoleta spiloides*	
Atlantic hawksbill sea turtle	*Eretmochelys imbricata imbricata*	FE
Peninsula mole skink	*Eumeces egregius onocrepis*	
Five-lined skink	*Eumeces fasciatus*	
Southeastern five-lined skink	*Eumeces inexpectatus*	
Broad-headed skink	*Eumeces laticeps*	
Eastern mud snake	*Farancia abacura abacura*	
Rainbow snake	*Farancia erytrogramma erytrogramma*	
Gopher tortoise	*Gopherus polyphemus*	ST
Eastern hognose snake	*Heterodon platirhinos*	
Southern hognose snake	*Heterodon simus*	
Striped mud turtle	*Kinosternon baurii*	
Florida mud turtle	*Kinosternon subrubrum steindachneri*	
Short-tailed snake	*Lampropeltis extenuate*	ST
Florida kingsnake	*Lampropeltis getula floridana*	
Eastern kingsnake	*Lampropeltis getula getula*	
Scarlet kingsnake	*Lampropeltis triangulum elapsoides*	
Kemp's ridley sea turtle	*Lepidochelys kempii*	FE
Alligator snapping turtle	*Macrochelys temminckii*	SSC
Ornate diamondback terrapin	*Malaclemys terrapin macrospilota*	
Eastern coachwhip	*Masticophis flagellum flagellum*	
Coral snake	*Micrurus fulvius fulvius*	
Gulf salt marsh snake	*Nerodia clarkii clarkii*	
Mangrove salt marsh snake	*Nerodia clarkii compressicauda*	
Banded water snake	*Nerodia fasciata fasciata*	
Florida water snake	*Nerodia fasciata pictiventris*	
Florida green water snake	*Nerodia floridana*	
Brown water snake	*Nerodia taxispilota*	
Rough green snake	*Opheodrys aestivus*	
Eastern slender glass lizard	*Ophisaurus attenuatus longicaudus*	
Island glass lizard	*Ophisaurus compressus*	
Eastern glass lizard	*Ophisaurus ventralis*	
Florida pine snake	*Pituophis melanoleucus mugitus*	ST
Suwannee cooter	*Pseudemys concinna suwanniensis*	
Peninsula cooter	*Pseudemys floridana peninsularis*	
Florida red-bellied turtle	*Pseudemys nelsoni*	
Striped crayfish snake	*Regina alleni*	
Pine woods snake	*Rhadinaea flavilata*	
Florida worm lizard	*Rhineura floridana*	
Eastern fence lizard	*Sceloporus undulates*	
Southern fence lizard	*Sceloporus undulatus undulatus*	
Ground skink, little brown skink	*Scincella lateralis*	
North florida swamp snake	*Seminatrix pygaea pygaea*	
Dusky pigmy rattlesnake	*Sistrurus miliarius barbouri*	
Loggerhead musk turtle	*Sternotherus minor minor*	
Common musk turtle, stinkpot	*Sternotherus odoratus*	
Florida brown snake	*Storeria dekayi victa*	
Florida redbelly snake	*Storeria occipitomaculata obscura*	
Florida box turtle	*Terrapene carolina bauri*	
Gulf coast box turtle	*Terrapene carolina major*	

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Three-toed box turtle	*Terrapene carolina triunguis*	
Bluestripe ribbon snake	*Thamnophis sauritus nitae*	
Bluestripe garter snake	*Thamnophis sirtalis similis*	
Eastern garter snake	*Thamnophis sirtalis sirtalis*	
Florida softshelled turtle	*Trionyx ferox*	
Eastern earth snake	*Virginia valeria valeria*	
Fishes		
Scrawled cowfish	*Acanthostracion quadricornis*	
Lined sole	*Achirus lineatus*	
Atlantic sturgeon	*Acipenser oxyrhynchus oxyrinchus*	FE
Gulf sturgeon	*Acipenser oxyrinchus desotoi*	FT
Diamond killifish	*Adinia xenica*	
Spotted eagle ray	*Aetobatus narinari*	
Orange filefish	*Aluterus schoepfii*	
Fringed pipefish	*Anarchopterus criniger*	
Striped anchovy	*Anchoa hepsetus*	
Bay anchovy	*Anchoa mitchilli*	
Ocellated flounder	*Ancylopsetta quadrocellata*	
American eel	*Anguilla rostrata*	
Sheepshead	*Archosargus probatocephalus*	
Hardhead catfish	*Ariopsis felis*	
Bronze cardinalfish	*Astrapogon alutus*	
Southern stargazer	*Astroscopus y-graecum*	
Gafftopsail catfish	*Bagre marinus*	
Silver perch	*Bairdiella chrysoura*	
Frillfin goby	*Bathygobius soporator*	
Gulf menhaden	*Brevoortia patronus*	
Grass porgy	*Calamus arctifrons*	
Blue runner	*Caranx crysos*	
Crevalle jack	*Caranx hippos*	
Bull shark	*Carcharhinus leucas*	
Blacktip shark	*Carcharhinus limbatus*	
Sand tiger shark	*Carcharias taurus*	
Snook	*Centropomus undecimalis*	
Rock sea bass	*Centropristis philadelphica*	
Black sea bass	*Centropristis striata*	
Atlantic spadefish	*Chaetodipterus faber*	
Florida blenny	*Chasmodes saburrae*	
Striped burrfish	*Chilomycterus schoepfii*	
Atlantic bumper	*Chloroscombrus chrysurus*	
Spotted whiff	*Citharichthys macrops*	
Bay whiff	*Citharichthys spilopterus*	
Darter goby	*Ctenogobius boleosoma*	
Sand seatrout	*Cynoscion arenarius*	
Spotted seatrout	*Cynoscion nebulosus*	
Sheepshead minnow	*Cyprinodon variegatus*	
Southern stingray	*Dasyatis americana*	
Atlantic stingray	*Dasyatis sabina*	
Bluntnose stingray	*Dasyatis say*	
Round scad	*Decapterus punctatus*	
Irish pompano	*Diapterus auratus*	

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Dwarf sand perch	*Diplectrum bivittatus*	
Sand perch	*Diplectrum formosum*	
Spottail pinfish	*Diplodus holbrookii*	
Gizzard shad	*Dorosoma cepedianum*	
Threadfin shad	*Dorosoma petenense*	
Sharksucker	*Echeneis naucrates*	
Whitefin sucker	*Echeneis neucratoides*	
Ladyfish	*Elops saurus*	
Atlantic goliath grouper	*Epinephelus itajara*	
Jackknife fish	*Equetus lanceolatus*	
Fringed flounder	*Etropus crossotus*	
Smallmouth flounder	*Etropus microstomus*	
Gray flounder	*Etropus rimosus*	
Silver jenny	*Eucinostomus gula*	
Tidewater mojarra	*Eucinostomus harengulus*	
Goldspotted killifish	*Floridichthys carpio*	
Marsh killifish	*Fundulus confluentus*	
Gulf killifish	*Fundulus grandis*	
Striped killifish	*Fundulus similis*	
Eastern mosquitofish	*Gambusia holbrooki*	
Skilletfish	*Gobiesox strumosus*	
Highfin goby	*Gobionellus oceanicus*	
Naked goby	*Gobiosoma bosc*	
Twoscale goby	*Gobiosoma longipala*	
Code goby	*Gobiosoma robustum*	
Ocellated moray	*Gymnothorax saxicola*	
Smooth butterfly ray	*Gymnura micrura*	
Tomtate	*Haemulon aurolineatum*	
White grunt	*Haemulon plumierii*	
Slippery dick	*Halichoeres bivittatus*	
Scaled sardine	*Harengula jaguana*	
Bluntnose jack	*Hemicaranx amblyrhynchus*	
Least killifish	*Heterandria formosa*	
Lined seahorse	*Hippocampus erectus*	
Dwarf seahorse	*Hippocampus zosterae*	
Zebratail blenny	*Hypleurochilus caudovittatus*	
American halfbeak	*Hyporhamphus meeki*	
Halfbeak	*Hyporhamphus unifasciatus*	
Warsaw grouper	*Hyporthodus nigritus*	
Feather blenny	*Hypsoblennius hentz*	
Hogfish	*Lachnolaimus maximus*	
Buffalo trunkfish	*Lactophyrs trigonus*	
Long-horned cowfish	*Lactoria cornuta*	
Pinfish	*Lagodon rhomboides*	
Spot	*Leiostomus xanthurus*	
Longnose gar	*Lepisosteus osseus*	
Freckled skate	*Leucoraja lentiginosa*	
Tripletail	*Lobotes surinamensis*	
Rainwater killifish	*Lucania parva*	
Gray snapper	*Lutjanus griseus*	
Dog snapper	*Lutjanus jocu*	
Mahogany snapper	*Lutjanus mahogoni*	

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Lane snapper	*Lutjanus synagris*	
Tarpon	*Megalops atlanticus*	
Rough silverside	*Membras martinica*	
Inland silverside	*Menidia beryllina*	
Southern kingfish	*Menticirrhus americanus*	
Northern kingfish	*Menticirrhus saxatalis*	
Clown goby	*Microgobius gulosus*	
Green goby	*Microgobius thalassinus*	
Atlantic croaker	*Micropogonias undulatus*	
Fringed filefish	*Monacanthus ciliatus*	
Striped mullet	*Mugil cephalus*	
White mullet	*Mugil curema*	
Fantail mullet	*Mugil gyrans*	
Red goatfish	*Mullus auratus*	
Smooth dogfish	*Mustelus canis*	
Yellowmouth grouper	*Mycteroperca interstitialis*	
Gag	*Myctoperca microlepis*	
Speckled worm eel	*Myrophis punctatus*	
Lesser electric ray	*Narcine bancroftii*	
Spinycheek scorpionfish	*Neomerinthe hemingwayi*	
Emerald parrotfish	*Nicholsina usta*	
Golden shiner	*Notemigonus crysoleucas*	
Shiner	*Notropis spp.*	
Yellowtail snapper	*Ocyurus chrysurus*	
Polka-dot batfish	*Ogcocephalus cubifrons*	
Leatherjacket	*Oligoplites saurus*	
Shrimp eel	*Ophichthus gomesii*	
Crested cusk-eel	*Ophidion josephi*	
Atlantic thread herring	*Opisthonema oglinum*	
Spotfin jawfish	*Opistognathus robinsi*	
Gulf toadfish	*Opsanus beta*	
Pigfish	*Orthopristis chrysoptera*	
Seaweed blenny	*Parablennius marmoreus*	
Banded blenny	*Paraclinus fasciatus*	
Gulf flounder	*Paralichthys albigutta*	
Broad flounder	*Paralichthys squamilentus*	
Gulf butterfish	*Peprilus burti*	
Harvestfish	*Peprilus paru*	
Sailfin molly	*Poecilia latipinna*	
Black drum	*Pogonias cromis*	
French angelfish	*Pomacanthus paru*	
Bluefish	*Pomatomus saltatrix*	
Leopard sea robin	*Prionotus scitulus*	
Bighead sea robin	*Prionotus tribulus*	
Smalltooth sawfish	*Pristis pectinata*	FE
Cobia	*Rachycentron canadum*	
Clearnose skate	*Raja eglantaria*	
Roundel skate	*Raja texana*	
Atlantic guitar fish	*Rhinobatos lentiginosus*	
Cownose ray	*Rhinoptera bonasus*	
Atlantic sharpnose shark	*Rhizoprionodon terraenovae*	
Spanish sardine	*Sardinella aurita*	

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Red drum	*Sciaenops ocellatus*	
Spanish mackerel	*Scomberomorus maculatus*	
Cero mackerel	*Scomberomorus regalis*	
Barbfish	*Scorpaena brasiliensis*	
Lookdown	*Selene vomer*	
Pygmy sea bass	*Serraniculus pumilio*	
Belted sandfish	*Serranus subligarius*	
Bucktooth parrotfish	*Sparisoma radians*	
Southern puffer	*Sphoeroides nephelus*	
Bandtail puffer	*Sphoeroides spengleri*	
Guaguanche barracuda	*Sphyraena guachancho*	
Great barracuda	*Sphyraena barracuda*	
Northern sennet	*Sphyraena borealis*	
Bonnethead shark	*Sphyrna tiburo*	
Checkered blenny	*Starksia ocellata*	
Planehead filefish	*Stephanolepis hispidus*	
Pygmy filefish	*Stephanolepis setifer*	
Atlantic needlefish	*Strongylura marina*	
Redfin needlefish	*Strongylura notata*	
Timucu	*Strongylura timucu*	
Dusky flounder	*Syacium papillosum*	
Blackcheeked tonguefish	*Symphurus plagiusa*	
Dusky pipefish	*Syngnathus floridae*	
Chain pipefish	*Syngnathus lousianae*	
Sargassum pipefish	*Syngnathus pelagicus*	
Bull pipefish	*Syngnathus springeri*	
Inshore lizardfish	*Synodus foetens*	
Florida pompano	*Trachinotus carolinus*	
Permit	*Trachinotus falcatus*	
Houndfish	*Tylosorus crocodilus*	
Southern hake	*Urophycis floridana*	
Spotted hake	*Urophycis regia*	
Insects		
	Dicrotendipes spp.	
True flies	*Diptera* spp.	
Beetles	*Coleoptera* spp.	
True bugs	*Hemiptera* spp.	
Seashore springtail	*Anurida maritima*	
Ants, bees, wasps	*Hymenoptera* spp.	
Butterflies, moths	*Lepidoptera* spp.	
Marine invertebrates		
Atlantic abra	*Abra aequalis*	
Striate glass-hair chiton	*Acanthochitona pygmaea*	
White miniature ark	*Acar domingensis*	
Channelled barrel-bubble	*Acteocina canaliculata*	
Cande's barrel-bubble	*Acteocina candei*	
West indian sea cucumber	*Actinopyga agassizi*	
Bay scallop	*Aequipectin irradians*	
Texas venus	*Agriopoma texasianum*	
Aligena species	*Aligena* spp.	

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Bigclaw snapping shrimp	*Alpheus heterochaelis*	
West indian alvania	*Alvania auberiana*	
Cockle	*Americardia* spp.	
	Amphicteis gunneri floridus	
Atlantic papermussel	*Amygdalum papyrium*	
Cut-ribbed ark	*Anadara floridana*	
Cockle	*Anadara* spp.	
Traverse ark	*Anadara transversa*	
Sybaritic tellin	*Angulus sybariticus*	
Texas tellin	*Angulus texanus*	
Delicate tellin	*Angulus tenellus*	
Many-colored tellin	*Angulus versicolor*	
Buttercup lucine	*Anodontia alba*	
Chalky buttercup lucine	*Anodontia philippiana*	
Pointed venus	*Anomalocardia cuneimeris*	
Common jingle	*Anomia simplex*	
Pilsbry tuskshell	*Antalis pilsbryi*	
Cockle	*Antigona* spp.	
Sea slug/spotted sea hare	*Aplysia dactylomela*	
Mossy ark	*Arca imbricata*	
Turkey wing	*Arca zebra*	
Cancellate ark	*Arcopsis adamsi*	
Atlantic assiminea	*Assiminea succinea*	
Coral	*Astrangia* spp.	
Giant basket starfish	*Astrophyton muricatum*	
Lunar dovesnail	*Astyris lunata*	
Stiff penshell	*Atrina rigida*	
Half-naked penshell	*Atrina seminuda*	
Sawtooth penshell	*Atrina serrata*	
Riise's glassy bubble	*Atys riiseanus*	
Ivory barnacle	*Balanus eburneus*	
Corbula sportella	*Basterotia corbuloidea*	
Square sportella	*Basterotia quadrata*	
Grass cerith	*Bittiolum varium*	
Impressed odostome	*Boonea impressa*	
Borniaclam	*Bornia longipes*	
Spiny slippersnail	*Bostrycapulus aculeata*	
Scorched mussel	*Brachidontes exustus*	
Biconic top-turris	*Brachycythara biconica*	
Sea fingers	*Briareum asbetinum*	
	Bucephalus cuculus	
Striate bubble	*Bulla striata*	
Lightning whelk	*Busycon sinistrum*	
Pear whelk	*Busycotypus spiratus*	
Bipartite caecum	*Caecum bipartitum*	
Cooper's caecum	*Caecum cooperi*	
Fine-line caecum	*Caecum multicostatum*	
Beautiful caecum	*Caecum pulchellum*	
Striate caecum	*Caecum strigosum*	
Box crab	*Calappa* spp.	
	Callianassa jamaicensis	
Greater blue crab	*Callinectes sapidus*	

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Lesser blue crab	*Callinectes similis*	
Beautiful topsnail	*Calliostoma pulchrum*	
Mauve mouth drill	*Calotrophon ostrearum*	
Circular chinese hat	*Calyptraea centralis*	
Common nutmeg	*Cancellaria reticulata*	
Cancellate cantharus	*Cantharus cancellarius*	
Broad-ribbed carditid	*Carditamera floridana*	
Needle odostome	*Careliopsis styliformis*	
Costate hornsnail	*Cerithidea costata turrita*	
Ladder hornsnail	*Cerithidea scalariformis*	
Yellow miniature cerith	*Cerithiopsis flava*	
Gem miniature cerith	*Cerithiopsis gemmulosa*	
Green's miniature cerith	*Cerithiopsis greenii*	
Variable cerith	*Cerithium lutosum*	
Flyspeck cerith	*Cerithium muscarum*	
Corrugate jewelbox	*Chama congregata*	
Lace murex	*Chicoreus florifer dilectus*	
Cross barred venus	*Chione cancellata*	
Venerid bivalve	*Chione elevata*	
Atlantic petricolid	*Choristodon robustum*	
	Chrysallida nioba	
Suppressed vitrinella	*Circulus suppressus*	
Hermit crab	*Clibanarius* spp.	
Fancy shell hermit crab	*Clibanarius vittatus*	
Striate scalesnail	*Cochliolepis striata*	
Dwarf tiger lucine	*Codakia orbiculata*	
Rusty dovesnail	*Columbella rusticoides*	
Stearn's cone	*Conus stearnsi*	
Truncate corbula	*Corbula barrattiana*	
Contracted corbula	*Corbula contracta*	
Well-ribbed dovesnail	*Costoanachis lafresnayi*	
Gulf dovesnail	*Costoanachis semiplicata*	
Dovesnail	*Costoanachis spp.*	
Florida cave amphipod	*Crangonyx grandimanus*	
Hobb's cave amphipod	*Crangonyx hobbsi*	
Lunate crassinella	*Crassinella lunulata*	
Eastern or american oyster	*Crassostrea virginica*	
Depressed slippersnail	*Crepidula depressa*	
Slipper limpet	*Crepidula fornicata*	
Waxy mangelia	*Cryoturris cerinella*	
	Cryoturris vincula	
Tellin semele	*Cumingia tellinoides vanhyningi*	
Slender isopod	*Cyathura polita*	
Trilex vitrinella	*Cyclostremiscus pentagonus*	
Two-tooth barrel-bubble	*Cylichnella bidentata*	
Flamingo tongue snail	*Cyphoma gibbosa*	
Florida marshclam	*Cyrenoida floridana*	
Angelwing	*Cyrtopleura costata*	
Hermit crab	*Dardanus* spp.	
Gold-line marginella	*Dentimargo aureocinctus*	
Tan marginella	*Dentimargo eburneolus*	
Black sea urchin	*Diadema antillarum*	

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Atlantic giant cockle	*Dinocardium robustum*	
Tube worm	*Diopatra cuprea*	
Orange sea star	*Echinaster* spp.	
Interrupted periwinkle	*Echinolittorina interrupta*	
Sea urchin	*Echinometria* spp.	
Variable spike	*Elliptio icterina*	
Minor jackknife	*Ensis megistus*	
Textured sportella	*Ensitellops protextus*	
Sportella	*Ensitellops* spp.	
Bladed wentletrap	*Epitonium albidum*	
Angulate wentletrap	*Epitonium angulatum*	
Semismooth wentletrap	*Epitonium apiculatum*	
Cande's wentletrap	*Epitonium candeanum*	
Humphrey's wentletrap	*Epitonium humphreysii*	
Brown-band wentletrap	*Epitonium rupicola*	
Mauger's erato	*Erato maugeriae*	
Gold-stripe eulima	*Eulima auricincta*	
Two-band eulima	*Eulima bifasciata*	
Channeled odostome	*Eulimastoma canaliculatum*	
Sharp-rib drill	*Eupleura sulcidentata*	
Flatback mud crab	*Eurypanopeus depressus*	
Alternate tellin	*Eurytellina alternata*	
Broad back mud crab	*Eurytium limosum*	
Pink shrimp	*Farfantepenaeus duorarum*	
Commercial shrimp	*Farfantepenaeus* spp.	
Eastern banded tulip	*Fasciolaria hunteria*	
True tulip	*Fasciolaria tulipa*	
Pitted murex	*Favartia cellulosa*	
Golfball coral	*Favia fragum*	
	Gammarus mucronatus	
Atlantic gastrochaenid	*Gastrochaena hians*	
Amethyst gemclam	*Gemma gemma*	
Ribbed mussel	*Geukensia demissa*	
Snowflake marginella	*Gibberula lavalleeana*	
Santo Domingo carditid	*Glans dominguensis*	
Blood worm	*Glycera americana*	
Blood worm	*Glycera dibranchiata*	
Square glyph-turris	*Glyphoturris quadrata*	
Eroded crab	*Glyptoxanthus* spp.	
	Grandidierella spp.	
Hadria marginella	*Granulina hadria*	
Ivory tuskshell	*Graptacme eborea*	
Tanaid	*Halmyrapseudes bahamensis*	
Amber glassy-bubble	*Haminoea succinea*	
Capitellid thread worm	*Heteromastus filiformis*	
Giant eastern murex	*Hexaplex fulvescens*	
Yellow sea cucumber, Florida sea cucumber	*Holothuria floridana*	
Sheepswool sponge	*Hippiospongia lachne*	
Caridean shrimp	*Hippolyte pleuracantha*	
Hooked mussel	*Ischadium recurvum*	
	Ischnochiton niveus	
Brown-tip mangelia	*Kurtziella atrostyla*	

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Punctate mangelia	*Kurtziella limonitella*	
Polychaete	*Laeonereis culveri*	
Common egg cockle	*Laevicardium laevigatum*	
Yellow eggcockle	*Laevicardium mortoni*	
Painted eggcockle	*Laevicardium pictum*	
Sea slug	*Lamellaria* spp.	
	Leitoscoloplos fragilis	
Sea whip	*Leptogoria* spp.	
Spider crab	*Libinia* spp.	
Antillean fileclam	*Limaria pellucida*	
Atlantic horseshoe crab	*Limulus polyphemus*	
Miniature lucine	*Linga amiantus*	
White shrimp	*Litopenaeus setiferus*	
Mangrove periwinkle	*Littoraria angulifera*	
Marsh periwinkle	*Littoraria irrorata*	
Bantum hydrobe	*Littoridinops palustris*	
Crinkled pyram	*Longchaeus suturalis*	
File fleshy limpet	*Lucapinella limatula*	
Woven lucine	*Lucina nassula*	
Thick lucine	*Lucina pectinata*	
Pennsylvania lucine	*Lucina pennsylvanica*	
Blood ark	*Lunarca ovalis*	
Florida lyonsia	*Lyonsia floridana*	
Green sea urchin	*Lytechinus variegatus*	
Short macoma	*Macoma brevifrons*	
Constricted macoma	*Macoma constricta*	
Calico clam	*Macrocallista maculata*	
Sunray venus	*Macrocallista nimbosa*	
Decorator crab	*Macrocoeloma* spp.	
Fragile surfclam	*Mactra fragilis*	
Rose coral	*Mancina areolata*	
Gem cyclostreme	*Marevalvata tricarinata*	
Striate piddock	*Martesia striata*	
Ochlockonee moccasinshell	*Medionidus simpsonianus*	FE
	Meioceras nitidum	
Eastern melampus	*Melampus bidentatus*	
	Melanella atypha	
Conoidal eulima	*Melanella conoidea*	
Sharp eulima	*Melanella hypsela*	
Jamaica eulima	*Melanella jamaicensis*	
	Melita nitida	
Crown conch	*Melongena corona*	
Stone crab	*Menippe mercenaria*	
Southern quahog	*Mercenaria campechiensis*	
Hard-shell clam	*Mercenaria mercenaria*	
Striate tellin	*Merisca aequistriata*	
Brown eulima	*Microeulima hemphillii*	
Spotted decorator crab	*Microphrys* spp.	
Clinging crab	*Mithrax* spp.	
False tip mussel	*Modiolus modiolus squamosus*	
Button snail	*Modulus modulus*	
Dward surfclam	*Mulinia lateralis*	

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Lateral mussel	*Musculus lateralis*	
	Mysella spp.	
Sharp nassa	*Nassarius acutus*	
Striate nassa	*Nassarius consensus*	
Bruised nassa	*Nassarius vibex*	
Gaudy natica	*Natica canrena*	
Pile worms	*Neanthes succinea*	
Round worm	*Nematoda* spp.	
Kingsly mud crab	*Neopanope packardii*	
Stimpson mud crab	*Neopanope texana*	
False sharks's eye	*Neverita delessertiana*	
Shark's eye	*Neverita duplicata*	
Brown-line niso	*Niso aeglees*	
Ponderous ark	*Noetia ponderosa*	
Mottled triphora	*Nototriphora decorata*	
Pointed nutclam	*Nuculana acuta*	
Atlantic nutclam	*Nucula proxima*	
Caribbean reef octopus	*Octopus briareus*	
Ovoid odostome	*Odostomia laevigata*	
	Olivella inusta	
Variable dwarf olive	*Olivella mutica*	
	Olivella perplexa	
	Olivella prefloralia	
Tiny dwarf olive	*Olivella pusilla*	
Lettered olive	*Oliva sayana*	
Fine-lined hydrobe	*Onobops jacksoni*	
	Onuphis eremita oculata	
Giant montacutid	*Orobitella floridana*	
West indian sea star	*Oreaster reticulatus*	
Crested oyster	*Ostreola equestris*	
Antilles oxynoe	*Oxynoe antillarum*	
Hermit crab	*Pagurus* spp.	
Brackish green shrimp	*Palaemonetes intermedius*	
Grass shrimp	*Palaemonetes pugio*	
Common mud crab	*Panopeus herbstii*	
Spiny lobster	*Panulirus argus*	
Subovate softshell	*Paramya subovata*	
Brown gem clam	*Parastarte triquetra*	
Fat dovesnail	*Parvanachis obesa*	
Oyster dovesnail	*Parvanachis ostreicola*	
Many lined lucine	*Parvilucina crenella*	
Interuppted vitrinella	*Parviturboides interruptus*	
	Pectinaria gouldii	
Miraculous pedipes	*Pedipes mirabilis*	
Anemone shrimp	*Periclimenes* spp.	
Tower pyram	*Peristichia toreta*	
Boring petricola	*Petricola lapicida*	
Hermit crab	*Petrochirus* spp.	
Apple murex	*Phyllonotus pomum*	
White-knobbed drillia	*Pilsbryspira leucocyma*	
Hairy crab	*Pilumnus* spp.	
Chalky pitar	*Pitar simpsoni*	

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	Pithos spp.	
Threetooth carditid	*Pleuromeris tridentata*	
Sea rods	*Plexaura* spp.	
Shark eye shell	*Polinices duplicatus*	
Tinted cantharus	*Pollia tincta*	
Polychaete worm	*Polydora websteri*	
Fourtooth toothshell	*Polyschides tetraschistus*	
Small finger coral	*Porites furcata*	
Iridescent swimming crab	*Portunus gibbesii*	
Blotched swimming crab	*Portunus spinimanus*	
Big blue spring cave crayfish	*Procambarus horsti*	
Light-fleeing cave crayfish	*Procambarus lucifugus*	
Common Atlantic marginella	*Prunum apicinum*	
Little oat marginella	*Prunum avenaceum*	
	Prunum succinea	
Florida lucine	*Pseudomiltha floridana*	
Sea feathers, sea plumes	*Pseudopterogorgia* spp.	
	Ptychodera bahamensis	
Plicate mangelia	*Pyrgocythara plicosa*	
Mangelia	*Pyrgocythata* spp.	
Oyster turris	*Pyrgospira ostrearum*	
	Rissoina elegantissima	
Mussel	*Quincuncina kleiniana*	
Sea pansies	*Renilla* spp.	
Emerson's miniature cerith	*Retilaskeya emersonii*	
Pitted baby-bubble	*Rictaxis punctostriatus*	
Reddish mangelia	*Rubellatoma rubella*	
	Sabellaria spp.	
Incongruous ark	*Scapharca brasiliana*	
Catesby's risso	*Schwartziella catesbyana*	
Florida risso	*Schwartziella floridana*	
Rainbow tellin	*Scissula iris*	
	Scoloplos fargilis	
Adam's miniature cerith	*Seila adamsi*	
Cancellate semele	*Semele bellastriata*	
Atlantic semele	*Semele proficua*	
Nut semele	*Semelina nuculoides*	
Scotch bonnet	*Semicassis granulata*	
White baby ear	*Sinum perspectivum*	
Skenea	*Skenea* spp.	
Blake's vitrinella	*Solariorbis blakei*	
Gabb's vitrinella	*Solariorbis infracarinata*	
Terminal vitrinella	*Solariorbis terminalis*	
Florida loggerhead sponge	*Spheciospongia vesparium*	
Southern surfclam	*Spisula raveneli*	
Red-mouthed rock snail	*Stramonita haemastoma*	
Florida rock snail	*Stramonita haemastoma canaliculata*	
	Strictispira acurugata	
Florida fighting conch	*Strombus alatus*	
	Stylochus frontalis	
Lineate dovesnail	*Suturoglypta iontha*	
Minor snapping shrimp	*Synalpheus minus*	

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Purplish tagelus	*Tagelus divisus*	
Miniature moon snail	*Tectonatica pusilla*	
High-spired vitrinella	*Teinostoma cryptospira*	
	Teinostoma parvicallum	
White-crest tellin	*Tellidora cristata*	
Sunrise tellin	*Tellina radiata*	
Speckeled tellin	*Tellinella listeri*	
Concave auger	*Terebra concava*	
Eastern auger	*Terebra dislocata*	
Fine-ribbed auger	*Terebra protexta*	
Lilac auger	*Terebra vinosa*	
Southern oyster drill	*Thais haemastoma*	
Bryozoan shrimp	*Thor floridanus*	
Gray pygmy-venus	*Timoclea grus*	
Slender barrel-bubble	*Tornatina inconspicua*	
Arrow shrimp	*Tozeuma* spp.	
Florida pricklycockle	*Trachycardium egmontianum*	
Yellow pricklycockle	*Trachycardium muricatum*	
	Transenella conradina	
Samana triphora	*Triphora albida*	
Mottled triphora	*Triphora decorata*	
	Triphora modesta	
	Triphora nigrocincta	
Horse conch	*Triplofusus giganteus*	
Tropical sea urchin	*Tripneustes ventricosus*	
Arrow dwarf triton	*Tritonoharpa lanceolata*	
Spider cave crayfish	*Troglocambarus maclanei*	
Caribbean truncatella	*Truncatella caribaeensis*	
Beautiful truncatella	*Truncatella pulchella*	
Chestnut turban	*Turbo castanea*	
	Turbonilla arnoldoi	
Hawk turbonille	*Turbonilla buteonis*	
	Turbonilla constricta	
Dall's turbonille	*Turbonilla dalli*	
	Turbonilla hemphilli	
Delicate turbonille	*Turbonilla levis*	
Punctate turbonille	*Turbonilla puncta*	
	Turbonilla punicea	
	Turbonilla pyrrha	
Turbonille	*Turbonilla* spp.	
Toyatan's turbonille	*Turbonilla toyatani*	
	Turbonilla virga	
Conrad's turbonille	*Turbonilla viridaria*	
Boring turretsnail	*Turritella acropora*	
Gulf marsh fiddler	*Uca longisignalis*	
Fiddler crab	*Uca* spp.	
Gulf oyster drill	*Urosalpinx perrugata*	
Tampa drill	*Urosalpinx tampaensis*	
Florida worm snail	*Vermicularia knorrii*	
Branching candle sponge	*Verongia longissima*	
Florida rainbow	*Villosa amygdala*	
Conical eulima	*Vitreolina conica*	

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Terminal vitrinella	*Vitrinella terminalis*	
Southern spindle-bubble	*Volvulella persimilis*	
Smooth risso	*Zebina browniana*	
	Zebinella decussata	
	Zebinella elegantissima	

B.3.2 / *Listed Species*

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Plants		
Brittle maidenhair fern	*Adiantum tenerum*	SE
Incised groove-bur	*Agrimonia incisa*	SE
Green-fly orchid	*Epidendrum conopseum*	C
Pine lily	*Lilium catesbaei*	ST
Cardinal flower	*Lobelia cardinalis*	ST
Florida spiny pod	*Matelea floridana*	SE
Blueflower butterwort	*Pinguicula caerulea*	ST
Yellow butterwort	*Pinguicula lutea*	ST
Yellow fringed orchid	*Platanthera ciliaris*	ST
Rose pogonia	*Pogonia ophioglossoides*	ST
Needle palm	*Rhapidophyllum hystrix*	C
Nightflowering petunia	*Ruellia noctiflora*	SE
Hooded pitcherplant	*Sarracenia minor*	ST
Parrot pitcherplant	*Sarracenia psittacina*	ST
Florida ladies tresses	*Spiranthes floridana*	SE
Crippled cranefly orchid	*Tipularia discolor*	ST
Coontie	*Zamia pumila*	C
Treat's rainlily	*Zephyranthes treatiae*	ST
Birds		
Scott's seaside sparrow	*Ammodramus maritimus peninsulae*	ST
Burrowing owl	*Athene cunicularia*	ST
Piping plover	*Charadrius melodus*	FT
Snowy plover	*Charadrius nivosus*	ST
Marian's marsh wren	*Cistothorus palustris marianae*	ST
Little blue heron	*Egretta caerulea*	ST
Reddish egret	*Egretta rufescens*	ST
Tricolored heron	*Egretta tricolor*	ST
Southeastern American kestrel	*Falco sparverius paulus*	ST
Florida sandhill crane	*Grus canadensis pratensis*	ST
American oystercatcher	*Haematopus palliatus*	ST
Wood stork	*Mycteria americana*	FT
Roseate spoonbill	*Platalea ajaja*	ST
Black skimmer	*Rynchops niger*	ST
Least tern	*Sternula antillarum*	ST
Bachman's warbler	*Vermivora bachmanii*	FE
Mammals		
Sherman's fox squirrel	*Sciurus niger shermani*	SSC
Homosassa shrew	*Sorex longirostris eonis*	SSC
Florida manatee	*Trichechus manatus latirostris*	FE

Common Name	Species Name	Status
Legend: FT = Federally and State Designated Threatened • **FE** = Federally & 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 • **C** = commercially exploited		
Reptiles		
American alligator	*Alligator mississippiensis*	FT (s/a)
Loggerhead sea turtle	*Caretta caretta caretta*	FT
Green sea turtle	*Chelonia mydas*	FT
Leatherback sea turtle	*Dermochelys coriacea*	FE
Eastern indigo snake	*Drymarchon corais couperi*	FT
Atlantic hawksbill sea turtle	*Eretmochelys imbricata imbricata*	FE
Gopher tortoise	*Gopherus polyphemus*	ST
Short-tailed snake	*Lampropeltis extenuate*	ST
Kemp's ridley sea turtle	*Lepidochelys kempii*	FE
Alligator snapping turtle	*Macrochelys temminckii*	SSC
Florida pine snake	*Pituophis melanoleucus mugitus*	ST
Fishes		
Atlantic sturgeon	*Acipenser oxyrhynchus oxyrinchus*	FE
Gulf sturgeon	*Acipenser oxyrinchus desotoi*	FT
Smalltooth sawfish	*Pristis pectinata*	FE
Marine Invertebrates		
Ochlockonee moccasinshell	*Medionidus simpsonianus*	FE

B.3.3 / ***Invasive Non-native and/or Problem Species***

Common Name	Species Name	FLEPPC* Category (Plants) Invasive Status (Others)
Plants		
Mimosa, silktree	*Albizia julibrissin*	I
Alligatorweed	*Alternanthera philoxeroides*	II
Tung oil tree	*Aleurites fordii*	II
Coral ardisia	*Ardisia crenata*	I
Scarlet milkweed	*Asclepias curassavicum*	Invasive
Pindo palm	*Butia capitata*	Invasive
Madagascar periwinkle	*Catharanthus roseus*	Invasive
Camphor tree	*Cinnamomum camphora*	I
Wild taro	*Colocasia esculenta*	I
Winged yam	*Dioscorea alata*	I
Air-potato	*Dioscorea bulbifera*	I
Common water hyancith	*Eichhornia crassipes*	I
Hydrilla	*Hydrilla verticillata*	I
Cogon grass	*Imperata cylindrica*	I
Crape-myrtle	*Lagerstroemia indica*	Invasive
Dotted duckweed	*Landolita punctata*	Invasive
Lantana	*Lantana camara*	I
Japanese privet	*Ligustrum japonicum*	I
Glossy privet	*Ligustrum lucidum*	I
Chinese privet, hedge privet	*Ligustrum sinense*	I
Japenese honeysuckle	*Lonicera japonica*	I
Japanese climbing fern	*Lygodium japonicum*	I
Chinaberry	*Melia azedarach*	I
Eurasian water-milfoil	*Myriophyllum spicatum*	II

Common Name	Species Name	FLEPPC* Category (Plants) Invasive Status (Others)
Nandina, heavenly bamboo	*Nandina domestica*	I
Sword fern	*Nephrolepis cordifolia*	I
Oleander	*Neria oleander*	Invasive
Violet wood sorrel	*Oxalis corymbosa*	Invasive
Skunk vine	*Paederia foetida*	I
Torpedo grass	*Panicum repens*	I
Bahiagrass	*Paspalum notadum saurae*	Invasive
Red-leaf photina	*Photina glabra*	Invasive
Common cane, Roseau cane	*Phragmites australis*	Problem
Golden bamboo	*Phyllostachys aurea*	II
Water lettuce	*Pistia stratiotes*	I
Chinese brake fern	*Pteris vittata*	II
Kudzu	*Pueraria montana*	I
Tropical Mexican clover	*Richardia brasiliensis*	Invasive
Castor bean	*Ricinus communis*	II
Mexican petunia	*Ruellia brittoniana*	I
Chinese tallow	*Sapium sebiferum*	Invasive
Brazilian pepper	*Schinus terebinthifolius*	Invasive
Sicklepod, coffeeweed	*Senna obtusifolia*	Invasive
Rattlebox, purple sesban	*Sesbania punicea*	II
White-flowered wandering jew	*Tradescantia fluminensis*	II
Caesar weed	*Urena lobata*	Invasive
Chinese wisteria	*Wisteria sinensis*	II
Malanga, elephant ear	*Xanthosoma sagittifolium*	II
Birds		
Muscovy duck	*Cairina moschata*	Non-Native
Rock pigeon	*Columba livia*	Non-Native
Monk parakeet	*Myiositta monachus*	Non-Native
House sparrow	*Passer domesticus*	Non-Native
Eurasian collared dove	*Streptopelia decaocto*	Non-Native
European starling	*Sturnus vulgaris*	Non-Native
Mammals		
Domestic dog	*Canis familaris*	Non-Native
Coyote	*Canis latrans*	Non-Native
Nine-banded armadillo	*Dasypus novemcinctus*	Non-Native
Domestic cat	*Felis silvestris*	Non-Native
House mouse	*Mus musculus*	Non-Native
Nutria	*Myocaster coypu*	Non-Native
Norway rat	*Rattus norvegicus*	Non-Native
Roof rat, black rat	*Rattus rattus*	Non-Native
Feral hog	*Sus scrofa*	Non-Native
Amphibians		
Cuban treefrog	*Osteopilus septentrionalis*	Non-Native
Fishes		
Brown hoplo	*Hoplosternum littorale*	Non-Native
Swamp eel	*Monopterus albus*	Non-Native
Red lionfish	*Pterois volitans*	Non-Native

Common Name	Species Name	FLEPPC* Category (Plants) Invasive Status (Others)
Sailfin catfish	*Pterygoplichthys multiradiatus*	Non-Native
Blue tilapia	*Oreochromis aureus*	Non-Native
Marine Invertebrates		
Indo-Pacific swimming crab	*Charybdis helleri*	Non-Native
Asian clam	*Corbicula fluminea*	Non-Native
Common periwinkle	*Littorina littorea*	Non-Native
Green mussel	*Perna viridus*	Potential Invader
Porcelain crab	*Petrolisthes armatus*	Non-Native
Mantis shrimp	*Pullosquilla litoralis*	Non-Native
Reptiles		
Brown anole	*Anolis sagrans*	Non-Native

**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).*

B.4 / Arthropod Control Plan

Spatial data (e.g. shapefiles) for the boundaries of the aquatic preserve have been made accessible to the appropriate mosquito control district. The aquatic preserve is deemed highly productive and environmentally sensitive. By policy of DEP since 1987, aerial adulticiding is not allowed, but larviciding and ground adulticiding (truck spraying in public use areas) is typically allowed. Mosquito control plans temporarily may be set aside under declared threats to public or animal health, or during a Governor's Emergency Proclamation. Mosquito control plans are typically proposed by local mosquito control agencies when they desire to treat on public lands. A plan has never been proposed for St. Martins Marsh Aquatic Preserve.

B.5 / Archaeological and Historical Sites

The list below was derived from shapefiles obtained from the Florida Department of State, Division of Historical Resources on June 8, 2016, and includes sites within .25 miles of St. Martins Marsh Aquatic Preserve.

SiteID	SiteName	Description	Location
CI00022	MULLET KEY	Campsite (prehistoric), Specialized site for procurement of raw materials, Prehistoric shell midden, Tidal-estuarine	Within St. Martins Marsh Aquatic Preserve
CI00030	OZELLO 1	Prehistoric shell midden	Within St. Martins Marsh Aquatic Preserve
CI00045	OZELLO 2	Prehistoric shell midden	Within St. Martins Marsh Aquatic Preserve
CI00048	NORTHEAST TIGERTAIL BAY	Prehistoric shell midden	Within St. Martins Marsh Aquatic Preserve
CI00052	OZELLO	Prehistoric shell midden	Within 0.25 miles of St. Martins Marsh Aquatic Preserve
CI00087	OZELLO 3	Prehistoric shell midden	Within St. Martins Marsh Aquatic Preserve
CI00118	FORT ISLAND	Prehistoric shell midden	Within 0.25 miles of St. Martins Marsh Aquatic Preserve
CI00128	GOVERNOR'S ISLAND	Prehistoric shell midden	Within 0.25 miles of St. Martins Marsh Aquatic Preserve
CI00129	COFFIN POINT	Prehistoric shell midden	Within St. Martins Marsh Aquatic Preserve
CI00130	GUSTAF BAY	Prehistoric burial(s),Specialized site for procurement of raw materials, Prehistoric shell midden, Other	Within 0.25 miles of St. Martins Marsh Aquatic Preserve
CI00131	TIGER TAIL ISLAND	Prehistoric shell midden	Within St. Martins Marsh Aquatic Preserve
CI00132	TIGER TAIL BAY	Prehistoric shell midden	Within 0.25 miles of St. Martins Marsh Aquatic Preserve
CI00135	BUD NELSON MEMORIAL	Prehistoric burial(s), Prehistoric shell midden, Prehistoric midden(s)	Within 0.25 miles of St. Martins Marsh Aquatic Preserve
CI00136	TIGER TAIL BAY MIDDEN	Prehistoric shell midden	Within St. Martins Marsh Aquatic Preserve
CI00137	NORTH SHIVERS BAY MIDDEN	Campsite (prehistoric), Land-terrestrial, Prehistoric shell midden	Within St. Martins Marsh Aquatic Preserve
CI00138	SALT RIVER 2		Within St. Martins Marsh Aquatic Preserve
CI00224	SPICE KEY	Campsite (prehistoric), Specialized site for procurement of raw materials, Prehistoric shell midden, Habitation (prehistoric)	Within St. Martins Marsh Aquatic Preserve
CI00225	FOUR PALMS	Campsite (prehistoric), Specialized site for procurement of raw materials, Habitation (prehistoric), Prehistoric shell midden	Within St. Martins Marsh Aquatic Preserve
CI00226	NN	Prehistoric shell midden, Historic refuse / dump, Artifact scatter-low density (< 2 per sq meter)	Within St. Martins Marsh Aquatic Preserve
CI00228A	NN	Prehistoric shell midden, Artifact scatter-low density (< 2 per sq meter)	Within St. Martins Marsh Aquatic Preserve
CI00228B	NN	Prehistoric shell midden	Within St. Martins Marsh Aquatic Preserve
CI00229	NN	Prehistoric shell midden, Artifact scatter-low density (< 2 per sq meter)	Within St. Martins Marsh Aquatic Preserve
CI00230	NN	Prehistoric shell midden, Historic refuse / dump, Ceramic scatter	Within 0.25 miles of St. Martins Marsh Aquatic Preserve
CI00231	NN	Prehistoric shell midden	Within St. Martins Marsh Aquatic Preserve
CI00232	NN	Prehistoric shell midden	Within St. Martins Marsh Aquatic Preserve
CI00233	NN	Prehistoric shell midden	Within St. Martins Marsh Aquatic Preserve
CI00234	NN	Prehistoric shell midden	Within St. Martins Marsh Aquatic Preserve
CI00417	CHAIR ISLAND	Habitation (prehistoric), Prehistoric shell midden, Tidal-estuarine	Within St. Martins Marsh Aquatic Preserve
CI00421	GREEN'S PLACE	Campsite (prehistoric), Prehistoric shell midden	Within St. Martins Marsh Aquatic Preserve
CI00427	STONEY/LANE TRACT I	Campsite (prehistoric), Prehistoric shell midden, Prehistoric midden(s)	Within St. Martins Marsh Aquatic Preserve
CI00444	LAST ISLAND	Habitation (prehistoric), Prehistoric midden(s)	Within St. Martins Marsh Aquatic Preserve
CI00451	WILLEY POINT	Campsite (prehistoric), Prehistoric midden(s)	Within St. Martins Marsh Aquatic Preserve
CI00452	DECIDUE	Habitation (prehistoric), Prehistoric shell midden, Artifact scatter-dense (> 2 per sq meter)	Within 0.25 miles of St. Martins Marsh Aquatic Preserve

SiteID	SiteName	Description	Location
CI00559	DECIDUE-MILTON MIDDEN	Subsurface features are present, Habitation (prehistoric), Prehistoric shell midden, Artifact scatter-dense (> 2 per sq meter)	Within 0.25 miles of St. Martins Marsh Aquatic Preserve
CI00566	JOHN BROWN I	Prehistoric shell midden	Within 0.25 miles of St. Martins Marsh Aquatic Preserve
CI00567	JOHN BROWN II	Prehistoric shell midden, Artifact scatter-low density (< 2 per sq meter)	Within St. Martins Marsh Aquatic Preserve
CI00568	JOHN BROWN III	Habitation (prehistoric), Prehistoric shell midden, Variable density scatter of artifacts	Within 0.25 miles of St. Martins Marsh Aquatic Preserve
CI00569	JOHN BROWN IV	Prehistoric shell midden, Artifact scatter-low density (< 2 per sq meter)	Within St. Martins Marsh Aquatic Preserve
CI00570	JOHN BROWN V	Prehistoric shell midden, Artifact scatter-low density (< 2 per sq meter)	Within St. Martins Marsh Aquatic Preserve
CI00580	BATTLE CREEK I	Prehistoric shell midden, Artifact scatter-dense (> 2 per sq meter)	Within St. Martins Marsh Aquatic Preserve
CI00581	BATTLE CREEK II	Prehistoric shell midden, Artifact scatter-dense (> 2 per sq meter)	Within St. Martins Marsh Aquatic Preserve
CI00582	SOUTH TIGER TAIL BAY I	Prehistoric shell midden, Artifact scatter-dense (> 2 per sq meter)	Within St. Martins Marsh Aquatic Preserve
CI00583	SOUTH TIGER TAIL BAY II	Prehistoric shell midden,Artifact scatter-low density (< 2 per sq meter)	Within St. Martins Marsh Aquatic Preserve
CI00584	BELL ISLAND SOUTH	Prehistoric shell midden, Artifact scatter-dense (> 2 per sq meter)	Within St. Martins Marsh Aquatic Preserve
CI00585	WILLEY POINT I	Prehistoric shell midden, Artifact scatter-dense (> 2 per sq meter)	Within St. Martins Marsh Aquatic Preserve
CI00586	WILLEY POINT II	Specialized site for procurement of raw materials, Land terrestrial, Prehistoric shell midden, Tidal-estuarine	Within St. Martins Marsh Aquatic Preserve
CI00587	HELL GATE SOUTH	Prehistoric shell midden, Artifact scatter-low density (< 2 per sq meter)	Within St. Martins Marsh Aquatic Preserve
CI00588	HELL GATE WEST I	Prehistoric shell midden, Artifact scatter-low density (< 2 per sq meter)	Within 0.25 miles of St. Martins Marsh Aquatic Preserve
CI00589	HELL GATE WEST II	Prehistoric shell midden, Artifact scatter-low density (< 2 per sq meter)	Within 0.25 miles of St. Martins Marsh Aquatic Preserve
CI00590	GUSTAF BAY EAST	Prehistoric shell midden, Artifact scatter-low density (< 2 per sq meter)	Within 0.25 miles of St. Martins Marsh Aquatic Preserve
CI00591	DORSEY	Prehistoric shell midden, Artifact scatter-dense (> 2 per sq meter)	Within St. Martins Marsh Aquatic Preserve
CI00592	WEST HOMOSASSA I	Prehistoric shell midden, Artifact scatter-low density (< 2 per sq meter)	Within 0.25 miles of St. Martins Marsh Aquatic Preserve
CI00593	WEST HOMOSASSA II	Prehistoric shell midden, Artifact scatter-low density (< 2 per sq meter)	Within 0.25 miles of St. Martins Marsh Aquatic Preserve
CI00596	WEST HOMOSASSA V	Prehistoric shell midden, Artifact scatter-dense (> 2 per sq meter)	Within 0.25 miles of St. Martins Marsh Aquatic Preserve
CI00598	SHELL ISLAND WEST	Prehistoric shell midden, Artifact scatter-dense (> 2 per sq meter)	Within 0.25 miles of St. Martins Marsh Aquatic Preserve
CI00599	DOG ISLAND	Prehistoric shell midden, Artifact scatter-dense (> 2 per sq meter)	Within 0.25 miles of St. Martins Marsh Aquatic Preserve
CI00600	OUTER DEEP CREEK	Prehistoric shell midden, Artifact scatter-low density (< 2 per sq meter)	Within St. Martins Marsh Aquatic Preserve
CI00601	FALSE CHANNEL ISLAND	Habitation (prehistoric), Prehistoric shell midden	Within St. Martins Marsh Aquatic Preserve
CI00602	GUSTAF BAY ISLAND	Prehistoric shell midden, Artifact scatter-low density (< 2 per sq meter)	Within St. Martins Marsh Aquatic Preserve
CI00603	GUSTAF BAY EAST-NORTH SHORE	Prehistoric shell midden, Artifact scatter-low density (< 2 per sq meter)	Within 0.25 miles of St. Martins Marsh Aquatic Preserve
CI00604	HELL GATE WEST III	Prehistoric shell midden, Artifact scatter-dense (> 2 per sq meter)	Within St. Martins Marsh Aquatic Preserve
CI00605	WILLEY POINT III	Prehistoric shell midden, Artifact scatter-low density (< 2 per sq meter)	Within 0.25 miles of St. Martins Marsh Aquatic Preserve
CI00606	BELL ISLAND NORTH	Prehistoric shell midden, Artifact scatter-low density (< 2 per sq meter)	Within St. Martins Marsh Aquatic Preserve
CI00607	LASHLEY POINT	Campsite (prehistoric), Land-terrestrial, Prehistoric shell midden	Within St. Martins Marsh Aquatic Preserve
CI00857	BROWN, JOHN VI	Subsurface features are present, Land-terrestrial, Prehistoric shell midden, Other	Within 0.25 miles of St. Martins Marsh Aquatic Preserve

SiteID	SiteName	Description	Location
CI00869	LITTLE HOMOSASSA RIVER I	Land-terrestrial, Prehistoric shell midden, Prehistoric midden(s)	Within St. Martins Marsh Aquatic Preserve
CI00870	LITTLE HOMOSASSA RIVER II	Land-terrestrial, Prehistoric shell midden, Prehistoric midden(s)	Within St. Martins Marsh Aquatic Preserve
CI00871	LITTLE HOMOSASSA RIVER III	Land-terrestrial, Prehistoric shell midden, Prehistoric midden(s)	Within St. Martins Marsh Aquatic Preserve
CI00872	LITTLE HOMOSASSA RIVER IV	Land-terrestrial, Prehistoric shell midden, Prehistoric midden(s)	Within St. Martins Marsh Aquatic Preserve
CI00873	LITTLE HOMOSASSA RIVER V	Land-terrestrial, Prehistoric shell midden, Prehistoric midden(s)	Within St. Martins Marsh Aquatic Preserve
CI00874	LITTLE HOMOSASSA RIVER VB	Land-terrestrial, Prehistoric shell midden, Prehistoric midden(s)	Within St. Martins Marsh Aquatic Preserve
CI00875	LITTLE HOMOSASSA RIVER VI	Land-terrestrial, Prehistoric shell midden, Prehistoric midden(s)	Within St. Martins Marsh Aquatic Preserve
CI00876	LITTLE HOMOSASSA RIVER VII	Land-terrestrial, Prehistoric shell midden, Prehistoric midden(s)	Within St. Martins Marsh Aquatic Preserve
CI00877	LITTLE HOMOSASSA RIVER VIII	Land-terrestrial, Prehistoric shell midden, Prehistoric midden(s)	Within St. Martins Marsh Aquatic Preserve
CI00878	LITTLE HOMOSASSA RIVER IX	Land-terrestrial, Prehistoric shell midden, Prehistoric midden(s)	Within St. Martins Marsh Aquatic Preserve
CI00879	LITTLE HOMOSASSA RIVER X	Land-terrestrial, Prehistoric shell midden, Prehistoric midden(s)	Within St. Martins Marsh Aquatic Preserve
CI00880	LITTLE HOMOSASSA RIVER XI	Land-terrestrial, Prehistoric shell midden, Prehistoric midden(s)	Within St. Martins Marsh Aquatic Preserve
CI00881	LITTLE HOMOSASSA RIVER XII	Land-terrestrial, Prehistoric shell midden, Prehistoric midden(s)	Within St. Martins Marsh Aquatic Preserve
CI00882	LITTLE HOMOSASSA RIVER XIII	Land-terrestrial, Prehistoric shell midden, Prehistoric midden(s)	Within St. Martins Marsh Aquatic Preserve
CI00883	LITTLE HOMOSASSA RIVER XIV	Land-terrestrial, Prehistoric shell midden, Prehistoric midden(s)	Within 0.25 miles of St. Martins Marsh Aquatic Preserve
CI00884	LITTLE HOMOSASSA RIVER XV	Land-terrestrial, Prehistoric shell midden, Prehistoric midden(s)	Within St. Martins Marsh Aquatic Preserve
CI00885	LITTLE HOMOSASSA RIVER XVI	Land-terrestrial, Prehistoric shell midden, Prehistoric midden(s)	Within St. Martins Marsh Aquatic Preserve
CI01060	NORTH LASHLEY 1	Campsite (prehistoric), Land-terrestrial, Prehistoric shell midden, Tidal-estuarine	Within St. Martins Marsh Aquatic Preserve
CI01061	NORTH LASHLEY 2	Campsite (prehistoric), Land-terrestrial, Prehistoric shell midden	Within St. Martins Marsh Aquatic Preserve
CI01062	NORTH LASHLEY 3	Campsite (prehistoric), Subsurface features are present, Land-terrestrial, Prehistoric shell midden	Within St. Martins Marsh Aquatic Preserve
CI01063	NORTH LASHLEY 4	Campsite (prehistoric), Land-terrestrial, Prehistoric shell midden	Within St. Martins Marsh Aquatic Preserve
CI01064	NORTH LASHLEY 6	Campsite (prehistoric), Land-terrestrial	Within St. Martins Marsh Aquatic Preserve
CI01066	MUD CREEK 1	Campsite (prehistoric), Specialized site for procurement of raw materials, Land-terrestrial, Prehistoric shell midden	Within St. Martins Marsh Aquatic Preserve
CI01067	MUD CREEK 2	Campsite (prehistoric), Land-terrestrial, Prehistoric shell midden, Prehistoric midden(s) Underwater	Within St. Martins Marsh Aquatic Preserve

SiteID	SiteName	Description	Location
CI01193	Camp Island	Prehistoric shell midden, Tidal-estuarine	Within St. Martins Marsh Aquatic Preserve
CI01194	Keith's 2	Campsite (prehistoric), Specialized site for procurement of raw materials, Prehistoric shell midden, Tidal-estuarine	Within St. Martins Marsh Aquatic Preserve
CI01195	Wasted	Prehistoric shell midden, Tidal-estuarine	Within St. Martins Marsh Aquatic Preserve
CI01196	Washed Up	Prehistoric shell midden, Tidal-estuarine	Within St. Martins Marsh Aquatic Preserve
CI01197	Sickle Midden	Prehistoric shell midden, Tidal-estuarine	Within St. Martins Marsh Aquatic Preserve
CI01198	Ofunlv Midden	Prehistoric shell midden, Tidal-estuarine	Within St. Martins Marsh Aquatic Preserve
CI01199	Etoh Midden	Campsite (prehistoric), Specialized site for procurement of raw materials, Prehistoric shell midden, Tidal-estuarine	Within St. Martins Marsh Aquatic Preserve
CI01200	Hidden Midden	Prehistoric midden(s), Tidal-estuarine	Within St. Martins Marsh Aquatic Preserve
CI01201	Illifoki	Campsite (prehistoric), Specialized site for procurement of raw materials, Prehistoric shell midden, Tidal-estuarine	Within St. Martins Marsh Aquatic Preserve
CI01202	Chiento Illifoki	Campsite (prehistoric), Specialized site for procurement of raw materials, Prehistoric shell midden, Tidal-estuarine	Within St. Martins Marsh Aquatic Preserve
CI01227	Charlie F. Carroll grave site	Private family cemetary (c1950)	Within 0.25 miles of St. Martins Marsh Aquatic Preserve
CI01282	THLU'THLU	Specialized site for procurement of raw materials, Habitation (prehistoric), Prehistoric shell midden, Prehistoric midden(s)	Within 0.25 miles of St. Martins Marsh Aquatic Preserve
CI01283	AMPA 1	Specialized site for procurement of raw materials, Habitation (prehistoric), Prehistoric shell midden, Prehistoric midden(s)	Within 0.25 miles of St. Martins Marsh Aquatic Preserve
CI01284	AMPA 2	Specialized site for procurement of raw materials, Habitation (prehistoric), Prehistoric shell midden, Prehistoric midden(s)	Within 0.25 miles of St. Martins Marsh Aquatic Preserve
CI01285	Iste'lane - 1	Building remains, Homestead, Other, Artifact scatter-low density (< 2 per sq meter)	Within 0.25 miles of St. Martins Marsh Aquatic Preserve
CI01286	Ampa 3	Specialized site for procurement of raw materials, Habitation (prehistoric), Prehistoric shell midden, Tidal-estuarine	Within 0.25 miles of St. Martins Marsh Aquatic Preserve
CI01287	AMPA 4	Specialized site for procurement of raw materials, Habitation (prehistoric), Prehistoric shell midden, Prehistoric midden(s)	Within 0.25 miles of St. Martins Marsh Aquatic Preserve
CI01288	THLA 2	Specialized site for procurement of raw materials, Habitation (prehistoric), Prehistoric shell midden, Tidal-estuarine	Within 0.25 miles of St. Martins Marsh Aquatic Preserve
CI01289	THLA 3	Specialized site for procurement of raw materials, Habitation (prehistoric), Prehistoric shell midden, Tidal-estuarine	Within 0.25 miles of St. Martins Marsh Aquatic Preserve
CI01290	THLA 4	Specialized site for procurement of raw materials, Habitation (prehistoric), Prehistoric shell midden, Tidal-estuarine	Within St. Martins Marsh Aquatic Preserve
CI01291	THLA 5	Specialized site for procurement of raw materials, Habitation (prehistoric), Prehistoric shell midden, Tidal-estuarine	Within 0.25 miles of St. Martins Marsh Aquatic Preserve
CI01292	THLA 6	Specialized site for procurement of raw materials, Habitation (prehistoric), Prehistoric shell midden, Tidal-estuarine	Within St. Martins Marsh Aquatic Preserve

SiteID	SiteName	Description	Location
CI01293	Huti 1	Specialized site for procurement of raw materials, Habitation (prehistoric), Prehistoric shell midden, Tidal-estuarine	Within 0.25 miles of St. Martins Marsh Aquatic Preserve
CI01294	Huti 2	Specialized site for procurement of raw materials, Habitation (prehistoric), Prehistoric shell midden	Within 0.25 miles of St. Martins Marsh Aquatic Preserve
CI01295	Huti 3	Specialized site for procurement of raw materials, Habitation (prehistoric), Prehistoric shell midden, Tidal-estuarine	Within 0.25 miles of St. Martins Marsh Aquatic Preserve
CI01296	Huti 4	Specialized site for procurement of raw materials, Habitation (prehistoric), Prehistoric shell midden, Tidal-estuarine	Within 0.25 miles of St. Martins Marsh Aquatic Preserve
CI01297	Huti 5	Specialized site for procurement of raw materials, Habitation (prehistoric), Prehistoric shell midden, Tidal-estuarine	Within 0.25 miles of St. Martins Marsh Aquatic Preserve
CI01298	Huti 6	Specialized site for procurement of raw materials, Habitation (prehistoric),	Within 0.25 miles of St. Martins Marsh Aquatic Preserve
CI01299	Huti 7		Within 0.25 miles of St. Martins Marsh Aquatic Preserve
CI01300	Iste Lane 2	Cistern, Homestead, Other, Artifact scatter-low density (< 2 per sq meter)	Within 0.25 miles of St. Martins Marsh Aquatic Preserve
CI01301	Thampko 7	Specialized site for procurement of raw materials, Habitation (prehistoric)	Within St. Martins Marsh Aquatic Preserve
CI01302	Thampko 8	Specialized site for procurement of raw materials, Habitation (prehistoric)	Within St. Martins Marsh Aquatic Preserve
CI01303	Thampko 1	Specialized site for procurement of raw materials, Habitation (prehistoric), Prehistoric shell midden, Prehistoric midden(s)	Within 0.25 miles of St. Martins Marsh Aquatic Preserve
CI01304	Thampko 2	Specialized site for procurement of raw materials, Habitation (prehistoric), Prehistoric shell midden, Prehistoric midden(s)	Within 0.25 miles of St. Martins Marsh Aquatic Preserve
CI01305	Thampko 3	Specialized site for procurement of raw materials, Habitation (prehistoric), Tidal-estuarine	Within St. Martins Marsh Aquatic Preserve
CI01306	Thampko 4	Specialized site for procurement of raw materials, Habitation (prehistoric), Tidal-estuarine	Within St. Martins Marsh Aquatic Preserve
CI01307	Thampko 5	Specialized site for procurement of raw materials, Habitation (prehistoric), Tidal-estuarine	Within St. Martins Marsh Aquatic Preserve
CI01308	Thampko 6	Specialized site for procurement of raw materials, Habitation (prehistoric)	Within St. Martins Marsh Aquatic Preserve
CI01309	THLA 9	Specialized site for procurement of raw materials, Habitation (prehistoric), Tidal-estuarine	Within St. Martins Marsh Aquatic Preserve
CI01310	THLA 10	Specialized site for procurement of raw materials, Habitation (prehistoric), Tidal-estuarine	Within St. Martins Marsh Aquatic Preserve
CI01311	THLA 11	Specialized site for procurement of raw materials, Habitation (prehistoric), Prehistoric shell midden, Other	Within 0.25 miles of St. Martins Marsh Aquatic Preserve
CI01312	Chiento 1	Specialized site for procurement of raw materials, Habitation (prehistoric)	Within St. Martins Marsh Aquatic Preserve
CI01347	Schoolhouse Island	School	Within St. Martins Marsh Aquatic Preserve

Appendix C

Public Involvement

*C.1 / **Advisory Committee***

The following Appendices contain information about the advisory committee meeting which was held in order to obtain input from the St. Martins Marsh Aquatic Preserve Management Plan Advisory Committee regarding the draft management plan.

*C.1.1 / **List of Members and Their Affiliations***

Member	Affiliation	Contact
John Lakich	Park Manager, Crystal River Preserve State Park	John.Lakich@dep.state.fl.us
Keith Morin	Environmental Specialist (Park Biologist), Crystal River Preserve State Park	Keith.Morin@dep.state.fl.us
Joyce Kleen	Wildlife Biologist, Crystal River National Wildlife Refuge	Joyce_Kleen@fws.gov
Earnie Olsen	Supervisor / Lead Instructor, Citrus County School's Marine Science Station	OlsenE@citrus.k12.fl.us
Sky Notestein	Senior Environmental Specialist, South West Florida Water Management District	Sky.notestein@swfwmd.state.fl.us
Savanna Barry	Regional Sea Grant Agent, UF/IFAS Extension Nature Coast Biological Station	Savanna.Barry@ufl.edu
Kimberlee Tennill	Park Manager, Homosassa Springs Wildlife State Park	Kimberly.Tennille@dep.state.fl.us
Tom Frazer	Professor, University of Florida	frazer@ufl.edu
Dennis Damato	Citrus County Commissioner District 1 (Crystal River)	dennis.damato@citrusbocc.com
Nijole Wellendorf	DEP DEAR Representative	Nijole.Wellendorf@dep.state.fl.us
Terry Hansen	DEP DEAR Representative (TMDL / BMAP)	Terry.Hansen@dep.state.fl.us
Ryan Crane	Law Enforcement, Florida Fish and Wildlife Conservation Commission, Withlacoochee Gulf Preserve (Non profit org)	Ryan.Crane@myfwc.com
John Roberts	Private Land owner	
Rick Mainster	Eco tour guides	
Don Chancey	Fishing industry	

hearing, he/she will need to ensure that a verbatim record of the proceeding is made, which record includes the testimony and evidence from which the appeal is to be issued.
For more information, you may contact: Denise Graves, (352)333-2505 or denise.graves@myfloridalicense.com.

DEPARTMENT OF ENVIRONMENTAL PROTECTION
The Florida Department of Environmental Protection, Florida Coastal Office announces a public meeting to which all persons are invited.
DATE AND TIME: Wednesday, September 28, 2016, 6:00 p.m. – 7:30 p.m.
PLACE: Crystal River City Hall Conference Room, 123 NW U.S. Highway 19, Crystal River, FL 34428
GENERAL SUBJECT MATTER TO BE CONSIDERED: A draft St. Martins Marsh Aquatic Preserve Management Plan has been prepared by the Florida Coastal Office. The draft plan is available for viewing or download at www.dep.state.fl.us/coastal/sites/stmartins/default.htm. The Florida Coastal Office seeks public comment on the draft. Members of the St. Martins Marsh Aquatic Preserve Management Plan Advisory Committee have also been invited to attend, listen to comments, and may provide or respond to comments.
A copy of the agenda may be obtained by contacting: Aquatic Preserve Manager Tim Jones at Timothy.W.Jones@dep.state.fl.us or (352)228-6031.
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: Tim Jones at Timothy.W.Jones@dep.state.fl.us. 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).

DEPARTMENT OF ENVIRONMENTAL PROTECTION
The Florida Department of Environmental Protection, Florida Coastal Office announces a public meeting to which all persons are invited.
DATE AND TIME: Thursday, September 29, 2016, 9:00 a.m.
PLACE: Crystal River Preserve State Park, 3266 N. Sailboat Ave., Crystal River, FL 34428
GENERAL SUBJECT MATTER TO BE CONSIDERED: The St. Martins Marsh Aquatic Preserve Management Plan Advisory Committee will meet to discuss comments at the public meeting - scheduled for September 28 and separately noticed - and possible revisions to the draft St. Martins Marsh Aquatic Preserve Management Plan. The draft plan is available for viewing or download at www.dep.state.fl.us/coastal/sites/stmartins/default.htm.
A copy of the agenda may be obtained by contacting: Aquatic Preserve Manager Tim Jones at Timothy.W.Jones@dep.state.fl.us or (352)228-6031.
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: Tim Jones at Timothy.W.Jones@dep.state.fl.us. 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).

DEPARTMENT OF HEALTH
Division of Medical Quality Assurance
The Florida Department of Health, Division of Medical Quality Assurance announces a public meeting to which all persons are invited.
DATE AND TIME: Tuesday, September 27, 2016, 3:00 p.m.
PLACE: Residence Inn Tallahassee Universities at the Capitol, 600 West Gaines Street, Tallahassee, FL 32304
GENERAL SUBJECT MATTER TO BE CONSIDERED: Division of Medical Quality Assurance Budget Training.
A copy of the agenda may be obtained by contacting: Jamie McNease, Medical Quality Assurance, Bureau of Operations, 4052 Bald Cypress Way, Bin #BCO-01, Tallahassee, Florida 32399-3253.
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 7 days before the workshop/meeting by contacting: Erica Milam, Medical Quality Assurance, 4052 Bald Cypress Way, Bin #BCO-01, Tallahassee, Florida 32399-3253, (850)245-4079. 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).

DEPARTMENT OF HEALTH
Division of Medical Quality Assurance
The Florida Department of Health, Division of Medical Quality Assurance announces a public meeting to which all persons are invited.
DATE AND TIME: Tuesday, September 27, 2016, 1:00 p.m.
PLACE: Residence Inn Tallahassee Universities at the Capitol, 600 West Gaines Street, Tallahassee, FL 32304
GENERAL SUBJECT MATTER TO BE CONSIDERED: Florida's Healthiest Weight Initiative.
A copy of the agenda may be obtained by contacting: Debora Hall, Division of Medical Quality Assurance, Bureau of Operations, 4052 Bald Cypress Way, Bin #BCO-01, Tallahassee, Florida 32399-3253.

Florida Department of Environmental Protection

Big Bend Aquatic Preserves
3266 North Sailboat Avenue
Crystal River, Florida 34428

Rick Scott
Governor

Carlos Lopez-Cantera
Lt. Governor

Jonathan P. Steverson
Secretary

St. Martins Marsh Aquatic Preserve Draft Management Plan
Advisory Committee Meeting
Thursday, September 29, 2016, 9:00 a.m. – 4:00 p.m.
Citrus County Visitors and Convention Bureau
915 N. Suncoast Boulevard
Crystal River, Florida 34429

Attendees: Grant Burton, Ed Call, Don Chancey, Kent Gardner, Joyce Kleen, John Lakich, Keith Morin, John Roberts, Rama Shuster

Staff: Tim Jones, Jamie Letendre, Katharine Smith, Earl Pearson, Penny Isom, Kim Wren, Jonathan Brucker, Christiana McCrimmon

Penny welcomed everyone and introductions were done around the room. A brief recap of last night's public meeting was given with the comments from each station read aloud.

The floor was open to discussion regarding the identified issues and any other issues.

Issue One: Water Quality

- Jon Brucker asked about expanding water quality stations / introducing new sites.
  - Tim Jones replied with a brief overview, and said that no new stations were planned in SMMAP.
- Ed Call asked whether the data is readily available.
  - Tim Jones responded that the data is available on a FTP site, and probably a little out of date right now. The metadata is compiled annually.
- Kent Gardner asked about the format.
  - The data is in a CSV file, which can be converted to a DAT.
- Keith Morin asked if reports were produced or analyzed. He recommended a ten-year report.
- Kent Gardner asked if the link was on the website.
  - The link is not, but the data is available on request.
  - All data requests have to go through the Press Office.
- Kent Gardner suggested making the data more available. It would be useful for students to model.

Issue Two: Management and Protection of Seagrass

- Grant Burton is interested in outreach for law enforcement officers since aquatic preserves aren't well-known.

    - Penny Isom will give him training information produced by some aquatic preserve offices.
- Joyce Kleen suggested including an educational component for law enforcement (Goal One, Objective Two, add Integrated Strategy Four).
- Tim Jones said that new signs are needed at boat ramps.
- Jamie Letendre noted that new signage partnership with Nature Coast Biological Station (SeaGrant) very effective.
- Rama Shuster pointed out that it's difficult to determine who caused the seagrass scarring, even when officers are on site because the vessel may simply be kicking up loose sediment and seagrass blades. Then the officer has to get into the water to locate damage, do lots of paperwork, and get a biologist out there. Paraphrased: Enforcement is difficult so don't be glib about "improve enforcement."
- Tim Jones noted that the rule (regarding seagrass protection) is not statewide, only apply to Aquatic Preserves.
- Joyce Kleen suggested including aquatic preserve boundaries at kiosks.
- Keith Morin suggested advising boaters to assume that they're within aquatic preserve boundaries since the boundaries are difficult to discern. Boaters should also be shown why protecting seagrasses is important.
- Rama Shuster pointed out that new shallow water performance boats are marketed as ecologically responsible, but it depends on how they're used. They can go over very shallow areas and thus damage resources there.
- Jon Brucker brought up Rob Rowe's suggestion at the St. Andrews AP meeting to give pamphlets to officers so that they can refer to them and them out as needed.
- Keith Morin and John Lakich spoke of the need for new kiosks on county boat ramps, and possibly working with the aquatic preserve staff to include all the information needed by the park and AP.
- Tim Jones brought up including the aquatic preserve map or other aquatic preserve information in the fishing regulations magazine.
- John Roberts and Captain Don Chancey suggested more presentations to user groups. There are two ecotour associations.
    - MEETA? And Homosassa Guides Association
- Keith Morin mentioned the Crystal River Power Squadron as a possibility.
- Jon Brucker suggested developing a brochure specifically for ecotour providers to distribute.
- Kim Wren said that the brochure could also be for law enforcement.
- Rama Shuster suggested checking with Florida Keys National Marine Sanctuary which may already have something like what is needed.
- Joyce Kleen suggested including information on proper methods to power off in the boater's guide.
- Kim Wren said to look for grants for a new publication to update and reprint. Chris Anderson with FWC has the current files.
- John Roberts urged that people strike while the iron is hot. Tourist season is ramping up now so now is a great time to act and get information out there.

- Kim Wren offered to work on something for the entire northwest region.
- Kathy Smith asked about funding for Public Service Announcements (PSAs).
- Jamie Letendre said that she gives presentations all over Citrus County, and even Sumter County, and the biggest takeback is that most people aren't even aware that there is an aquatic preserve.
- Keith Morin suggested getting FWC to share the PSA on Facebook. They have a huge following.
- John Roberts suggested sharing it with local operators like the Manatee Manners video at local dive shops.
- Rama Shuster suggested trying to enlist iconic figures in boating and fishing to help spread the word, such as Guy Harvey.
- John Roberts said that the connection between a 40" redfish and healthy seagrass bed isn't obvious. Do more to help demonstrate that link.

Issue Three: Natural Resource Obstacles

- Rama Shuster mentioned that he just finished with a blue crab trap removal, and there was no involvement from anyone outside the industry. No volunteers, just FWC.
    - Tim Jones said that they do a crab trap removal, but it's usually in winter, and don't use volunteers since they may accidentally bring in active traps.
    - Grant Burton said that crabbers are assessed a fine if the trap can be identified as theirs. If you know where a lot of crab traps are, please let FWC's Marine Fisheries know. It will save them a lot of time with their clean-ups.
- John Roberts suggested enlisting professional captains to ID the locations of traps. Raise awareness of how bad they are and who to tell.
- Outreach Input: Rama Shuster said there are very active airboat associations. Inquire about contacting them. They may be interested in helping.
- Grant Burton suggested getting on the Florida Sportsmans' Show for a short segment.
- Addition of derelict vessel strategy:
    - Ed Call strongly supports the public meeting comment about adding an integrated strategy on derelict vessels and moorings. There are three in Kings Bay alone. City of Crystal River has removed two; two more need to be removed. Will continue to be an environmental issue. Funding is small compared to need.
    - Rama Shuster also strongly supports adding that strategy. He has a designated officer in each county to handle derelict vessels so there's a single point person, and they are able to handle the paperwork.
    - Rama Shuster - One proper removal beats a dozen improper removals. Contractors aren't needed for all removals or even funding (grant funding?).
    - Ed Call said that there is significant financial risk for communities to work on their own. Transport is a big cost. It can cost $3K to $4K per boat, not including staff time. Having a single contact person per county is great.
    - Citrus County Representative for FWC derelict vessel removal: Matthew VanNess is the contact

- Captain Don Chancey – The county can still write derelict vessels through the sheriff's office.
- Grant Burton – Some counties assess costs to owner's license renewal fees.
- Jon Brucker – It may be possible to convert a derelict vessel to an artificial reef in another location.
- Ed Call – Include a mooring plan as an integrated strategy.
- Grant Burton – How many derelict vessels are in the aquatic preserve?
- Tim Jones – Not many? A few houseboats are mooring for extended periods of time.
- Ed Call – Kings Bay is looking at mooring fields which will push more vessels into SMMAP, even though they aren't required. There are about 20 houseboats in Kings Bay.
- Rama Shuster – What causes the problems?
- Tim Jones – Mostly shading. Some from resting on the bottom. And from the discharge.
- John Roberts – A single point contact will help for mooring issues as well.
- John Lakich – Are lionfish an issue? (page 63)
    - A: Tim Jones: No, but they're listed in the plan as a potential threat.
- Rama Shuster – Is hydrilla an issue?
    - Answer: Jamie Letendre: to SMMAP specifically – no. The salinity keeps the plant outside the AP boundaries.
    - Answer 2: Joyce Kleen – There is some in Kings Bay and the Crystal River, but they're getting replaced by Eurasian water milfoil, another exotic, but one that is more salt tolerant. Both are eaten by manatees.

Issue Four: Public Use

- John Lakich – The Leary reference on page 71 is probably out of date. It's probably 1,500 boats now, not people. Look for more recent data.
    - Ed Call – FWS should have updated data.
    - Joyce Kleen – Do scallop tour guides need a specific license? This might help track the users.
    - Rama Shuster – It's the same as the fishing guide license so a survey would be needed to tease out that information.
- Rama Shuster – Develop a joint boater awareness / seagrass awareness campaign. Use one of those digital signs with the rolling text at boat ramps. People are stuck there a while anyway, and most are unaware of the regulations. Something could be seasonally placed on the crow's nest. Target out-of-towners as the locals usually know the waters. There are five to seven boat ramps to target. (Days Inn, Charlies Fish House, Petes Pier, Ft. Island Park, Ft. Island Beach, Riverhaven, Riverside, McCraes where public can see while waiting to launch their boats.)
- Ed Call – Boat ramps are extremely lacking in Citrus County.
- Rama Shuster – North Canal Street boat ramp will be finished soon (with RESTORE Act funding).
- Ed Call – The 3rd Street ramp will close soon, and the site will be part of Riverwalk instead.

- Keith Morin – Dixie Shores has a vacant spot.
- John Lakich – The park is not opposed to a new boat ramp in a proper location, but most of the park shoreline is salt marsh.
- John Roberts – Design the new boat ramp with the kiosk in mind, to better educate boaters.
- Ed Call – The largest demographic is paddleboats. There isn't any prop scarring or oil leakage, but they can still impact salt marsh.
- Jamie Letendre and John Lakich – What about a new paddle craft launch? Both boaters and paddlers would appreciate since the kayaks and canoes get in the way at other boat launches.
- Rama Shuster – Are the paddling trails well-marked?
    - Answer: Jamie Letendre – There's a flip book with maps and points. There are permitting issues with signs.
    - Rama Shuster – Signs are helpful for kayakers to follow, and also for boaters so that they are better prepared to expect kayakers when coming around a corner.
    - John Roberts – Set it up as a series of waypoints so that it can be distributed to boaters as well, and put the paddling guide on the website.
    - Meet with Parks for an Avenza maps commercial account.
    - Kent Gardner – You can also use Google Maps Lite.
- John Lakich – What about a new user study?
    - Ed Call – TDC has Citrus County data, which basically means this area.
    - Joyce Kleen – Can you get a grant for a user study?
    - Jamie Letendre and Tim Jones – There have been two recent studies - one by FSU and one by Nature Coast Biological Station.
    - Jon Brucker – It could be a component of a grant.
    - Joyce Kleen – Recruit Nature Coast Biological Station. They're looking for things to do.
- Rama Shuster – The plan looks like it's branding catch-and-release fishing as a consumptive use.
- On page 71, describe catch-and-release as non-consumptive use. Delete the first sentence so you don't lead with paddling (and emphasize it). Add recreational boating.

Miscellaneous

- Joyce – Do we need to include the archaeological site table? Some names give the location and people might be able to find them.
    - It's part of the template and requested by DHR, but we will check with DHR on omitting names.
- Keith Morin – The maps are unclear about who is managing what.
    - Have a conversation between FCO's GIS person and Park Planning.

- Joyce Kleen – Sea level rise needs to be addressed. Submerged lands are increasing. Palm trees are dying. The shift from freshwater to salt water tolerant plants needs to be addressed.
- John Lakich – (Page 42) Include the acquisition history of CRPSP and the purpose for why it was acquired.
- John Lakich – (Page 75) Include the MOU for facilities sharing. And where would additional people go?
    - Penny Isom will get examples from other shared offices between Parks and FCO.
- Generalize the vehicles information. Describe the needs and generalize on how well it's being met, but each vehicle isn't needed to be itemized.
- John Roberts – The photos are extraordinary.
- John Lakich – The section titles are the same size as the subsections in some areas. For example, Wild Hog and then Archaeological Resources.
- On page 39, it's red drum, but usually gets mentioned as redfish. Maybe introduce as redfish (also known as red drum).
- Page 10 – Situated, not siting.
- Page 43 – Update the completion date on the second paragraph, last sentence.
- Switch redfish to red drum.
- Page 72 – Indent more or have a font change to better distinguish between Integrated Strategies and Performance Measures.
- Page 51 – Include sea level rise as a major issue.
- Enlarge some of the maps (maybe just map 2 by chopping some of the sides off?).
- Page 37 – Better correlate the extensive archaeological resources with the abundant natural resources.
- Check for archeological sites (page 37, line 1, page 38, line 6, maybe others).

Penny explained the next steps in the management plan process: revisions will be made to the plan before it goes to the Acquisition and Restoration Council for a public meeting in Tallahassee. The plan will go to the Governor and Cabinet for final approval. Comments can still be submitted on or before October 12. The advisory committee members were thanked for their time and input.

Meeting was adjourned around 1 p.m.

C.2 / **Formal Public Meeting**

The following Appendices contain information about the Formal Public Meeting(s) which was held in order to obtain input from the public about the St. Martins Marsh Aquatic Preserve Draft Management Plan.

C.2.1 / **Florida Administrative Register Posting**

hearing, he/she will need to ensure that a verbatim record of the proceeding is made, which record includes the testimony and evidence from which the appeal is to be issued.
For more information, you may contact: Denise Graves, (352)333-2505 or denise.graves@myfloridalicense.com.

DEPARTMENT OF ENVIRONMENTAL PROTECTION
The Florida Department of Environmental Protection, Florida Coastal Office announces a public meeting to which all persons are invited.
DATE AND TIME: Wednesday, September 28, 2016, 6:00 p.m. – 7:30 p.m.
PLACE: Crystal River City Hall Conference Room, 123 NW U.S. Highway 19, Crystal River, FL 34428
GENERAL SUBJECT MATTER TO BE CONSIDERED: A draft St. Martins Marsh Aquatic Preserve Management Plan has been prepared by the Florida Coastal Office. The draft plan is available for viewing or download at www.dep.state.fl.us/coastal/sites/stmartins/default.htm. The Florida Coastal Office seeks public comment on the draft. Members of the St. Martins Marsh Aquatic Preserve Management Plan Advisory Committee have also been invited to attend, listen to comments, and may provide or respond to comments.
A copy of the agenda may be obtained by contacting: Aquatic Preserve Manager Tim Jones at Timothy.W.Jones@dep.state.fl.us or (352)228-6031.
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: Tim Jones at Timothy.W.Jones@dep.state.fl.us. 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).

DEPARTMENT OF ENVIRONMENTAL PROTECTION
The Florida Department of Environmental Protection, Florida Coastal Office announces a public meeting to which all persons are invited.
DATE AND TIME: Thursday, September 29, 2016, 9:00 a.m.
PLACE: Crystal River Preserve State Park, 3266 N. Sailboat Ave., Crystal River, FL 34428
GENERAL SUBJECT MATTER TO BE CONSIDERED: The St. Martins Marsh Aquatic Preserve Management Plan Advisory Committee will meet to discuss comments at the public meeting - scheduled for September 28 and separately noticed - and possible revisions to the draft St. Martins Marsh Aquatic Preserve Management Plan. The draft plan is available for viewing or download at www.dep.state.fl.us/coastal/sites/stmartins/default.htm.
A copy of the agenda may be obtained by contacting: Aquatic Preserve Manager Tim Jones at Timothy.W.Jones@dep.state.fl.us or (352)228-6031.
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: Tim Jones at Timothy.W.Jones@dep.state.fl.us. 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).

DEPARTMENT OF HEALTH
Division of Medical Quality Assurance
The Florida Department of Health, Division of Medical Quality Assurance announces a public meeting to which all persons are invited.
DATE AND TIME: Tuesday, September 27, 2016, 3:00 p.m.
PLACE: Residence Inn Tallahassee Universities at the Capitol, 600 West Gaines Street, Tallahassee, FL 32304
GENERAL SUBJECT MATTER TO BE CONSIDERED: Division of Medical Quality Assurance Budget Training.
A copy of the agenda may be obtained by contacting: Jamie McNease, Medical Quality Assurance, Bureau of Operations, 4052 Bald Cypress Way, Bin #BCO-01, Tallahassee, Florida 32399-3253.
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 7 days before the workshop/meeting by contacting: Erica Milam, Medical Quality Assurance, 4052 Bald Cypress Way, Bin #BCO-01, Tallahassee, Florida 32399-3253, (850)245-4079. 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).

DEPARTMENT OF HEALTH
Division of Medical Quality Assurance
The Florida Department of Health, Division of Medical Quality Assurance announces a public meeting to which all persons are invited.
DATE AND TIME: Tuesday, September 27, 2016, 1:00 p.m.
PLACE: Residence Inn Tallahassee Universities at the Capitol, 600 West Gaines Street, Tallahassee, FL 32304
GENERAL SUBJECT MATTER TO BE CONSIDERED: Florida's Healthiest Weight Initiative.
A copy of the agenda may be obtained by contacting: Debora Hall, Division of Medical Quality Assurance, Bureau of Operations, 4052 Bald Cypress Way, Bin #BCO-01, Tallahassee, Florida 32399-3253.

(850)487-1827 or access the Commission website, https://floridabuilding.org/c/default.aspx.

DEPARTMENT OF BUSINESS AND PROFESSIONAL REGULATION
Florida Building Commission
The Florida Building Commission, Structural Technical Advisory Committee, announces a public meeting to which all persons are invited.
DATE AND TIME: October 4, 2016, 2:30 p.m.
PLACE: Meetings to be conducted using communications media technology, specifically teleconference and webinar. Join the webinar at https://global.gotomeeting.com/join/904362973. Conference call number: United States (toll-free) 1(866)899-4679, meeting ID / access code: 904-362-973. Public point of access: 2601 Blair Stone Road, Tallahassee, Florida 32399
GENERAL SUBJECT MATTER TO BE CONSIDERED: To Consider and discuss the following Declaratory Statement:
Ds 2016-058 by Matt Spiak of Sprint Corporation
A copy of the agenda may be obtained by contacting: Joe Bigelow, as set forth below, or on the Commission website.
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 10 days before the workshop/meeting by contacting: Barbara Bryant, Building Codes and Standards Office, Division of Professions, Department of Business and Professional Regulation, 2601 Blair Stone Road, Tallahassee, Florida 32399, (850)487-1824, fax: (850)414-8436. 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).
If any person decides to appeal any decision made by the Board with respect to any matter considered at this meeting or hearing, he/she will need to ensure that a verbatim record of the proceeding is made, which record includes the testimony and evidence from which the appeal is to be issued.
For more information, you may contact: Joe Bigelow, Structural Technical Advisory Committee, Building Codes and Standards Office, Division of Professions, Department of Business and Professional Regulation, 2601 Blair Stone Road, Tallahassee, Florida 32399, (850)487-1824, fax: (850)414-8436 or access information on the Commission's website, https://floridabuilding.org/c/default.aspx.

DEPARTMENT OF ENVIRONMENTAL PROTECTION
The Florida Department of Environmental Protection, Florida Coastal Office announces a public meeting to which all persons are invited.
DATE AND TIME: Thursday, September 29, 2016, 9:00 a.m.
PLACE: Citrus County Visitors and Convention Bureau, 915 N. Suncoast Blvd., Crystal River, FL 34429
GENERAL SUBJECT MATTER TO BE CONSIDERED: This is an update to the St. Martins Marsh Aquatic Preserve Management Plan Advisory Committee Meeting which was announced in the Florida Administrative Register on August 26. The meeting location has been changed due to flooding from Hurricane Hermine. The new location is the Citrus County Visitors and Convention Bureau.
The St. Martins Marsh Aquatic Preserve Management Plan Advisory Committee will meet to discuss comments at the public meeting - scheduled for September 28 and previously noticed - and possible revisions to the draft St. Martins Marsh Aquatic Preserve Management Plan. The draft plan is available for viewing or download at www.dep.state.fl.us/coastal/sites/stmartins/default.htm.
A copy of the agenda may be obtained by contacting: Tim Jones at Timothy.W.Jones@dep.state.fl.us or (352)228-6031.
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: Tim Jones at Timothy.W.Jones@dep.state.fl.us. 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).

DEPARTMENT OF HEALTH
Board of Massage Therapy
The Board of Massage Therapy announces a public meeting to which all persons are invited.
DATES AND TIMES: October 20, 2016, 9:00 a.m., ET; October 21, 2016, 9:00 a.m., ET
PLACE: Renaissance Orlando at SeaWorld, 6677 Sea Harbour Drive, Orlando, FL 32821; (407)351-5555
GENERAL SUBJECT MATTER TO BE CONSIDERED: General business of the board. Meetings may be cancelled prior to the meeting date. Please check the Board web site at http://floridasmassagetherapy.gov/ for cancellations or changes to meeting dates or times.
A copy of the agenda may be obtained by contacting: Alexandra Alday at Alexandra.Alday@flhealth.gov.
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 7 days before the workshop/meeting by contacting: Alexandra Alday at Alexandra.Alday@flhealth.gov. 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).

Florida Department of Environmental Protection • Florida Coastal Office

St. Martins Marsh Aquatic Preserve

Public Meeting

Wednesday, September 28, 2016
6:00 pm - 7:30 pm

Crystal River City Hall
Conference Room
123 NW U.S. Highway 19
Crystal River, FL 34428

To view the draft plan, please visit:
www.dep.state.fl.us/coastal/sites/stmartins/default.htm

The Florida Department of Environmental Protection's Florida Coastal Office (FCO) is responsible for the management of Florida's 41 aquatic preserves, three National Estuarine Research Reserves, a National Marine Sanctuary, Florida Coastal Management Program, Outer Continental Shelf Program, and 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. FCO is updating these management plans, and is currently seeking input on the draft St. Martins Marsh Aquatic Preserve management plan.

Meeting objectives:

1. Review purpose and process for revising the St. Martins Marsh 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.

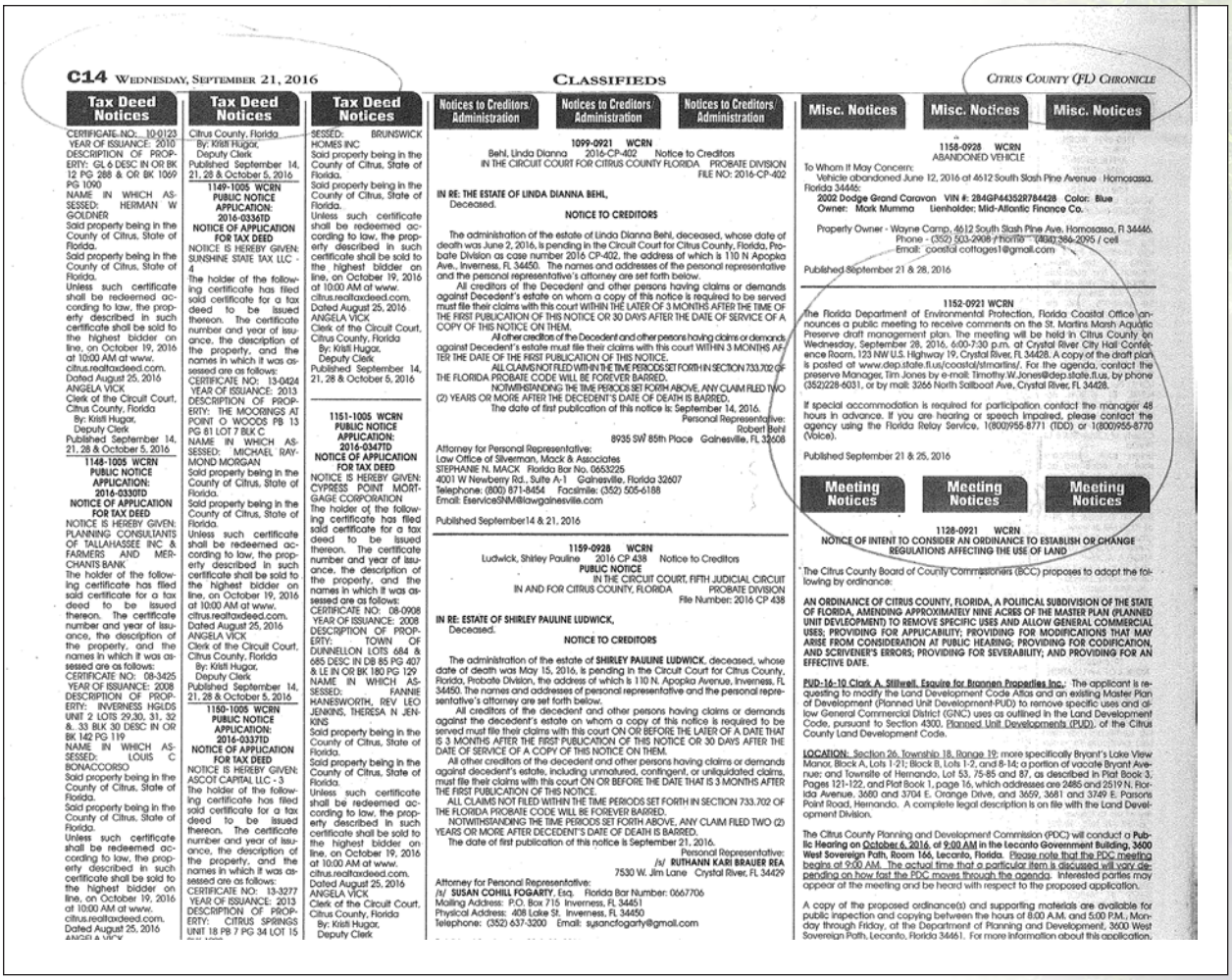
The information from the meeting will be compiled and used by FCO in the revision of the draft management plan.

Please contact Tim Jones at (352)228-6031, Timothy.W.Jones@dep.state.fl.us or visit our website at www.dep.state.fl.us/coastal/sites/stmartins/ for more information or to request a written copy of the plan. Written comments are welcome and can be submitted by mail or email FloridaCoasts@dep.state.fl.us on or before **October 12, 2016**.

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 Tim Jones at (352)228-6031 or Timothy.W.Jones@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. NA12NOS4190093-CM327 and NA15NOS4190096-CM06M. The views, statements, finding, 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. August 2016.

FLORIDA'S AQUATIC PRESERVES



Tax Deed Notices

CERTIFICATE NO: 10-0123
YEAR OF ISSUANCE: 2010
DESCRIPTION OF PROPERTY: GL 6 DESC IN OR BK 12 PG 288 & OR BK 1069 PG 1090
NAME IN WHICH ASSESSED: HERMAN W GOLDNER
Said property being in the County of Citrus, State of Florida.
Said property being in the County of Citrus, State of Florida.
Unless such certificate shall be redeemed according to law, the property described in such certificate shall be sold to the highest bidder on line, on October 19, 2016 at 10:00 AM at www.citrus.realtaxdeed.com.
Dated August 25, 2016
ANGELA VICK
Clerk of the Circuit Court, Citrus County, Florida
By: Kristi Hugar,
Deputy Clerk
Published September 14, 21, 28 & October 5, 2016

1148-1005 WCRN
PUBLIC NOTICE
APPLICATION: 2016-03307D
NOTICE OF APPLICATION FOR TAX DEED

NOTICE IS HEREBY GIVEN: PLANNING CONSULTANTS OF TALLAHASSEE INC & FARMERS AND MERCHANTS BANK
The holder of the following certificate has filed said certificate for a tax deed to be issued thereon. The certificate number and year of issuance, the description of the property, and the names in which it was assessed are as follows:
CERTIFICATE NO: 08-3425
YEAR OF ISSUANCE: 2008
DESCRIPTION OF PROPERTY: INVERNESS HGLDS UNIT 2 LOTS 29,30, 31, 32 & .33 BLK 30 DESC IN OR BK 142 PG 119
NAME IN WHICH ASSESSED: LOUIS C BONACCORSO
Said property being in the County of Citrus, State of Florida.
Said property being in the County of Citrus, State of Florida.
Unless such certificate shall be redeemed according to law, the property described in such certificate shall be sold to the highest bidder on line, on October 19, 2016 at 10:00 AM at www.citrus.realtaxdeed.com.
Dated August 25, 2016
ANGELA VICK

Tax Deed Notices

Citrus County, Florida
By: Kristi Hugar,
Deputy Clerk
Published September 14, 21, 28 & October 5, 2016

1149-1005 WCRN
PUBLIC NOTICE
APPLICATION: 2016-03361D
NOTICE OF APPLICATION FOR TAX DEED

NOTICE IS HEREBY GIVEN: SUNSHINE STATE TAX LLC - 4
The holder of the following certificate has filed said certificate for a tax deed to be issued thereon. The certificate number and year of issuance, the description of the property, and the names in which it was assessed are as follows:
CERTIFICATE NO: 13-0424
YEAR OF ISSUANCE: 2013
DESCRIPTION OF PROPERTY: THE MOORINGS AT POINT O WOODS PB 13 PG 81 LOT 7 BLK C
NAME IN WHICH ASSESSED: MICHAEL RAYMOND MORGAN
Said property being in the County of Citrus, State of Florida.
Said property being in the County of Citrus, State of Florida.
Unless such certificate shall be redeemed according to law, the property described in such certificate shall be sold to the highest bidder on line, on October 19, 2016 at 10:00 AM at www.citrus.realtaxdeed.com.
Dated August 25, 2016
ANGELA VICK
Clerk of the Circuit Court, Citrus County, Florida
By: Kristi Hugar,
Deputy Clerk
Published September 14, 21, 28 & October 5, 2016

1150-1005 WCRN
PUBLIC NOTICE
APPLICATION: 2016-03371D
NOTICE OF APPLICATION FOR TAX DEED

NOTICE IS HEREBY GIVEN: ASCOT CAPITAL LLC - 3
The holder of the following certificate has filed said certificate for a tax deed to be issued thereon. The certificate number and year of issuance, the description of the property, and the names in which it was assessed are as follows:
CERTIFICATE NO: 13-3277
YEAR OF ISSUANCE: 2013
DESCRIPTION OF PROPERTY: CITRUS SPRINGS UNIT 18 PB 7 PG 34 LOT 15

Tax Deed Notices

SESSED: BRUNSWICK HOMES INC
Said property being in the County of Citrus, State of Florida.
Said property being in the County of Citrus, State of Florida.
Unless such certificate shall be redeemed according to law, the property described in such certificate shall be sold to the highest bidder on line, on October 19, 2016 at 10:00 AM at www.citrus.realtaxdeed.com.
Dated August 25, 2016
ANGELA VICK
Clerk of the Circuit Court, Citrus County, Florida
By: Kristi Hugar,
Deputy Clerk
Published September 14, 21, 28 & October 5, 2016

1151-1005 WCRN
PUBLIC NOTICE
APPLICATION: 2016-03471D
NOTICE OF APPLICATION FOR TAX DEED

NOTICE IS HEREBY GIVEN: CYPRESS POINT MORTGAGE CORPORATION
The holder of the following certificate has filed said certificate for a tax deed to be issued thereon. The certificate number and year of issuance, the description of the property, and the names in which it was assessed are as follows:
CERTIFICATE NO: 08-0908
YEAR OF ISSUANCE: 2008
DESCRIPTION OF PROPERTY: TOWN OF DUNNELLON LOTS 684 & 685 DESC IN DB 85 PG 407 & LE IN OR BK 180 PG 129
NAME IN WHICH ASSESSED: FANNIE HANESWORTH, REV LEO JENKINS, THERESA N JENKINS
Said property being in the County of Citrus, State of Florida.
Said property being in the County of Citrus, State of Florida.
Unless such certificate shall be redeemed according to law, the property described in such certificate shall be sold to the highest bidder on line, on October 19, 2016 at 10:00 AM at www.citrus.realtaxdeed.com.
Dated August 25, 2016
ANGELA VICK
Clerk of the Circuit Court, Citrus County, Florida
By: Kristi Hugar,
Deputy Clerk

Notices to Creditors/ Administration

1099-0921 WCRN
Behl, Linda Dianna 2016-CP-402 Notice to Creditors
IN THE CIRCUIT COURT FOR CITRUS COUNTY FLORIDA PROBATE DIVISION
FILE NO: 2016-CP-402

IN RE: THE ESTATE OF LINDA DIANNA BEHL,
Deceased.

NOTICE TO CREDITORS

The administration of the estate of Linda Dianna Behl, deceased, whose date of death was June 2, 2016, is pending in the Circuit Court for Citrus County, Florida, Probate Division as case number 2016 CP-402, the address of which is 110 N Apopka Ave., Inverness, FL 34450. The names and addresses of the personal representative and the personal representative's attorney are set forth below.

All creditors of the Decedent and other persons having claims or demands against Decedent's estate on whom a copy of this notice is required to be served must file their claims with this court WITHIN THE LATER OF 3 MONTHS AFTER THE TIME OF THE FIRST PUBLICATION OF THIS NOTICE OR 30 DAYS AFTER THE TIME OF SERVICE OF A COPY OF THIS NOTICE ON THEM.

All other creditors of the Decedent and other persons having claims or demands against Decedent's estate must file their claims with this court WITHIN 3 MONTHS AFTER THE DATE OF THE FIRST PUBLICATION OF THIS NOTICE.

ALL CLAIMS NOT FILED WITHIN THE TIME PERIODS SET FORTH IN SECTION 733.702 OF THE FLORIDA PROBATE CODE WILL BE FOREVER BARRED.

NOTWITHSTANDING THE TIME PERIODS SET FORTH ABOVE, ANY CLAIM FILED TWO (2) YEARS OR MORE AFTER THE DECEDENT'S DATE OF DEATH IS BARRED.

The date of first publication of this notice is: September 14, 2016.

Personal Representative:
Robert Behl
8935 SW 85th Place Gainesville, FL 32608

Attorney for Personal Representative:
Law Office of Silverman, Mack & Associates
STEPHANIE N. MACK Florida Bar No. 0653225
4001 W Newberry Rd., Suite A-1 Gainesville, Florida 32607
Telephone: (800) 871-8454 Facsimile: (352) 505-6188
Email: EserviceSNM@lawgainesville.com

Published September14 & 21, 2016

1159-0928 WCRN
Ludwick, Shirley Pauline 2016 CP 438 Notice to Creditors
PUBLIC NOTICE
IN THE CIRCUIT COURT, FIFTH JUDICIAL CIRCUIT
IN AND FOR CITRUS COUNTY, FLORIDA PROBATE DIVISION
File Number: 2016 CP 438

IN RE: ESTATE OF SHIRLEY PAULINE LUDWICK,
Deceased.

NOTICE TO CREDITORS

The administration of the estate of **SHIRLEY PAULINE LUDWICK**, deceased, whose date of death was May 15, 2016, is pending in the Circuit Court for Citrus County, Florida, Probate Division, the address of which is 110 N. Apopka Avenue, Inverness, FL 34450. The names and addresses of personal representative and the personal representative's attorney are set forth below.

All creditors of the decedent and other persons having claims or demands against the decedent's estate on whom a copy of this notice is required to be served must file their claims with this court ON OR BEFORE THE LATER OF A DATE THAT IS 3 MONTHS AFTER THE FIRST PUBLICATION OF THIS NOTICE OR 30 DAYS AFTER THE DATE OF SERVICE OF A COPY OF THIS NOTICE ON THEM.

All other creditors of the decedent and other persons having claims or demands against decedent's estate, including unmatured, contingent, or unliquidated claims, must file their claims with this court ON OR BEFORE THE DATE THAT IS 3 MONTHS AFTER THE FIRST PUBLICATION OF THIS NOTICE.

ALL CLAIMS NOT FILED WITHIN THE TIME PERIODS SET FORTH IN SECTION 733.702 OF THE FLORIDA PROBATE CODE WILL BE FOREVER BARRED.

NOTWITHSTANDING THE TIME PERIODS SET FORTH ABOVE, ANY CLAIM FILED TWO (2) YEARS OR MORE AFTER DECEDENT'S DATE OF DEATH IS BARRED.

The date of first publication of this notice is September 21, 2016.

Personal Representative:
/s/ **RUTHANN KARI BRAUER REA**
7530 W. Jim Lane Crystal River, FL 34429

Attorney for Personal Representative:
/s/ **SUSAN COHILL FOGARTY**, Esq. Florida Bar Number: 0667706
Mailing Address: P.O. Box 715 Inverness, FL 34451
Physical Address: 408 Lake St. Inverness, FL 34450
Telephone: (352) 637-3200 Email: susancfogarty@gmail.com

Misc. Notices

1158-0928 WCRN
ABANDONED VEHICLE

To Whom It May Concern:
Vehicle abandoned June 12, 2016 at 4612 South Slash Pine Avenue Homosassa, Florida 34446:
2002 Dodge Grand Caravan VIN #: 2B4GP44352R784428 Color: Blue
Owner: Mark Mumma Lienholder: Mid-Atlantic Finance Co.

Property Owner - Wayne Camp, 4612 South Slash Pine Ave, Homosassa, Fl 34446, Phone - (352) 503-2908 / Florida - (404) 386-2095 / cell
Email: coastal cottages1@gmail.com

Published September 21 & 28, 2016

1152-0921 WCRN

The Florida Department of Environmental Protection, Florida Coastal Office announces a public meeting to receive comments on the St. Martins Marsh Aquatic Preserve draft management plan. The meeting will be held in Citrus County on Wednesday, September 28, 2016, 6:00-7:30 p.m. at Crystal River City Hall Conference Room, 123 NW U.S. Highway 19, Crystal River, FL 34428. A copy of the draft plan is posted at www.dep.state.fl.us/coastal/sitmartins/. For the agenda, contact the preserve Manager, Tim Jones by e-mail: Timothy.W.Jones@dep.state.fl.us, by phone (352)228-6031, or by mail: 3266 North Sailboat Ave., Crystal River, FL 34428.

If special accommodation is required for participation contact the manager 48 hours 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).

Published September 21 & 25, 2016

Meeting Notices

1128-0921 WCRN
NOTICE OF INTENT TO CONSIDER AN ORDINANCE TO ESTABLISH OR CHANGE REGULATIONS AFFECTING THE USE OF LAND

The Citrus County Board of County Commissioners (BCC) proposes to adopt the following by ordinance:

AN ORDINANCE OF CITRUS COUNTY, FLORIDA, A POLITICAL SUBDIVISION OF THE STATE OF FLORIDA, AMENDING APPROXIMATELY NINE ACRES OF THE MASTER PLAN (PLANNED UNIT DEVELOPMENT) TO REMOVE SPECIFIC USES AND ALLOW GENERAL COMMERCIAL USES; PROVIDING FOR APPLICABILITY; PROVIDING FOR MODIFICATIONS THAT MAY ARISE FROM CONSIDERATION AT PUBLIC HEARING; PROVIDING FOR CODIFICATION, AND SCRIVENER'S ERRORS; PROVIDING FOR SEVERABILITY; AND PROVIDING FOR AN EFFECTIVE DATE.

PUD-16-10 Clark A. Stillwell, Esquire for Brannen Properties Inc.: The applicant is requesting to modify the Land Development Code Atlas and an existing Master Plan of Development (Planned Unit Development-PUD) to remove specific uses and allow General Commercial District (GNC) uses as outlined in the Land Development Code, pursuant to Section 4300, Planned Unit Developments (PUD), of the Citrus County Land Development Code.

LOCATION: Section 26, Township 18, Range 19; more specifically Bryant's Lake View Manor, Block A, Lots 1-21; Block B, Lots 1-2, and 8-14; a portion of vacate Bryant Avenue; and Townsite of Hernando, Lot 53, 75-85 and 87, as described in Plat Book 3, Pages 121-122, and Plat Book 1, page 16, which addresses are 2485 and 2519 N. Florida Avenue, 3680 and 3704 E. Orange Drive, and 3659, 3681 and 3749 E. Parsons Point Road, Hernando. A complete legal description is on file with the Land Development Division.

The Citrus County Planning and Development Commission (PDC) will conduct a **Public Hearing on October 6, 2016, at 9:00 AM in the Lecanto Government Building, 3600 West Sovereign Path, Room 166, Lecanto, Florida.** Please note that the PDC meeting begins at 9:00 AM. The actual time that a particular item is discussed will vary depending on how fast the PDC moves through the agenda. Interested parties may appear at the meeting and be heard with respect to the proposed application.

A copy of the proposed ordinance(s) and supporting materials are available for public inspection and copying between the hours of 8:00 A.M. and 5:00 P.M., Monday through Friday, at the Department of Planning and Development, 3600 West Sovereign Path, Lecanto, Florida 34461. For more information about this application,

Florida Department of Environmental Protection

Big Bend Aquatic Preserves
3266 North Sailboat Avenue
Crystal River, Florida 34428

Rick Scott
Governor

Carlos Lopez-Cantera
Lt. Governor

Jonathan P. Steverson
Secretary

St. Martins Marsh Aquatic Preserve Draft Management Plan
Public Meeting
Wednesday, September 28, 2016, 6:00 – 7:30 p.m.
Crystal River City Hall
Conference Room
123 NW U.S. Highway 19
Crystal River, Florida 34428

Attendees: Nigel Rudolph, Karrie Jones
Staff: Tim Jones, Jamie Letendre, Katharine Smith, Earl Pearson, Penny Isom, Kim Wren, Jonathan Brucker, Christiana McCrimmon

Penny welcomed everyone, gave a brief introduction about the purpose of the meeting, and introduced aquatic preserve and Tallahassee staff.

Tim gave a PowerPoint presentation about St. Martins Marsh Aquatic Preserve, its challenges, and work being conducted.

After the presentation, Penny explained the commenting process. The room was set up so there were four stations, one for each of the four issues identified in the management plan. Attendees worked as a group to assess and discuss the issues associated with the draft plan. Staff provided background on each issue and recorded comments the public had pertinent to each issue (listed below). The group addressed all four issues and the floor was opened for additional comment.

Issue one: Water Quality (WQ)

- NO COMMENTS RECORDED

Issue two: Management and Protection of Seagrass

- The group would like to see continued coordination between the North West Aquatic Preserve Offices (all 4 of them – keep open line of communication and share techniques)

Issue three: Natural Resource Obstacles

- Coordinate with the 4 other North West Aquatic Preserve Offices

- Continue to collaborate with other Aquatic Preserves and outside entities to assess and protect cultural resources
- Include derelict vessels and other mooring issues in integrated strategies of marine debris

Issue four: Public Use

- Partner with cultural resource entities to create and post signage
- Continue Archaeo-Eco kayak tours

After the comments were received, the group reconvened and Penny explained the next steps in the management plan process: an advisory committee meeting, Acquisition and Restoration Council meeting (a public meeting in Tallahassee), and Governor and Cabinet meeting. The public was reminded that comments could still be submitted on or before October 12, 2016. They were thanked for taking time out of their busy schedules to attend and provide valuable feedback.

Meeting was adjourned.

Goals, Objectives, and Strategies

*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. This budget assumes optimal staffing levels and does not include the costs associated with staffing such as salary or benefits. Budget categories identified correlate with the FCO Management Program Areas. The Funding Source column depicts the source of funds with "S" designated for state, "F" for federal, and "O" for other funding sources (e.g. non-profit groups, etc.). Dollar figures in red font indicate funding not available at this time.

Large, beneficial projects, outside the current capacity of St. Martins Marsh Aquatic Preserve's funding and staffing, are identified in Appendix D.4, in case opportunities become available to support those projects in the ten-year span of this management plan.

Goals, Objectives & Integrated Strategies	Mgmt. Program	Implement.Date (Planned)	Length of Initiative	Est. Avg. Yearly Cost	Funding	16-17	17-18	18-19	19-20	20-21	21-22	22-23	23-24	24-25	25-26
Issue 1: Water Quality															
Goal 1: Further develop and improve the strategic, long-term water quality monitoring program within SMMAP that will assist with identifying and addressing issues pertaining to the natural resources.															
Objective 1: Analyze and interpret the status and trends of SMMAP's water quality throughout the Springs Coast to identify potential impacts to natural resources and provide quality scientific data and recommendations to address such issues.															
Strategy 1: Maintain a strategic long-term water quality monitoring program that includes biotic and abiotic parameters, and compile analyzed data to evaluate water quality status and trends.	Ecosystem Science	2004	Ongoing	$17,000	F	$17,000	$17,000	$23,000	$23,000	$17,000	$17,000	$17,000	$17,000	$23,000	$23,000
Strategy 2: Continue to monitor nutrients and water clarity through a partnership with UF's Project COAST to determine total nitrogen and phosphorous, chlorophyll, and water clarity.	Ecosystem Science	1997	Ongoing	$4,500	F	$4,500	$4,500	$4,500	$6,000	$4,500	$4,500	$4,500	$4,500	$4,500	$6,000
Strategy 3: Acquire additional YSI data-logger equipment to expand water quality monitoring efforts with SMMAP. Upgrade existing equipment from YSI 6-series dataloggers to YSI EXO2 series equipment.	Ecosystem Science	2015	Ongoing	$30,000	F	$30,000	$30,000	$30,000	$30,000	$30,000	$5,000	$5,000	$5,000	$5,000	$5,000
Strategy 4: Upgrade site locations from standard YSI 600 equipment to YSI 6600 equipment to increase monitoring parameters and improve baseline data collection.	Ecosystem Science	2015	Ongoing	$500	F	$500	$500								
Objective 2: Identify specific and emerging water quality issues related to nutrients, pollution, and environmental, contaminants, and with coordination from other agencies, develop a response strategy to these issues.															
Strategy 1: Identify point and non-point sources of pollutants and turbidity.	Ecosystem Science	2012	Ongoing	$250	F	$250	$250	$250	$250						
Strategy 2: Support the development of nutrient criteria.	Resource Mgmt.	1997	Ongoing	$5,500	F	$5,500	$5,500	$5,500	$5,500	$7,500	$5,500	$5,500	$5,500	$5,500	$7,500
Strategy 3: Support the development of TMDLs and a BMAP.	Resource Mgmt.	2012	Ongoing	Included in other strategy											

Goals, Objectives & Integrated Strategies	Mgmt. Program	Implement.Date (Planned)	Length of Initiative	Est. Avg. Yearly Cost	Funding	16-17	17-18	18-19	19-20	20-21	21-22	22-23	23-24	24-25	25-26
Objective 3: Ensure the sustainability of scallop, fish, salt marsh, seagrass habitat, and other concerned species through the development of a tiered approach to water quality monitoring.															
Strategy 1: Continue to monitor the distribution and abundance of specific indicator species to determine the ecological health of the bay system.	Ecosystem Science	1998	Ongoing	Included in other strategy											
Strategy 2: Determine the biodiversity of SMMAP by establishing baseline data and broad scale characterizations of benthic communities.	Ecosystem Science	2013	Ongoing	$500	F	$500	$500	$500							
Goal 2: Provide timely and accurate water quality data and information to the public and other entities/agencies.															
Objective 1: Acquire a repository to store water quality data in a centralized database that is user-friendly, provides quality assurance and quality control for the data collection effort, and can be accessed via the internet.															
Strategy 1: Work with other entities and agencies to develop a centralized water quality storage database and website.	Ecosystem Science	2012	Ongoing	No Additonal Cost											
Objective 2: Utilize a variety of methods to inform the public and other entities regarding water quality conditions, the importance of water quality, and suggestions to improve water quality within SMMAP.															
Strategy 1: Utilize educational signage at strategic access points to SMMAP to educate the public on the ecological significance of the bay and how the public can assist in conserving natural resources.	Education and Outreach	2011	As Needed	$500	F		$500				$500				$1,000
Strategy 2: Coordinate and participate in public lectures and other events where staff can address water quality issues and discuss methods for improving water quality.	Education and Outreach	2004	Ongoing	$200	F	$200	$200	$200	$200	$200	$200	$200	$200	$200	$200
Strategy 3: Provide and/or create opportunities for the public to volunteer to assist with monitoring efforts and unique events (i.e. Earth Day).	Education and Outreach	2004	As Needed	Included in other strategy											
Issue 2: Management and Protection of Seagrasses															
Goal 1: Manage seagrass communities through research and monitoring, education and outreach efforts, continued resource management and collaborative mapping efforts with other state agencies to effectively protect and maintain this habitat as a valuable, natural resource throughout SMMAP.															
Objective 1: Monitor the status and trends of seagrass distribution within SMMAP to determine the overall health and identify potential threats to the habitat.															
Strategy 1: Develop and implement a Seagrass Monitoring Plan for SMMAP.	Ecosystem Science	1998	Ongoing	$7,500	F	$7,500	$7,500	$7,500	$7,500	$7,500	$7,500	$7,500	$7,500	$7,500	$7,500
Strategy 2: Continued collaboration with FWC and other state agencies on the SIMM report to produce a resource for seagrass monitoring, mapping and data sharing.	Partnership (Ecosystem Science)	1998	Ongoing	$1,000	F	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000
Strategy 3: Utilize existing GIS technology, aerial surveys, and ground truthing to identify severely scarred areas to determine restoration needs, assess management options, and develop a seagrass restoration plan for SMMAP.	Ecosystem Science	TBD	TBD	$12,000	F					$12,000					$12,000

Goals, Objectives & Integrated Strategies	Mgmt. Program	Implement.Date (Planned)	Length of Initiative	Est. Avg. Yearly Cost	Funding	16-17	17-18	18-19	19-20	20-21	21-22	22-23	23-24	24-25	25-26
Strategy 4: Establish and maintain close communication with all federal, state, and local land managers that are responsible for making resource management decisions that could affect water quality or seagrass habitat in SMMAP.	Resource Mgmt.	2004	Ongoing	No Additonal Cost											
Strategy 5: Coordinate with stakeholders, adjacent resource managers and law enforcement to support clean-up efforts.	Resource Mgmt.	2004	Ongoing	$3,500	F	$3,500	$3,500	$3,500	$3,500	$3,500	$3,500	$3,500	$3,500	$3,500	$3,500
Objective 2: Promote the importance of seagrass habitats by generating a variety of informational outlets that target recreational, commercial, and scientific user groups operating in SMMAP.															
Strategy 1: Update the current SMMAP brochures to include additional information on the importance of seagrass habitat, water quality, and sound user practices that can be used to prevent destruction of seagrasses.	Education and Outreach	2004	Ongoing	$500	F	$500	$500	$500	$500	$500	$500	$500	$500	$500	$500
Strategy 2: Repair, replace, or install education signage pertaining to resource protection at public and private boat ramps and marinas throughout SMMAP.	Education and Outreach	2011	Ongoing	$500	F	$500				$500					$1,000
Strategy 3: Continue to participate in education and outreach events throughout the surrounding areas to promote the importance of seagrass and other estuarine habitats.	Education and Outreach	2004	Ongoing	Included in other strategy											
Issue 3: Natural Resource Obstacles															
Goal 1: Document the natural resources in SMMAP.															
Objective 1: Develop and implement restoration goals for impacted areas or areas of concern.															
Strategy 1: Work with law enforcement to ensure implementation of the seagrass law prohibiting destruction of seagrasses in SMMAP.	Resource Mgmt.	2004	Ongoing	Included in other strategy											
Strategy 2: Coordinate with other resource agencies and law enforcement to support efforts to address derelict and/or illegal fisheries gear and harvesting activities.	Partnership (Resource Mgmt.)	2004	Ongoing	$1,000	F	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000
Strategy 3: Partner with other agencies and enlist public participation to assist in the removal of derelict and/or illegal fisheries gear from SMMAP.	Resource Mgmt.	2004	Ongoing	$1,000	F	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000
Objective 2: Maintain existing submerged cultural resources.															
Strategy 1: Document and protect submerged cultural resources within SMMAP.	Partnership (Resource Mgmt.)	2015	Ongoing	No Additonal Cost											

Goals, Objectives & Integrated Strategies	Mgmt. Program	Implement.Date (Planned)	Length of Initiative	Est. Avg. Yearly Cost	Funding	16-17	17-18	18-19	19-20	20-21	21-22	22-23	23-24	24-25	25-26
Goal 2: Educate the public about the importance of SMMAP's history, natural resources and cultural resources.															
Objective 1: Partner with other agencies and/or non-governmental organizations to promote greater understanding and interpretation of resources.															
Strategy 1: In conjunction with other natural resource agencies, develop and install kiosks or signage informing the public on how to avoid impacting seagrass habitat.	Education and Outreach	2004	Ongoing	Included in other strategy											
Strategy 2: Repair, replace, or install up to date signage and kiosks to educate the public on SMMAP and its resources.	Education and Outreach	2004	Ongoing	Included in other strategy											
Strategy 3: Develop an informational brochure on the current efforts employed by SMMAP's water quality, seagrass and resource management programs.	Education and Outreach	2004	Ongoing	Included in other strategy											
Issue 4: Public Use															
Goal 1: Maintain a safe and natural environment for SMMAP's wildlife, habitats, and user groups.															
Objective 1: Facilitate research to identify human use conflicts with natural resources.															
Strategy 1: Work with law enforcement and other resource management entities to identify and address uses within SMMAP that are not water dependent, potentially illegal, or harmful to natural resources.	Public Use	2004	Ongoing	$200	F	$200	$200	$200	$200	$200	$200	$200	$200	$200	$200
Strategy 2: Partner with other agencies to develop and distribute information identifying potential use conflicts and methods of prevention.	Public Use	2004	Ongoing	$500	F	$500				$500					$500
Objective 2: Reduce the amount of debris, contaminants, and other resource damages associated with user group activities.															
Strategy 1: Understand and address consumptive use impacts from fishing gear and methods that cause potential harm to the resource.	Public Use	2004	Ongoing	No Additonal Cost											
Strategy 2: Promote awareness of proper boating practices to reduce propeller scarring in seagrasses and bentic communities.	Public Use	2004	Ongoing	$500	F	$500		$500		$500		$500		$500	
Strategy 3: Coordinate and participate in projects that remove or make use of debris within SMMAP.	Public Use	2004	Ongoing	$1,000	F	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000
Strategy 4: Develop and distribute informational brochures and/or participate in local meetings to educate user groups of potential impacts to the natural resources associated with user activities.	Public Use	2004	Ongoing	Included in other strategy											

*D.2 / **Budget Summary Table***

The following table provides a summary of cost estimates for conducting the management activities identified in this plan.

	Ecosystem Science	Resource Management	Education & Outreach	Public Use	Partnering	Annual Total
2016-2017	$60,250	$10,000	$1,200	$2,200	$2,000	$75,650
2017-2018	$60,250	$10,000	$1,200	$1,200	$2,000	$74,650
2018-2019	$65,750	$10,000	$700	$1,700	$2,000	$80,150
2019-2020	$66,750	$10,000	$700	$1,200	$2,000	$80,650
2020-2021	$71,000	$12,000	$1,200	$2,200	$2,000	$88,400
2021-2022	$34,000	$10,000	$1,200	$1,200	$2,000	$48,400
2022-2023	$34,000	$10,000	$700	$1,700	$2,000	$48,400
2023-2024	$34,000	$10,000	$700	$1,200	$2,000	$47,900
2024-2025	$40,000	$10,000	$700	$1,700	$2,000	$54,400
2025-2026	$53,500	$12,000	$2,700	$1,700	$2,000	$71,900
Ten Year Totals	**$519,500**	**$104,000**	**$11,000**	**$16,000**	**$20,000**	**$670,500**

*D.3 / **Major Accomplishments Since the Approval of the Previous Plan***

Since the approval of St. Martins Marsh Aquatic Preserve's (SMMAP's) previous management plan in September of 1987, many management activities have changed focus and expanded over the years. Management strategies were historically concentrated on mapping and cataloging resources, identifying issues threatening these resources, and permitting. Below are a few major accomplishments that staff have implemented over the last 20+ years, and continue to expand upon today.

Water Quality Monitoring Program

In 1987, SMMAP's continuous water quality monitoring program was non-existent and limited to nutrient monitoring. The present day continuous water quality monitoring program was started in 2004. Using both YSI 600 and 6600 series datalogger equipment, SMMAP's water quality monitoring program was developed and modeled after the National Estuarine Research Reserve's System-Wide Monitoring Program which follows standardized methods to ensure continuity and accuracy of data collection. Five water quality monitoring stations were established in Citrus County. The selection of locations allowed for comparison between relatively pristine, undeveloped areas versus more urbanized drainage basins, as well as variations in salinity regimes within the systems that feed into SMMAP. The primary objective of these efforts was to establish baseline data for scientific comparison, measure short and long term changes in SMMAP's contributing systems, and assess the impacts both human and natural events may have on SMMAP.

In conjunction with the continuous water quality monitoring program, staff began assisting with Project COAST, a partnership with the University of Florida, to collect various water quality field samples within SMMAP in 1997. Monthly sampling events occur at 30 fixed stations within the three surrounding systems (Withlacoochee, Crystal, and Homosassa rivers). Examples of parameters collected include light attenuation through the water column, temperature, salinity, pH, Secchi depth, and dissolved oxygen. Water samples are also filtered and processed for chlorophyll assessments and surface water grab samples are taken for nitrogen and phosphorous analysis. In 2014, an additional grab sample was added to this effort through a partnership with Florida Fish and Wildlife Conservation Commission- Fish and Wildlife Research Institute, whose primary focus is on harmful algal blooms in coastal waters throughout the state.

Seagrass Monitoring Program

In 1997, SMMAP began monitoring 25 fixed seagrass sites in Citrus County, with an additional 100 sites added throughout the Big Bend region starting in 2002. The objective of this effort was to quantify the spatial/temporal variability and trends of seagrass abundance and distribution (e.g. establish baseline data) within SMMAP. Identification and assessment of seagrass and macroalgae is completed using the Braun-Blanquet scale, which is a method used for measuring the submerged aquatic vegetation. This involves identifying all vegetative species represented and percent coverage within a one meter square "quadrat." Staff examine data to determine trends in species composition, abundance, and distribution of seagrasses within SMMAP. This information can also be used to determine species composition, abundance and distribution of seagrasses within a particular area. Presence or absence of bay scallops and variegated sea urchins (*Lytechinus variegatus*), epiphyte densities, sediment type and sediment depths are also collected.

Education and Outreach Program

SMMAP's previously adopted plan did not address education and outreach specifically. Presently, SMMAP staff compile several brochures for public distribution, maintain informational kiosks at major boat ramps, attend

community events, and develop curricula for local programs. The educational and outreach practices conducted by SMMAP are geared towards the promotion of maintaining and restoring the aquatic preserve for future generations. By coordinating and participating in various education and outreach events, SMMAP is able to reach out to a wide and varied audience. Common target audiences for such events include: landowners and developers, commercial and recreational resource users, students of all ages, organized working groups, the general public, as well as local, regional, state, and federal government agencies. While education and outreach is extremely important, participation proves difficult at times due to budget and staff limitations.

Partnerships

Over the past 20 years, staff have developed many successful partnerships to aid in the management and protection of SMMAP's natural resources. These relationships build a strong network for data sharing, as well as increase physical efforts to maintain or improve communities with SMMAP boundaries. Examples of partnerships created, or strengthened, since the adoption of SMMAP's 1987 management plan include federal (U.S. Geological Survey, U.S. Fish and Wildlife Service), state (University of Florida, Crystal River Preserve State Park, Florida Fish and Wildlife Conservation Commission- Fish and Wildlife Research Institute and Division of Law Enforcement), various non-profits (Gulf Archeological Research Institute, Friends of the Withlacoochee Gulf Preserve), Crystal River Marine Science Station, as well as local libraries, and elementary schools.

Marine Debris

In early 2000, SMMAP staff began partnering with local communities, state agencies, and federal agencies to conduct annual marine debris cleanup efforts in Citrus County. Addressing issues, such as marine debris, is important in assessing the overall health of SMMAP's resources. Marine debris presents a real and chronic threat to wildlife and public safety; entanglement, ingestion, and the release of toxins into the environment are issues related to debris. Additionally, the presence of debris detracts from the aesthetic value of natural landscapes. Marine debris can include paper and plastic products, construction debris, derelict vessels, and derelict aquaculture and fisheries gear. Since this effort began, staff has annually removed an average of more than 1,200 pounds of marine debris from local waters.

Restoration

In 2009, staff partnered with The Nature Conservancy on a pilot prop scar restoration project in SMMAP. Due to the shallow depth of SMMAP, the seagrass beds are susceptible to prop scarring from improper boating activities. These trenches created by boat propellers can cause significant amounts of seagrass loss due to constant scouring. Staff identified 17 prop scars, totaling approximately 392 meters, to be restored using a sediment tube technique. In 2010, contractors placed sediment tubes consisting of 20-centimeter diameter biodegradable cotton tubes of approximately one meter in length into the target scars. After approximately one year, most of the scars had recolonized with various species of microalgae's and shoal grass. Some scars, where the sediment tubes sank below ambient grade, remained barren but no further scouring had occurred. With the exception of a few areas that continued to be undermined by the currents, the project was deemed relatively successful in the restoration of most prop scars.

*D.4 / **Gulf Priority Restoration Projects***

Florida's expansive coastline and wealth of aquatic resources have defined it 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 and hosting a diversity of wildlife and habitats (including economically and ecologically valuable nursery areas). The following two projects are proposed by the Florida Coastal Office as top priorities for the St. Martins Marsh Aquatic Preserve in regards to creating and maintaining healthy ecosystems and economies. Following the two projects is a table listing the projects, including the top two, that were reviewed and are supported by St. Martins Marsh Aquatic Preserve. In addition, the table also crosswalks the St. Martins Marsh Aquatic Preserve management plan's issues, goals, objectives, and strategies with the projects.

BBSAP PRIORITY RESTORATION PROJECTS

St. Martins Marsh Learning Center

Partners:
Florida Department of Environmental Protection's Florida Park Service, Florida Public Archaeology Network

Funding Required:
$9,000,000

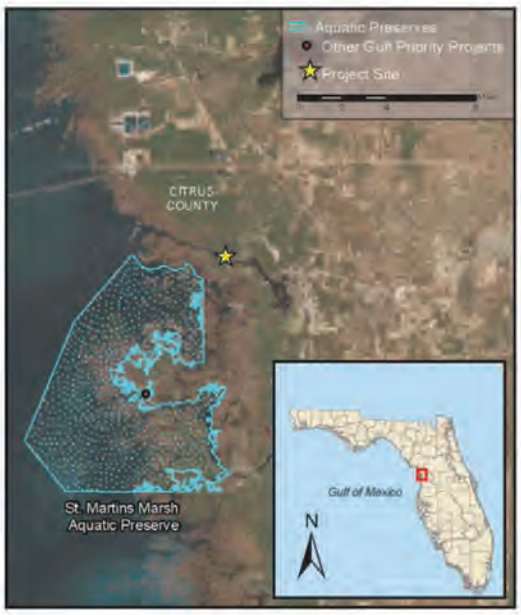
Location:
Crystal River Florida
28.9085° N, 82.6369°W

Project Timeline:
2 Years

Project Objectives:

This project will focus on the construction of an eco-conscious facility that highlights opportunities the public can recreate at their residences. Examples of these ecological improvements include, but are not limited to: the removal of the existing septic system, installation of solar panels, water retention through a rain barrel/gutter system, and removal of harden shorelines and replacement of living shorelines with native vegetation. Additionally, the plans include installation of concrete box culverts for hydrological restoration and wildlife passages. The project is located on Crystal River Preserve State Park property and will influence the park and Florida Public Archaeology Network.

This area contains some of the most ecologically diverse and pristine habitats in the state of Florida. Currently, there are no public facilities of this nature that provides this type of educational experience to residents and visitors of Citrus County and its adjacent communities. Due to the economic and recreational importance of resources in this area, it is critical to provide the public with an experience that promotes sound stewardship.



Project Outcomes:

This project will promote responsible use, educate the public, and allow for the facilitation of research and conservation of the natural and cultural resources within Citrus County, Florida

BBSAP PRIORITY RESTORATION PROJECTS

St. Martin's Marsh Learning Center

Location in aquatic preserve management plan(s):
BBSAP: Issue 2, Goal 1, Objective 2, Strategy 2-3 Issue 3, Goal 1, Objective 1, Strategy 2 Issue 3, Goal 2, Objective 1, Strategy 2 Issue 4, Goal 2, Objective 1, Strategy 1 Issue 4, Goal 2, Objective 2, Strategy 1-2

BBSAP PRIORITY RESTORATION PROJECTS

St. Martins Marsh Aquatic Preserve Seagrass Restoration – Phase I

Partners:
Unspecified

Funding Required:
$2,000,000

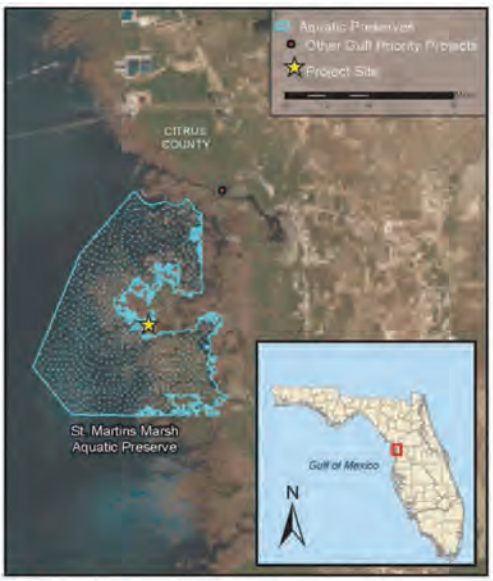
Location:
St. Martins March Aquatic Preserve, Citrus County
28.8295° N, 82.6804° W

Project Timeline:
2 Years

Project Objectives:

This proposal is the first step in a comprehensive effort to design and implement seagrass restoration within St. Martins Marsh Aquatic Preserve to enhance and conserve the unique ecological structure of this area. Healthy seagrass meadows are one of the world's most biodiverse and productive ecosystems that support a magnitude of commercial and recreational species at varying stages of life. Additional benefits include: substrate and sediment stabilization and nutrient absorption; decreased wave energy reducing shoreline impacts; and habitat improvement. Phase I includes pre-restoration site assessment, project design and engineering, and necessary permitting for the entire St. Martins Marsh Aquatic Preserve project area.

This project will stabilize and restore critical seagrass habitat in the Crystal Bay and St. Martins Keys area; which supports one of the most stable population of bay scallops in the state of Florida. Furthermore, this project will aid in the protection of coastal habitats and cultural resources. The project area is located entirely within the St. Martins Marsh Aquatic Preserve boundaries and influences acquisition and management investments from the Gulf Environmental Benefit Fund.



Project Outcomes:

Seagrass beds are considered a vital part of marine and estuarine ecosystems because of their productivity level and sensitivity to water quality changes. Seagrasses provide food, habitat and significant nursery grounds for a myriad of vertebrate and invertebrate species while maintaining water quality and promoting substrate stabilization. This project will facilitate the assessment, design, engineering and permitting needed to restore damaged seagrass habitat within the Big Bend Seagrasses Aquatic Preserve. This project will facilitate the assessment, design, engineering and permitting needed to restore damaged seagrass habitat within the Big Bend Seagrasses Aquatic Preserve.

BBSAP PRIORITY RESTORATION PROJECTS

St. Martins Marsh Aquatic Preserve Seagrass Restoration – Phase I

Location in aquatic preserve management plan(s):
BBSAP: Issue 2, Goal 1, Objective 1, Strategy 1-6 Issue 4, Goal 1, Objective 1, Strategy 1-4 Issue 4, Goal 1, Objective 2, Strategy 1, 5
SMMAP: Issue 2, Goal 1, Objective 1, Strategy 1-4 Issue 3, Goal 1, Objective 1, Strategy 1 Issue 4, Goal 1, Objective 1, Strategy 1-2

The projects listed below have also been reviewed and are supported by St. Martins Marsh Aquatic Preserve. For project details go to www.dep.state.fl.us/deepwaterhorizon/default.htm.

Project Name	Amount	Partners	Location in SMMAP mgmt plan
Southwest Florida Regional Coastal Habitat Restoration Plan	$85,360,554	Tampa Bay Estuary Program, Sarasota Bay Estuary Program, Charlotte Harbor National Estuary Program, Crystal River Preserve State Park	Issue III, Goal I, Objective I, Integrated Strategy II & III
Southwest Florida Regional Replenishment of Animal Populations Plan	$10,450,400	Tampa Bay Estuary Program, Sarasota Bay Estuary Program, Charlotte Harbor National Estuary Program	Issue II, Goal I, Objective I, Integrated Strategy I, II III & IV; Issue III, Goal I, Objective I, Integrated Strategy II & III
Predicting and Monitoring Seagrass Restoration Success – The Role of Epiphyte Attenuation	$169,500	The Nature Conservancy, U.S. Department of Defense, U.S. Fish and Wildlife Service, Florida Fish and Wildlife Conservation Commission, Southwest Florida Water Management District	Issue II, Goal I, Objective I, Integrated Strategy I, II III & IV
District Seagrass Mapping Project	$1,000,000	Southwest Florida Water Management District	Issue II, Goal I, Objective I, Integrated Strategy I, II III & IV
St. Martins Marsh Learning Center	$9,000,000	Florida Coastal Office, Florida Park Service, Florida Public Archaeology Network	Issue I, Goal II, Objective II, Integrated Strategy II & III; Issue II, Goal I, Objective II, Integrated Strategy I, II & III; Issue III, Goal II, Objective I, Integrated Strategy I & II; Issue III, Goal II, Objective II, Integrated Strategy I & II; Issue IV, Goal II, Objective I, Integrated Strategy I & II
St. Martins Marsh Aquatic Preserve Seagrass Restoration – Phase I	$2,000,000	Florida Coastal Office	Issue II, Goal I, Objective I, Integrated Strategy I, II, III & IV; Issue III, Goal I, Objective I, Integrated Strategy I; Issue IV, Goal I, Objective I, Integrated Strategy I & II
Project COAST-Water Quality Monitoring (Hernando, Citrus, Levy & Pasco counties)	$2,267,992	The Nature Conservancy, U.S. Department of Defense, U.S. Fish and Wildlife Service, University of Florida	Issue I, Goal I, Objective I, Integrated Strategy II; Issue I, Goal I, Objective II, Integrated Strategy I; Issue I, Goal II, Objective I, Integrated Strategy I

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. 1
3	Degree of title interest held by the Board, including reservations and encumbrances such as leases.	18-2.021	p. 1, 6-8
4	The legal description and acreage of the property.	18-2.018 & 18-2.021	Ex. Sum & p. 12
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. 11
6	An assessment as to whether the property, or any portion, should be declared surplus. Provide Information regarding assessment and analysis in the plan, and provide corresponding map.	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. Please clearly indicate parcels on a map.	18-2.021	N/A
8	Identification of adjacent land uses that conflict with the planned use of the property, if any.	18-2.021	p. 43-45
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. 41-43
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. 10
12	A description of past and existing uses, including any unauthorized uses of the property.	18-2.018 & 18-2.021	p. 9-10, 37-38, 43-45, 70-71
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, 47-73
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.2
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. 41-43, 51-58, 61-64
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. 69-73
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

Land Management Plan Compliance Checklist Required for State-owned conservation lands over 160 acres			
Item #	**Requirement**	**Statute/Rule**	**Pg#/App**
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.3
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. 12-22, 47-73
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).	253.034(10)	p. 71
*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.			
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. Include the advisory group members and their affiliations, as well as the date and location of the advisory group meeting.	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. Include a copy of each County's advertisements and announcements (meeting minutes will suffice to indicate an announcement) in the management plan.	253.034(5) & 259.032(10)	App. C

Land Management Plan Compliance Checklist Required for State-owned conservation lands over 160 acres			
Item #	**Requirement**	**Statute/Rule**	**Pg#/App**
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. Include managers replies to the teams findings and recommendations.	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
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. Use brief descriptions and include USDA maps when available.	18-2.021	p. 16-18
33	Insert FNAI based natural community maps when available.	ARC consensus	p. 24
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. 23-33
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. 28
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	p. 16
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. 23-37, 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. 23-35, App. B.4
40	The identification or resources on the property that are listed in the Natural Areas Inventory. Include letter from FNAI or consultant where appropriate.	18-2.021	p. 23-33
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, 47-73, App. E.2
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. 23-33, 37-38, 47-73
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

Land Management Plan Compliance Checklist Required for State-owned conservation lands over 160 acres			
Item #	**Requirement**	**Statute/Rule**	**Pg#/App**
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. Include fire management plans - they can be in plan body or an appendix.	259.032(10) & 253.034(5)	App. D.1
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. See footnote.	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. 23-37, 47-73
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. See footnote.	253.034(5)	App. B.3.4
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 re-quirement via lease language	App. B.4
48	Exotic and invasive species maintenance and control	259.032(10) & 253.034(5)	

Land Management Plan Compliance Checklist Required for State-owned conservation lands over 160 acres			
Item #	**Requirement**	**Statute/Rule**	**Pg#/App**
48-A.	Management needs, problems and a desired outcome (see requirement for # 42-A).	259.032(10) & 253.034(5)	p. 35-37, 63
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
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. If yes, provide a list of the appropriate managing agencies that have been notified of the proposed plan.	18-2.018 & 18-2.021	p. 1-4
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. 1-4, 18-22
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. 24-27
52	***Quantitative description of the land regarding an inventory of hydrological features and associated acreage. See footnote.	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. Include maps of all cultural resources except Native American sites, unless such sites are major points of interest that are open to public visitation.	18-2.018, 18-2.021 & per DHR's request	Ex. Sum, p. 37-38, App B.5
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, App B.5
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

Land Management Plan Compliance Checklist Required for State-owned conservation lands over 160 acres			
Item #	**Requirement**	**Statute/Rule**	**Pg#/App**
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.

Section G: Facilities (Infrastructure, Access, Recreation)			
58	***Quantitative data description of the land regarding an inventory of infrastructure and associated acreage. See footnote.	253.034(5)	p. 77-78
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. 75-78, 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. 69-71, 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

Land Management Plan Compliance Checklist Required for State-owned conservation lands over 160 acres			
Item #	**Requirement**	**Statute/Rule**	**Pg#/App**
Section H: Other/ Managing Agency Tools			
62	Place this LMP Compliance Checklist at the front of the plan.	ARC and 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 and 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)	p. 47-73
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
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: 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: 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:

Deena S. Woodward
Division of Historical Resources, Bureau of Historic Preservation, Compliance and Review Section
R. A. Gray Building, 500 South Bronough Street
Tallahassee, FL 32399-0250
Phone: (850) 245-6425, Toll Free: (800) 847-7278, Fax: (850) 245-6435

Florida Department of Environmental Protection

Marjory Stoneman Douglas Building
3900 Commonwealth Boulevard, MS 235
Tallahassee, Florida 32399-3000

Rick Scott
Governor

Carlos Lopez-Cantera
Lt. Governor

Jonathan P. Steverson
Secretary

December 2016

Jenette Collins, Director
Citrus County Planning and Development Department
3600 West Sovereign Path, Suite 109
Lecanto, Florida 34461

Dear Ms. Collins:

Attached is a copy of the draft St. Martins Marsh Aquatic Preserve Management Plan. (The plan can also be found at http://www.dep.state.fl.us/coastal/sites/stmartins/) The plan was developed with input from the public and the St. Martins Marsh Aquatic Preserve Management Plan Advisory Group. It is anticipated to be reviewed and approved by the Acquisition and Restoration Council at the April 2017 meeting in Tallahassee. We respectfully request, within 30 days of receipt of this letter, your review of the Aquatic Preserve plan for its compliance with the Citrus County Comprehensive Plan. Please reply to the physical address (or e-mail address) regarding whether the management plan is in compliance with the county's comprehensive plan. Thank you in advance for your time and effort in this matter.

If you have any questions, please don't hesitate to contact me at (850)245-2098 or Penny.Isom@dep.state.fl.us.

Sincerely,

Penny Isom
Planning Manager
Florida Coastal Office

Board of County Commissioners
DEPARTMENT OF PLANNING AND DEVELOPMENT
3600 W. Sovereign Path, Lecanto, FL 34461-8070
(352) 527-5226 Fax (352) 527-5317
Web Address: www.citrusbocc.com

In reply, refer to: PL2-17-40

February 17, 2017

Penny Isom
Planning Manager
DEP, Florida Coastal Office
3900 Commonwealth Boulevard, MS 235
Tallahassee, Florida 32399-3000

SUBJECT: St. Martins Marsh Aquatic Preserve Management Plan

Dear Mrs. Isom:

This letter will confirm that the above referenced management plan is consistent with the Citrus County Comprehensive Plan adopted pursuant to Section 163.3167, Florida Statutes.

However, we do have a technical assistance comment regarding Integrated Strategy One on pg. 73, which references identifying appropriate locations for paddling launch sites to provide access via kayak or canoe. The Citrus County Comprehensive Plan, Chapter 13 – Manatee Protection Plan Element, does prohibit new boat ramps within essential manatee habitat. Therefore, we would recommend that any paddling launch sites be designed so as they may not be used as a boat ramp.

Should you require further assistance, please contact the Land Development Division at (352) 527-5239.

Sincerely,

Joe Hochadel

Joe Hochadel
Planner
Land Development Division

JH/cw

Florida Department of Environmental Protection

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

Rick Scott
Governor

Carlos Lopez-Cantera
Lt. Governor

Ryan E. Matthews
Interim Secretary

April 26, 2017

Ms. Penny Isom
Planning Manager
Florida Coastal Office
Florida Department of Environmental Protection
3900 Commonwealth Boulevard, MS 235
Tallahassee, Florida 32399-3000

RE: St. Martins Marsh Aquatic Preserve Management Plan

Dear Ms. Isom:

On **April 21, 2017**, the Acquisition and Restoration Council recommended approval of the **St. Martins Marsh Aquatic Preserve** management plan. Please advise Mr. James Parker of this office when the plan has been approved by the Board of Trustees.

Sincerely,

Raymond V. Spaulding
Office of Environmental Services
Division of State Lands
Department of Environmental Protection

St. Martins Marsh Aquatic Preserve
Management Plan

St. Martins Marsh Aquatic Preserve
3266 North Sailboat Avenue
Crystal River, FL 34428
352.228.6028 • www.dep.state.fl.us/coastal/sites/stmartins

Florida Department of Environmental Protection
Florida Coastal Office
3900 Commonwealth Blvd., MS #235
Tallahassee, FL 32399 • www.aquaticpreserves.org