St. Andrews Aquatic Preserve

Management Plan

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

The main channel entrance to St. Andrews Bay separates Shell Island from the mainland. (Photo: St. Andrews State Park)

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February 2017

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The star-eye hermit crab is just one of the numerous species that call St. Andrews Aquatic Preserve home. (Photo: Matthew B. Davis)

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. Andrews Aquatic Preserve Management Plan	
Lead Agency:	Florida Department of Environmental Protection's (DEP) Florida Coastal Office (FCO)
Common Name of Property:	St. Andrews Aquatic Preserve (formally known as St. Andrews State Park Aquatic Preserve)
Location:	Bay County, Florida
Acreage Total:	24,116
Acreage Breakdown According to Florida Natural Areas Inventory (FNAI) Natural Community Types	
FNAI Natural Communities	*Acreage according to GIS*
Seagrass Bed:	944
Tidal Marsh:	15
Algal Bed:	unknown
Composite Substrate:	unknown
Consolidated Substrate:	unknown
Unconsolidated Substrate:	unknown
Coral Reef:	unknown
Octocoral Bed:	unknown
Sponge Bed:	unknown
Worm Reef:	unknown
Management Agency:	DEP's FCO
Designation:	Aquatic Preserve
Unique Features:	St. Andrews Bay is a large estuary with very little freshwater input. Because of this limited supply of freshwater and low sediment load, its coastal waters tend to be clear with primarily sandy sediments. These conditions make the bay ideal habitat for the growth of lush seagrass communities. Much of the productivity of the region is attributed to the nearshore salt marsh and seagrass habitats that serve as nursery and foraging grounds for a variety of commercial and recreational fish and invertebrate species, sea turtles, and birds. The seagrass communities in St. Andrews Bay are essential for the commercially and recreationally important blue crab (*Callinectes sapidus*), penaeid shrimp, spotted seatrout (*Cynoscion nebulosus*), mullet (*Mugil* spp.), and red drum (*Sciaenops ocellatus*).
Archaeological/Historical Sites:	The Division of Historical Resources of the Department of State, has identified nine archeological sites in the immediate coastal areas of St. Andrews Aquatic Preserve. They include three shell middens dating back to the middle to late Woodland Period (300 A.D. -1000 A.D.), one shell midden of unknown date that has been destroyed by wave action, two World War II era gun mounts, and two picnic shelters from the 1950s. A ninth site, the Pier Store, has been removed.
Management Needs:	
Ecosystem Science	Seagrass communities are a vital component to Florida's coastal ecology and economy. Maintaining a strategic long-term seagrass and water quality monitoring program will be crucial in sustaining the biological and ecological integrity of the bay system for future generations.
Resource Management	The extensive seagrass habitat in St. Andrews Bay is valuable to Bay County's economy and has remained an area of focus over the years due to the loss and decline of this habitat throughout the Gulf of Mexico region. Stormwater discharge (which causes nutrient levels to increase in the bay), propeller scarring, and dredging are some of the potential factors that can negatively impact this valuable community. Water quality monitoring must include resource assessment as well as pollution and contamination source control.
Education and Outreach	The human dimension is an essential component of resource and ecosystem management. The intent of the aquatic preserve education and outreach program is to foster an understanding of the natural resources in the bay. Combined with research, regulations, and habitat management, education and outreach provide a comprehensive approach to resource protection.

Public Use	St. Andrews Aquatic Preserve and the surrounding Panama City Beach area are an increasingly popular tourist destination, especially in the summer months. Sugar white sand beaches, abundant and diverse marine life, and lots of other tourist attractions bring in visitors from near and far. Shell Island is an extremely popular beach, and is a swimming and snorkeling destination for both visitors and locals alike. St. Andrews Aquatic Preserve encourages sustainable use of natural resources while minimizing user impacts.
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 this important habitat. St. Andrews Aquatic Preserve held public and advisory committee meetings July 13 and 14, 2016 in Panama City to receive input on the draft management plan. An additional public meeting was held in Tallahassee February 17, 2017 when the Acquisition and Restoration Council reviewed the management plan.

Coastal Zone Management Issues:

Florida has an estimated population of more than 19 million residents and more than 98 million visitors annually (U.S. Census Bureau, 2014; Visit Florida, 2015). Florida also has the second longest coastline of any state, and nowhere else in the country are so many people so close to such an extensive and economically valuable coastline. Within these coastal communities, recreational activities such as boating, fishing and diving shape community culture and provide positive economic growth. However, rapid coastal development, increasing public access and changing land use patterns are complicating regulation and management efforts within valuable aquatic systems. To protect and enhance the unique coastal resources throughout Florida, a variety of issues that affect water quality, quantity and growth management must be addressed (DEP, 2006). Current management issues and concerns facing the St. Andrews Aquatic Preserve include hands-on management and restoration of resources, resource protection, effective education and outreach efforts, and public use evaluations. Aquatic preserve goals will necessitate effective partnerships with a variety of private, local, regional, state and federal entities to protect the biodiversity and productivity of the bay system.

Goals:

Research and monitoring associated with the St. Andrews Aquatic Preserve will emphasize and provide a better understanding of the functioning and interrelationships of the aquatic preserve's natural systems, show the status and trends of the natural resources within the aquatic preserve over time, and provide information to allow for the best management practices to be implemented in the protection of the bay system. Research and monitoring efforts in the St. Andrews Aquatic Preserve were developed based on the uses of and threats to the natural resources of this system. To effectively monitor the resources of the bay and to be able to document and determine the health of the bay system as well as accomplish program goals, a variety of projects and efforts must be utilized and implemented. These include hands-on management and restoration of resources, resource protection, education and outreach, and public use evaluations. There is also a need to use advanced Geographical Information System (GIS) technology and aerial imagery to accurately map sensitive habitats. Each of these goals will necessitate effective partnerships with a variety of private, local, regional, state and federal entities. In addition, prioritizing issues, objectives and strategies will lead to a cohesive management program and the long-term conservation of the natural system.

FCO/Trustees Approval

FCO Approval: Nov. 16, 2016 **ARC approval:** Feb. 17, 2017 **Trustees approval:** Apr. 11, 2017

Comments:

Acronym List

Abbreviation	Meaning
ANERR	Apalachicola National Estuarine Research Reserve
BEST	Bay Environmental Study Team
CBRS	Coastal Barrier Resource System
CSO	Citizen Support Organization
DACS	Florida Department of Agriculture and Consumer Services
DEP	Florida Department of Environmental Protection
DOH	Florida Department of Health
EPA	U.S. Environmental Protection Agency
F.A.C.	Florida Administrative Code
FCO	Florida Coastal Office
FE	Federally and State Designated Endangered
FEMA	Federal Emergency Response Agency
FNAI	Florida Natural Areas Inventory
F.S.	Florida Statutes
FT	Federally and State Designated Threatened
FTE	Full Time Equivalent
FWC	Florida Fish and Wildlife Conservation Commission
FWRI	Florida Wildlife Research Institute
G	Global
GEMS	Gulf Ecological Management Site
GIS	geographic information system
HAB	harmful algal bloom
NERR	National Estuarine Research Reserve
NOAA	National Oceanic and Atmospheric Administration
NWFWMD	Northwest Florida Water Management District
OFW	Outstanding Florida Water
OPS	Other Personal Services
RMA	St. Andrew Bay Resource Management Association
S	State
SE	State Designated Endangered
SSC	State Designated Species of Special Concern
ST	State Threatened
SWIM	Surface Water Improvement and Management Plan
TMDL	Total Maximum Daily Load
Trustees	Board of Trustees of the Internal Improvement Trust Fund
USACE	U.S. Army Corps of Engineers
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey

Table of Contents

List of Tables

List of Figures

List of Appendices

The sun sets over the dunes in St. Andrews State Park.

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, three National Estuarine Research Reserves (NERRs), a National Marine Sanctuary, Coral Reef Conservation Program, Florida Coastal Management Program, Outer Continental Shelf Program, and the Florida Oceans and Coastal Council (Map 1). 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 extensive 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.

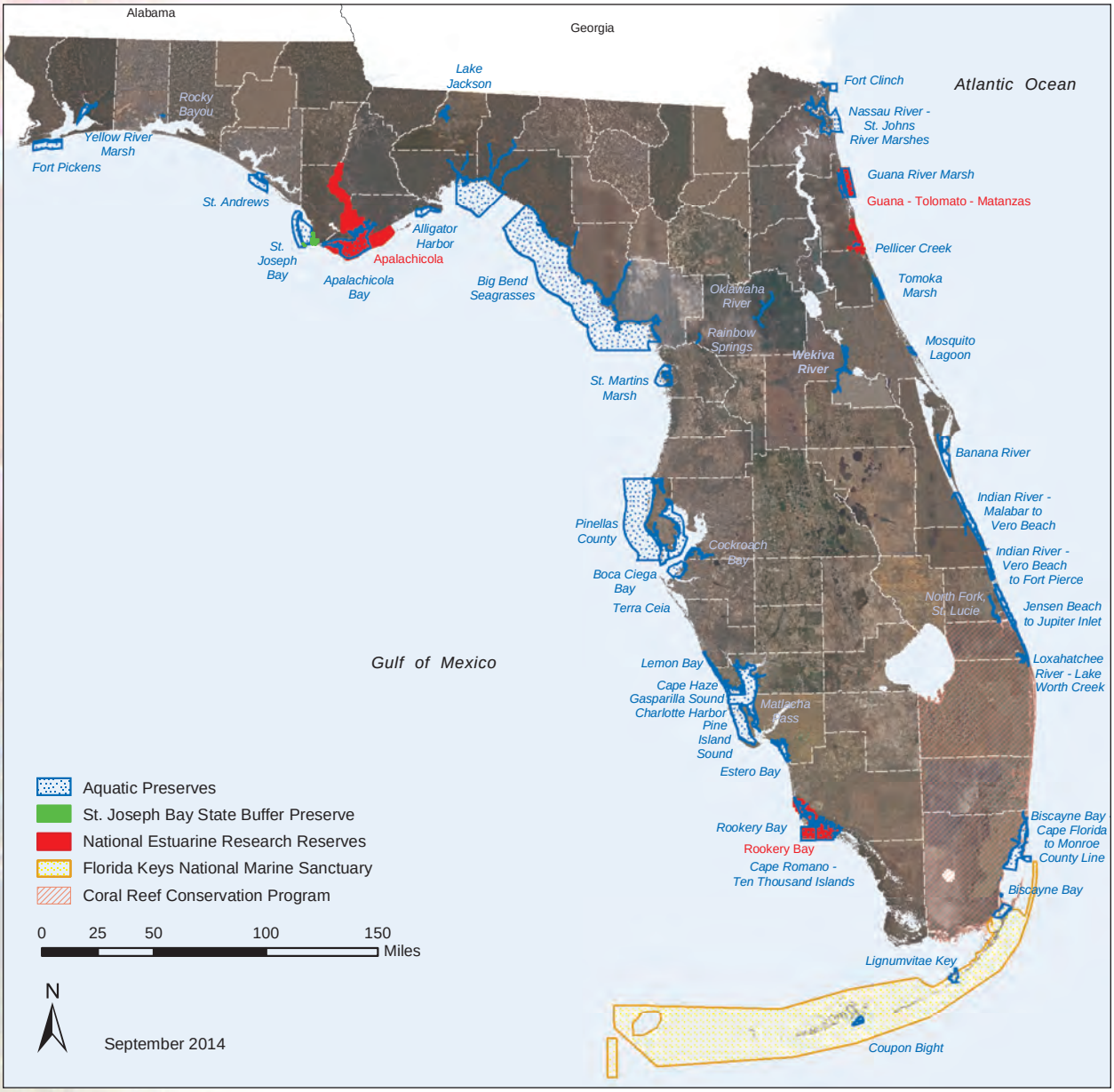
Title to submerged lands not conveyed to private landowners is held by the Board of Trustees of the Internal Improvement Trust Fund (the Trustees). The Governor and Cabinet, sitting as the Trustees, act as guardians for the people of the state of Florida (§253.03, Florida Statutes [F.S.]) and regulate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

The 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***

Florida's aquatic resources are at risk for both direct and indirect impacts of increasing development and recreational use, as well as resulting economic pressures, such as energy generation and increased fish and shellfish harvesting to serve and support the growing population. These potential impacts to resources can reduce the health and viability of the ecosystems that contain them, requiring active



Map 1 / Florida Coastal Office System

management to ensure the long-term health of the entire network. Effective management plans for the aquatic preserves are essential to address this goal and each site's own set of unique challenges. The purpose of these plans is to incorporate, evaluate and prioritize all relevant information about the site into a cohesive management strategy, allowing for appropriate access to the managed areas while protecting the long-term health of the ecosystems and their resources.

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

To aid in the analysis and development of the management strategies for the site plans, the FCO identified four comprehensive management programs applicable to all aquatic preserves. To address the goals, objectives, integrated strategies and performance measures of the four programs, relevant information about the specific site has been collected, analyzed and compiled to provide a foundation for development of the management plan. While it is expected that unique issues may arise with regard to resource or management needs of a particular site, the following management programs will remain constant across the resource protection network:

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

Each aquatic preserve management plan will identify unique local and regional issues and contain the goals, objectives, integrated strategies, and performance measures to address those issues. The plan will also identify the program and facility needs required to meet the goals, objectives, and strategies of the management plan. These components are key elements for achieving the resource protection mission of each aquatic preserve.

The previous St. Andrews State Park Aquatic Preserve (hereafter referred to as St. Andrews Aquatic Preserve) management plan was approved May 14, 1991.

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 Florida's Government-in-the-Sunshine Law (§286.011, F.S.), including:

- 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.

Salt marsh on the bayside of Shell Island serves as an exclusive habitat for a variety of juvenile fish, invertebrates, birds, reptiles, and mammals.

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 as well as providing management support through the Florida Coastal Management Program, the Outer Continental Shelf Program, and the Coral Reef Conservation Program. The three NERRs, the Florida Keys National Marine Sanctuary, and the Coral Reef Conservation Program are managed in cooperation with the National Oceanic and Atmospheric Administration (NOAA).

FCO manages sites in Florida for the conservation and protection of natural and historical resources and resource-based public use that is compatible with the conservation and protection of these lands. FCO is a strong supporter of the NERR system and its approach to coastal ecosystem management. 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 exceptional areas of submerged lands and associated waters 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 offshore reserve, 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 statutorily 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.

Comments of FCO staff, 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.

Florida Statutes that authorize and empower non-FCO programs within DEP or other agencies may also be important to the management of FCO sites. For example, Chapter 403, F.S., authorizes DEP to adopt 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 should be read together with Chapter 18-18 or Chapter 18-20 to determine what activities are permissible within an aquatic preserve. If Chapter 18-18 or Chapter 18-20 are silent on an issue, Chapter 18-21 will control; if a conflict is perceived between the rules, the stricter standards of Chapter 18-18 or Chapter 18-20 supersede those of Chapter 18-21. Because Chapter 18-21 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. In the context of the rule, the term "activity" 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.). In addition, activities on sovereignty submerged lands must be not contrary to the public interest (Rule 18-21.004, F.A.C.). Chapter 18-21 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, the rule also addresses spoil islands, preventing their development in most cases.

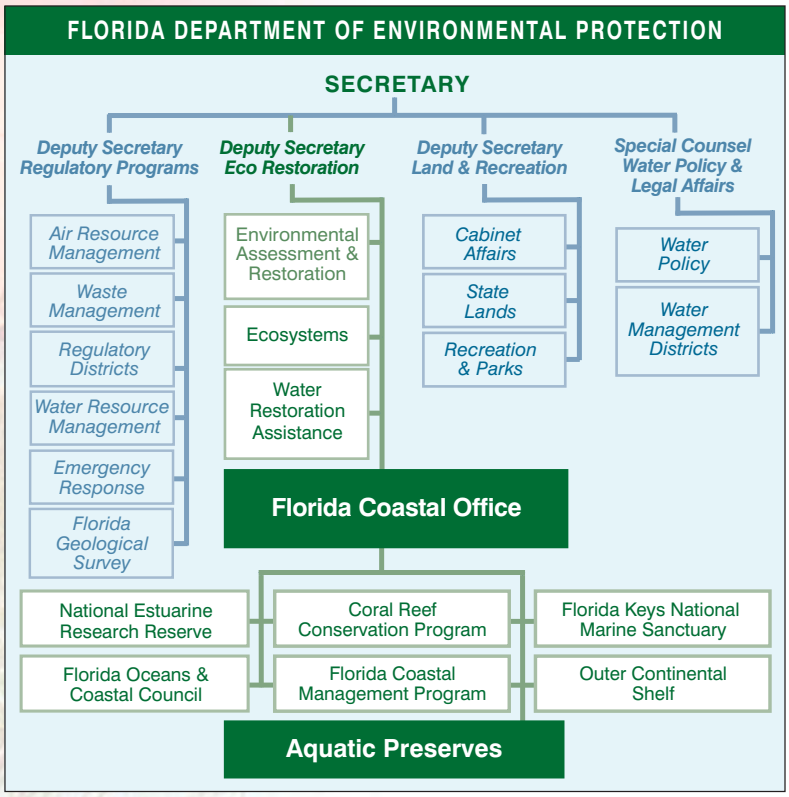


Figure 1 / State management structure.

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. Chapter 18-18 is specific to the Biscayne Bay Aquatic Preserve and is more extensively described in that site's management plan. Chapter 18-20 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. The rule 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.

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.

A loggerhead sea turtle nests along the shores of St. Andrews State Park as the sun sets in the background.

Chapter Three

St. Andrews Aquatic Preserve

3.1 / ***Historical Background***

Native Americans once inhabited St. Andrews Bay and gathered shellfish for meals from the bay's shallow clear waters. St. Andrews State Park, which is adjacent to the aquatic preserve, has nine archeological sites listed in the Florida Master Site File (FMSF). These include prehistoric shell middens, village sites and an historic refuse site from the First or Second Spanish Period. These sites suggest that the barrier peninsula provided a rich source of food and shelter locations for pre-Columbian inhabitants more than 1,000 years ago (C. G. Fowler, personal communication, January 12, 2015).

St. Andrews Bay (also known as St. Andrew Bay) most likely received its name from Spanish navigators who explored the northeast gulf in the 16th century but it is unclear which St. Andrew in particular was the namesake (West, 1922). The British acquisition of Florida in 1763 led to an exhaustive survey a year later that included the first accurate charting of St. Andrews Bay, and free land grants to pensioned soldiers led to the establishment of Wells, the first settlement on the bay. The first exports were indigo and naval stores, but the majority of trade was for goods exchanged between natives and settlers such as timber, cattle, skins, hides, furs, honey, beeswax, and myrtle wax. In 1783, Spain reclaimed Florida and most British settlers departed for other colonies which led to the decline of the port of St. Andrews. After the region became part of the United States in 1819, the Florida Legislature passed a bill to create a canal connecting St. Andrews Bay with Choctawhatchee Bay. Although the canal project was abandoned, abundant timber and oysters attracted exporters in the mid-1800s (Florida Department of State, n.d.-a).

Historically known as St. Andrews, the small community that is now part of present day Panama City is rich in both history and resources. St. Andrews was founded in 1827 on the shores of St. Andrews Bay and was incorporated in 1908. On July 1, 1913, Bay County was created by the Florida Legislature from portions of Washington, Calhoun, and Walton counties (Bay County, 2014).

Many of the early settlers of St. Andrews were fishermen, but due to the abundance of many large trees, especially yellow pines, many turned to working in the sawmills that were built. Bay County and the St. Andrews Bay area owe much of their progress to sawmill and lumber pioneers. Ben Steele built what is now the Bay Line Railroad, which operates from Panama City, to Dothan, Alabama, and was a sawmill man. Later, Walter Sherman opened another sawmill located in Millville near Steele's railroad. When the lumber business was fading, Sherman was concerned about the future of his employees and the economics of the area. He contacted the International Paper Company and they constructed Florida's first paper mill on St. Andrews Bay in 1928 (Bay District Schools, n.d.). The mill is still in operation today and is currently owned by Smurfit-Stone Container Corporation (Brim & Handley, 2007).

Bay County and the surrounding region has had a strong military presence that dates back to the Civil War. St. Andrews Bay was the site of several skirmishes during the Civil War. On March 20, 1863, Confederate troops engaged a Union landing party from the U.S.S. Roebuck on St. Andrews Bay. The Union sailors were coming ashore at the abandoned village of St. Andrews on a scouting mission and were surprised by the Confederates, who demanded their surrender. When the sailors refused, the Confederates opened fire and six Union sailors were killed and three wounded. Only two escaped unharmed. No Confederates were injured in the brief firefight (The Historical Marker Database, n.d.-a).

Between 1861 and 1865, St. Andrews Bay saltworks provided salt, fish, and cattle to the troops and citizens of the South. Approximately 2,500 men from Florida, Georgia, and Alabama were exempted from combat duty in order to labor in the saltworks. Because of the importance of the saltworks to the Confederacy, Union forces commenced a series of assaults beginning in August 1862. In December 1863, additional Union attacks occurred and overpowered the Confederates. The attacks resulted in the destruction of more than 290 saltworks, valued at more than $3,000,000. The St. Andrews Bay saltworks were promptly rebuilt and remained in operation through February 1865 (The Historical Marker Database, n.d.-b).

St. Andrews State Park, which is adjacent to the St. Andrews Aquatic Preserve, was a former coastal artillery unit during WWII. Two of the original Army barracks are still standing and were re-purposed to house the state park's administrative and training centers. In 1942, at the onset of WWII, the Army established a Temporary Harbor Defense installation at this site overlooking the recently opened pass into St. Andrews Bay. The unit's main purpose was to protect the area from German submarines operating in the Gulf of Mexico. Two gun placements were located on the dunes. The remains of one serve as the foundation for a pavilion in the Jetty Use Area. Another placement is periodically exposed on the beach shoreline from erosion. Troops of Battery C, 13th Coastal Artillery were assigned to establish the Temporary Harbor Defense in April 1943. The site was inactivated on January 14, 1944 without a shot having been fired at an enemy (DEP, 2004).

Tyndall Air Force Base, named after WWI veteran Lieutenant Frank B. Tyndall, opened as a gunnery school in 1941 and is still active today. In 1942, Wainwright Shipyard, located in Grand Lagoon, began construction of 102 Liberty ships and six tankers used in WWII. Across the bay from Wainwright Shipyard, the Naval Section Base began in 1942. In 1945, the base was re-commissioned as a U.S. Navy Countermeasures Station. It is now known as the Naval Surface Warfare Center (Florida Department of State, n.d.-b).

In 1938, the U.S. Army Corps of Engineers (USACE) constructed the main entrance channel (Map 2) by excavating through a barrier peninsula to create a rock-jettied inlet approximately six miles (9.7 kilometers) west of the historical East Pass entrance. In about 1950, USACE constructed the Gulf Intracoastal Waterway connecting western St. Andrews Bay with Choctawhatchee Bay and connecting eastern St. Andrews Bay with Lake Wimico and with St. Joseph Bay via the Gulf County Canal (Map 2). In the 1960s, a dam was constructed across a portion of North Bay to create Deer Point Lake (Brim & Handley, 2007).

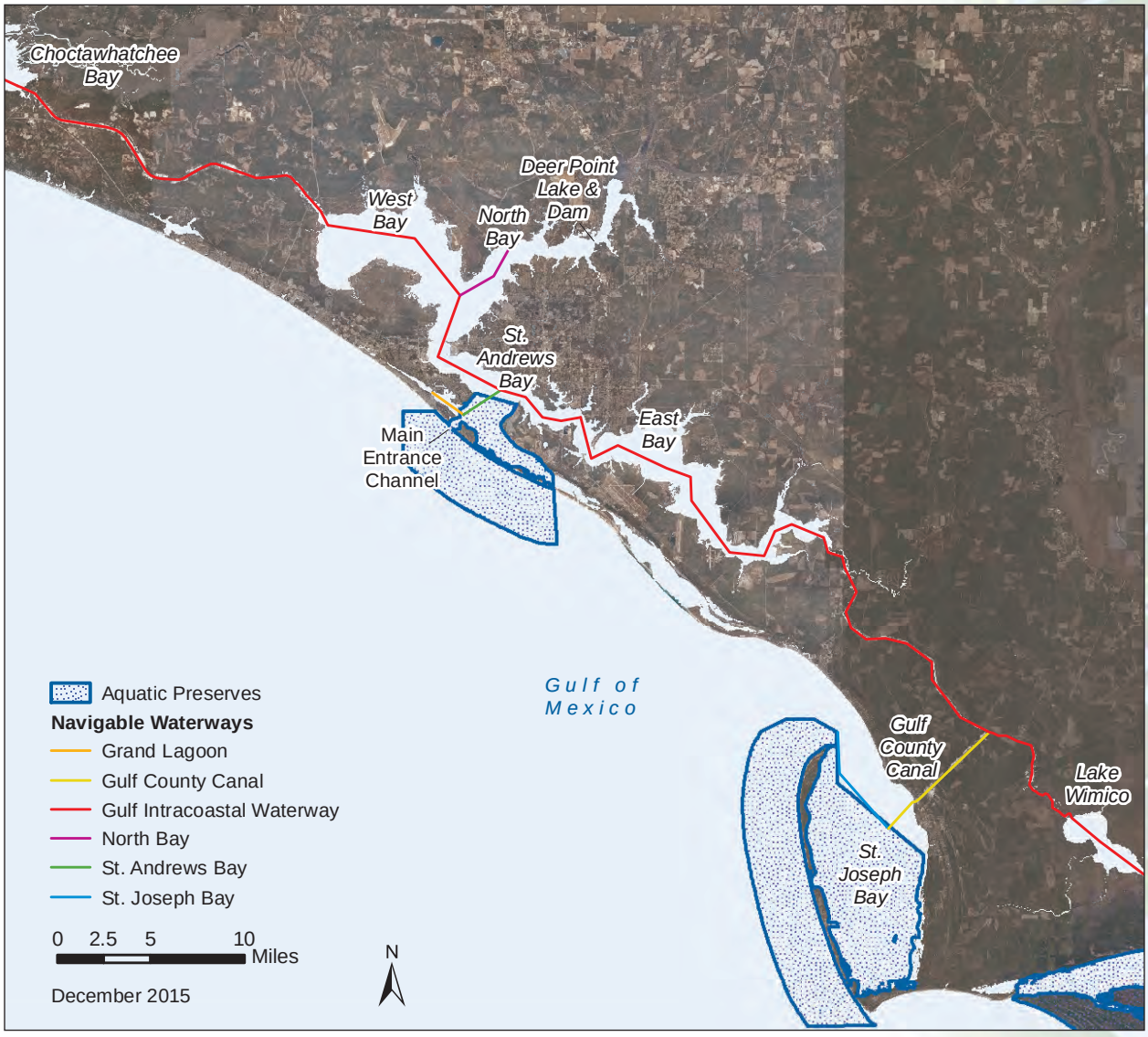
The primary industries in Bay County are tourism and the military, with Tyndall Air Force Base playing a dominant role in the community. The U.S. Navy's Coastal Systems Station and the U.S. Coast Guard also share the bay's shoreline. Most tourist activity occurs on Panama City Beach or upon bay waters. Other significant industries include the Smurfit-Stone Container Corporation paper mill, Arizona Chemical, Port Panama City, and the Gulf Power Lansing Smith generation plant (Brim & Handley, 2007).

St. Andrews Aquatic Preserve was designated by the Florida Legislature in 1972 for the purpose of maintaining the preserve area in an essentially natural condition. Relatively clear water is one of the characteristic features of St. Andrews Aquatic Preserve. Several factors contribute to the bay's clarity, such as its spring-fed tributaries, low amounts of silty clay in the local soils and the filtering effect of the marshes and seagrasses (Florida Department of Natural Resources, 1991).

International/National/State/Regional Significance

The Florida Panhandle is one of the nation's six "biological hot spots," along with Hawaii, the southern Appalachians, the San Francisco Bay area, the Death Valley region, and southern California, that has many rare species that are only found in small areas. The highest biodiversity of species in the United States is found specifically within the central Florida Panhandle, along the Apalachicola River. In addition, more than 788 native vertebrate species and more than 2,000 native plants inhabit the Florida Panhandle from the Perdido River eastward to the Suwannee River (DEP, 2014).

St. Andrews Bay is a large estuary with very little freshwater input. Econfina Creek, Deer Point Lake Reservoir, the Gulf Intracoastal Waterway, and smaller creeks and bayous are the primary sources of freshwater inflow, with a combined total discharge of less than 28.3 cubic meters per second (m^3/s) (Brim & Handley, 2007). Because of this limited supply of freshwater and low sediment load, its coastal waters tend to be clear with primarily sandy sediments. These conditions make the bay ideal habitat for the growth of lush seagrass communities. Much of the productivity of the region is attributed to the nearshore salt marsh and seagrass habitats that serve as nursery and foraging grounds for a variety of commercial and recreational fish and invertebrate species, sea turtles, and birds. Five species of seagrasses are present in the St. Andrews Bay system and cover more than 11,000 acres (Yarbro & Carlson, 2011). The seagrass communities in St. Andrews Bay are essential for the commercially and recreationally important bay scallop (*Argopecten irradians*), blue crab (*Callinectes sapidus*), penaeid shrimp, spotted seatrout (*Cynoscion nebulosus*), mullet (*Mugil* spp.), and red drum (*Sciaenops ocellatus*) (Northwest Florida Water Management District [NWFWMD], 2000).



Map 2 / St. Andrews Bay system and navigable waterways.

Location/Boundaries

The St. Andrews Bay system contains four coastal plain estuaries: West Bay, North Bay, St. Andrews Bay, and East Bay. St. Andrews Aquatic Preserve is located entirely within the St. Andrews Bay section. Map 2 illustrates the location of St. Andrews Aquatic Preserve relative to the entire St. Andrews Bay system.

St. Andrews Aquatic Preserve is located in northwest Florida, south of Panama City and east of Panama City Beach (Map 3). The 24,116 acre aquatic preserve covers the entire inlet of St. Andrews Bay. The northern boundary is an east-west oriented line that runs from Courtney Point to just south of Redfish Point. The southern boundary runs west from the southwest point of St. Andrews State Park for approximately two miles and extends approximately three miles out into the Gulf of Mexico. The eastern boundary is located approximately one-half mile east of Shell Island and extends from Tyndall Air Force Base to three miles offshore. Boundaries of St. Andrews Aquatic Preserve include only state-owned (sovereignty) submerged lands that occur below the mean high water line. Uplands and artificial canals are excluded from the aquatic preserve. Map 3 shows the location and boundaries of St. Andrews Aquatic Preserve.

St. Andrews Bay, which surrounds the Panama City metropolitan area on three sides, is about an equal distance (160 kilometers, or 100 miles) from Pensacola to the west and Tallahassee to the east. The bay can be accessed via several roads, including U.S. Highway 98, Thomas Drive, and Harrison Boulevard.

Map 3 / St. Andrews Aquatic Preserve.

View of the west end of Shell Island from the main channel entrance.

3.3 / ***Resource Description***

The information in this section describes the resources found in the aquatic preserve.

Surrounding Population Data and Future Projected Changes

More than three-quarters of Florida's population live in coastal communities. As the population continues to rise and the demand for development, infrastructure, and services increases, there could be environmental and subsequent economic impacts that must be appropriately managed. Panama City is a relatively large community with both urban and rural subsections. According to the U.S. Census Bureau, in 2014, Panama City's population was 37,681 and Panama City Beach had a population of 12,408. In 2014 the U.S. Census Bureau estimated Bay County's population to be 178,985, which had increased by 6.0 percent since 2010 (U.S. Census Bureau, 2014). Bay County has a population density of approximately 222 persons per square mile.

Topography and Geomorphology

Today, Florida has six major geographic regions that historians use to describe these areas. The Coastal Lowlands encircle the state and extend along the shores inland from 10 to 100 miles. St. Andrews Bay is located within the Gulf Coastal Lowlands, a geographic province characterized by marine terraces (remnant shorelines from times of higher sea level) and flat, sandy terrain, bars, spits, and dune fields (Map 4).

The general topography (the configuration of a surface including its relief and the position of its natural and man-made features) of this area was formed during the Pleistocene epoch and is composed of ancient marine terraces that run parallel to the Gulf of Mexico shoreline (White, 1970). There are eight marine terraces in Florida, formed by waves, currents, and varying sea levels. When the sea level remained stationary for long periods, the waves and currents would erode the sea floor to form a fairly level surface. When the sea level dropped, the sea floor became a level plain or terrace. The Silver Bluff Terrace, an area extending from the modern Gulf coast to approximately eight feet below mean sea level, is present within the aquatic preserve boundaries. Dune systems, relict beach ridges, and swales typify the Silver Bluff Terrace (Florida Department of Natural Resources, 1991).

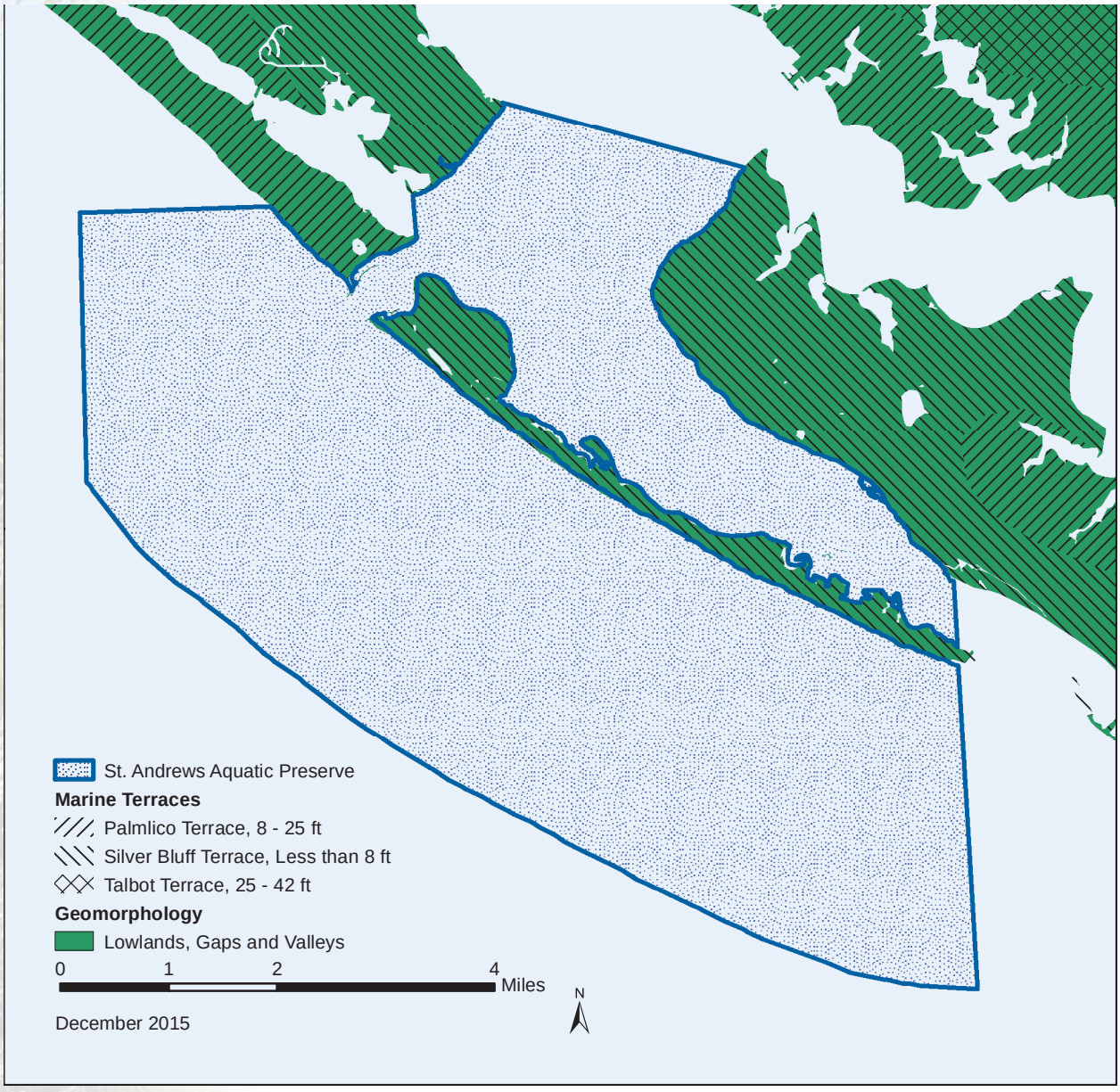
There are 144 sequentially numbered (west to east) DEP survey reference points, generally referred to as range monuments or R-monuments, spaced approximately 1,000 feet (300 meters) apart in Bay County. Map 5 illustrates these reference points in order to locate various items along St. Andrews Bay. Bay County is considered to be highly developed between R-1 and R-92, and between R-127 and R-138.

There is one major coastal alteration within St. Andrews Aquatic Preserve. The St. Andrews Bay channel entrance, located between monuments R-97 and R-98, is man-made and federally maintained. The

entrance was cut through the barrier island in 1934 and two jetties were constructed to stabilize the channel in the same year (Dean & O'Brien, 1987). The jetties have been modified at least twice since then. In addition, there is one gulf pier adjacent to the aquatic preserve: between R-92 and R-93. There are many seawalls and bulkheads between R-1 and R-92; most of which have normally had some beach width in front of them (Foster & Cheng, 2001).

According to the Shoreline Change Rate Report (Foster & Cheng, 2001), St. Andrews Bay has a complex geomorphology, which is defined as a science that deals with the relief features on the earth. The direction of net littoral transport in the Panama City Beach area is from east to west, as evidenced by the recurring erosion problem west of the jetties of the St. Andrews Bay entrance channel (Foster & Cheng, 2001). The area adjacent to St. Andrews Bay entrance channel, DEP reference points R-80 to R-97, experienced a classic downdrift-from-an-inlet erosion pattern during the period 1934-1971, averaging a loss of six feet of shoreline per year at the inlet, R-97, and tapering down to a loss of one foot per year at R-80. Erosion in this area has since been abated and controlled for the most part by numerous beach nourishments in the St. Andrews State Park area using sand from inlet maintenance dredging projects in the period 1971-2000 (Foster & Cheng, 2001).

Hurricanes in this area occur frequently and both the storms and their effects can remain in the area for long periods of time. Five major storms in recent history were Hurricane Eloise in 1975, Hurricane Opal in 1995, Hurricane Ivan in 2004, and hurricanes Dennis and Katrina in 2005. Since many buildings in the highly developed zones (R-1 to R-92 and R-127 to R-138) were located close to the water, where dunes previously existed, widespread property damage occurred. In addition to property damage, extensive



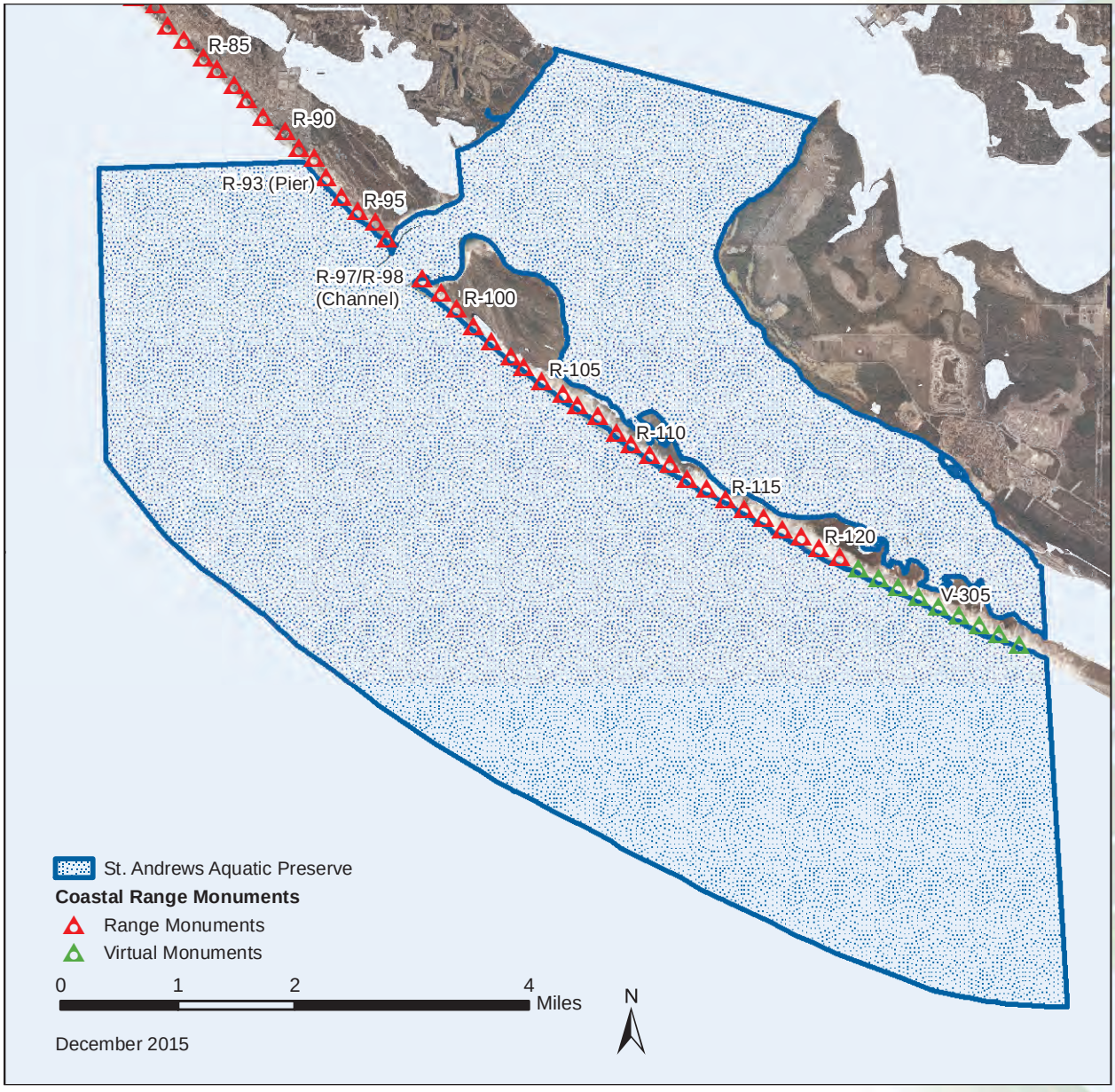
Map 4 / Geomorphology of St. Andrews Aquatic Preserve.

dune erosion and deposition of sand in deeper water offshore occurred. In April 1999, a large-scale beach and dune restoration project was completed from the Walton/Bay county line (R-1) east to St. Andrews State Park pier (R-93). Erosion of the restored beach and dune system by Hurricane Dennis was significant, and with the cumulative impact from Hurricane Ivan, the beach and dune system was in a severely eroded condition along much of the coast (DEP, 2005).

In response to the erosion caused by Hurricane Ivan, an interim beach nourishment project began in April 2005 to partially restore the 1999 project. However, the eastern segment of the Panama City Beaches Restoration Project (R-77 to R-93) experienced moderate beach erosion in terms of beach profile lowering during Hurricane Dennis (DEP, 2005).

The shoreline extending westward from the St. Andrews Bay entrance channel is considered to be relatively stable to mildly eroding. In the post inlet construction period of 1935 through 1990, in excess of nine million cubic yards of maintenance dredging material had been disposed of in deep water. Approximately 1.5 million cubic yards had been placed on the beach west of the inlet from 1971 to 1990 (USACE, 1994). Nourishments in the R-92 to R-97 reach in St. Andrews State Park are expected to continue using sand from maintenance dredging operations.

Shell Island, mostly state-owned, is monitored only in part, from R-98 to R-121. Foster and Cheng (2001) note that this zone is difficult to reliably estimate due to a high level of beach width fluctuations, probably caused by storms and large scale beach cusps. There was also considerable landward overwash across the



Map 5 / Coastal monuments of St. Andrews Aquatic Preserve.

entire island during Hurricane Opal in 1995. The island was also significantly impacted by the storm tides of Hurricane Ivan in 2004, and Hurricane Dennis in 2005 exacerbated the beach and dune erosion conditions with additional overwash processes. Numerous overwash fans (the deposition of sediment transported across the barrier island into St. Andrews Bay) were created by both hurricanes Ivan and Dennis (DEP, 2005).

St. Andrews Bay East Pass, located at the eastern end of Shell Island, was a natural inlet, formerly the navigation channel to St. Andrews Bay, which was maintained by the USACE until 1934. The total volume of dredged material from the inlet from 1911 to 1934 was 6.1 million cubic yards (Dean & O'Brien, 1987). This pass closed due to littoral drift in 1998 and the joining of the pass with the nearby Crooked Islands was documented on January 8, 2000 (Foster & Cheng, 2001).

After St. Andrews Bay East Pass closed in 1998, a reopening project was planned and a new artificial cut was completed in December 2001. The new cut remained open for two years before closing in late 2003. Hurricane Ivan reopened this inlet to tidal flow in September 2004. Considerable shoaling had subsequently taken place, but the storm tides of Hurricane Dennis in July 2005 once again flushed out shoaled sediment which helped to maintain tidal flow. However, by November 2005, the inlet filled in with sediment and was closed again (DEP, 2006). As of November 2015, the inlet remains closed. Foster and Cheng (2001) note that the lateral erosional process has also been supplying sand to the Mexico Beach area, east of the Crooked Islands. In addition, they state that the Shell Island Zone, R-98 to R-121, appears to be sheltered by nearshore relic shoal deposits, possibly from an earlier inlet location.

Many in the communities surrounding St. Andrews Bay have advocated for the re-opening of St. Andrews Bay East Pass. This topic was brought up again by a proposal for funding from the Bay County's RESTORE Act monies. The proposal is seeking funding to conduct a feasibility study, looking into the environmental impacts of re-opening the pass. The proposal cites increased flow of saltwater into the area, improved water quality and clarity, as well as an increase in seagrass bed coverage as beneficial environmental outcomes if the pass were to be re-opened (Schnell, 2015). Should this feasibility study project be funded, an Environmental Impact Study would be conducted by USACE, as well as a Beach and Inlet Management plan, which would be completed by DEP's Regulatory Division.

St. Andrews Aquatic Preserve is designated under the Coastal Barrier Improvement Act of 1990 as being located within the St. Andrew Complex (Units P31 and P31P) of the Coastal Barrier Resource System (CBRS). We note that the Coastal Barrier Improvement Act prohibits federal funding within the CBRS for many actions including shoreline stabilization and beach nourishment, unless the project meets an exception, and that consultation with the U.S. Fish and Wildlife Service (USFWS) is required for any project that will be constructed with federal funding. East Pass is located within CBRS Unit P31. If an environmental impact statement to re-open East Pass is completed, and a decision is made to move forward with construction, the use of federal funding for the construction of the project may be prohibited. St. Andrews Aquatic Preserve staff will continue to follow the issue closely.

Geology

Geology is the science of the history of the earth and its life, especially as recorded in rock.

The St. Andrews Bay system lies in the Coastal Plain physiographic province, has a surface stratigraphy composed largely of post-Pleistocene sands, and is classified as coastal integrated drainage because of the set of small local streams draining its coastal regions (Young, Butts, Donelan, & Ray, 1987; Wolfe, Reidenauer, & Means, 1988; Fernald & Purdum, 1992).

The Florida Geological Survey performed an extensive study of the geology of the entire state of Florida and used subsurface data, in the form of well cuttings and cores, to develop a cross-section map of the state. This study also extrapolated formational tops recognized in the subsurface to the surface where exposures are limited. The landforms found in Bay County were either created or carved from four surface geologic formations. From most recent to oldest, these formed during the Holocene, Pliocene, Miocene, Oligocene, and Eocene epochs (Scott, 2001). The Pliocene formations consist of clay and sand. These form the Jackson Bluff Formation as well as the Citronelle formation. The Alum Bluff Group and the Chattahoochee Formation were both formed during the Miocene. The Alum Bluff Group is characterized by sand and clay, while the Chattahoochee Formation consists of dolostone, limestone, sand and clay. The Suwanee Limestone Formation, which consists of limestone, was formed during the Oligocene, 33.9 to 23 million years ago. Finally, the Ocala Limestone and Avon Park Formations both formed during the Eocene, about 55.8 to 33.9 million years ago, and are characterized by limestone and dolostone (Scott, 2001).

The surface map shows that St. Andrews Aquatic Preserve contains primarily Holocene sediments, consisting of sand, clay, and organics (Scott, 2001). Holocene sediments formed more than 10,000 years ago and consist of sedimentary sand, clay and organics. They occur near the coastline at elevations less than five feet.

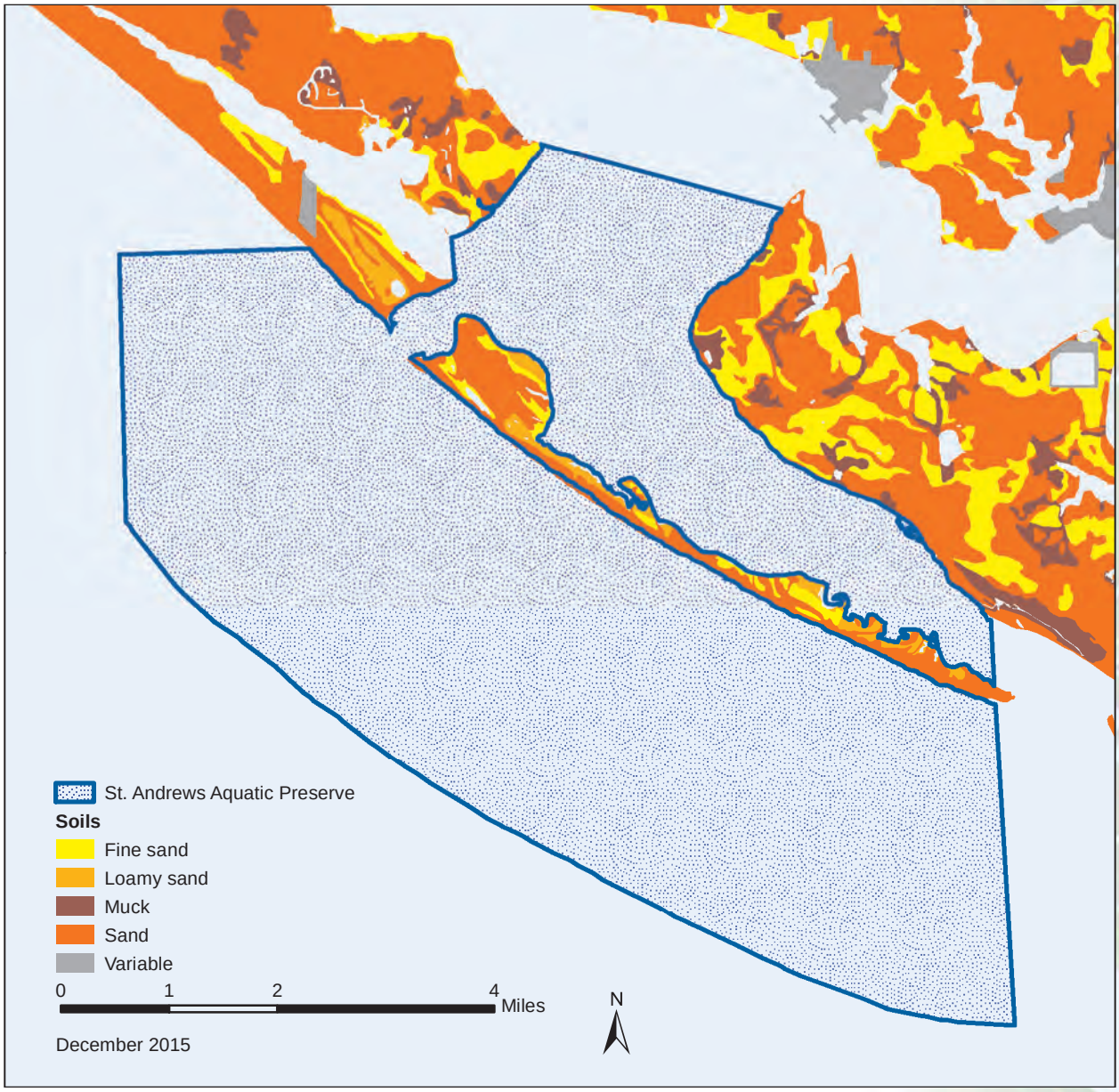
The general soil type within the aquatic preserve is made up of the Kureb-Resota-Mandarin series (Map 6). These soils are nearly level to gently sloping, with areas that are excessively, moderately, and somewhat poorly drained. They are sandy, with a depth of 80 inches or more. Some have organic stained layers (U.S. Department of Agriculture, 1984).

The bottom sediment composition within the bay varies, but several studies have revealed a positive correlation of increased silt and clay content as distance from the St. Andrews entrance channel increases. Deepwater sampling stations within the bay that were farthest from the jettied inlet had sediments containing 67 to 68 percent fine material (silts and clays) (USACE, 1994).

Hydrology and Watershed

The St. Andrews Bay system covers an area of about 68,480 acres, or 107 square miles (27,714 hectares). It is unique among Gulf Coast estuaries for several reasons. Waters are deep and clear because little fresh water flows into the bay (Saloman, Naughton, & Taylor, 1982), the primary source being Econfina Creek, which has an average discharge of just 538 cubic feet per second (ft^3/s) (15.3 m^3/s) (U.S. Geological Survey, 1990). The total discharge of all natural surface-water sources entering this estuary is probably less than 1,000 ft^3/s (28.3 m^3/s). By comparison, the average flow of the Apalachicola River into Apalachicola Bay to the east is about 25,000 ft^3/s (707 m^3/s) (Brim, 1998).

Because of the absence of a large river emptying into St. Andrews Bay, there is little sedimentation and associated turbidity in this bay, a situation contrary to that of most “true” estuaries, which have robust

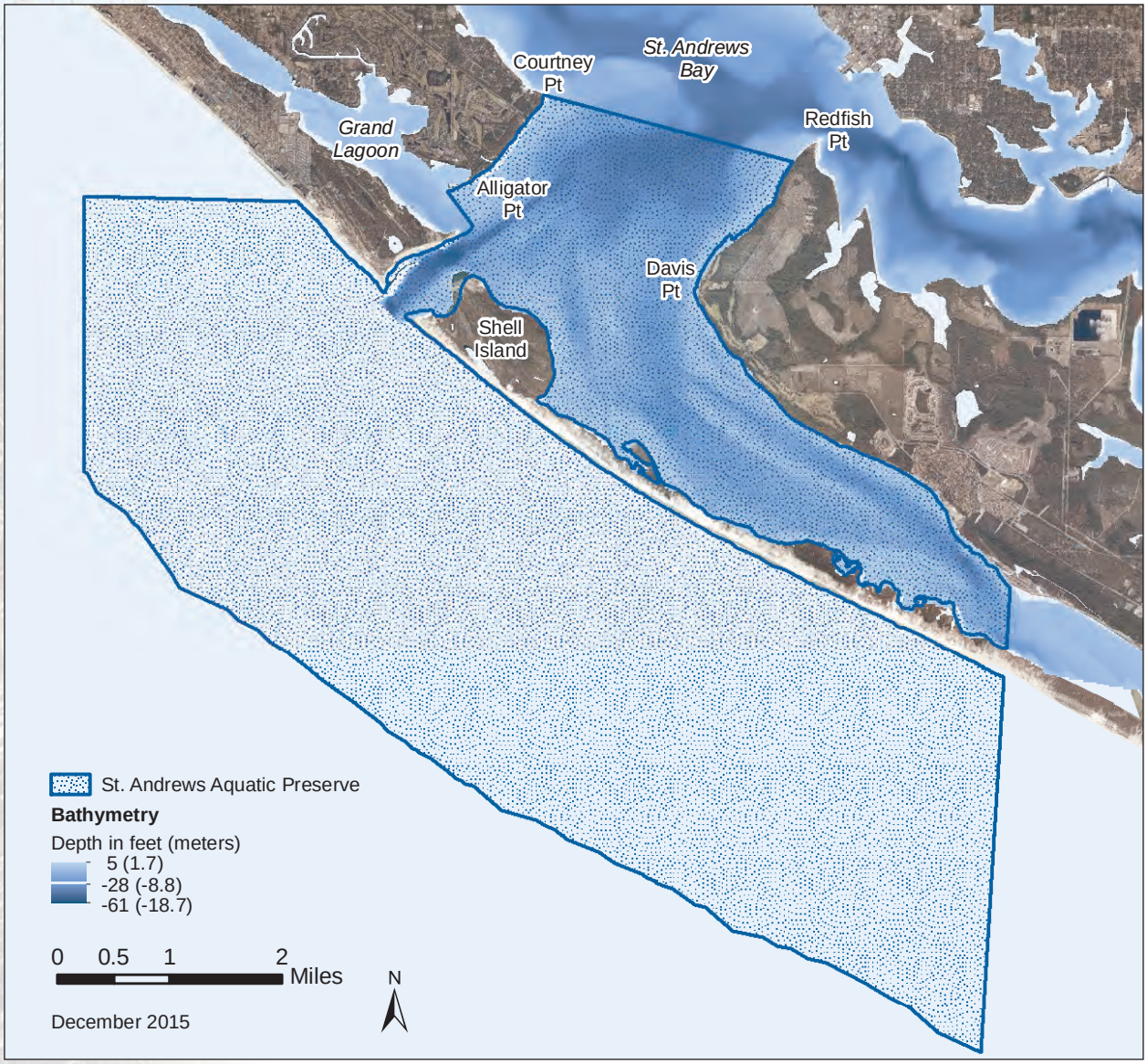


Map 6 / Soils adjacent to St. Andrews Aquatic Preserve.

rivers draining into them. Bay depths of 60 feet (18 meters) are not uncommon (Map 7), and seagrasses flourish because of the clear, high-salinity waters. Furthermore, tidal flushing is minimal, with spring tides having a vertical amplitude of only about 2.2 feet (0.67 meters) and neap tides often only 0.2 feet (0.06 meters) (Brim & Handley, 2007). However, the tidal range more than doubles during the summer when the winds are out of the south and during the winter, when generally northerly winds blow, water is pushed out of the bay creating some of the lowest tides of the year (Tolbert & Austin, 1959; Salsman & Howard, 1989). Salsman and Howard (1989) reported that the phases of the moon do not significantly alter the tidal range in St. Andrews Bay; therefore, extreme high and low tides are due mainly to changes in the winds and in barometric pressure.

Although the tidal range is small, full saltwater does enter the bay through the main channel. Historically water entered to a lesser extent through East Pass, which was closed off following several hurricanes. The inflow of saltwater from the Gulf of Mexico creates a vertical salinity gradient that changes as the halocline moves up or down within the water column, and much of this movement is controlled by the amount of rain the area receives (Ichiye & Jones, 1961; Fitzhugh, 2012).

The Clean Water Act requires that the surface waters of each state be classified according to designated uses. Florida has six classes with associated designated uses. The waters of St. Andrews Aquatic Preserve are listed as Class III, which is defined as waters that provide “fish, consumption, recreation, propagation and maintenance of a healthy, well-balanced population of fish and wildlife” (DEP, 2015). The surface waters of the state are Class III unless described in rule 62-302.400, Florida Administrative Code. The surrounding waters of East and West bays are both considered Class II water bodies, which are those coastal waters where shellfish propagation or harvesting occurs. Class II water standards are

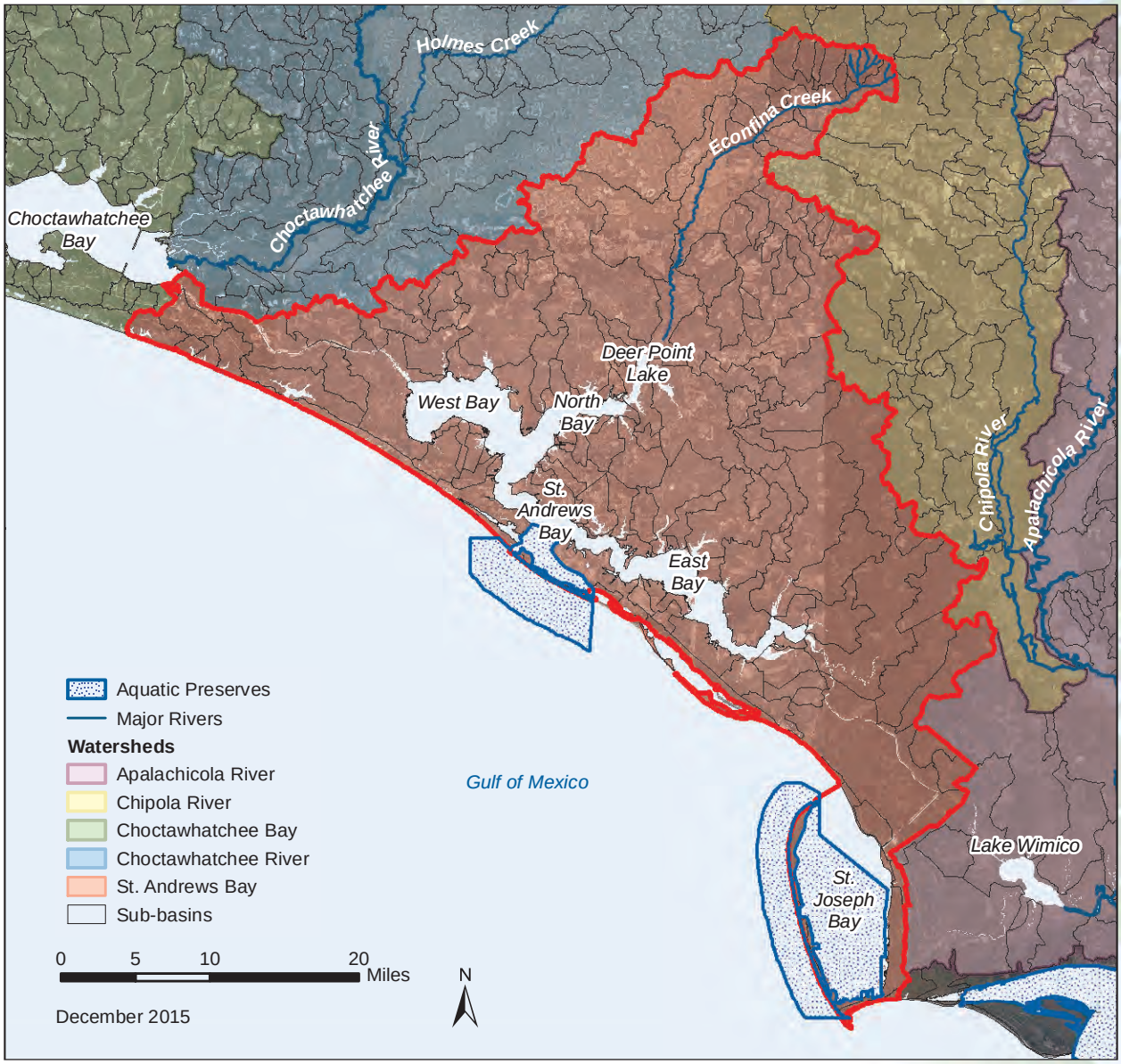


Map 7 / Bathymetry of St. Andrews Bay.

more stringent concerning bacteriological quantity than any other class due to the fact that consumed, uncooked shellfish can concentrate pathogens in quantities significantly higher than the surrounding waters. The Florida Department of Agriculture and Consumer Services (FDACS) maintains a lab in Panama City Beach and conducts surveys to determine water quality in shellfish waters. All Class II waters are additionally classified by FDACS as approved, conditionally approved, or prohibited based upon these surveys. As conditions change, areas are closed or opened based on bacterial surveys and major rainfall events which increase bacterial levels due to stormwater runoff (FDACS, n.d.-b).

St. Andrews Aquatic Preserve is also designated as an Outstanding Florida Water by DEP. This designation is applied to certain waters that are worthy of special protection due to their natural attributes. These waters are afforded special protection by the state 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 and does not allow any degradation. Stringent standards are applied regarding proposed alterations or potentially damaging activities planned for these waters.

In addition, St. Andrews Bay 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 geographic areas 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 to provide a framework for protection of ecologically important habitats (Gulf of Mexico Foundation, n.d.).



Map 8 / St. Andrews Bay watershed.

The St. Andrews Bay watershed is the only major estuarine drainage basin entirely within the Florida Panhandle. For management purposes, this watershed is defined as incorporating the interconnected St. Andrews, West, East, and North bays; St. Joseph Bay; and Deer Point Reservoir, as well as the respective surface water basins of each of these waterbodies (NWFWMD, 2000). Map 8 illustrates the drainage basin for St. Andrews Aquatic Preserve. This is consistent with the St. Andrews Bay watershed described in "1996 Water quality assessment for the State of Florida" (Hand, Col, & Lord, 1996) and U.S. Geological Survey Hydrologic Unit 03140101. The overall watershed covers approximately 749,663 acres in six Florida counties (NWFWMD, 2000). Approximately 61 percent of the watershed is located in Bay County, with 20 percent in Gulf County, nine percent in Washington County, four percent in Calhoun County, four percent in Walton County, and two percent in Jackson County.

Climate

The climate of Bay County is largely determined by its proximity to the Gulf of Mexico, the northern continental land mass, and its temperate latitude. Generally, the warm waters help create warm, humid summers and mild winters. Wind conditions are generally north through the winter and southerly during the summer months. Hurricanes and tropical storms occasionally influence the late summer and fall weather of the region, bringing extremes in wind, rainfall, and tide. Nine named storms have made landfall in or near Bay County from 1975-2012 (Bay County, 2015). Average annual rainfall is about 60 inches with peak rainfall periods occurring primarily during the summer and fall months. September is typically the wettest month and the dry season occurs from October through December. Convection-type storms are the predominant source of rainfall in the summer and frontal storms are the typical source in the winter. The average low temperature is approximately 55°F, while the average high temperature is 79°F. Seasonal and annual temperatures vary greatly however, ranging from the upper 90s in the summer to the lower 20s in the winter. Prevailing winds are from a southerly direction during the spring and summer and from a northerly direction during the fall and winter months. Local winds, however, may change abruptly due to thunderstorms and the movement of fronts through the area.

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 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).

Data used to produce a map delineating the major natural community types found adjacent to St. Andrews Aquatic Preserve were developed using multiple sources (Map 9). 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 on St. Andrews Aquatic Preserve have been adapted from the Guide to the Natural Communities of Florida (FNAI, 2010).

The following text provides descriptions of the FNAI natural communities found in Bay County that are likely to be found in St. Andrews Aquatic Preserve. More mapping information is needed to discern the exact acreages and percent of each natural community found in the aquatic preserve boundaries.

FNAI Natural Community Type	# Acres	% of Area	Federal Rank	State Rank	Comments
Algal Bed	Unknown	Unknown	G3	S2	
Composite Substrate	Unknown	Unknown	G3	S3	
Consolidated Substrate	Unknown	Unknown	G3	S3	
Coral Reef	Unknown	Unknown	G2	S3	
Octocoral Bed	Unknown	Unknown	G2	S1	
Seagrass Bed	943.9	3.9	G3	S2	
Sponge Bed	Unknown	Unknown	G2	S2	
Tidal Marsh	15.2	<0.1	G5	S4	Salt marsh
Unconsolidated Substrate	Unknown	Unknown	G5	S5	
Worm Reef	Unknown	Unknown	G1	S1	

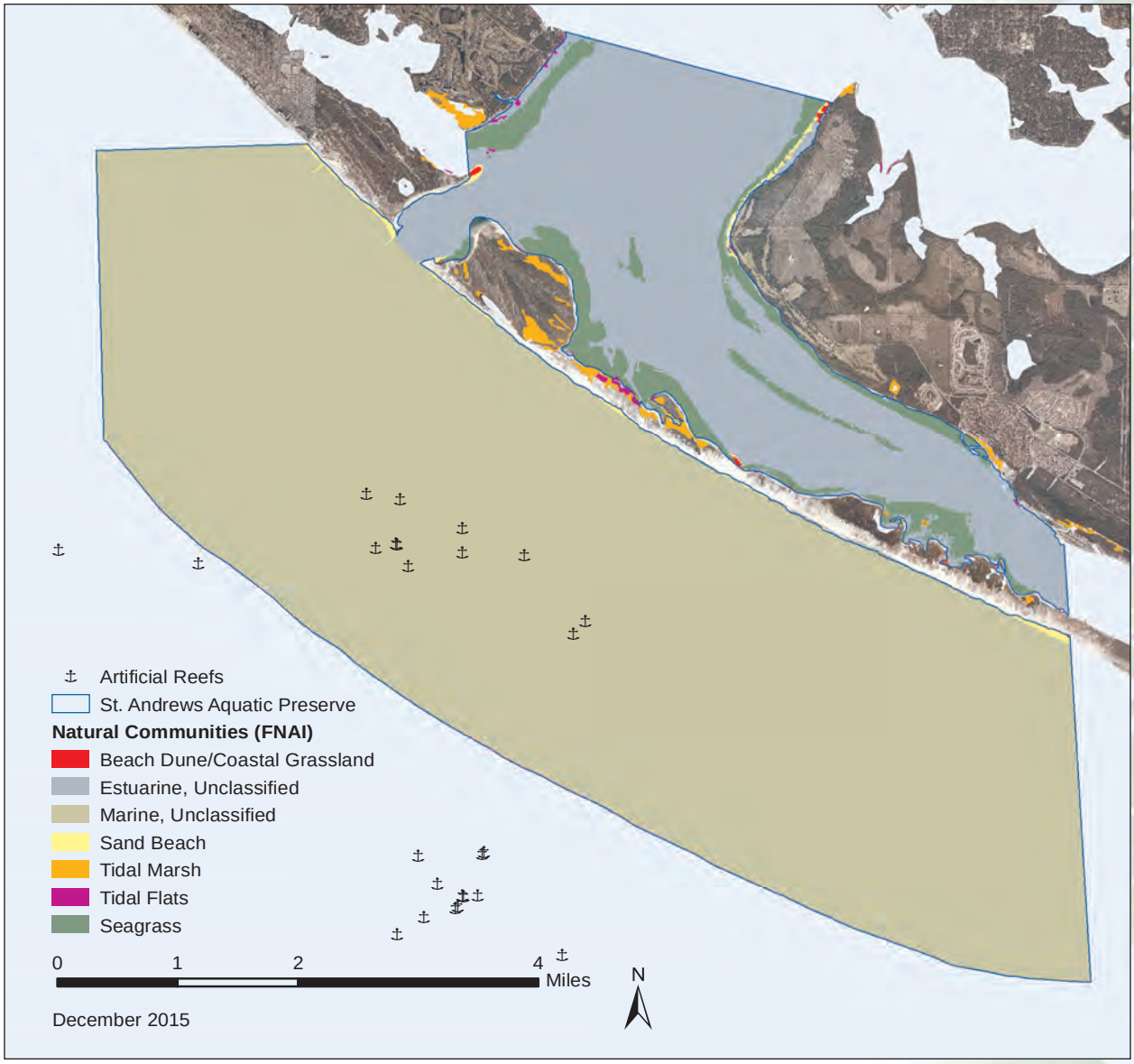
Table 1 / Summary of natural communities of St. Andrews Aquatic Preserve..

Algal Bed - (synonyms: algal mats, periphyton mats). Marine and estuarine algal beds are floral based natural communities characterized as large populations of non-drift macro or micro algae. The dominant plant species include star alga, *Argardhiella, Avrainvellea, Batophora, Bryopsis, Calothrix, Caulerpa, Chondria, Cladophora, Dictyota, Digenia, Gracilaria, Halimeda, Laurencia, Oscillatoria*, shaving brush, *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, a species of great commercial importance.

The distribution, abundance, and condition of algal beds in St. Andrews Aquatic Preserve is unknown at this time. 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.



Map 9 / St. Andrews Aquatic Preserve Florida Natural Areas Inventory natural communities.

Composite Substrate - Marine and estuarine composite substrates consist of a combination of natural communities such as “beds” of algae and seagrasses or areas with small patches of consolidated and unconsolidated bottom with or without sessile floral and faunal populations.

Composite substrates may be dominated by any combination of marine and estuarine sessile flora or fauna, or mineral substrate type. Typical combinations of plants, animals and substrates representing composite substrates include soft and stony corals with sponges on a hard bottom such as a limerock outcrop; psammophytic algae and seagrasses scattered over a sand bottom; and patch reefs throughout a coralgal bottom. Any of the remaining marine and estuarine natural communities can grade into composite substrate communities.

The distribution, abundance, and condition of composite substrate in St. Andrews Aquatic Preserve is unknown at this time. Although composite substrates can occur in any marine or estuarine area in Florida, some combinations are common while others are extremely rare. Combinations of consolidated and unconsolidated substrate components, like those likely found in St. Andrews Aquatic Preserve, offer the greatest opportunity for diversity, and should be high priority areas for protection. Management requirements are negligible providing the composite community is adequately protected.

Protection efforts will vary slightly based on components of the composite substrate community. Generally, degradation of physical and chemical water quality parameters should be prevented, as well as mechanical disturbance from anchoring, dredging, trawling and similar activities.

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 distribution and abundance of consolidated substrate in St. Andrews Aquatic Preserve is unknown at this time.

Coral Reef - (synonyms: deep-water barrier reef, deep-water patch reef, shallow-water barrier reef, shallow-water patch reef, live bottom community, hard bottom community, transitional reef, Hawk Channel reef, bank reef). Marine and estuarine coral reefs are faunal based natural communities generally characterized as expansive conglomerates of hard, sessile, limestone-building coral occurring in warm subtidal waters. Coral reefs are formed from a diverse assemblage of carbonate precipitating organisms of the phylum Cnidaria (Coelenterata). Two classes of Cnidaria are the principal reef builders. Hydrozoa, the class which includes coral, are important fast growing, colonial reef builders that are capable of withstanding temperate water temperatures.

Coral reefs can be classified into at least four kinds including: shallow and deep water barrier reefs and shallow and deep water patch reefs. Patch reef communities are roughly dome shaped with a topographic relief of five to 10 feet. Patch reefs vary considerably in dimension, depending on the size and number of coral colonies comprising the reef. A patch reef may be as small as a single giant brain coral head with its associated biota, or as large as several acres. Common builders of patch reefs include mountainous star coral, giant brain coral, smooth starlet coral, cavernous star coral, smooth brain coral, grooved brain coral and fire coral. Associated flora and fauna vary greatly between shallow water and deep water patch reefs.

Coral reefs are among the most diverse and productive environments in the world. Coral reefs provide shelter and food for a myriad of reef fishes and marine invertebrates. Gross production of calcium carbonate is between 100 and 500 tons per acre per year on actively growing reefs. Fragmented coral are often the primary source for creating and nourishing the beaches of nearby islands. These qualities, combined with their structural complexity, biological richness, and aesthetic appeal make coral reefs an extremely valuable resource wherever they occur.

Coral reefs are biologically and structurally sensitive systems. They are slow growing, requiring decades to fully develop. Thus, structural damage caused by boat groundings, anchors, and other physical impacts may require decades to fully recover. Coral reefs in Florida, particularly in the Panhandle, are at the northern extent of their range. As such, they are vulnerable to decreases in water temperature. High water temperatures also affect corals adversely. Sedimentation and turbid water restrict coral growth and, when significant, smother and kill coral reefs. Thus, dredge and fill operations or upland developments which increase the amount of suspended sediments in runoff water impact coral reefs.

Pollutants may trigger planktonic algal blooms, reduce oxygen levels, or otherwise upset the delicate balance of the reef ecosystem, thereby damaging the coral reef community. Over-fishing, coral

collecting, and other recreational activities may also create chronic problems in this community and should be periodically assessed.

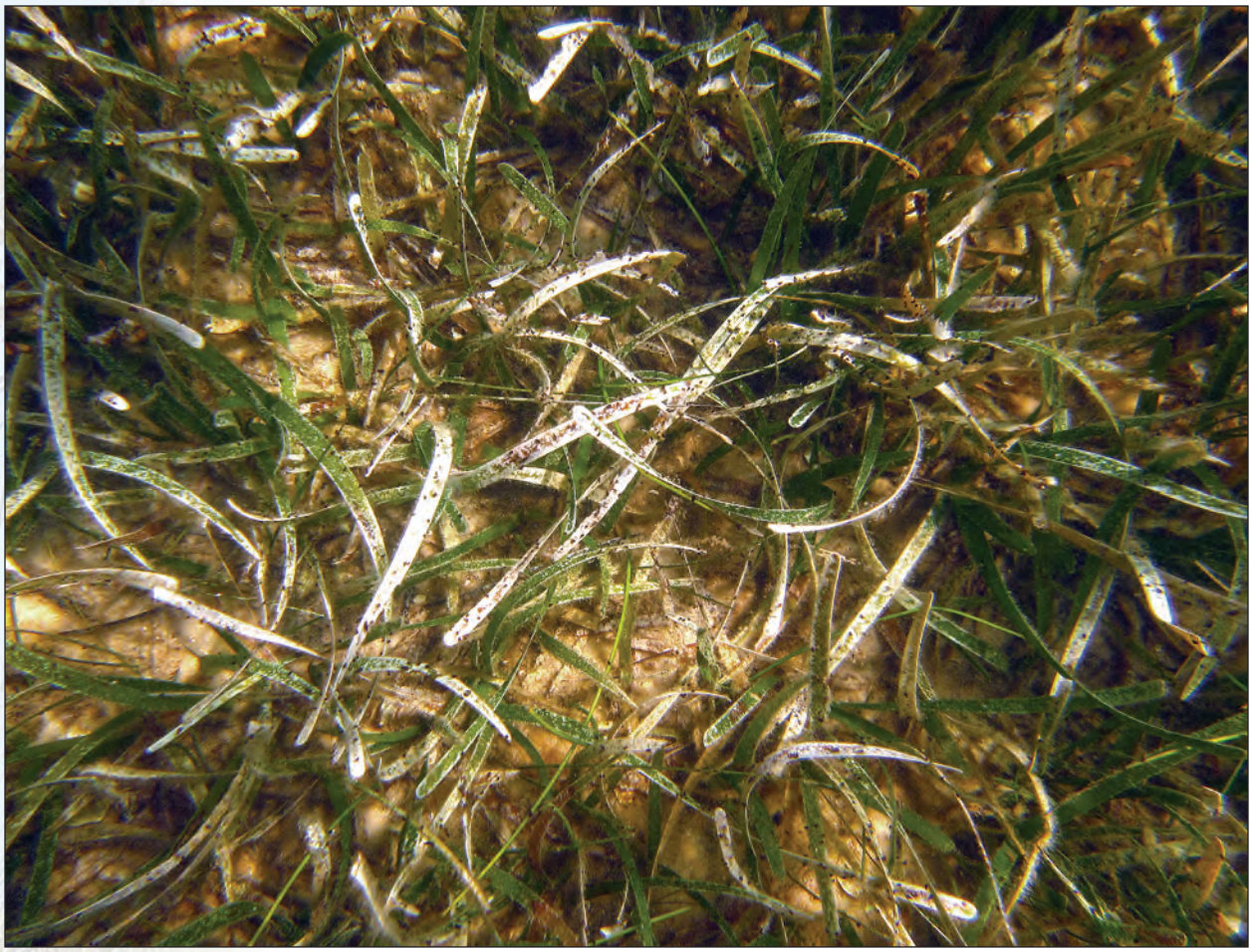
There are currently several species of coral and related species on the rocks and the surrounding sand of the jetties in St Andrews Aquatic Preserve. The appearance of these corals was first noted in 2010 by Panama City Marine Institute and has continued to spread. The largest concentration is on the pass side of the western jetty wall at a depth of 10 to 25 feet. There are also growing colonies of the Gulf side as well. Each area has at least two distinct species, one being the tube coral (*Cladocora arbsuscala*) and the diffuse ivory bush coral (*Oculina diffusa*). There are also reports of robust ivory tree coral (*Oculina robusta*) in the area, but identification has not yet been verified. The concentration of corals can be dense in some spots, specifically on the pass side where there is a greater flow of water (R. Boyce, personal communication, November 2, 2015). Further information about the distribution, abundance, and condition of coral reef in St. Andrews Aquatic Preserve is still needed.

Anemones are among the myriad of species that can be found near the jetties in St. Andrews Aquatic Preserve. (Photo: Matthew B. Davis)

Octocoral Bed - (synonyms: gorgonians, sea fans, sea feathers, sea fingers, sea pansies, sea plumes, sea rods, sea whips, soft corals). Marine and estuarine octocoral beds are soft faunal based natural communities characterized as large populations of sessile invertebrates of the Class Anthozoa, Subclass Octocorallia, Orders Gorgonacea and Pennatulacea. The dominant animal species are soft corals such as gorgonians, sea fans, sea feathers, sea fingers, sea pansies, sea plumes, sea rods, and sea whips. This community is confined to the subtidal zone since the sessile organisms are highly susceptible to desiccation. Other sessile animals typically occurring in association with these soft corals are sea anemones. An assortment of non-sessile benthic and pelagic invertebrates and vertebrates (e.g., sponges, mollusks, tube worms, burrowing shrimp, crabs, isopods, amphipods, sand dollars, and fishes) are associated with octocoral beds.

The distribution, abundance, and condition of octocoral beds in St. Andrews Aquatic Preserve is unknown at this time. Management considerations should include locating all true octocoral beds, and providing protection for them from external degradation. Primary threats to octocoral beds include siltation from beach renourishment or beach restoration projects, anchor damage by nautical craft, trawling by commercial fishermen, collecting for tourist-oriented trade, and water pollution, particularly oil spills.

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, but are more closely related to terrestrial lilies and gingers than grasses. The three most common species of seagrasses in Florida are turtle grass (*Thalassia testudinum*), manatee grass (*Syringodium filiforme*), and shoal grass (*Halodule wrightii*), which are all found in St. Andrews Aquatic Preserve. 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.



Seagrass habitats are valuable resources to both the aquatic system and the local economy because they support a large variety of commercial and recreational fish and invertebrate species.

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, sea turtles, and many fish, including spotted seatrout, spot (*Leiostomus xanthurus*), sheepshead (*Archosargus probatocephalus*), and red drum. The dense seagrasses also serve as shelter or nursery grounds for many invertebrates and fish, including marine snails, clams, bay scallops, polychaete worms, pink shrimp (*Farfantepenaeus duorarum*), blue crab, starfish, sea urchins, tarpon (*Megalops atlanticus*), seahorses, Florida pompano (*Trachinotus carolinus*), jack (*Caranx* spp), permit (*Trachinotus falcatus*), snapper (*Lutjanus* spp.), white grunt (*Haemulon plumieri*), mullet, barracuda (*Sphyraena barracuda*), filefish, and cowfish.

St. Andrews Aquatic Preserve contains approximately 944 acres of seagrass beds, making up about four percent of the natural communities present in the aquatic preserve. The distribution, composition, and condition of seagrass in the aquatic preserve has not been monitored in at least four years prior to the writing of this management plan. The St. Andrew Bay Resource Management Association (RMA) conducted seagrass monitoring in the aquatic preserve (as well as other areas of St. Andrews Bay) from 2000-2010. A statewide FWC Fish and Wildlife Research Institute report stated that from 1992-2003 seagrass cover had increased throughout the bay. However, tropical storms in 2004 and 2005 along with increasing watershed development may have impacted seagrasses since the last mapping effort (Yarbro & Carlson, 2011).

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 (*Aplysina cauliformis*), Florida loggerhead sponge (*Spheciospongia vesparium*) and sheepswool sponge (*Hippospongia 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, sea anemones, mollusks, tube worms, isopods, amphipods, burrowing shrimp, crabs, sand dollars, and fishes. Sessile and drift algae can also be found scattered throughout sponge beds.

The distribution, abundance, and condition of sponge beds in St. Andrews Aquatic Preserve is unknown at this time. Management considerations should include locating all true sponge beds within the aquatic preserve, and providing protection for them from external degradation. Primary threats to sponge beds include siltation from beach renourishment or beach restoration projects, anchor damage by nautical craft, trawling by commercial fishermen, collecting for tourist-oriented trade, and water pollution, particularly oil spills.

Tidal Marsh - (synonyms: salt marsh, brackish marsh, coastal wetlands, coastal marshes, tidal wetlands). Marine and estuarine tidal marshes are floral based natural communities generally characterized as expanses of grasses, rushes and sedges along coastlines of low wave energy and river mouths. Black needlerush (*Juncus roemaerianus*) and smooth cordgrass (*Spartina alterniflora*) are indicator species which usually form dense, uniform stands. The stands may be arranged in well-defined zones according to tide levels or may grade subtly over a broad area, with elevation as the primary determining factor. In the upper reaches of river mouths, where estuarine tidal marsh begins to blend with freshwater tidal swamp and marsh, sawgrass (*Cladium mariscoides*) may occur in dense stands. Sawgrass is the least salt tolerant of these tidal marsh species. Other typical plants include saltgrass (*Distichlis spicata*), saltmeadow cordgrass (marsh hay) (*Spartina patens*), Gulf cordgrass (*Spartina spartinae*), saltbush (*Baccharis halimifolia*), marsh elder (*Iva frutescens*), saltwort (*Batis maritime*), bushy seaside oxeye (*Borrichia frutescens*), cattail (*Typha* spp.), bulrushes, seashore dropseed (*Sporobolus virginicus*), seashore paspalum (*Paspalum vaginatum*), glassworts, and salt marsh fleabane (*Pluchea odorata*). Typical animals include periwinkle (*Littorina* spp.), spiders, fiddler crab (*Uca* spp.), blue crab, isopods, amphipods, diamondback terrapin (*Malaclemys terrapin*), salt marsh snake (*Nerodia clarkii*), wading birds, waterfowl, osprey (*Pandion haliaetus*), rails (*Rallus* spp.), marsh wrens (*Cistothorus palustris*), and raccoon (*Procyon lotor*).

Fishes frequently found in this community include blacktip shark (*Carcharhinus limbatus*), lemon shark (*Negraprion brevirostris*), bonnethead shark (*Sphyrna tiburo*), scalloped hammerhead shark (*Sphyrna lewini*), southern stingray (*Dasyatis americana*), tarpon, ladyfish (*Elops saurus*), menhaden (*Brevoortia* spp.), sardines, anchovy (*Anchoa* spp), catfish, needlefish, killifish, bluefish (*Pomatomus saltatrix*), blue runner (*Caranx crysos*), lookdown (*Selene volmer*), permit, snapper, white grunt, sheepshead, porgies, pinfish, seatrout, red drum, mullet, barracuda, blenny, goby, triggerfish (*Balistes* spp.), filefish, and puffers.

A myriad of invertebrates and fish, including most of the commercially and recreationally important species such as shrimp, blue crab, American oyster (*Crassostrea virginica*), sharks, grouper, snapper and mullet, also use tidal marshes throughout part or all of their life cycles.

The area just inside the border of St. Andrews Aquatic Preserve contains approximately 15 acres of tidal marsh, making up less than one percent of the natural communities present in the aquatic preserve, but more extensive marshes are immediately adjacent. Most of the tidal marsh occurs on the bay side of Shell Island over much of the length of the island, and it is in good condition. Needle rush and sawgrass dominate this community. The tidal marsh community on Shell Island declined following the hurricane activities of 2004 and 2005 due to an influx of saltwater and overwash throughout the island. Many of these areas are now beach dune or coastal grassland habitat due to sand migration and the subsequent increase in beach elevation that no longer succumbs to tidal inundation (DEP, 2016).

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, mollusks, isopods, amphipods, burrowing shrimp, 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). 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, flounder, spot, and sheepshead. The intertidal and supratidal zones are extremely important feeding grounds for many shorebirds and invertebrates.

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, tidal marshes, tidal swamps, grass beds, coral reefs, mollusk reefs, worm reefs, octocoral beds, sponge beds, and algal beds. Unconsolidated substrate communities which are composed chiefly of sand (e.g., sand beaches) are the most important recreational areas in Florida, attracting millions of residents and tourists annually.

This community is resilient and may recover from recreational disturbances. However, this community is vulnerable to compaction associated with vehicular traffic on beaches and disturbances from dredging activities and low dissolved oxygen levels, all of which can cause infaunal organisms to be destroyed or to migrate out of the area. Generally these areas are easily recolonized either by the same organisms or a series of organisms which eventually results in the community returning to its original state once the disturbance has ceased. In extreme examples, such as significant alterations of elevation, there is potential for serious long-term impacts from this type of disturbance.

The condition of this community within the adjacent St. Andrews State Park is considered to be excellent. Generally fine sugar-white sand is the major constituent on the Gulf side of the park. Many re-nourishment activities have been used to abate erosion of the state park's mainland beach (DEP, 2004).

Tidal flats are present on the bay side of Shell Island. This natural community extends itself from the low tide line along the bay shoreline landward. This community grades into seagrass beds and salt marsh habitat in some locations. Some areas of the bay shore are eroding and others are accreting. In the eroding areas, exposed roots can be found along the bay shore at low tide, indicating the amount of erosion. Other eroding areas on Shell Island are converting into salt marsh habitat due to lower elevations and the resulting salt water intrusion. Wider beach areas along the bay shore and exposed tidal flats are utilized by foraging shorebirds. In particular, areas with open access from the beach dune habitat or marine unconsolidated habitat are important foraging areas for shorebird broods (i.e., with flightless young) at low tides (DEP, 2016).

Worm Reef - (synonym: Sabellariid reef). Worm reefs are faunal based natural communities characterized by large colonial conglomerates of rigid Sabellariid worm tubes of the species *Phragmatopoma lapidosa*. These shallow water "reefs" are generally found in the lower reaches of the intertidal zone or upper reaches of the subtidal zone. Sabellariid reefs provide shelter for a diverse assortment of small benthic vertebrate and invertebrate organisms, particularly since the surrounding habitat is generally bare substrate (e.g., consolidated substrate or unconsolidated substrate). Therefore, the mere presence of worm reefs greatly increases the faunal diversity of a given area.

Of all the marine and estuarine natural communities, worm reefs are probably the least well known. The distribution, abundance, and condition of worm reefs in St. Andrews Aquatic Preserve is unknown at this time. A worm reef can be surrounded by and grade into virtually any of the remaining marine and estuarine natural communities but is more likely to grade into an expanse of unconsolidated substrate. Information regarding effective management of worm reefs is lacking. However, excessive turbidity and siltation are probably significant factors in the decline of worm reefs.

Other Habitats/Adjacent Habitats to St. Andrews Aquatic Preserve

Man-made habitat – St. Andrews Aquatic Preserve also has several areas of man-made (artificial) habitat. The St. Andrews entrance channel is a man-made pass into the estuary that provides access to the federally maintained navigation channel to the Port of Panama City and the Gulf Intercoastal Waterway. The jetties that border the pass support a diverse flora and fauna associated with hard surfaces (Keppner, 2002). Just off the beach near the West Jetty is a small lagoon with a depth of seven to 15 feet, dubbed the "Kiddie Pool" by locals. The area typically has clear, emerald-green water that is sheltered from heavy currents and often used for snorkeling by families with children. This area of the jetty is inhabited by a myriad of tropical species of fish and invertebrates. Semi-tropical fish species such as cocoa damselfish (*Stegastes variabilis*), Atlantic spadefish (*Chaetodipterus faber*), angelfishes, parrotfishes, and butterflyfishes (*Chaetodon* spp.) are frequently observed during the warmer months of summer.

The aquatic preserve also includes six authorized artificial reef structures located offshore of the estuary (FWC, 2013b; University of Florida/Institute of Food and Science, n.d.). These areas attract fish that might not otherwise inhabit the area and have been used extensively by snorkelers and SCUBA divers. Although jetties and artificial reefs are man-made structures, they have contributed greatly to the species diversity of the aquatic preserve.

Bottlenose dolphin are often seen frolicking in the emerald clear waters of St. Andrews Aquatic Preserve.

Native Species

St. Andrews Bay is exceptional because of its wealth of biological diversity. Keppner (2002) documented the diversity associated with the bay and compared it with surveys of Indian River Lagoon, Florida, which has been touted as the most biologically diverse estuary in North America. His report documents 2,913 species of plants and animals associated with St. Andrews Bay, nearly 400 more species than found in the lagoon. Of course, not all of these species are present in the aquatic preserve, but many are found in the adjacent uplands or use the aquatic preserve in some stage of their life history.

Estuarine communities such as St. Andrews Bay are characterized by both high productivity and high biodiversity. In fact, estuaries are among the most productive ecosystems on earth (Bertness, 1999). The high primary productivity of estuaries reflects their nutrient-rich conditions and the presence of many primary producers (Walters, Roman, Stiner, & Weeks, 2001). Plants, algae, fungi and cyanobacteria generate detritus which nourishes hundreds of species in the salt marsh. Detritus is composed of non-living particulate organic material including the bodies of dead organisms and fecal material colonized by decomposer microorganisms. Only a small fraction of plant tissue is eaten by herbivores while it is living, the larger percentage ends up in the water column and settles to the bottom, becoming detritus (Whitney, Means, & Rudloe, 2004). The detrital food chain, together with plankton, is the major component of the estuarine food chain. The estuarine ecosystem is an important spawning and nursery habitat for many species of fish and invertebrates. Approximately 72 percent of commercial and 74 percent of sport species of fishes and invertebrates must spend all or part of their lives in or associated with an estuarine system (Durako, Murphy, & Haddad, 1988). The clear high salinity waters of St. Andrews Bay and associated habitats serve as a productive nursery and spawning ground for recreationally and commercially important species of fish and wildlife. Several recreationally and commercially important fish species spend one or more phases of their lifecycle in St. Andrews Bay. Appendix B.3 lists the native species found in and around St. Andrews Aquatic Preserve.

St. Andrews Bay is home to nine species of submerged aquatic vegetation. Among these are turtle grass, shoal grass, and manatee grass. Seagrasses serve as important food sources for manatees, marine turtles, and many fish, including spotted seatrout, spot, sheepshead, and red drum. The dense seagrasses also serve as shelter or nursery grounds for many invertebrates and fish (Keppner, 2002).

The diamondback terrapin, loggerhead sea turtle (*Caretta caretta*), and Kemp's ridley sea turtle (*Lepidochelys kempi*) are among the species of reptiles found within the aquatic preserve (Keppner, 2002).

Mammals also abound in the areas surrounding St. Andrews Bay. More than 30 species, including the endangered Florida manatee (*Trichechus manatus latirostris*), the endangered Choctawhatchee beach mouse (*Peromyscus polionotus allophrys*), the river otter (*Lutra canadensis*), and the Seminole bat (*Lasiuris seminolus*) are found in and around St. Andrews Aquatic Preserve (Keppner, 2002).

St. Andrews Bay and the surrounding drainage basin are among the most important bird habitats in the southeastern United States. This area lies on the eastern fringe of the Mississippi flyway, thus receiving large numbers of birds from both the Midwest and Atlantic Seaboard during migratory periods. Approximately 230 species of birds have been documented within or adjacent to St. Andrews Bay, with several being designated as endangered or threatened by the Florida Fish and Wildlife Conservation Commission (FWC) (Keppner, 2002; U.S. Fish and Wildlife Service [USFWS], 2013).

A seaweed blenny peeks out of its home in the jetty rocks in St. Andrews Aquatic Preserve. These man-made structures are home to a myriad of tropical fish and invertebrates, and are a prime spot for divers and snorkelers. (Photo: Matthew B. Davis)

Approximately 300 species of fish have been documented in and around the aquatic preserve. Many are pelagic species found in the offshore reaches of the aquatic preserve, while the rest utilize the estuary during part or all of their life cycle. Among these are American eel (*Anguilla rostrate*), red snapper (*Lutjanus campechanus*), gray snapper (*L. griseus*), hogfish (*Lachnolaimus maximus*) and the federally-threatened Gulf sturgeon (*Acipenser oxyrhinchus desotoi*). Common estuarine and marine species that are of local importance commercially include striped mullet (*Mugil cephalus*), spotted seatrout, menhaden, red drum, flounders, and sharks (FWC, 2014; Keppner, 2002).

Listed Species

St. Andrews Aquatic Preserve provides valuable habitat and protection for a variety of rare and protected species including fish, reptiles, mammals, and birds. Listed species are those which are listed by FNAI, USFWS, National Marine Fisheries Service, FWC, and Florida Department of Agriculture and Consumer Services, as endangered or threatened. Listed species includes any species that are determined to be in danger of extinction or likely to become extinct within the foreseeable future throughout all or a significant portion of its range based upon the best scientific and commercial data available. States and/or federal agencies provide special protection and conservation measures to promote recovery of a listed species. A major distinction between the federal and Florida Endangered Species Acts is that federal authorizations and intent (Endangered Species Act, Section 2(a)), include provisions providing a means to conserve the ecosystems upon which listed species depend (conserve is defined under the Endangered Species Act, as all measures and procedures needed to delist a species).

More than twenty species listed as endangered or threatened potentially inhabit or utilize resources in St. Andrews Aquatic Preserve (see Appendix B.3.) These species may spend some portion of their time in the uplands, beaches, islands, waters or associated wetlands of the aquatic preserve. Specific management strategies for listed species preservation are addressed in Chapter 4 of this plan. All St. Andrews Aquatic Preserve management actions are in compliance with the federal recovery plans for these species and, when necessary, in accordance with all permitting and agency consultation requirements.

Florida has more threatened and endangered native species than any state except California and Hawaii. Rapid population growth in Florida increasingly stresses species that are dependent on coastal

habitats. Species can become threatened due to habitat destruction, over-utilization, disease, or natural or manmade factors. Several species within the aquatic preserve have been designated by the Florida Committee on Rare and Endangered Plants and Animals as rare due to limited availability of subtropical aquatic habitat and degradation of habitat quality in Florida.

Choctawhatchee beach mice, piping plover (*Charadrius melodus*), snowy plover (*C. alexandrinus*), least tern (*Sternula antillarum*), and sea turtles are among the better-known endangered species found in or around this aquatic preserve. Beach mice currently occupy Shell Island but are no longer found on the mainland portion of the adjacent state park. The mainland portion is designated by the USFWS as a recovery site for the beach mouse in the current Recovery Plan for the Choctawhatchee, Perdido Key, and Alabama beach mouse (USFWS, 1987).

Two species of endangered sea turtles are known to nest at St. Andrews State Park. The majority of nests are from loggerhead sea turtles, but leatherback sea turtles (*Dermochelys coriacea*) also nest on the park. Annual sea turtle nesting is low at the park and ranges from one to 21 nests. From 1996 to 2012, the average number of sea turtle nests at St. Andrews State Park (mainland and Shell Island) was 10.8 nests. Green (*Chelonia mydas*) and Kemp's ridley turtles are in the surrounding area, but there are no records of either species nesting on the park (R. A. Pruner, personal communication, March 2, 2015). Sea turtles face many threats both on land and in the water. The main threat to sea turtles at sea is entanglement in fishing gear such as longlines, monofilament fishing line, nets, and crab trap lines. When entangled in marine debris, the sea turtle cannot escape and usually drowns. Some sea turtles are also harvested illegally in some countries for their meat and eggs. 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).

The endangered snowy plover is just one of the listed shorebirds that nest on Shell Island. (Photo: USFWS)

Listed shorebird species that commonly nest on St. Andrews State Park include snowy plover, least tern, and black skimmer (*Rynchops niger*). These nesting shorebirds face threats to their population as coastal areas become increasingly developed. Their nesting on sandy beaches makes this species extremely vulnerable to disturbance and predation. Threats to shorebirds include increased disturbance from humans, increased population of predators in its range, and habitat loss. Causes of habitat loss include development, shoreline hardening, invasive vegetation, beach raking/grooming, beach driving, and some beach renourishment activities. Increased populations of humans may lead to increased populations of predators and more frequent disturbance to nesting adults, which increases the detectability of nests and chicks to predators. Animals such as raccoons, opossums (*Didelphis virginiana*), rats (*Rattus norvegicus*), coyotes (*Canis latrans*), crows, feral cats (*Felis catus*) and off-leash dogs pose a threat to chicks, eggs, and even adult plovers (FWC, n.d.-b).

The Florida manatee is considered to be endangered at both the federal and state level and can be seen occasionally within the aquatic preserve. The Florida manatee experiences low natural adult mortality. The manatee, however, is listed as endangered because its population is impacted by man-made alterations to estuarine and freshwater systems and by fast moving boat traffic in the waters where the species breeds, sleeps, and feeds. The Florida population is thought to be stable or increasing as a whole (USFWS, 2014a). Declining water clarity and seagrass beds, and increased boat traffic are of concern when considering support of the manatee population.

Invasive Non-native and/or Problem Species

Like most waterbodies in Florida, St. Andrews Aquatic Preserve is home to non-native species that compete with native residents for food and space. Much of the state consists of a patchwork of habitats

resulting from human activities such as agriculture, water management, dredging and filling, and residential development. Haller & Sutton suggest that due to the lack of naturally limiting predators, unoccupied niches or where an introduced species outcompetes native species, invasive plants are dominating ecosystems in many areas of Florida (as cited in DEP, 2009). Numerous non-native species have been identified within St. Andrews Bay Aquatic Preserve (see Appendix B.3 for a complete listing). The South Florida Restoration Science Forum website (www.sofia.usgs.gov/sfrsf) states that preventing invasion or establishment of noxious species is more cost-effective than post-establishment control. The most effective means of prevention would be prohibitions on import and sale of invasive species.

An invasion of a non-native species has been classified as "the second most important threat to native species, behind habitat destruction" (Ecological Society of America, 2009). Introductions of non-native marine invertebrates and seaweeds to coastal habitats in the United States have increased one hundred-fold in the last 200 years (Jacoby, Walters, Baker, & Blyler, 2003). Introduction of non-native species have been both deliberate and accidental. Ships transport living organisms across oceans and between coastlines, from fouling organisms on their hulls to species living in ballast water (Jacoby et al., 2003). Saltwater species are generally spread from ballast waters and include plankton, nekton, fouling organisms and benthic organisms. Other potential activities that may cause the spread of non-native organisms are the movement of navigation buoys, marine floats, dry docks, and drilling. Disposal of dredge spoil, beach nourishment materials and equipment may also be responsible for transporting non-native species (Jacoby et al., 2003). St. Andrews Bay contains one international port facility (Port Panama City), and could also be impacted by vessels or commercial traffic traveling the ICW channel, utilizing nearby marinas or vectors transported through the inlets.

Invasive lionfish are the most important threat to the aquatic habitat of St. Andrews Aquatic Preserve. The red Indo-Pacific lionfish (*Pterois volitans*) was first recorded in the Gulf of Mexico in December 2009 in the southern Gulf, off the northern Yucatan Peninsula (Aguilar-Perera & Tuz-Sulub, 2010). Sightings of lionfish are becoming more common in the northern Gulf of Mexico, especially associated with artificial reefs (including oil/gas platforms). Lionfish were first documented in St. Andrews Bay in 2011 and have been seen inside the west jetty of the main channel entrance, within the boundaries of the aquatic preserve. Other sightings include inside St. Andrews Bay and in Sun Harbor Marina (U.S. Geological Survey, 2012). Lionfish are a predatory reef fish. They eat native fish, which can reduce native populations and have negative effects on the overall reef habitat and health as they can eliminate species that serve important ecological roles such as fish that keep algae in check on the reefs. Lionfish also compete for food with native predatory fish such as grouper and snapper (FWC, 2013c). On the Atlantic side of the state, lionfish have been shown to reduce their fish prey by up to 90 percent and continue to consume native fishes at unsustainable rates. Long-term effects of lionfish are unknown. Albins & Hixon (2008) suggest that direct and indirect effects of lionfish could combine with the impacts of preexisting stressors (especially overfishing) and cause substantial deleterious changes in estuarine and marine communities. Currently, FWC is encouraging harvesting of lionfish which are reported as excellent table fare. Effective August 2012, FWC announced changes to the lionfish harvest. Harvesting invasive lionfish no longer will require a fishing license when using certain gear, and there is no recreational or commercial bag limit (FWC, 2013c).

In addition to invasive exotics, some native species that predate endangered shorebirds and sea turtles are considered problem species. Coyotes depredate sea turtle nests and eat nesting shorebirds and young. Armadillos (*Dasypus novemcinctus*) are increasingly becoming a concern on Shell Island, in terms of dune vegetation disturbance and shorebird and sea turtle nest depredation. Feral and free ranging domestic cats wander in from adjacent areas and prey on nesting shorebirds, small rodents, and anything else they can catch and kill (DEP, 2004).

Archaeological and Historical Resources

Aquatic preserves offer a window into Florida's cultural and historical past. The Division of Historical Resources (DHR), a division of the Department of State, has identified nine archeological sites in the immediate coastal areas of St. Andrews Aquatic Preserve. They include three shell middens (Florida Master Site File numbers BY00086, BY00087, BY00170) dating back to the middle to late Woodland Period (300 A.D.-1000 A.D.) and one shell midden (BY00171) of unknown date that has been destroyed by wave action. Ten additional sites that border the aquatic preserve boundaries have also been identified. These sites are important to management of the aquatic preserve due to their risk of inundation or erosion into the protected waterway. Because of the moderate wave energy of the coastline, many relict Native American sites have probably become buried by sand or destroyed by wave action (DEP, 2004).

Archaeological sites and historical resources are protected under Florida Statutes Chapter 267 and are not to be disturbed unless prior permission is granted from the Division of Historical Resources. It is illegal to

collect artifacts without a permit, and local law enforcement personnel are trained to recognize and protect these sites from vandalism. St. Andrews Aquatic Preserve has seen little professional archaeological survey, and therefore the potential exists that land managers and visitors might locate new archaeological sites. If new sites are detected, St. Andrews Aquatic Preserve will alert DHR staff immediately and work with them on an appropriate course of action.

Notable among the historical sites are Spanish Shanty Cove (BY00086), which is an unnamed village site and shell midden affiliated with the Weeden Island culture, circa 700-1000 A.D. The site has been considered as having potential for nomination to the National Register of Historic Places. The Spanish Ante Point site (BY00087) was recorded as a village site with midden, some of whose area was occupied by tabby floor of a historic house site. BY00170, which is unnamed, and BY00171, had a Fort Walton affiliation. A second site combining pre-Contact and recent historical remains is BY00798, a mostly oyster shell midden which also contained bone and pot shards. It appears affiliated with late Weeden Island culture (prior to about A.D. 1000) (DEP, 2004).

Another interesting resource is the site of two World War II era gun placements (BY01341 and BY01342) in St. Andrews State Park. The remains of one serve as the foundation for a pavilion in the Jetty Use Area. Another placement is periodically exposed on the beach shoreline from erosion (DEP, 2004).

Two picnic shelters in the park (BY01655 and BY01656) were built in 1956 as part of a designated segregated use area for African Americans. St. Andrews State Park was one of only a few state parks which allowed entry to African Americans in the 1950s (DEP, 2004).

A ninth site, the park's Pier Store (BY01654), has been removed and was replaced by a new facility that was relocated to a more inland location in order to reduce encroachment from nearby dunes (DEP, 2016).

Table 2 summarizes registered historic and archaeological resources immediately adjacent to St. Andrews Aquatic Preserve.

Other Associated Resources

St. Andrews Aquatic Preserve is located in some of the most natural coastal areas that remain in Bay County. The clear waters of the bay support an abundant and biologically diverse ecosystem that includes lush seagrass beds, salt marsh, benthic communities, commercial and recreational fish species, sea turtles, rays, sharks, and dolphins. Seagrasses cover approximately 944 acres of the aquatic preserve bottom and salt marsh composes a significant portion of the wetlands along the edge of the aquatic preserve. Seagrasses and salt marsh habitat play an important role in the food web of St. Andrews Bay. A variety of commercial and recreational fish and invertebrate species utilize the bay's extensive habitat for nursery and foraging grounds.

Shell Island remains the least disturbed and developed area in Bay County, which aids in its natural beauty and relatively pristine habitats. Many locals and tourists alike enjoy visiting Shell Island due to its lack of commercial and residential development. The area is accessible only by boat; ferry rides to the island are available at St. Andrews State Park.

The Florida Circumnavigational Saltwater Paddling Trail is a 1,515-mile sea kayaking trail which begins at Big Lagoon State Park near Pensacola, extending around the Florida peninsula and Keys, and ending at Fort Clinch State Park near the Georgia border. The trail is divided into 26 segments. Segment Three

Historic Site Name	Registry ID	Location	Date	Significance
Spanish Shanty Cove West Midden	BY00086	Panama City	300-1000 A.D.	Weeden Island shell midden
Spanish Shanty Point	BY00087	Panama City	300-1000 A.D.	Weeden Island shell midden, ruins
No Name	BY00170	Panama City	300-1000 A.D.	Weeden Island shell midden
Wiles/Clark	BY00171	Panama City	Unknown	Former shell midden site, destroyed by wave action
1942 WWII Gunmount 1	BY01341	Delwood Beach	1942	WWII Gunmount
1942 WWII Gunmount 2	BY01342	Panama City	1942	WWII Gunmount
Picnic Shelter 2	BY01655	St. Andrews State Park	1956	Segregated shelter in 1950s
Picnic Shelter 3	BY01656	St. Andrews State Park	1956	Segregated shelter in 1950s

Table 2 | Historic and archaeological resources adjacent to St. Andrews Aquatic Preserve. (Data provided by DHR January 9, 2015.)

includes St. Andrews Aquatic Preserve. Segment guides, photos and maps can be downloaded from www.dep.state.fl.us/gwt/paddling/saltwater.htm.

The Great Florida Birding and Wildlife Trail is managed by FWC. The 2,000-mile highway trail connects 514 birding and wildlife viewing sites throughout Florida. St. Andrews Bay is on the eastern edge of the Mississippi flyway and receives large numbers of migratory birds in spring and fall. St. Andrews State Park is featured as a stop on the trail. Maps and individual site information can be obtained at www.floridabirdingtrail.com.

3.4 / ***Values***

In recent years the areas surrounding St. Andrews Bay have become increasingly more developed. St. Andrews Aquatic Preserve and St. Andrews State Park remain some of the most natural and least disturbed coastal areas in the county. The residents and tourists in Bay County enjoy the aesthetic values and coastal resources surrounding the beaches of the Gulf of Mexico and St. Andrews Bay. Clear waters and adjacent conservation lands provide year-round recreational activities to nature enthusiasts including fishing, boating, snorkeling, birding, kayaking, canoeing, hiking, and exploring.

Gulf fisheries are some of the most productive in the world. In 2013, the commercial fish landings of the Florida Gulf region totaled more than 62 million pounds accounting for nearly $180 million in revenues (National Oceanic and Atmospheric Administration, 2013). The Gulf of Mexico is also ranked as the number one region in the nation for seafood harvest both in poundage and monetary value (Beck et al., 2000).

With more than one million registered recreational boats in Florida as well as 300,000 visiting vessels annually, 2,200 marinas, 8,400 miles of shoreline, 7,000 lakes and 51,000 miles of rivers and streams, the state ranks first in the nation in boating activity. Registered recreational boats in Bay County totaled 18,057 in 2014 (Florida Department of Highway Safety and Motor Vehicles, 2014).

For decades during the 20th century, coastal development in Florida routinely resulted in damage or destruction to vast regions of natural wildlife habitat, compromising the viability of key populations of marine species found throughout Florida's natural food chains. Further degradation of St. Andrews Bay can pose substantial economic impacts to the state and region. The bay has demonstrated to be valuable nursery habitat for countless marine species of significant ecological and economic importance to Florida's commercial and recreational fisheries. Florida's fishermen harvested more than 83 million pounds of seafood in 2013, with a dockside value of $232 million (FWC, 2013a). In 2013, seafood landings for Bay County totaled 3,660,313 pounds or 4.4 percent of statewide landings. Annual landing summaries can be found at www.myfwc.com/research/saltwater/fishstats.

The existence of the aquatic preserve in St. Andrews Bay helps buffer against negative environmental impacts that might result from coastal development. The aquatic preserve helps provide a much-needed "buffer zone" within which potential environmental impacts are analyzed more closely than in unprotected marine environments. The aquatic preserve is critical to avian and aquatic biology and ecology, geology, hydrology, and restoration science.

Knowledge gained from previous restoration projects within St. Andrews Bay and its watershed will lay the foundation for future similar projects. Protection of irreplaceable coastal environments, such as the aquatic preserve, is necessary too for both commercial and recreational fishing industries through protection of fishery nursery areas important to shrimp, crabs, and a variety of economically important fish.

3.5 / ***Citizen Support Organization***

Support from the community is vital to the success of any aquatic preserve. As of the writing of this management plan, no citizen support organization (CSO) exists for St. Andrews Aquatic Preserve. It would be extremely beneficial for the aquatic preserve to encourage the creation of a CSO.

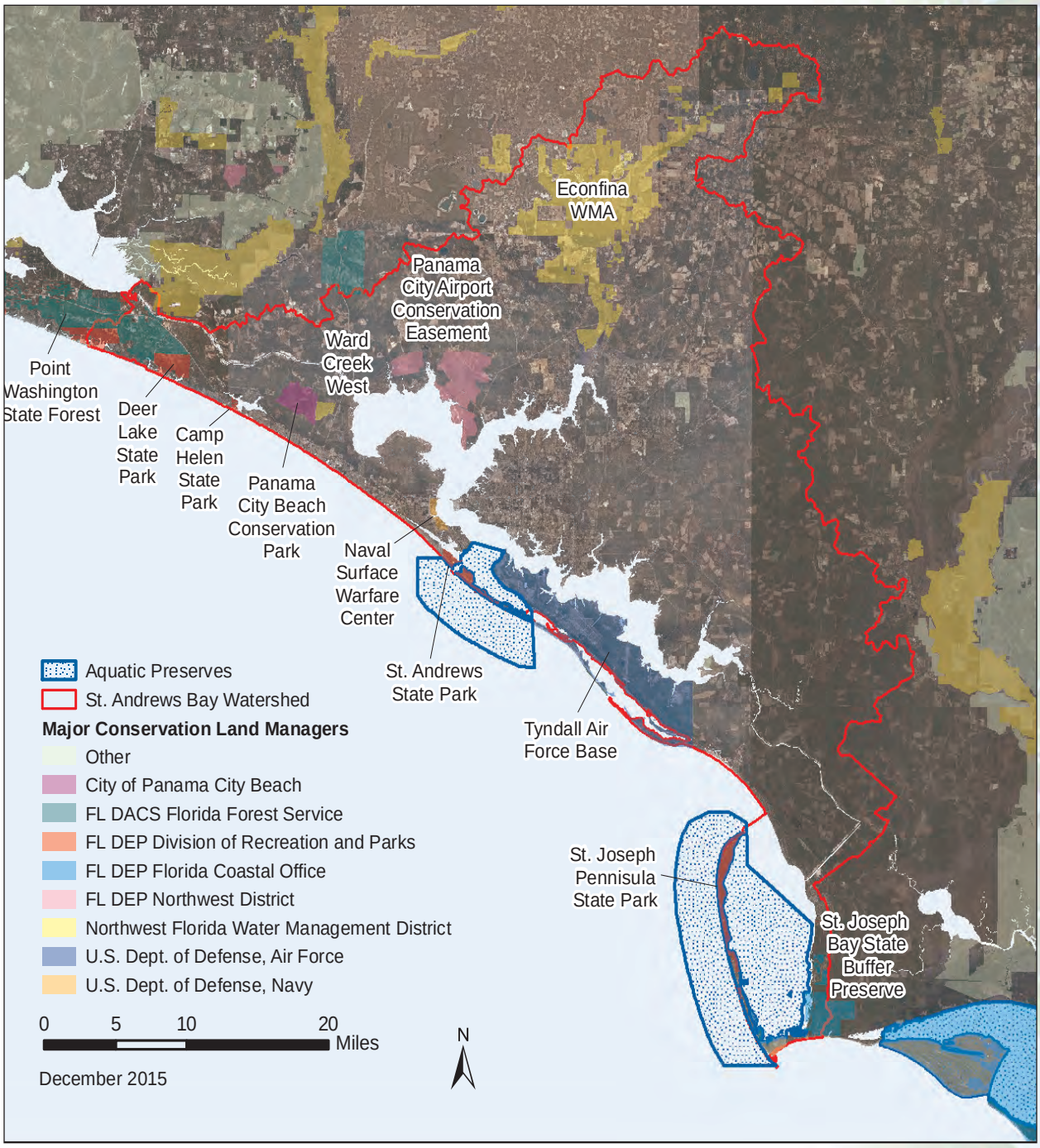
The Aquatic Preserve Society, a statewide CSO, was formed in June 2014 to promote the protection of Florida's 41 aquatic preserves. A statewide CSO will vastly increase the effectiveness of the existing network and enhance awareness of aquatic preserves.

The Friends of St. Andrews State Park CSO works with the Florida Park Service to "preserve and protect our park's natural and cultural resources and to provide recreational opportunities to area visitors" (Friends of St. Andrews State Park, n.d.).

While there are no DEP sanctioned CSOs specifically supporting St. Andrews Aquatic Preserve, there are a few local citizen volunteer groups that are doing great work in the bay. Formerly known as the Bay Environmental Study Team, or BEST, the Friends of St. Andrew Bay is a local non-advocacy, volunteer environmental organization that has been in existence in Bay County since 1987. Their mission is "to evaluate the status of the St. Andrew Bay ecosystem, identify problems, and initiate corrective actions where necessary." Their goal is "to maintain and restore a healthy St. Andrew Bay ecosystem for the benefit of all people" (Friends of St. Andrew Bay, n.d.).

The RMA is another great volunteer based organization in Bay County. RMA is a private, nonprofit 501(c)(3) citizens' group whose members are "committed to the proper management of St. Andrew Bay and adjoining bays, lakes, tributaries and wetlands." The major objective of RMA is "to ensure that future growth is properly managed to maintain the quality and productivity of the local estuarine system" (RMA, n.d.-a).

Both the Friends of St. Andrew Bay and the RMA have used ecosystem-based science and coordinated volunteer efforts to ensure the protection of St. Andrews Bay.



Map 10 / Adjacent conservation lands and designated resources.

The St. Andrews Aquatic Preserve is located in Bay County, on the northwest coast of Florida. Several significant conservation lands and open waters that lie within the drainage basin of the St. Andrews Aquatic Preserve include St. Andrews State Park, Point Washington State Forest, Camp Helen State Park, Deer Lake State Park, Econfina Creek Water Management Area, St. Joseph Bay State Buffer Preserve, St. Joseph Bay Aquatic Preserve, and St. Joseph Peninsula State Park (Map 10). These areas provide a full spectrum of resource based recreation opportunities including boating, fishing, picnicking, saltwater beach activities, hiking, biking, horseback riding, camping, and nature study (DEP, 2004).

State lands within the drainage basin:

St. Andrews State Park

St. Andrews State Park, managed by DEP's Division of Recreation and Parks, is immediately adjacent to St. Andrews Aquatic Preserve. The state park manages land in Lower Grand Lagoon as well as a portion of Shell Island. The state park is managed by the Florida Division of Recreation and Parks. Their mission is "to provide resource-based recreation while preserving, interpreting and restoring natural and cultural resources." Well-known for its sugar white sands and emerald green waters, this former military reservation has over one-and-a-half miles of beaches on the Gulf of Mexico and Grand Lagoon. The public can enjoy swimming, snorkeling, scuba diving, kayaking, canoeing, sunbathing, picnicking, hiking, bird watching, and other activities. Two fishing piers, a jetty, and a boat ramp provide ample fishing opportunities for anglers. Two nature trails wind through a rich diversity of coastal plant communities. Full-facility campsites, as well as primitive youth group camping, make this park a popular overnight destination. A concession offers snacks, souvenirs, and fishing amenities. Shell Island boat tours are available during the spring and summer (DEP, n.d.-c).

Camp Helen State Park

Camp Helen State Park, also managed by DEP's Division of Recreation and Parks, is located on the western-most edge of Bay County. The park is bordered by the Gulf of Mexico on three sides, and by Lake Powell, one of the largest coastal dune lakes in Florida. From 1945 until 1987 Camp Helen was a company resort for the employees of an Alabama textile mill, known as Avondale Mills. Some of those buildings have now been restored. This 180-acre park is for day use only. Activities include swimming, beachcombing, nature study, hiking and both freshwater and saltwater fishing (DEP, n.d.-a).

Deer Lake State Park

Deer Lake State Park is located in Santa Rosa, Florida and shares its name with the coastal dune lake within its boundaries. Coastal dune lakes are extremely rare worldwide and in the United States they occur only along the Gulf Coast. A boardwalk across the dunes offers access to the beach where visitors can picnic, swim, and fish. Deer Lake State Park is managed by DEP's Division of Recreation and Parks (DEP, n.d.-b)

T.H. Stone Memorial St. Joseph Peninsula State Park

Located in Gulf County, T.H. Stone Memorial St. Joseph Peninsula State Park sits on the northern-most tip of the St. Joseph peninsula. The park offers both bay and Gulf-side beaches with sugar white sand. Recreational activities at the park include hiking, fishing, sunbathing, swimming, snorkeling, and bird-watching. The park also offers both full facility and primitive campsites, as well as a boat launch. T.H. Stone Memorial State Park is managed by DEP's Division of Recreation and Parks (DEP, n.d.-f).

St. Joseph Bay State Buffer Preserve

The St. Joseph Bay State Buffer Preserve, located in Gulf County, is managed by DEP's Florida Coastal Office. The preserve provides an essential ecological buffer to St. Joseph Bay that protects the bay's water quality, natural productivity, and critical habitats. The preserve also protects an intact natural coastal landscape with one of the highest concentrations of rare plants in the southeastern United States. Recreational activities on the preserve include tram tours, hiking trails, and a kayak launch (DEP, n.d.-e).

St. Joseph Bay Aquatic Preserve

St. Joseph Bay Aquatic Preserve includes approximately 73,000 acres of St. Joseph Bay, located in Gulf County. The aquatic preserve, managed by DEP's Florida Coastal Office, boasts extensive seagrass beds, clear waters, and borders white sand beaches. Recreational activities include fishing, diving, snorkeling, scalloping, swimming, birding, kayaking, and boating (DEP, n.d.-d).

Point Washington State Forest

Point Washington State Forest was acquired under Florida's Conservation and Recreation Lands (CARL) program in 1992 and is managed by the Florida Forest Service. The forest, located in the southernmost portion of Walton County, is managed for timber, wildlife, outdoor recreation and ecological restoration. Point Washington State Forest is available to the public for various types of outdoor recreation. The forest is widely used for hunting, off-road bicycling, hiking, and camping (FDACS, n.d.-a).

Econfina Creek Water Management Area

Managed by the Northwest Florida Water Management District, Econfina Creek Water Management Area is comprised of 43,770 acres in Washington and Bay counties for water resource protection, restoration, and preservation. Econfina Creek is largely spring-fed and is well known for its cold, clear water, natural vegetation, bird life, and geologic and hydrologic features. It is the steepest gradient canoe trail in the state, featuring rapids, springs, and rock outcrops. Recreation opportunities include camping, picnicking, boating, fishing, hunting, canoeing, hiking, biking, horseback riding, and wildlife viewing (NWFWMD, n.d.-a).

Ward Creek West

Ward Creek West is a 719-acre tract located to the west of State Road 79 in Bay County and is within the West Bay sub basin of the St. Andrews Bay watershed. Approximately 675 acres of this tract are wetland and approximately 44 acres are upland. Acquired in 2008, this site is managed for ecological integrity by NWFWMD (NWFWMD, n.d.-b).

Federal lands within the drainage basin:

Tyndall Air Force Base

Also immediately adjacent to the aquatic preserve on a portion of Shell Island and a portion of land immediately to the north of Shell Island (locally called Beacon Beach) is Tyndall Air Force Base. Tyndall Air Force Base contains 18,000 acres of forest and coastline that have remained in their natural state, an important factor in the natural state of St. Andrews Bay (Anderson, 2008).

Naval Surface Warfare Center: Panama City Division

The Naval Surface Warfare Center is located approximately 1.5 miles to the west of the aquatic preserve boundary. The base includes 13 miles of wetlands and three miles of coastline, as well as 177 acres of managed forest (Naval Surface Warfare Center, n.d.).

United States Coast Guard

The U.S. Coast Guard owns a 30 acre parcel on the northwest corner of Shell Island along the channel (DEP, 2016).

Other lands within the drainage basin:

Panama City Beach Conservation Park

Managed by Panama City Beach, the Panama City Conservation Park is 2,912 acres of the West Bay Ecosystem. Panama City Beach uses its reclaimed water to rehydrate the conservation park's 2,004 acres of wetlands (Panama City Beach Chamber of Commerce, n.d.). Recreation opportunities include biking, hiking, picnicking, and nature viewing.

Panama City Airport Conservation Easement

The 9,600 acre conservation easement was to mitigate for environmental impacts of the relocation and construction of the Northwest Florida Beaches International Airport and industrial district. While not open to the public, the easement contributes to the protection of the natural shoreline, water quality, and aquatic resources of West Bay within the St. Andrews Bay watershed (St. Joe Company, 2006).

Bay County Conservancy, Inc.

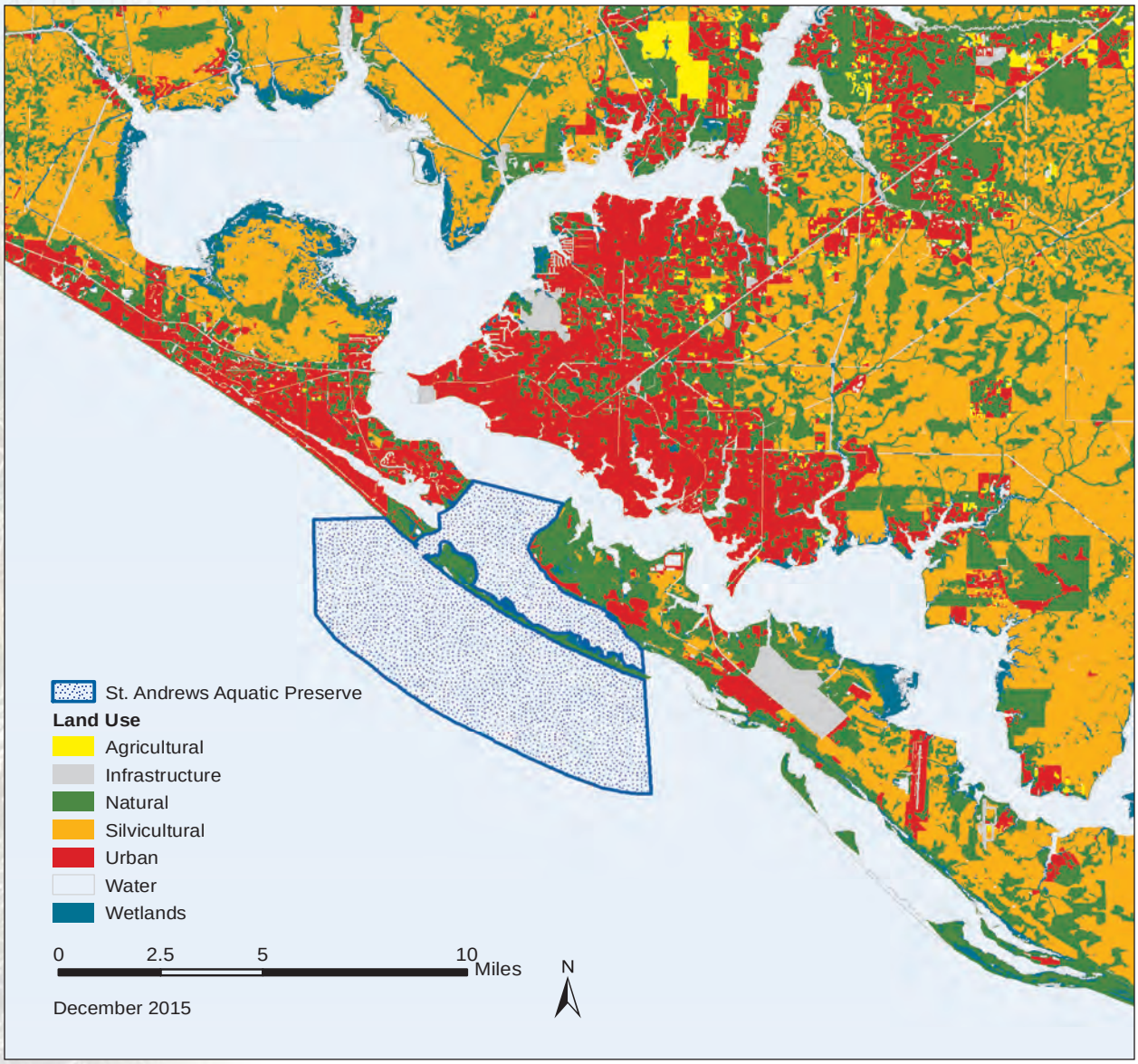
The Bay County Conservancy, Inc. is a land trust dedicated to the preservation of environmentally sensitive lands in northwest Florida, and is a 501(c)(3) non-profit organization and a member of the national Land Trust Alliance. Their goal is to acquire land that will enhance the present and future natural resources of the Bay County area. Bay County Conservancy properties include Audubon Nature Preserve, Tumble Creek Preserve, King Family Preserve, Mary Ola Reynolds Miller Palm Preserve, and Richard Jennings Preserve (Bay County Conservancy, n.d.).

*3.7 / **Surrounding Land Use***

Panama City is the main municipality surrounding the bay. Tourism and the military are the primary industries adjacent to the St. Andrews Bay system, although much of Bay County is rural and supports silviculture (Map 11). Other industries in the watershed include Smurfit-Stone Container Co., Eastern Shipbuilding Group, Arizona Chemical, Port of Panama City, and the Northwest Florida Beaches International Airport (DEP, 2012). Land use west of St. Andrews State Park and St. Andrews Aquatic Preserve consists of condominium development along the beach, and the Venture Out manufactured home community along the north side of Thomas Drive. Across Grand Lagoon to the north of the park is residential and resort development and the Naval Surface Warfare Center. Tyndall Air Force Base is located along the southern shore of East Bay and includes the southeast portion of Shell Island (DEP, 2004).

St. Andrews Aquatic Preserve includes submerged lands adjacent to a large portion of Shell Island. The U.S. Coast Guard owns a parcel on the northwest corner of the island along the channel. Numerous privately held parcels are located on the eastern end of the boundary, two of which include homes. The remainder of the island is part of Tyndall Air Force Base, which provides an important open space buffer to the east (DEP, 2004).

Land designations along the western boundary include Seasonal/Resort and General Commercial. Uses allow for a mix of accommodations and businesses that are used for non-residential, tourist-oriented purposes. Land use in this area along Thomas Drive is not likely to change significantly in the future since this area has achieved full build-out (DEP, 2004).



Map 11 / Land use surrounding St. Andrews Aquatic Preserve.

Sea oats on the Gulf-side beaches of St. Andrews State Park aid in preventing erosion to the beach, and are an important part of the habitat.

Part Two

Management Programs and Issues

Chapter Four

St. Andrews Aquatic Preserve 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 are endowed with very few staff, partnering is a necessity, and by bringing issues into a broad public consciousness partners who wish to be involved are able to do so. Involving partners in issue-based management ensures that a particular issue receives attention from angles that the aquatic preserve may not normally address.

This section will explore issues that impact the management of St. Andrews Aquatic Preserve directly, or are of significant local or regional importance that the aquatic preserve's participation in them may prove beneficial. While an issue may be the same from preserve to preserve, the goals, objectives and 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, St. Andrews Aquatic Preserve will characterize each of its issues and delineate the unique goals, objectives and strategies that will set the framework for meeting the challenges presented by the issues.

Each issue will have goals, objectives and strategies associated with it. Goals are broad statements of what the organization plans to do and/or enable in the future. They 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.

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. Andrews Aquatic Preserve

Prior to 2011, St. Andrews Aquatic Preserve was managed by the Northwest Florida Aquatic Preserves office, located in Milton, Florida in Santa Rosa County. The long distance, along with limited staff, made it difficult for the aquatic preserve staff to perform ecosystem science based monitoring in St. Andrews Aquatic Preserve. In 2011, budget cuts forced the Florida Coastal Office to reduce staff and close several aquatic preserve offices, resulting in drastically reduced oversight of St. Andrews Aquatic Preserve. In 2014, the management of the aquatic preserve was re-established as part of the Central Panhandle Aquatic Preserves with funding from the National Fish and Wildlife Foundation and ecosystem science management was resumed in the summer of 2015.

Mapping

In order to effectively manage resources within St. Andrews Aquatic Preserve, it is imperative to conduct routine mapping of these resources. This allows for the identification of areas within the aquatic preserve where increased research, monitoring, and management emphasis is necessary. Habitat mapping within St. Andrews Bay has, for the most part, focused on seagrass habitat.

- In 1953, 1964, and 1980, the U.S. Geological Survey (USGS) National Wetlands Research Center conducted seagrass mapping projects in St. Andrew Bay.
- In 1992, the USGS National Wetlands Research Center mapped seagrass in St. Andrews Bay as part of the northeastern Gulf of Mexico seagrass mapping project.
- From 1992-1993, the Florida Fish and Wildlife Conservation Commission's (FWC) Florida Marine Research Institute (now known as Florida Wildlife Research Institute [FWRI]) mapped propeller scars in seagrasses through aerial surveys throughout Florida.
- In 2010, USGS conducted a seagrass mapping study as part of damage assessment following the 2010 Deepwater Horizon oil spill.

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 2000, HydroQual, Inc. completed a hydrodynamic model for St. Andrews Bay.
- In 2009, Tetra Tech, Inc. completed a hydrodynamic and water quality modeling report for St. Andrews Bay for the U.S. Environmental Protection Agency (EPA).
- In 2012, the Florida Department of Environmental Protection (DEP) completed a site specific establishment of nutrient criteria for St. Andrews Bay.

Monitoring and Research

Considerable water quality and fisheries data has been collected in St. Andrews Bay over the last 40 years. Below are some of the historical water quality, benthic community, and fishery studies that have been conducted in the bay.

- In 1976, Saloman, Naughton, and Taylor completed a comprehensive analysis of benthic data from studies designed to show short-term environmental effects of offshore dredging during an emergency restoration project following Hurricane Eloise at Panama City Beach in July-August 1976.
- In 1981, Culter and Medhaven of Mote Marine Laboratory studied long-term nourishment effects on the benthic fauna and surface sediments of the nearshore zone off Panama City Beach.
- In 1981, John Grady of the Southeast Fisheries Science Center within the National Oceanic and Atmospheric Administration (NOAA) studied the substrates underlying seagrass beds compared to adjacent un-vegetated sand flats in St. Andrew Bay.
- In 2007, Murphy and Valle-Levinson of NOAA's Southeast Fisheries Science Center described the tidal and non-tidal circulation patterns in St. Andrews Bay.
- Heinisch and Fable investigated movements of gag grouper (*Mycteroperca microlepis*) in and around St. Andrews Bay from August 1994 through August 1996.
- In 1998, Samuels and Bejder conducted a systematic study designed to quantify effects of swim-with activities on the behavior of bottlenose dolphins in waters near Panama City Beach.

4.1.2 / Current Status of Ecosystem Science at St. Andrews Aquatic Preserve

Research and monitoring are crucial components of resource and ecosystem management. Data obtained from monitoring programs provides 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. Major management issues that St. Andrews Aquatic Preserve confronts include: health of seagrass beds, changes in water quality, 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 integral in maintaining and protecting the natural resources within the aquatic preserve. Current Ecosystem Science Programs within St. Andrews Aquatic Preserve and the future needs of the program are discussed in the following sections.

Water Quality Monitoring Projects

Several organizations and agencies conduct water quality monitoring for a variety of parameters (Map 12).

St. Andrew Bay Resource Management Association Water Quality Monitoring

Since 1990, the St. Andrew Bay Resource Management Association, Inc. (RMA) Bay Watch Program has been monitoring long-term trends in water quality and aquatic resources in the St. Andrews Bay watershed. Teams of volunteers collect water samples monthly at a total of 68 sample stations throughout the St. Andrews Bay estuarine system, Lake Powell, and other lakes in the watershed. Forty of the stations sampled each month are in partnership with the University of Florida's LAKEWATCH program. Data collected at each station includes temperature, pH, dissolved oxygen, salinity, secchi depth, weather conditions, and sea state. Samples are collected at each LAKEWATCH station and evaluated for turbidity, nutrients, and chlorophyll. Results are available in STORET (a (STOrage and RETrieval database) under organization code 21FLKWAT (RMA, n.d.-b).

RMA staff and volunteers partnered with DEP from January 2000 through June 2015 to collect monthly water samples from 19 seagrass stations in West Bay and St. Andrews Bay. Data collected included temperature, pH, dissolved oxygen, salinity, conductivity, secchi depth, weather conditions, and sea state. Nutrients and bacteria were monitored quarterly. Samples were returned to DEP's central lab in Tallahassee for evaluation of turbidity, color, biological oxygen demand five day total, total suspended solids, and chlorophyll a. Results are available in STORET under organization code 21FLPNS (P. Couch, personal communication, December 20, 2015). St. Andrews Aquatic Preserve will consider taking over water quality sampling for RMA's seagrass stations that lie within the aquatic preserve boundaries.

In 2014, RMA produced a water quality "report card" with grades based on water clarity and levels of nutrients and chlorophyll. The report compares water quality grades from 1991-1993 to data from 2011-2013. Areas of the bay that were given a "good" water quality score include St. Andrew Bay, portions of East Bay, and portions of North Bay. Grand Lagoon (which is adjacent to the aquatic preserve) went from

a “fair” grade in 1991-1993 to a “poor” grade in 2011-2013. The report cites increased stormwater runoff due to more development, septic tank drain fields emptying into the lagoon during rain events, and the construction of more seawalls, resulting in fewer native plants to remove pollutants as the main reasons for the deterioration of water quality in Grand Lagoon (Burris et al., 2014). St. Andrews Aquatic Preserve plans to coordinate with RMA on water quality monitoring in the aquatic preserve by sampling additional water quality stations and possibly adding data loggers for continuous data collection.

Florida Department of Agriculture and Consumer Services Water Quality Monitoring

Florida 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; hence, should not be open to harvest. DACS routinely monitors fecal coliform and water quality parameters at established stations in each of Florida’s shellfish harvesting areas. While there are no shellfish harvesting areas within the aquatic preserve, adjacent areas (East Bay, West Bay, and North Bay) do contain shellfish (oyster) harvesting areas and are monitored by DACS. Sub-surface water samples are collected, placed in ice-filled coolers and shipped overnight to a certified laboratory. The analysis for fecal coliform takes 24 hours, and numbers of bacteria are expressed in the units of Most Probable Number per 100 milliliters (ml) (DACS, n.d.-a).

Florida Healthy Beaches Program

The Florida Department of Health (DOH) in Bay County, Environmental Health Division, samples water quality at ten sites from the west to the east end of the county on a bi-weekly basis for enterococci (enteric bacteria that normally inhabit the intestinal tract of humans and animals), except for the winter months of November through February. The presence of enteric bacteria can be an indication of fecal pollution, which may come from stormwater runoff, pets and wildlife, and human sewage. If they are present in high concentrations in recreational waters and are ingested while swimming or enter the skin through a cut or sore, they may cause human disease, infections, or rashes. Results of these samples are rated poor, moderate, or good based on total bacteria counts. These results are posted on www.floridahealth.gov/environmental-health/beach-water-quality/index.html and sites with poor results are posted with an advisory sign and a public service announcement is issued (DOH, n.d.).

Harmful Algal Bloom Monitoring

FWC’s FWRI Harmful Algal Bloom (HAB) group monitors more than 100 locations around the state weekly, twice-monthly, or monthly to detect nuisance, harmful and toxic algal blooms, including red tide. A red tide is a higher-than-normal concentration of a microscopic alga (plant-like organism). In Florida, the species that causes most red tides is *Karenia brevis*. FWRI staff coordinates sample collection with state agencies, local governments and private citizens participating in a volunteer offshore monitoring program.

In St. Andrews Bay samples are collected by FWRI’s Molluscan Fisheries group and/or Florida Department of Agriculture and Consumer Services (DACS) and brought back to FWRI in St. Petersburg for analyses (K. Atwood, personal communication, March 30, 2015). There they are filtered in house by FWRI’s HAB toxins group for toxins and DNA for reporting and for on-going research projects. All data are entered into the HAB historical database. Researchers report monitoring results to managers who can then take appropriate actions, such as closing shellfish harvesting areas, as necessary, to protect human health. In addition to routine monitoring, HAB staff respond to possible blooms throughout Florida. Following reports of discolored water, respiratory irritation, fish kills, or dead or stranded marine mammals, HAB staff lead sampling trips or coordinate sampling with the same collaborators they rely on for routine monitoring. This event-response effort varies from year to year, depending on the frequency and duration of blooms (FWC, n.d.-a).

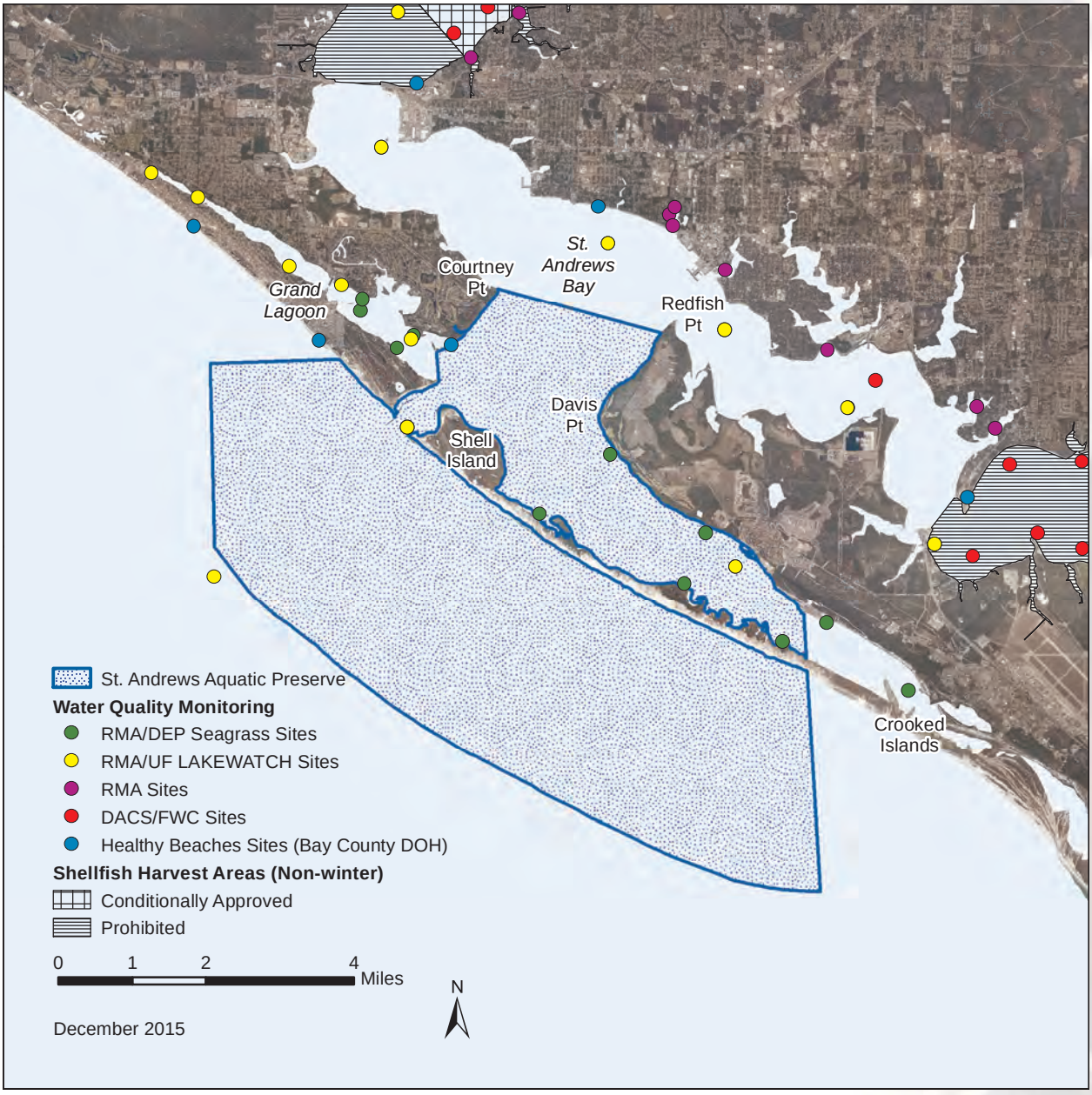
Description	*Karenia brevis* (cells/liter)	Possible Effects (*K. brevis* only)
–Not present - background	background levels of 1,000 cells or less	None anticipated
Very low	>1,000 to 10,000	Possible respiratory irritation; shellfish harvesting closures >5,000 cells/liter
Low	>10,000 to 100,000	Respiratory irritation, possible fish kills and bloom chlorophyll probably detected by satellites at upper limits
Medium	>100,000 to 1,000,000	Respiratory irritation and probable fish kills
High	>1,000,000	As above plus discoloration

Table 3 / Possible effects of red tide.

Since 2000 there have been four instances of a high level (>1,000,000 cells/liter) of red tide in Bay County waters. The first was in September – October 2000. The next was from October – December 2005, and then again in October 2007. The most recent red tide event was in October 2015 – January 2016 (FWC, n.d.-c). Table 3 shows the possible effects from red tide according to their level of concentration.

Northwest Florida Water Management District Water Quality Projects

The Northwest Florida Water Management District (NWFWMD) has completed several projects to improve water quality in St. Andrews Bay, including many stormwater retrofit projects, stabilization projects, and mapping and monitoring projects. In 2000, NWFWMD published a comprehensive plan for watershed management of the St. Andrews Bay watershed. This report, called the Surface Water Improvement and Management (SWIM) Plan, outlines several projects including seagrass and water quality monitoring. From 2004 – 2011 the NWFWMD partnered with the Federal Emergency Management Agency (FEMA) to complete a Map Modernization Program, resulting in digital flood insurance rate maps for Bay, Gulf, and Washington counties. Since 2009, NWFWMD has also been working on a coastal storm surge model for Bay and Gulf counties. These new maps are expected to be available in 2017 and will meet Risk Map standards for areas that are newly studied. NWFWMD has also partnered with FEMA since 2010 to implement the Risk Mapping, Assessment and Planning program, to deliver quality data that supports risk management decisions and flood mitigation actions. Monitoring projects include rainfall and water level monitoring for Bay County and Deer Point Lake, groundwater and surface water monitoring, and testing



Map 12 | Water quality monitoring stations at St. Andrews Aquatic Preserve.

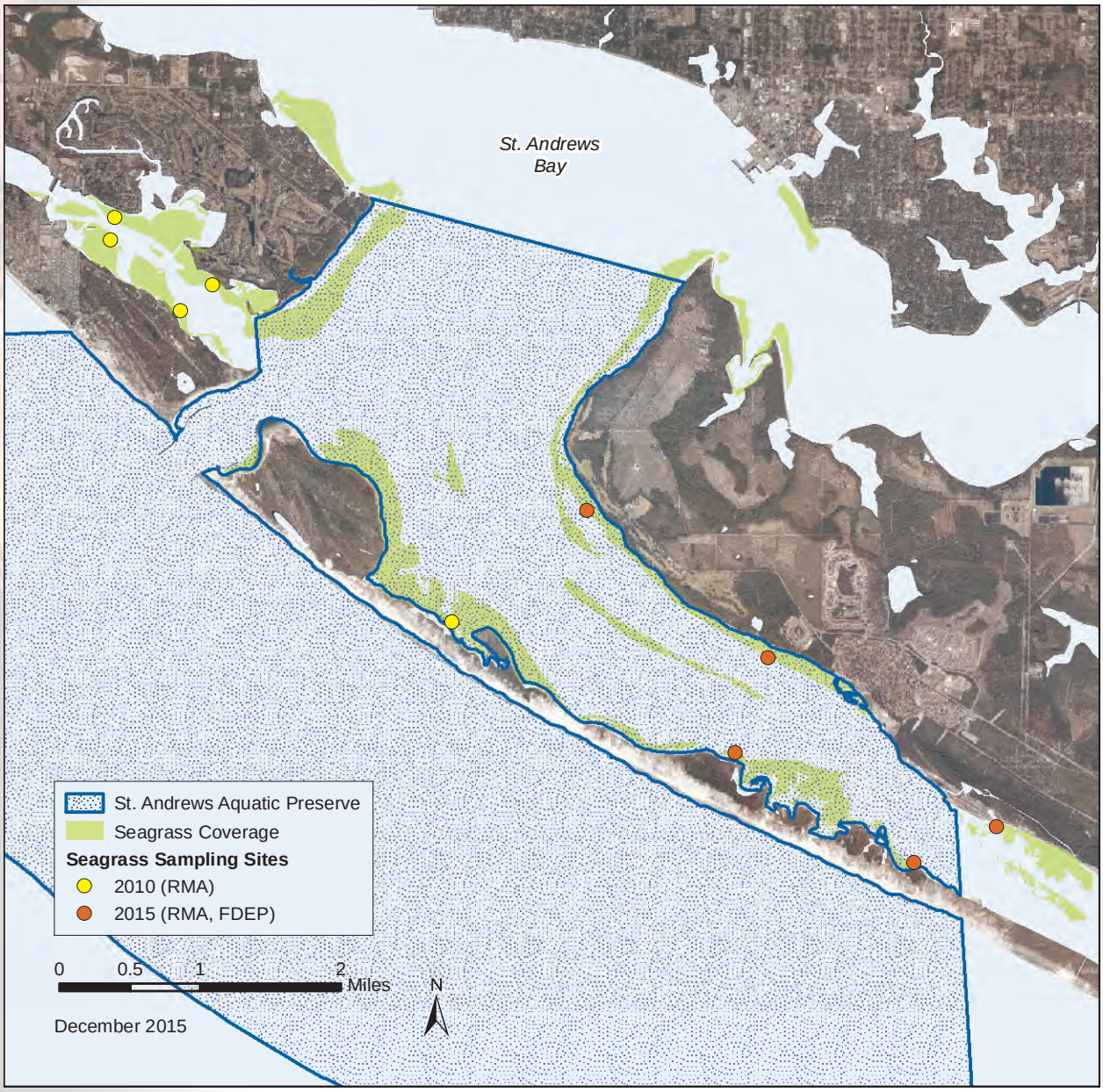
for fecal coliforms in Econfina Creek (C. Coger, personal communication, April 17, 2015). St. Andrews Aquatic Preserve will continue to coordinate with NWFWMD to protect the St. Andrews Bay watershed.

Natural Community and Wildlife Monitoring

Seagrass Monitoring

As St. Andrews Bay's shallow estuarine waters continue to be impacted by development it is important to collect baseline conditions within St. Andrews Aquatic Preserve for post impact comparisons and to identify any habitat restoration or watershed management activities. Seagrass and water quality data provides helpful information which can be used to address management issues of the resource. In 2015, St. Andrews Aquatic Preserve partnered with RMA to re-establish monitoring of five seagrass sites in the aquatic preserve (Map 13). In conjunction with water quality monitoring, the data being collected can be used to determine the overall health of these highly diverse ecosystems. This information can also be used to determine species composition, abundance, and distribution of seagrasses within a particular area. 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 scallops and urchins is also collected.

Turtle grass is the dominant seagrass species and provides the most habitat in St. Andrews Bay. This subtidal species grows to depths of 5.9 to 7.9 feet in St. Andrews Bay proper and in St. Andrews Sound. Light attenuation appears to limit maximum growth depths to 3.9 to 5.9 feet in the interior bay segments.



Map 13 / Seagrass monitoring stations at St. Andrews Aquatic Preserve.

There are also extensive beds of manatee grass and shoal grass. Manatee grass is found within turtle grass beds, or less often in pure stands near the influence of clear, highly saline water entering the bay from the Gulf. Shoal grass is a pioneer species that dominates the shallow and intertidal bay areas. These beds can be exposed to the air in winter when north winds push large amounts of water from the bay, and in spring when north winds combine with low spring tides (Brim & Handley, 2002). Widgeon grass occurs in some of the fresher parts of the bay, including some bayous. Star grass and paddle grass (*Halophila* spp.) have been noted on rare occasions within turtle grass beds in the south part of St. Andrews Bay (Brim & Handley, 2002).

During the 2010 seagrass monitoring conducted by RMA, two seagrass species - turtle grass and shoal grass - were observed at almost every seagrass transect. Manatee grass was observed at many of the sites in the aquatic preserve while star grass was observed at only one site in West Bay (outside of aquatic preserve boundaries). Seagrasses in the aquatic preserve grew to greater depths than seagrasses in West Bay and there was a significant difference ($p<0.0001$) in seagrass depth among the different areas. The maximum depth at which seagrasses grow decreased as distance from West Pass increased, with the shallowest seagrass depths recorded for an area of West Bay known as the West Bay Bowl. Maximum depths for seagrass ranged from 5 feet 10 inches to 6 feet 6 inches (1.8-2.0 meters [m]) in St. Andrews Bay to 1 foot 8 inches to 3 feet 10 inches (0.53-1.19 m) in the West Bay Bowl. The shallowest mean depth for seagrass (two feet five inches [0.75 m]) was reported in West Bay Bowl (L. Fitzhugh, personal communication, May 19, 2015).

In collaboration with other state agencies, FWC collects data from existing monitoring inventories and mapping databases to create more accurate estimates on spatial coverage and species composition of seagrasses for the Seagrass Integrated Mapping and Monitoring program. 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 & Madley, 2007). In 2003 seagrasses covered 11,232 acres in all of St. Andrews Bay, and seagrass acreage increased between 1992 and 2003 by 14 percent. The bay saw an increase of continuous beds (2,205 acre increase) but a decrease of patchy seagrass beds (804 acre decrease). Propeller scarring was extensive in all shallow seagrass areas throughout the bay (Gudeman, Mezich, Smith, & Carlson, 2010).

Bay Scallop Monitoring

To assess the status of bay scallops in Florida waters, FWRI scientists conduct adult population surveys each June along the state's west coast. Annual scallop surveys have been conducted by FWRI in St. Andrews Bay since 1994. Twenty stations located in seagrass beds in depths up to 10 feet are surveyed for adult scallops (Map 14). At each station, researchers deploy a 300-meter (984.3 feet), weighted transect line. Two divers – one on either side of the line – each count all scallops within a meter-wide (3.3 feet) area along the line, for a total survey area of 600 square meters (1,968.5 square feet). Divers measure the first 30 scallops at each station to determine the average size of the population. Researchers compare estimates between years and sites to determine if bay scallop populations are maturing at different rates. Using the results of transect surveys, researchers can determine the health of a local scallop population based on abundance, distribution, and population.

In addition to monitoring the local adult populations, FWRI scientists study juvenile bay scallops as they recruit to, or settle into, the population. Most juveniles come from the local population where they were spawned, but some come from distant populations, relocated by the ocean currents. To study the recruitment of bay scallops to local populations, scientists anchor citrus bags stuffed with black mesh to a block to collect juveniles. The collectors are deployed every month in the nearshore, seagrass habitats. The bags simulate grass blades, and juvenile bay scallops, called spat, settle out of the water column and attach to collectors. The collectors are left underwater for eight weeks and then retrieved for processing. Researchers count any scallops found on the collectors. They standardize data by dividing that count by the number of days the collector was in the water. Researchers then average the counts from each collector to determine the recruitment rate for each deployment period. Scientists use average recruitment rates to compare local populations, determine timing of spawning events, and evaluate the health of a population over time (FWC, 2015a).

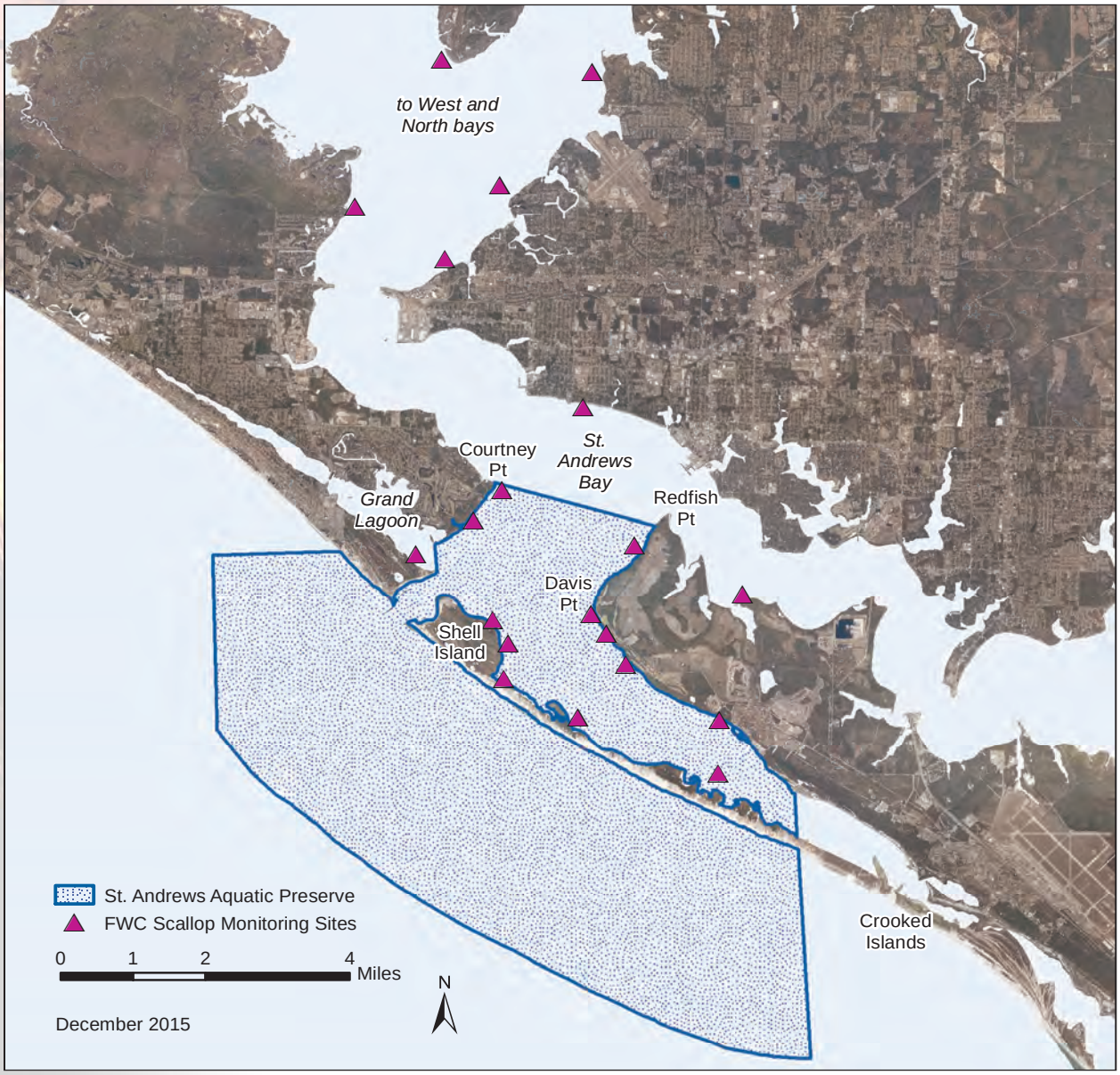
In 2014, there were no bay scallops observed during the spring survey, a first in 21 years. Due to that finding, this site was classified as collapsed. The highest density observed during spring surveys at this site was in 2011 (0.166 scallops per square meter) following years of small-scale restoration efforts, and was the only observed time that this subpopulation reached stable status (FWC, 2015a).

Juvenile monitoring in St. Andrews Bay was initiated in September 2003 and the greatest mean recruitment rate was observed in 2004 at 2.19 scallops per collector per day. The mean recruitment rate

observed per collector in 2014 was similar to 2013 with 0.09 scallops per day, four percent of the 2004 value. Based on the mean rate observed during 2014, recruitment in St. Andrews Bay was classified as low. In 2014, juveniles were observed on collectors retrieved in nine of the 12 months, and the greatest mean rate (0.93 scallops per day) was observed on collectors deployed in October and retrieved in December (FWC, 2015a). St. Andrews Aquatic Preserve staff have assisted FWRI in completing bay scallop monitoring in the past, and will continue to provide assistance as needed.

Juvenile Reef Fish Monitoring

Since 2008, biologists from the Marine Fisheries Research section of FWRI have worked to develop and implement a research and monitoring program to provide timely fisheries-independent data for a variety of state- and federally-managed reef fishes, including gag grouper, red grouper, red snapper, and others. Studies provide additional data for non-managed fishes to support ecosystem-based assessment and management. Researchers use different types of sampling gear to target fish in multiple stages of their life history. Using 183-meter haul seines and 6.1-meter otter trawls, biologists collect juvenile reef fishes from high-salinity, estuarine seagrass habitat at five locations along the west and northwest Florida coast, including St. Andrews Bay. Each fish caught is identified, counted, measured, and released. This research is important because fish at this stage of development are underrepresented in historical monitoring efforts. In St. Andrews Bay, researchers collect 21 haul-seine samples and 42 otter-trawl samples each year by conducting monthly surveys from May through November. This research is conducted by FWRI staff stationed in the Apalachicola Field Lab in Eastpoint (FWC, n.d.-e).



Map 14 | Scallop monitoring stations at St. Andrews Aquatic Preserve

Since 2008, more than 130,000 individuals (N=138,749) representing 95 taxa have been collected. According to preliminary data, total black sea bass (*Centropristis striata*) catches (in combined sampling gears) increased from nine in 2008 to 144 caught in 2013. Conversely, gag grouper catches have decreased from 42 collected (in all sampling gears) in 2008 to four in 2012 and 2013. More analyses will need to be conducted to determine if these trends are statistically significant (R. Gorecki, personal communication, March 5, 2015).

Juvenile Shark Project

NOAA operates a laboratory in Panama City through the Southeast Fisheries Science Center of the National Marine Fisheries Service. The National Marine Fisheries Service's mission is stewardship of the nation's living marine resources for the benefit of the nation. The Shark Population Assessment Group conducts juvenile shark sampling through the Gulf of Mexico States Shark Pupping and Nursery Area project. Data collected through this project are used in NOAA's Sustainable Fisheries Stock Assessment and Fisheries Evaluation report for Atlantic Ocean and Gulf of Mexico Highly Migratory Species. The group is currently surveying four coastal bay systems in northwest Florida: St. Andrews Bay, Crooked Island Sound, St. Joseph Bay, Apalachicola Bay, and the gulf-side of St. Vincent Island. Trends in catch-per-unit-effort vary depending on species. In 2008, catch per unit effort was relatively low in St. Andrews Bay. Young-of-the-year and juvenile Atlantic sharpnose shark (*Rhizoprionodon terranovae*), juvenile blacknose shark (*Carcharhinus acronotus*), and juvenile blacktip shark were the only species encountered in this area. Juvenile Atlantic sharpnose shark was the most encountered species (Bethea et al., 2009).

4.1.3 / *Ecosystem Science Issues*

Issue I: Water Quality

Water quality monitoring has increasingly become an important part of the aquatic preserve's role in understanding the bay's natural processes. Monitoring water quality allows researchers to document short-term variability and long-term changes in the status of the bay's health and facilitates in implementing appropriate protection for waterways. The collected data can be used to gain a better understanding of how water quality is impacted and will help us understand the important role we play in water conservation. Water quality issues influence human and environmental health, therefore, monitoring changes to the bay's waterways and having an adequate monitoring program is essential to being able to recognize and prevent contamination problems.

A healthy bay contains a balanced amount of nutrients and normal fluctuations in salinity and temperature. It also has plenty of oxygen, which is a basic requirement for nearly all aquatic biota, and little 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 bay encourage the growth of aquatic plants and algae. Although nutrients are essential to all plant life within the bay, 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 comes from diffuse sources such as stormwater runoff that collects sediment, nutrients, bacteria, pesticides, fertilizers, animal or human waste, heavy metals, oil and grease. When rain moves over and through the ground, the water absorbs and assimilates any pollutants it comes into contact with. Following a heavy rainstorm for example, water will flow across a parking lot and pick up oil left on the asphalt by cars. When these nutrient sources are not controlled, excess nutrients find their way into the groundwater, creeks, rivers, and eventually the bay. Stormwater runoff is considered the primary water quality threat in most of the watershed. It causes habitat degradation, fish kills and closure of shellfish beds and swimming areas (DEP, 2008). Continued long-term water quality monitoring is necessary and essential to protect the valuable natural resources in St. Andrews Aquatic Preserve.

Goal One: In collaboration with other entities currently doing monitoring, develop a strategic, long-term water quality monitoring program within St. Andrews Aquatic Preserve that will assist with identifying and addressing issues pertaining to the natural resources.

Objective One: Analyze and interpret the status and trends of water quality in St. Andrews Aquatic Preserve to identify potential impacts to natural resources, and provide quality scientific data and recommendations to address such issues.

Integrated Strategy One: Develop 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 dataloggers 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. Aquatic preserve staff will be responsible for the implementation of this project; with one staff member assigned to calibrate, deploy and retrieve, and maintain the dataloggers approximately every two weeks. Additionally, approximately 20 hours each month will be dedicated to organizing, plotting, and analyzing the data.

Integrated Strategy Two: Monitor nutrients and water clarity in St. Andrews Aquatic Preserve through a partnership with the RMA Baywatch team to determine total nitrogen and phosphorous, chlorophyll, and water clarity. This project requires RMA staff and volunteers to collect water samples and relevant data once a month at the designated sampling sites. Monitoring efforts began in 1990 and aquatic preserve staff will be available to assist with sampling efforts as needed. Through coordination and cooperation with DEP's Division of Environmental Assessment and Restoration, natural background levels of nutrients will be determined from comparisons of current and historical data and the development of a total nitrogen load allocation strategy. This project will also remain a high priority over the next 10 years as coastal development continues to increase.

Integrated Strategy Three: Evaluate and, if needed, expand Baywatch water quality sampling in St. Andrews Aquatic Preserve by adding more water quality monitoring sites within the aquatic preserve.

Goal One, Objective One - Performance Measures:

Performance Measure One: Develop an annual report detailing scientific results and recommendations regarding the water quality within St. Andrews Aquatic Preserve.

Performance Measure Two: Identify additional water quality monitoring sites.

Performance Measure Three: If needed, install dataloggers at additional water quality monitoring sites.

Objective Two: Identify specific and emerging water quality issues related to pollution sources and environmental contaminants and develop a response strategy to issues that may be indicated by reports or monitoring data.

Integrated Strategy One: Partner with other state and local agencies to identify potential point and nonpoint sources of pollution in St. Andrews Bay and develop a monitoring plan to effectively evaluate the impacts from this type of pollution. Efforts may include integrating current water quality data with geographic information system (GIS) technology to trace possible pollution sources.

Goal One, Objective Two - Performance Measures:

Performance Measure One: In coordination with other agencies, identify potential pollution threats.

Performance Measure Two: Develop a strategy to address issues, including planning, action and prevention.

Objective Three: Ensure the sustainability of scallop, fish, and other concerned species as well as salt marsh and seagrass 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 St. Andrews Aquatic Preserve.

Integrated Strategy One: Partner with other local and state agencies to assist in monitoring 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 data collecting and 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 St. Andrews Aquatic Preserve by establishing baseline data and broad scale characterizations of benthic communities which are sensible indicators of habitat quality in an aquatic environment.

Integrated Strategy Three: Acquire data and work in conjunction with other agencies to develop a biological assessment report.

Goal One, Objective Three - Performance Measures:

Performance Measure One: Work with other state and federal agencies to develop a database of all concerned species.

Performance Measure Two: Use water quality data and other indicators to create an approach to protect/ensure sustainability.

Performance Measure Three: Develop a biological assessment plan/report.

As human populations continue to grow along Florida's coastlines, anthropogenic impacts to seagrass habitats, including propeller scarring, occur more frequently.

Issue II: Protection of Seagrass Habitat

Seagrass communities are considered to be the most productive ecosystems in the world. They are a vital component of Florida's coastal ecology and economy. Seagrass habitat is an integral part of the St. Andrews Bay system and an important natural resource that performs a number of significant functions. Seagrasses provide nurseries, nutrition, and shelter for a wide variety of commercial and recreational fish and invertebrate species; they provide critical habitat for animals such as wading birds, manatees and sea turtles; and their extensive root systems stabilize sediments on the bay bottom, helping to improve water quality and clarity which in turn, keeps the bay healthy. The health and status of many commercially and recreationally important seafood species such as shrimp, crabs, scallops, redfish, trout and mullet is directly proportional to the health and acreage of seagrass habitat. For these reasons, many areas in Florida have implemented seagrass monitoring programs to determine the health and trends of local seagrass populations (DEP, 2008).

During the rapid population increase over the past 30 to 40 years, seagrass habitat has declined in inshore marine areas around Florida. As human populations continue to concentrate along the coastline, impacts to seagrass habitats increase through nutrient loading, light reduction, increased boat traffic, and more direct vessel impacts such as propeller scarring (Fonseca, Kenworthy, & Thayer, 1998). Deterioration in seagrass habitat has been attributed to both natural and human-induced disturbance, but human mediated disturbance is now the most serious cause of seagrass loss worldwide (Sargent, Leary, Crewz, & Kruer, 1995). Propeller scarring occurs in shallow water when a boat's propeller tears and cuts up seagrass roots, stems and leaves, leaving a long, narrow furrow devoid of seagrasses. This damage can take eight to 10 years to repair and with severe scarring these areas may never completely recover. Recovery time is different for each species and depends on the type of growth of each species, the degree of damage, water quality conditions, and sediment characteristics. The amount of destruction from an event depends on water depth and the size, speed, and path of the vessel. Some vessels create scars in areas at low tide that would not do so at high tides. Although linear features are most often associated with the term propeller scar, some areas of seagrass habitats have been completely denuded by repeated scarring. In other instances, a linear scar can become a larger feature if the sediments are scoured to undercut the seagrass bed. This erosion can result in detachment of large sections of seagrasses that then float away leaving behind patches of bare sediment wider than the original propeller scar (Dawes, Phillips, & Morrison,

2004). According to a 1995 Florida Marine Research Institute Technical Report, Scarring of Florida's Seagrasses: Assessment and Management Options, Bay County has 10,530 acres of seagrass habitat and 4,950 acres (47.0 percent) of that has been lightly to severely scarred by vessels (Sargent, Leary, Crew, & Kruer, 1995). Scarred seagrasses have been observed in all areas of the state, mostly in shallow coastal waters less than six feet deep. This is a conservative estimate of scarring because groups of scars were mapped, not isolated, individual, propeller scars.

According to an aerial seagrass survey conducted by FWRI, Florida has more than 2.5 million acres of seagrass in its shallow coastal waters. Seagrasses that are affected by propeller scarring may never completely recover and areas that have been damaged have the potential to expand and merge with other injuries resulting in even greater cumulative impacts. Impaired water clarity due to turbidity, algal blooms, and improper disposal of dredged material as well as excessive nutrients and disease may also degrade valuable seagrass habitat. Elevated nitrogen levels stemming from increased commercial and residential development may lead to a decline in the relative abundance of seagrasses compared to phytoplankton and macroalgae, including epiphytes. High nutrient levels may also make seagrasses more susceptible to disease (DEP, 2008). St. Andrews Bay is a unique and fragile ecosystem that is host to abundant concentrations of marine grasses. Three different species of seagrasses are known to occur within the aquatic preserve: Cuban shoal grass, manatee grass, and turtle grass. Star grass (*Halophila engelmanni*) and widgeon grass (*Ruppia maritima)* also occur at low densities in the bay, but are found outside aquatic preserve boundaries. These communities are critically important to the health and vitality of the waters of the bay; however, prominent and increasing propeller scar damage along with an increase in nutrient levels is evident and increasing in many areas. With increasing development and visitor use, these trends are expected to continue.

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 St. Andrews Aquatic Preserve.

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

Integrated Strategy One: Develop and implement a Seagrass Monitoring Plan for St. Andrews Aquatic Preserve that maintains a strategic, long-term seagrass monitoring project to include water quality indicators, percent coverage of seagrass and algae species, algae identification, density, epiphyte load, and sediment depths. This will be done in coordination with RMA and volunteers.

Goal One, Objective One – Performance Measure: Develop a St. Andrews Aquatic Preserve Seagrass Monitoring Report. 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. This report will be updated every five years.

4.2 / The Resource Management Program

The Resource Management Program addresses how FCO manages St. Andrews Aquatic Preserve and its resources. The primary concept of St. Andrews Aquatic Preserve resource management projects and activities are guided by FCO's mission statement: "Conserving and restoring Florida's coastal and aquatic resources for the benefit of people and the environment." FCO's sites accomplish resource management by physically conducting management activities on the resources for which they have direct management responsibility, and by influencing the activities of others within and adjacent to their managed areas and within their watershed. Watershed and adjacent area management activities, and the resultant changes in environmental conditions, affect the condition and management of the resources within their boundaries. 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. St. Andrews Aquatic Preserve also collaborates with these groups by reviewing various protected area management plans. The sound science provided by the Ecosystem Science Program is critical in the development of effective management projects and decisions. The nature and condition of natural and cultural resources within St. Andrews Aquatic Preserve are diverse. This section explains the history and current status of our resource management efforts.

4.2.1 / Background of Resource Management at St. Andrews Aquatic Preserve

Resource management activities have focused on both the impacts of an individual action, as well as the cumulative impacts of all changes and actions on the natural system (DEP, 2008). St. Andrews Aquatic Preserve staff have been responsible for reviewing and commenting on proposed environmental regulatory permits, Minimum Flows and Levels, Total Maximum Daily Loads (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 such as, conducting field assessments, making comments and recommendations to appropriate agencies, ensuring consistency with all established rules and regulations, notifying the appropriate regulatory agencies of violations and illegal activities. Maintaining good communication between all local, state, and federal environmental regulatory agencies is essential to protecting the resources of St. Andrews Aquatic Preserve. Protection of adjacent lands is one of the best ways to protect St. Andrews Aquatic Preserve's resources. A tremendous effort has been made by state, federal, and other entities to purchase lands adjacent to St. Andrews Aquatic Preserve.

4.2.2 / Current Status of Resource Management at St. Andrews Aquatic Preserve

Listed Species Management

A species must be federally listed as endangered or threatened to be protected under the Endangered Species Act. An endangered species is in danger of extinction throughout all or a significant portion of its living range. A threatened species is likely to become endangered in the foreseeable future, if measures are not taken to reverse its decline. Species of Special Concern are those that warrant special attention even though they do not fit the other categories. Extinction can be caused by habitat destruction, invasive species, disease and pollution. In many cases, these listed species will benefit most from proper management of their natural communities. Natural systems management will simultaneously help preserve the listed species which inhabit those systems. At times, however, additional management measures, such as increasing public awareness through interpretive literature and programs, are needed because of the disturbed condition of some communities, or because of unusual circumstances which aggravate the particular problems of the species.

With increasing development in the area, there is a future need to continue to monitor population trends of listed species within the aquatic preserve by direct or indirect research. Priority species will be chosen based on their listing and their susceptibility to impacts due to habitat alterations. Efforts will continue to provide technical and logistical support to research and monitoring projects and stranding events and to provide educational information to citizens, coastal decision-makers, and government agencies on these species and the habitat they utilize within the aquatic preserve. Listed species currently monitored within the aquatic preserve are discussed in the following sections.

Shorebird nesting research and monitoring

Although most bird species are not designated as protected under the Endangered Species Act, migratory birds are protected under the Migratory Bird Treaty Act. Under the provisions of the Migratory Bird Treaty Act, it is unlawful, among other actions, to pursue, hunt, take, capture, or kill any migratory bird except as permitted by regulations issued by the U.S. Fish and Wildlife Service.

Shorebird nesting surveys are completed each year on St. Andrews State Park as a partnership between DEP's Florida Parks Service and Audubon Florida. Breeding season for shorebirds is recognized as February 15 to August 31. However, surveys end when the last brood fledges, which can be as late as the last week of September. During the nesting season the park is monitored for nesting activity on a weekly basis by park and district staff. Nests are located and monitored for fate (hatch or fail). If nests fail, efforts are made to determine the cause for failure (e.g., predation, overwash, abandonment, etc.). For Wilson's plover (*Charadrius wilsonia*) and snowy plover nests that hatch, efforts are made to color-band adults and chicks. Bands are used in the short term to monitor fledge rates and establish local population abundance. Over the long term, banding is used for survival analysis. For the banding program, emphasis is placed on the chicks because doing so establishes known-age cohorts. At St. Andrews State Park, banding efforts for snowy plovers began in 2008 and in 2012 for Wilson's plover. All banding efforts are in collaboration with FWC, U.S. Fish and Wildlife Service, and the University of Florida. For colonial nesting species, (i.e., least terns, black skimmers, and gull-billed terns [*Gelochelidon nilotica*]) nests are monitored for fate. Once nests hatch, chicks at various stages are counted (e.g., downy, pin-feather, or fledged) to get an idea of hatch and fledge rates by species for the colony. All nesting data for all shorebird species is entered into the Florida Shorebird Alliance database. All nesting surveys are completed following established protocol by FWC, Florida Shorebird Alliance, and the Division of Recreation and Parks standard and specific requirements for the district.

In response to multispecies habitat management that includes predator removal and protection of nesting and brood rearing habitat from potential impacts related to human disturbance, a substantial increase in nesting shorebirds has occurred at St. Andrews State Park (Pruner, Friel, & Zimmerman, 2011). For example, zero snowy plovers were documented on Shell Island in 1989 (Chase & Gore, 1989), 10 individuals were documented in 2006 (Himes, Douglass, Pruner, Croft, & Seckinger, 2006), 28 in 2009 (Pruner et al., 2011), and in 2012, 38 individual snowy plovers were documented nesting on Shell Island. Wilson's plovers, least terns, and black skimmers also consistently nest on Shell Island.

Sea turtle nesting research and monitoring

From May 1 – October 31, St. Andrews State Park staff attempt to conduct sea turtle nest surveys daily as per FWC Marine Turtle Conservation Guidelines (2007). Two species of sea turtles are known to nest at the park. The majority of nests are from loggerhead sea turtles, but leatherback sea turtles also nest on the park.

From 1996 to 2012, the average number of sea turtle nests at St. Andrews State Park (mainland and Shell Island) was 10.8 nests. Green and Kemp's ridley turtles are in the surrounding area, but there are no records of either species nesting on the park. Coyotes, storm surge and artificial lighting are the main threats to sea turtle nests and hatchlings at the park. Sky glow can be seen from the park, particularly on the mainland, but disorientation events are rare. From 2006-2012, there were seven known sea turtle disorientations from artificial lighting on Shell Island and the mainland. However, disorientations have not been reported for the past two years. Five of the seven disorientations occurred on Shell Island in 2006 following the hurricanes of 2004-2005. The erosions of the primary dunes from storm activity likely increased the amount of sky glow observed from the island. Disorientations on the mainland were observed in 2009 from nests located near the western park boundary and hatchlings were observed moving towards the neighboring development. Coyotes regularly dig up nests on Shell Island. Predator control is very important to prevent continued nest predation (R. Pruner, personal communication, March 2, 2015).

To the west of the state park boundaries, sea turtle nests are monitored by the Turtle Watch group, a part of RMA. Turtle Watch was started in 1991 and is a group of volunteers whose common purpose is to locate sea turtle nests, protect them until hatching, and help the hatchlings make it safely to the water. RMA monitors sea turtle activity along 17.6 miles of Gulf beach between St. Andrews State Park and Camp Helen State Park. Volunteers survey the beach every night during nesting season (May 1 - October 31) using all-terrain vehicles. When a nest is located, it is marked with four stakes connected with orange ribbon and yellow caution tape. An informational sign identifies the area as a turtle nest, and a green tag has the sequential nest number. Volunteers check the nests twice nightly for signs of hatchling emergence, beginning at incubation day 50. Any disoriented hatchlings are collected and released on a dark beach (RMA, n.d.-c).

Thirty-seven nests and 23 non-nesting emergences (false crawls) were made by threatened loggerhead turtles during 2014, representing the third highest annual nesting since monitoring began in 1991. No crawls from other species were found. The nests produced 3,115 hatchlings from 4,017 eggs for an overall emergence success of 78 percent. This is the largest annual hatchling production since monitoring began in 1991. Thirteen loggerhead nests laid close to the water were moved to a higher elevation nearby within 12 hours of deposition to protect the eggs from surf flooding. The relocated nests had an overall emergence success of 81 percent compared to 76 percent for the in situ nests. Artificial lights from beachfront development represent the primary threat to sea turtles on developed beach, a threat that is being addressed by a lighting ordinance in effect throughout the survey area. Of the 30 nests that hatched at night, 1,545 of 2,628 hatchlings (59 percent) were adversely affected by artificial lights. Additionally, three adult female loggerheads were disoriented on the beach while returning to the water after nesting. These results are improved from the 2013 nesting season, when 72 percent of hatchlings and six adults were affected by lights. The two largest contributors were street lights (16 percent) and exterior condo lights (15 percent) (K. Watson, personal communication, June 9, 2015).

Habitat Restoration and 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, 2000). Therefore, it is important to evaluate each project on a case by case basis.

Seagrass Restoration

The seagrass habitat in St. Andrews Aquatic Preserve is valuable to Bay County's economy and has remained an area of focus over the years. In recent years, the loss and decline of seagrass beds has been well documented throughout the Gulf of Mexico. Stormwater discharge, fugitive sediments, and physical stressors from propeller scarring and dredging are some of the potential factors that result in secondary and cumulative impacts to these seagrass communities. Seagrasses typically are slow to recover when damaged or cut. The actual recovery time is different for each species and depends on the type of growth of each species, the degree of damage, water quality conditions, and sediment characteristics. Repairing damaged areas will, in turn, protect vital coastal habitats and those commercial and recreational industries dependent on them.

In 2010, FWC's Marine Estuarine Subsection of the Aquatic Habitat Conservation and Restoration Section, in conjunction with aquatic preserve and state park staff, completed a seagrass restoration project in St. Andrews Aquatic Preserve to address seagrass habitat that had been severely damaged by propeller scars. In 2007, sediment tubes, which are essentially biodegradable "socks" filled with local grain sand, were placed in propeller scars in order to raise the sediment to ambient grade and thus accelerate seagrass recolonization. In addition, an outreach and education component of the project included placement of non-regulatory "Caution: Shallow Seagrass" signs near seagrass areas and informational kiosks at local boat ramps.

Staff monitor seagrass sites in the aquatic preserve to determine seagrass distribution, abundance, and overall health of the habitat.

Restoration sites were monitored during in-water surveys of selected propeller scars both treated with sediment tubes and scars left untreated, to determine if sediment tubes create conditions more suitable for rapid seagrass recovery. In addition, aerial photography of propeller scars was used to analyze changes in propeller scar occurrence over time to assess the effectiveness of the sign installations.

These monitoring efforts showed that the installation of sediment tubes did accelerate seagrass recovery in propeller scars, but effective means of addressing continuing propeller scar formation from vessel traffic needs to be incorporated into a management regime for the affected areas. The monitoring also looked at propeller scar formation in areas marked with non-regulatory shallow seagrass signs, and found that, despite the signs, propeller scars continued to be formed and in some areas, scarring worsened (Gudeman et al., 2010).

St. Andrews Aquatic Preserve staff, along with staff from Florida Parks Service and RMA surveyed the area of FWC's previous seagrass restoration efforts, (which are located on the bayside of Shell Island) in May of 2015 and found that while there were no signs of sediment tubes remaining in any of the areas, new propeller scars were evident in all of the previous restoration sites. With ever increasing boat and personal watercraft traffic in this area, it is clear that more work will need to be done to educate the public about safe boating practices, and enforcement of seagrass damage penalties is also necessary. St. Andrews Aquatic Preserve will continue to partner with FWC, the Florida Park Service, and RMA in future seagrass restoration and protection efforts.

Shoreline Restoration

Extreme high tides, wave action, 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 play a role in maintaining 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 (NWFWMD, 2000). St. Andrews Aquatic Preserve is a supporter of "Living Shorelines Initiative" that is sponsored by the U.S. Fish and Wildlife Service and is carried out in St. Andrews Bay by RMA.

RMA has been performing shoreline restoration projects since 2003. RMA assists property owners to determine feasibility of using native plants instead of armoring for shoreline stabilization. RMA worked with property owners to complete four projects in August 2014. RMA coordinated project design, permitting, plant acquisition, and volunteer labor to install the plants. Homeowners paid for the native marsh plants (smooth cordgrass [*Spartina alterniflora*]), and helped with the planting. These opportunities are a win-win situation. In most cases restoring a shoreline using natural techniques is less expensive than armoring with seawalls, provides valuable habitat for wildlife, and has proven to be effective at preventing additional erosion. There are many benefits to a natural marsh shoreline over a modified hardened shoreline. Marsh grasses help to prevent erosion by buffering the impact of wind and waves on the shoreline. As the plants grow, they trap sediment which will stabilize and actually build the shoreline, a benefit not provided by shoreline armoring. They help improve water quality by filtering pollutants that run off the land and into the bays, creeks, and bayous (RMA, 2015; Ray-Culp, 2007). St. Andrews Aquatic Preserve plans to coordinate with both RMA and Northwest Florida Aquatic Preserves in any future living shoreline projects in or near the aquatic preserve.

Recreational harvest of bay scallops has been closed in St. Andrews Bay since 2002. FWC is planning restoration efforts to boost population numbers.

Bay Scallop Restoration

The recreational bay scallop fishery in St. Andrews Bay has been closed since 2002 due to unstable populations. Historically, scallops were harvested in all areas of the bay system that contained seagrass beds. Scallop restoration efforts have been led by the Molluscan Fisheries Research Group, a division of FWRI. In 2003, FWRI received funding for a five year restoration effort in coordination with RMA, Gulf Coast State College and NOAA's National Marine Fisheries lab. This restoration program's goal was to re-invigorate local populations that were thought to have low recruitment rates. Adult scallops were collected from St. Joseph Bay in neighboring Gulf County and were delivered to Bay Shellfish Company's hatchery in St. Petersburg, Florida, and conditioned until spawning occurred. Larvae were collected and then planted into each of four areas in

St. Andrews Bay where they could settle onto the seagrass blades within an enclosure. This method was continued each year and both adult and juvenile scallops (spat) were monitored throughout the study period. Unfortunately this project was not successful in re-establishing the bay scallop population in St. Andrews Bay (FWC, 2008).

In 2008, FWRI began collecting wild scallop spat from St. Andrews Bay and delivering them to Gulf Coast State College staff who used them as educational tools in the spring semester. Students measured the scallop's shell height each month, while recording water quality at the same time. At the end of each semester, any remaining scallops were released back into seagrass beds in St. Andrews Bay. Preliminary results of this effort look successful, with higher highs and fewer low recruitment years, but the cause of the jump in recruitment is still unclear (S. Stephenson, personal communication, June 29, 2015).

More recently, as part of the Natural Resource Damage Assessment phase III response from the Deepwater Horizon oil spill that occurred in 2010, a 10-year restoration effort was awarded to FWRI that will target the Panhandle region and focus on stabilizing local scallop populations. Those efforts are anticipated to begin in 2015 and the St. Andrews Bay system will be a heavily targeted area as part of that restoration plan (FWC, 2015a). St. Andrews Aquatic Preserve staff will assist in FWRI's bay scallop restoration projects as needed.

Invasive Non-native and Native Removal and Treatment

On Shell Island, coyotes and feral cats pose a risk to endangered sea turtle and shorebird nests. U.S. Department of Agriculture is contracted to trap coyotes on Shell Island, and state park staff trap for feral cats whenever possible, typically from September to April (M. Shoemaker, personal communication, June 12, 2015).

Invasive animals are also of concern, particularly aquatic invasives. Invasive Indo-Pacific lionfish are proving to be an ever-present danger to the balance of marine ecosystems along the Gulf of Mexico. Lionfish were first documented in St. Andrews Bay in 2011 and have been seen inside the west jetty of the main channel entrance, within the boundaries of the aquatic preserve (USGS, 2013). Lionfish are a predatory reef fish. They eat native fish, which can reduce native populations and have negative effects on the overall reef habitat and health as they can eliminate species that serve important ecological roles such as fish that keep algae in check on the reefs. Lionfish also compete for food with native predatory fish such as grouper and snapper (FWC, 2015b).

Currently, FWC is encouraging the harvest of lionfish which are reported as excellent table fare. Effective August 2012, FWC announced changes to the lionfish harvest. Harvesting invasive lionfish no longer will require a fishing license when using certain gear, and there is no recreational or commercial bag limit. FWC has also hosted several "Lionfish Derby" events and workshops to encourage divers to spear lionfish (FWC, n.d.-d). St. Andrews Aquatic Preserve will coordinate with FWC to organize workshops and derby events in the Panama City area in order to work toward eradicating lionfish in the aquatic preserve and surrounding waters.

4.2.3 / ***Resource Management Issues***

Issue I: Water Quality (Continued from Water Quality issue in Ecosystem Science section.)

Goal One: Develop a strategic, long-term water quality monitoring program within St. Andrews Aquatic Preserve that will assist with identifying and addressing issues pertaining to the natural resources. (Same goal as in Ecosystem Science section.)

Objective Two: (Numbering continued from the same issue and goal in Ecosystem Science section.) 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.

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

Integrated Strategy Three: Support the development of TMDLs. Staff will contribute water quality data to assist in the development of an assessment report documenting scientific data, results, conclusions, and recommendations regarding TMDLs within St. Andrews Aquatic Preserve.

Goal One, Objective Two - Performance Measures:
Performance Measure Three: In coordination with other state agencies, identify potential pollution threats in and around St. Andrews Aquatic Preserve.
Performance Measure Four: Develop a strategy to address issues, including planning, action and prevention.

Issue II: Protection of Seagrass Habitat. (Continued from same issue in Ecosystem Science section.)

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 St. Andrews Aquatic Preserve. (Continued from same goal in Ecosystem Science section.)

Objective One: Monitor the status and trends of seagrass distribution within St. Andrews Aquatic Preserve to determine the overall health and identify potential threats to the habitat. (Continued from same objective in Ecosystem Science section.)

Integrated Strategy Two: (Numbering continued from the same issue, goal, and objective in Ecosystem Science section.) Continue to collaborate with FWC and other state agencies on the Seagrass Integrated Mapping and Monitoring report to produce a resource for seagrass monitoring, mapping, and data sharing.
Integrated Strategy Three: Utilize advanced GIS technology and hyperspectral imagery to quantify gains or losses to seagrass acreages, identify severely scarred areas to determine restoration needs, assess management options and develop a seagrass restoration plan for St. Andrews Aquatic Preserve.
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 St. Andrews Aquatic Preserve. 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.

Goal One, Objective One – Performance Measure: Develop a St. Andrews Aquatic Preserve Seagrass Monitoring Plan. 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. This report will be updated every five years.

Goal Two: To restore areas of severely scarred seagrass and prevent further damage from propeller scars.

Objective One: Develop a seagrass restoration plan for St. Andrews Aquatic Preserve.

Integrated Strategy One: Partner with RMA, Florida Park Service, FWC, and local volunteers to survey the most severely scarred areas to prioritize areas with the greatest need for restoration.
Integrated Strategy Two: Seek funding for future seagrass habitat restoration projects in St. Andrews Aquatic Preserve.
Integrated Strategy Three: Coordinate with FWC law enforcement to ensure enforcement of the seagrass law prohibiting destruction of seagrasses in St. Andrews Aquatic Preserve. Create a mechanism to estimate the cost associated with the loss and restoration of seagrass beds in the area.

Goal Two, Objective One Performance Measure: Measure acreage of restored areas and percentage of success of the restored areas to be determined by post-monitoring study.

4.3 / The Education and Outreach Management Program

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

4.3.1 / *Background of Education and Outreach at St. Andrews Aquatic Preserve*

Education and outreach programs conducted by St. Andrews Aquatic Preserve are designed to promote the goal of maintaining aquatic preserves at their current level of environmental quality for future generations. Coordinating and participating in education and outreach events proves difficult at times due to a lack of staff and budget. Common target audiences for education and outreach events include: landowners and developers, commercial and recreational resource users, students at all grade levels, organized groups, the general public, and government agencies (local, regional, state, and federal). Specific examples of education and outreach activities include: coordinating volunteer networks; developing and distributing informational brochures, posters, kiosks, and signage; participating in local events and festivals; organizing coastal marine debris removal programs, and participating in a variety of workshops and conferences. In the Panhandle region, public events and festivals, constructing kiosks, and publishing brochures, pamphlets and posters are the most effective methods to communicate information about coastal resources. Specific areas of volunteer involvement include, but are not limited to: assisting with field sampling, data entry, routine maintenance, kiosk construction, and providing support at outreach events.

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

The human dimension is an essential component of resource and ecosystem management. Education and outreach are tools managers can use to address the human dimensions of resource issues. Combined with research, regulations, and habitat management, education and outreach provide a comprehensive approach to resource protection. The adoption and implementation of education and outreach programs improves the public's knowledge for species and habitat protection and conservation. The intent of the aquatic preserve education and outreach efforts is to foster informed and responsible stakeholders of the natural resources in the bay. Goals include educating citizens, coastal managers, target groups and developers to use the environment in ways that preserve it, consider environmental issues when planning and making decisions which could affect the environment, and take part in decisions affecting nearby natural resources.

St. Andrews Aquatic Preserve strives to provide accurate and comprehensible information about the natural resources within the aquatic preserve to the stakeholders, the general public, and local, state, and federal agencies. In addition to informational pamphlets and brochures, staff has also installed informational signage at the St. Andrews State Park boat ramp, with other locations being planned for the future. Staff has worked with other agencies and local governments to install signage in the area, providing important information regarding St. Andrews Aquatic Preserve, boater safety, recreational issues, and protecting seagrasses and other habitats.

Staff participate in education and outreach events throughout the Florida Panhandle to provide information about the natural resources found in the aquatic preserve. (Photo: Apalachicola Times)

Staff attends local and regional meetings and working groups to present and disseminate relevant information, such as data trends in water quality, about St. Andrews Aquatic Preserve, focusing on the protection, preservation, and enhancement of the environment and encouraging sound decision-making regarding land use and natural resources. Additionally, staff participates in a variety of local events that promote environmental protection and resource conservation; these include, but are not limited to: International Coastal Cleanup, Seagrass Awareness Month, Earth Day, Estuaries Day, and many others.

In the future, St. Andrews Aquatic Preserve aims to maintain and continue current education and outreach efforts to educate the public, stakeholders, and local, state, and regional officials. Staff will continue to update and distribute informational handouts and brochures. Additionally, kiosks will be

Aquatic preserve staff divers give the "OK" signal as they prepare to collect benthic samples. Baseline data collected during ecosystem monitoring helps managers make more informed decisions on ways to protect our natural resources.

maintained, updated, or installed at new locations, as new and more pertinent information needs to be presented. Also, St. Andrews Aquatic Preserve staff will continue to attend local and regional meetings and conferences to obtain, discuss, and distribute vital information pertaining to the protection, conservation, and enhancement of resources within the aquatic preserve. Social media has become an increasingly popular and convenient way to reach a wide range of audiences. St. Andrews Aquatic Preserve will work toward a bigger presence in social media, particularly Facebook and Twitter, to update local residents and visitors about upcoming events, research, and other pertinent information.

Aquatic preserve staff also hopes to continue participating in many outreach events and festivals to encourage sound resource management and the conservation and protection of St. Andrews Aquatic Preserve. Furthermore, expanding the volunteer network within St. Andrews Aquatic Preserve is a major goal. Volunteer support enables staff to more effectively complete field work and participate in many outreach events. St. Andrews Aquatic Preserve staff rely heavily on other agencies for volunteer coordination when participating in local events throughout the Panhandle; with such a small staff, maintaining current records of volunteers proves difficult. Creating a "Friends Group" or citizen support organization strictly for St. Andrews Aquatic Preserve would be beneficial for promoting volunteer opportunities within the aquatic preserve. St. Andrews Aquatic Preserve aims to develop a more structured and sound volunteer program in the future. There is also a need to develop a school-based program to bring the bay to the local students. The aquatic preserve will coordinate with local schools in the future to develop and implement an educational program that will involve lectures, information, and field trips to the bay to discuss the importance of the ecosystem. Education and Outreach programs in St. Andrews Aquatic Preserve are critical to the protection, conservation, and enhancement of the aquatic and coastal resources.

*4.3.3 / **Education and Outreach Issues***

Issue I: Water Quality (Continued from same issue in Resource Management section.)

Goal Two: (Numbering continued from the same issue in Resource Management section.) 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 DEP's Division of Environmental Assessment and Restoration (DEAR) to contribute to a centralized water quality storage database and website. DEAR is working toward 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: Contribute to a storage database, in collaboration with DEP and the three National Estuarine Research Reserves, to ensure data is available to the public.

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 St. Andrews Aquatic Preserve.

Integrated Strategy One: Utilize educational signage at strategic access points to St. Andrews Aquatic Preserve 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, citizen scientist opportunities, etc.).

Goal Two, Objective Two - Performance Measures
Performance Measure One: Create and revise informational brochures to disseminate to the public.
Performance Measure Two: Track number of St. Andrews Aquatic Preserve kiosks that are installed, updated, or repaired throughout the Panama City area.
Performance Measure Three: Track number of people that attend public lectures on water quality or other outreach events.

Issue II: Protection of Seagrass Habitat (Continued from same issue in Resource Management section.)

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 St. Andrews Aquatic Preserve. (Continued from same goal in Resource Management section.)

Objective Two: (Numbering continued from the same goal in Resource Management section.) Promote the importance of seagrass habitats by generating a variety of informational outlets that target recreational, commercial, and scientific user groups operating in St. Andrews Aquatic Preserve.

Integrated Strategy One: Design and distribute brochures and other outreach materials that include 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 St. Andrews Aquatic Preserve.
Integrated Strategy Three: Provide educational and informational materials, such as boater's guides and brochures to local government, businesses, marinas, and tour operators.
Integrated Strategy Four: Continue to organize and participate in educational classes and outreach events throughout the Panhandle to promote the importance of seagrass and other estuarine habitats.
Integrated Strategy Five: Coordinate with local boat and personal watercraft rental companies, snorkel tour companies, and other tourism-driven businesses to inform visitors of proper boating practices to reduce the amount of propeller scarring in seagrasses. This could include but is not

limited to informational brochures, public service announcements or videos to be shown prior to outings in the bay.

Goal One, Objective Two – Performance Measures:
Performance Measure One: Produce and acquire brochures and signage informing users of the importance of seagrass habitat, water quality, and good boating practices that can be used to prevent destruction of seagrasses.
Performance Measure Two: Track number of signs that are repaired or installed.
Performance Measure Three: Track number of events attended.
Performance Measure Four: Track education and outreach measures used by rental companies.

4.4 / The Public Use Management Program

The Public Use Management Program addresses the delivery and management of public use opportunities at the aquatic 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.

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. Andrews Aquatic Preserve

St. Andrews Aquatic Preserve is located adjacent to St. Andrews State Park which provides easy access to the aquatic preserve through a boat ramp and public swimming areas. Popular recreational activities include fishing, boating, swimming, snorkeling, SCUBA diving, personal watercraft use, sunbathing, and beachcombing. Boat tours to Shell Island are also a popular activity and are provided by private businesses on the mainland. Historically commercial harvesting of bay scallops was permitted within the bay but this proved to be a controversial aspect of the marine harvest since it competed with the recreational harvesting of scallops. By 1994, however, commercial scalloping was banned completely and in 2002 recreational harvest was also closed in the area due to unstable populations. Today, commercial fishing and shellfish harvesting within the St. Andrews Aquatic Preserve is limited; in 2009 only 14 commercial blue crab and one stone crab harvesting licenses were sold in Bay County (FWC, 2009). Most commercial fishing vessels are docked in Grand Lagoon and may pass through St. Andrews Aquatic Preserve on their way to their offshore fishing grounds but do not actively fish in the aquatic preserve.

Primary public use issues in St. Andrews Aquatic Preserve include: boater use and safety, water quality, and marine debris. The health of the seagrass beds is very important, and it is a major goal of St. Andrews Aquatic Preserve to maintain and improve seagrass health. Seagrass beds are vital habitat for many commercially important species. The shallow waters and unmarked sandbars, coupled with boater carelessness pose a threat to seagrass beds, resulting in propeller scarring being a major issue in the aquatic preserve. As development and population pressures increase, potential negative impacts may affect water quality in the aquatic preserve. Staff will continue to monitor seagrass health and water quality in the aquatic preserve to assess effects of recreational and developmental pressures.

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

St. Andrews Aquatic Preserve encourages sustainable use of natural resources while minimizing user impacts. Public support and participation are imperative to protecting natural resources. Strong citizen support is vital to the success of the aquatic preserve's programs. Public participation in resource management enables them to understand the important ecological and economic issues of the system. The goal is to foster understanding of the problems facing these fragile ecosystems and the steps needed

to adequately manage this important habitat. In addition, it is important to target specific user groups that enjoy the area. Knowledge of how the bay system works and the resources that make up the system can contribute to the reduction of habitat and species decline. Providing factual, timely information that is appropriate to the target user groups, coastal managers, citizens and developers is a major goal of the aquatic preserve. Additionally, upland development activity has the potential to have a significant adverse impact on the natural resources of the aquatic preserve. Regularly scheduled meetings between the county and the aquatic preserve should be coordinated to discuss the effectiveness of the management plan and to discuss the enforcement of applicable resource laws and ordinances.

The major uses of St. Andrews Aquatic Preserve continue to revolve around recreational activities. The clear and shallow waters of the aquatic preserve offer excellent fishing and snorkeling opportunities due to the lush seagrass habitat that supports a variety of commercial and recreational fish species. The majority of the vessels in St. Andrews Aquatic Preserve are recreational boaters. There are more than 50 boat ramps that provide access to the St. Andrews Bay system, although some are private, only to be used by military personnel, or require a fee. The closest public boat ramps that provide access to the aquatic preserve are available at the St. Andrews State Park boat ramp, Dolphin boat ramp, Safari Street boat ramp, Panama City Civic Center Marina, St. Andrews Marina, and Carl Grey Park boat ramp. In addition to public boat accesses, many visitors to the area access St. Andrews Aquatic Preserve from private launches owned by boat rental companies. Many of these are located in Grand Lagoon. Map 15 shows the closest access points to St. Andrews Aquatic Preserve.

The clear waters of St. Andrews Aquatic Preserve offer some of the best fishing in the Florida Panhandle.

Many users of the bay may not be aware of how their daily activities impact the natural resources associated with St. Andrews Bay. Therefore, an education and outreach component to accomplishing the aquatic preserve's goals and objectives is crucial to ensuring effective management of the bay system from future impacts. Increased use of the aquatic preserve, for recreation and visitation, results in development pressure on the surrounding lands. This in turn results in increased potential to degrade water quality through stormwater runoff and other nonpoint pollution sources as well as providing public beach and bay access problems. A need exists to acquire information regarding our visitors in order to provide recreation access that is consistent with resource protection. To develop a management program for the resources of the St. Andrews Aquatic Preserve it is essential to understand how people use the resource in addition to the biology and ecology of the bay.

St. Andrews Aquatic Preserve will continue to assist the local government with public access issues in the form of making recommendations based on natural resource information and data. Management efforts will continue to focus on research and monitoring activities that provide sound, scientific data on the natural resources within the bay in order to make appropriate management decisions, and public education through the use of signage, presentations, brochures and marked channels.

4.4.3 / ***Public Use Issues***

Water quality and protection of seagrass habitat are two key issues for St. Andrews Aquatic Preserve. While both have public use components, those components overlap with components for other management programs, particularly the Education and Outreach Program. Since they were addressed in that section, those objectives and strategies will not be repeated here.

Issue III: Sustainable Public Use

St. Andrews Aquatic Preserve and the surrounding Panama City Beach area are an increasingly popular tourist destination, especially in the summer months. Sugar white sand beaches, lush seagrass beds, and lots of other tourist attractions bring in visitors from near and far. In 2013, St. Andrews State Park was the fourth most visited state park in Florida with 893,102 visitors (Garman, 2013). Shell Island is an extremely popular beach, swimming and snorkeling destination for visitors and locals alike. St. Andrews Aquatic Preserve encourages sustainable use of natural resources while minimizing user impacts.

The area surrounding St. Andrews Aquatic Preserve is one of the only relatively undeveloped areas in Panama City Beach and provides many opportunities for the public to enjoy the aquatic preserve's natural resources. Popular recreational activities include, but are not limited to: boating, personal watercraft use, fishing, kayaking, snorkeling, and swimming. Public support and interagency participation are imperative to protecting natural resources. Public participation in resource management enables them to understand the important ecological and economic issues of the system.

By examining existing public use and natural resource patterns and trends, St. Andrews Aquatic Preserve staff can proactively identify potential conflicts and work with stakeholders to prioritize strategies to sustain a healthy ecosystem for the benefit of Florida residents and visitors. Ecological services derived from healthy ecosystems include aesthetics, water, food, carbon storage, storm buffers,

Map 15 | Public access at St. Andrews Aquatic Preserve.

and pollution abatement. These can sustain human life and support social and economic prosperity (Turner et al., 2007). Raising public awareness for the valuable services that a healthy bay provides is a priority objective to build stakeholder support to conserve and restore this important natural resource.

Addressing issues such as marine debris is important in assessing the overall health of the aquatic preserve. 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.

Historically, anglers and divers in the Bay County area have placed materials on the bottom of St. Andrews Bay just north of Shell Island to create an artificial reef system. The artificial reefs were placed inshore to provide easily accessible focal sites moderately protected from bad weather (near the Panama City main inlet channel). Sometime in the mid-1970s, a 150 foot long barge sank in 19 feet of water in St. Andrews Bay. It is unclear if this barge, called the “Spanish Shanty barge” or “Tar barge” was accidentally or intentionally sunk (Berg & Berg, 1991). Also in the inshore debris area are several lifeboats that were reportedly taken from Liberty ships (a class of cargo ship built during WWII) that were sunk offshore as artificial reefs around 1977 (Gudeman et al., 2010). It is assumed that because these existing reefs were in the area, local fishermen, tour boat operators and divers added material to

Map 16 | Non-authorized artificial reefs at St. Andrews Aquatic Preserve.

nearby sites, perhaps thinking they were permitted reef sites. A wide variety of fouled marine debris now covers a large portion of the bay bottom (Map 16). The materials used are not considered appropriate as artificial reef substrates nor is the location, near seagrass beds, acceptable. Records indicate no documentation of a DEP or U.S. Army Corps of Engineers artificial reef permit for this location. Many of these materials are in close proximity to very high density seagrass beds. The potential impact of these unpermitted reef materials on nearby seagrass communities prompted an assessment of the marine debris on this site by St. Andrews Aquatic Preserve and FWC staff in 2007. The inspection of the area indicated the materials to be composed of a variety of disposed items, including but not limited to, shopping carts, folding tables, plastic crates, cinder blocks, appliances, and children's car seats. The combined effects of deterioration over time of the materials and settlement into the sediment severely limits the reef habitat value of the materials. This area is currently more of a scattered debris field than an organized functional artificial reef. St. Andrews Aquatic Preserve will continue to work with FWC, Northwest Florida Aquatic Preserves, and RMA to determine the best course of action for the debris field site. Possible remedies could include the removal of the marine debris objects while looking into appropriate sites for an approved artificial reef structure.

Dolphin encounter tours have become increasingly popular within St. Andrews Bay. While many dolphin tour companies only advertise dolphin sightseeing tours and adhere to strict guidelines, some allow illegal behaviors, such as in-water interactions and the feeding of wild dolphins. The Marine Mammal Protection Act of 1972 prohibits the "take" of all marine mammals. According to the act, take is defined as "to harass, hunt, capture, or kill, or attempt to harass, hunt, capture, or kill any marine mammal." The definition of take was amended in 1993 to include "feeding or attempting to feed a marine mammal in the wild" (NOAA, n.d.). Feeding wild dolphins can cause the dolphin to rely on begging for food from humans, upsetting their natural role as hunters and altering their diets. This behavior also puts the human at risk, since dolphins sometimes become aggressive when seeking food and are known to bite when teased (NOAA, n.d). Samuels and Bejder (2004) concluded that human interaction in St. Andrews Bay put a specific juvenile dolphin at risk once every 12 minutes, while humans interacting with that dolphin were estimated to be at risk once every 29 minutes. St. Andrews Aquatic Preserve will work with dolphin tour companies to educate them on appropriate interactions with wild dolphins as well as the penalties and dangers of feeding and harassing wild dolphins.

Goal One: Encourage user experiences and public recreation opportunities consistent with natural resource conservation.

Objective One: Inform local residents and visitors about actions they can take to conserve and restore resources of the St. Andrews Aquatic Preserve.

Integrated Strategy One: Partner with other state and federal agencies to develop and distribute information identifying potential use conflicts and methods of prevention.
Integrated Strategy Two: Develop informational brochures and/or participate in local meetings to educate user groups of potential impacts to the natural resources associated with user activities.
Integrated Strategy Three: Post educational signage at public access points. Partnerships with public access managers will be formed to install educational kiosks at high-use public boat ramps within and near St. Andrews Aquatic Preserve. Aquatic preserve signage currently exists at only one public ramp. Informational and aesthetic displays that highlight natural resources found in the aquatic preserve as well as the ramifications improper use can have on fish and wildlife will be constructed at each of the high-use public boat ramps.

Goal One, Objective One - Performance Measures:
Performance Measure One: Continue to attend (and track) quarterly meetings with regulatory staff and NWFWMD staff to provide updates and discuss relevant issues within St. Andrews Bay.
Performance Measure Two: Track quantity of brochures distributed and/or public education meetings attended.
Performance Measure Three: Track quantity and location of educational signage at public boat ramps.

Objective Two: Examine public use patterns and trends within the St. Andrews Aquatic Preserve to proactively identify potential resource/public use conflicts and by working with key stakeholders, develop conservation strategies to minimize damage to the natural resources.

Integrated Strategy One: In an effort to identify resource/public use conflicts and develop conservation strategies, St. Andrews Aquatic Preserve staff will create and implement an aquatic preserve visitor use survey.

Goal One, Objective Two Performance Measure: Produce a summary report on visitor use survey.

Objective Three: Encourage an increase in the amount and frequency of law enforcement within St. Andrews Aquatic Preserve.

Integrated Strategy One: Facilitate regular communication with law enforcement for rapid response to illegal activities. An annual meeting with local and state law enforcement officers will be organized to discuss speed limits, boater safety, derelict vessels, harassment or take of protected fish and wildlife, gill netting, user group conflicts, and other pertinent issues.

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

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: Promote the Florida Circumnavigational Trail through educational signage to be posted at the present kayak launch located at St. Andrews State Park and any future paddling launch sites. Staff will work with Florida Greenways and Trails to provide updated information pertaining to resources found along the trail.

Goal Two, Objective One Performance Measure: Work with adjacent land managers and government agencies to promote expansion of non-consumptive activities (e.g., kayaking, nature viewing), but stress that current St. Andrews Aquatic Preserve access and uses will not be further restricted.

Goal Three: Address areas impacted by human use while educating users of the effects of improper use.

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

Integrated Strategy One: Coordinate with other resource agencies and law enforcement to support efforts to address derelict and/or illegal fisheries gear and harvesting activities and to assist in the removal of derelict fishing gear and/or illegal fisheries gear in St Andrews Aquatic Preserve.
Integrated Strategy Two: Promote awareness of the detrimental effects of illegal dumping and marine debris to the natural resources of St. Andrews Aquatic Preserve. This will be done through stakeholder workshops, signage, brochures, social media, public service announcements, etc.
Integrated Strategy Three: Partner with FWC and other agencies to secure funding for and develop habitat restoration projects involving the removal of marine debris. The marine debris field on the bayside of Shell Island will be a priority for restoration. The restoration would also consider appropriate alternatives for an artificial reef in the area. The restoration and permitted artificial reef installation will provide an improved experience for local fisherman, discourage future illegal dumping, and protect nearby seagrass habitat.

Goal One, Objective Two – Performance Measures:
Performance Measure One: Partner with local citizens, state agencies, and federal agencies to complete at least one marine debris removal project annually in areas of concern to protect and restore resources.
Performance Measure Two: Track quantity of education and outreach measures regarding marine debris.
Performance Measure Three: Produce a summary report of efforts made in Shell Island marine debris field removal/restoration.
Performance Measure Four: Review locations for a permitted artificial reef near Shell Island.

Aquatic preserve staff remove monofilament fishing line from a loggerhead sea turtle's flipper. Entanglement in derelict fishing gear is an extremely dangerous threat to marine life and can prove deadly.

Part Three

Additional Plans

Chapter Five

Administrative Plan

Successful implementation of the St. Andrews Aquatic Preserve research, education, and resource management programs outlined in this management plan is dependent on an effective administration strategy and framework that provides for adequate staffing, facilities, funding, and cooperation with other agencies and citizen support organizations. The objectives of the aquatic preserve's administrative program include the following: 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 the aquatic preserve.

Staffing

The Central Panhandle Aquatic Preserves office is responsible for the management of four aquatic preserves in Bay, Gulf, and Franklin counties. These include Alligator Harbor (14,184 acres), Apalachicola Bay (80,875 acres), St. Joseph Bay (55,675 acres), and St. Andrews (24,116 acres) aquatic preserves. Prior to budget cuts that closed the office in 2011, staff included the aquatic preserve

manager (Environmental Specialist III, full time equivalent [FTE]) as well as two Environmental Specialist I positions (Other Personal Services [OPS], limited benefits). As of Fiscal Year 2015-2016, staff is composed of the aquatic preserve manager (FTE Environmental Specialist III) and Special Projects Coordinator (OPS Environmental Specialist III). The latter position is currently grant-funded. In order to run an effective program and accomplish the goals set out in this plan, the aquatic preserve must offer some kind of incentive to retain and attract talented and dedicated staff. Converting the Special Projects Coordinator position from OPS to FTE status would benefit the program and will remain a high priority for the aquatic preserve. Over the next 10 years as development pressures increase along the coast, and funding becomes available, additional staff will be necessary to continue important research and monitoring efforts within the Central Panhandle Aquatic Preserves.

Staffing Needs

Converting the Special Projects Coordinator (OPS Environmental Specialist III) position to FTE will be a priority as this position assists the aquatic preserve manager, plans and implements resource monitoring activities including seagrass and water quality, and enters, analyzes, and interprets all data collected during monitoring activities. The position also heads up restoration efforts and assists with grant writing.

Two full time positions (OPS Environmental Specialist I), which would be dedicated to field operations are also needed. These positions would be tasked with assisting current staff when conducting research and monitoring, education and outreach, as well as any other mission critical or necessary task.

Personal watercraft use is extremely popular in St. Andrews Bay. Balancing the protection of natural resources with recreational public use is a high priority for the aquatic preserve.

Chapter Six

Facilities Plan

Facilities

The Central Panhandle Aquatic Preserves office is currently housed within the Apalachicola National Estuarine Research Reserve's (ANERR's) facility in Eastpoint, Florida. The ANERR facility is sited on 26 acres along the shore of Apalachicola Bay near the northern terminus of the St. George Island bridge. The facility is approximately 18,000 square feet and was funded by both National Oceanic and Atmospheric Administration acquisition and construction grant funds and money appropriated by the Florida Legislature.

Upon the occasion of a hurricane storm event, all vessels and vehicles of the aquatic preserve will follow the procedures outlined in the ANERR Hurricane Plan, which is updated annually. This plan accounts for how all facilities, equipment and data sources are to be protected in the event of a storm, and provides for the relocation of vehicles, vessels, and sensitive equipment.

Vehicles

The Central Panhandle Aquatic Preserves office does not have a vehicle assigned to it. Vehicles are borrowed from ANERR's fleet when needed. A dedicated vehicle, capable of towing up to a 25 foot boat, is needed for the aquatic preserve in order to accomplish management goals.

Vessels

- **19 foot Twin Vee Bay Cat** – In 2004, the aquatic preserve acquired a 19 foot Twin Vee Bay Cat Skiff and trailer that are utilized to accomplish program management goals. When the offices closed in 2011, the Twin Vee was absorbed by ANERR's research program. The aquatic preserve office now borrows this boat from ANERR when it is available. A dedicated vessel is needed for the aquatic preserve in order to fully accomplish program management goals.
- **Tandem Kayak** – Acquired in 2002 to use while monitoring seagrass habitat in shallow areas.

List of Appendices

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 o private property owners adjacent to a preserve. In furtherance of these

rights, reasonable improvement for ingress and egress, mosquito control, shore protection and similar purposes may be permitted by the State of Florida Board of Trustees of the Internal Improvement Trust Fund and other jurisdictional agencies, after review and formal concurrence by any specifically designated managing agency for the preserve in question.(7) Other uses of an aquatic preserve, or human activity within a preserve, although not originally contemplated, may be permitted by the State of Florida Board of Trustees of the Internal improvement Trust Fund and other jurisdictional agencies, but only after a formal finding of compatibility made by the said Trustees on the advice of any specifically designated managing agency for the preserve in question.

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

CLAUDE R. KIRK, JR, Governor

TOM ADAMS, Secretary of State

EARL FAIRCLOTH, Attorney General

FRED O. DICKINSON, JR., Comptroller

BROWARD WILLIAMS, Treasurer

FLOYD T. CHRISTIAN, Commissioner of Education

DOYLE CONNER, Commissioner of Agriculture

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

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

All the statutes can be found according to number at 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

CITIZEN SUPPORT ORGANIZATION AGREEMENT

THIS LETTER OF AGREEMENT is made the 5th day of December, 2014, by the State of Florida Department of Environmental Protection's ("Department") Florida Coastal Office ("FCO"), for the purposes of recognizing the Aquatic Preserve Society, Inc. hereinafter called "APS," as an approved Citizen Support Organization.

PARTIES

1. The Department is an agency of the state created under section 20.255, F.S.
2. The FCO acts as manager over the Aquatic Preserve, the Buffer Preserve(s), the National Estuarine Research Reserves, and the Coral Reef Conservation Program throughout the State.
3. APS is a not for profit Florida corporation incorporated under the provisions of chapter 617, F.S., and approved by the Department of State.

PURPOSE

4. The FCO is vested with maintaining the aquatic preserve and buffer preserve system for resource management, restoration, education, public enjoyment, and healthful recreation.
5. APS desires to act as an approved Citizen Support Organization ("CSO") for the FCO, with all rights and privileges provided in section 20.2551, F.S.
6. APS's mission is to establish a general membership, raise funds to benefit the FCO and the state's Aquatic Preserves, associated Buffer Preserve(s), the Florida National Estuarine Research Reserve Systems and the Coral Reef Conservation Program, act as an umbrella for a statewide system of chapter CSOs, and serve as an advocate for the FCO's needs and priorities.
7. By this Letter of Agreement, the FCO has determined that APS's organization and purpose, as provided in APS' s Articles of Incorporation, incorporated and made part of this agreement as Attachment A, are consistent with the goals of the Department and are in the best interests of the state.

NOW THEREFORE, it is agreed:

8. The Department hereby grants to APS the exclusive approval to serve as the Citizen Support Organization for the FCO, in accordance with the provisions of section 20.2551, F.S., subject to all terms and conditions set forth in this agreement.
9. This agreement shall take effect upon execution and shall continue indefinitely or until terminated pursuant to paragraphs 10-11, below, or modified pursuant to paragraph 13, below.
10. Any violation of, or failure to comply with, the terms of this approval shall, at the option of the Department, terminate this agreement after three days from receipt of notice in writing to APS. The APS shall further ensure that it meets all not for profit corporate management and tax regulations and, in the event that the CSO ever fails to maintain its nonprofit status, it shall immediately notify the Department.
11. This agreement may be terminated by either party without cause after 90 days from the receipt of notice in writing to the other party.
12. In the event that this Agreement is terminated with or without cause or the CSO

otherwise ceases to exist, any remaining assets of the CSO shall be transferred to another approved CSO or donated to the FCO.

13. The Department may modify this Agreement at any time by letter modification or substantial rewrite of this Agreement. APS may either execute the modification or terminate its status as a CSO. APS understands that there are preexisting CSO groups already within the aquatic preserve and buffer preserve system and these existing CSO groups will be given the opportunity to join APS at their will. Future aquatic preserve and buffer preserve CSO groups will also be permitted to become chapter members of the APS.

14. APS shall have appropriate use of the FCO's Aquatic Preserve, Buffer Preserve and National Estuarine Research Reserve property, equipment, staff and facilities when approved, in writing, a minimum of 15 business days in advance of use by the applicable site manager and FCO CSO Coordinator.

15. APS is hereby authorized to: conduct programs and activities; raise funds; request and receive grants, gifts, and bequests of money; acquire, receive, hold, invest, and administer, in its own name, securities, funds, objects of value, or other property, real or personal; make expenditures to or for the direct or indirect benefit of the FCO; and conduct official meetings of APS.

16. All notices and orders given to APS may be served by mail at the following address: Aquatic Preserve Society, **630 Oak Park Road Sopchoppy, FL. 32358** All notices and orders given to the FCO may be served by mail at the following address: FDEP, Florida Coastal Office Director, c/o CSO Coordinator, Florida Department of Environmental Protection, Florida Coastal Office 3900 Commonwealth Boulevard, MS 235 Tallahassee, Florida 32399-3000.

17. The CSO Coordinator is hereby designated as the Department's agreement manager and shall be responsible for insuring performance of the terms and conditions of this agreement.

18. The FCO may permit, without charge, appropriate use of FCO property, equipment, staff and facilities by APS subject to the conditions of this paragraph. Such use must be directly in keeping with the approved purposes of APS, and may not be made at times or places that would unreasonably interfere with the FCO's use of property and facilities or normal FCO operations. In order to use property or facilities of the FCO, the APS must:

A. Comply with all FCO, and Department policies, rules and regulations as they may be amended periodically;

B. Develop and submit to the FCO CSO Coordinator and applicable FCO site manager, for review and prior written approval, a program or schedule of all projects, activities and events it plans to carry out on FCO property, including the designation of a specific location and time for such use, no less than 15 business days prior to the project, activity, or event; and

C. Be responsible for maintaining the property, facilities, or equipment assigned in a clean and orderly state.

19. APS agrees that all funds generated by APS will be used for the direct or indirect benefit of the FCO and the state's Aquatic Preserves, associated Buffer Preserve(s), National Estuarine Research Reserves and the Coral Reef Conservation Program or in accordance with Articles III of Attachment A of this agreement. At no time shall less than **85%** of all revenue collected by APS be used for the direct benefit of the office of the FCO and its associated programs.

20. APS agrees to provide for financial reporting by the submittal of:

A. A Monthly gross sales report, submitted quarterly within 30 days of the end of each calendar quarter; and

B. An annual Profit and Loss (P&L) statement, where "annual" means the state

fiscal year, July 1 through June 30, submitted within 30 days of the end of each fiscal year.

21. In accordance with section 215.981(2), F.S., should APS's annual expenditures (of the state fiscal year, July 1 through June 30 of each year) exceed $300,000, APS shall provide for an annual financial audit of its accounts and records to be conducted by an independent certified public accountant in accordance with Chapter 10.700, Rules of the Auditor General and Financial Accounting Standards No. 117, Financial Statements of Not-For-Profit Organizations established by the Financial Accounting Standards Board. The audit report shall be submitted within 9 months after the end of the fiscal year to the Auditor General and to the FCO Director.

22. APS agrees and consents to allow the FCO, or the Department to conduct operational and financial reviews of the APS's finances without prior notice.

23. By July 1, of each year, APS shall submit the yearly CSO Report Form as a complete Attachment B, Including all attachments thereto, to the FCO.

24. APS agrees to comply with Chapter 119, F.S., and allow public access to all documents, papers, letters, or other material subject to provisions of Chapter 119, Florida Statutes.

25. It is acknowledged that the APS is operating as a citizen support organization and volunteer nonprofit organization for the benefit of the Florida Department of Environmental Protection. As such, activities of the APS may be covered by state liability protection as outlined in Sections 110.504 and 768.28, F.S. Nothing in this agreement shall be interpreted to act as a waiver of the state's sovereign immunity.

26. Both APS and the FCO will meet their respective obligations under this agreement in such a manner as to maintain a distinct separation, evident to the public, between the activities and management of the CSOs and those of the FCO.

IN WITNESS WHEREOF, based on the foregoing, the State of Florida Department of Environmental Protection herein approves the APS as Citizen Support Organization.

Approved as to form and legality:

By:
Attorney

STATE OF FLORIDA, DEPARTMENT OF ENVIRONMENTAL PROTECTION

By:
Kevin Claridge
Director
Florida Coastal Office

Signed as a recognition of this LETTER OF AGREEMENT and its conditional approval:

ATTEST:

By:
Secretary

AQUATIC PRESERVES SOCIETY, INC.
BOARD APPROVED:

Secretary

CITIZEN SUPPORT ORGANIZATION
SUPPLEMENTAL LETTER OF AGREEMENT

THIS SUPPLEMENTAL LETTER OF AGREEMENT is made this 5th day of December, 2014, by the State of Florida Department of Environmental Protection's ("Department") Florida Coastal Office ("FCO"), and the previously recognized Aquatic Preserve Society, Inc. hereinafter called "APS," an approved Citizen Support Organization, for the purposes of establishing an agreement to provide for the completion of public interest projects for the state's Aquatic Preserves.

PARTIES

1. The Department is an agency of the state created under section 20.255, F.S.
2. The FCO acts as manager over the Aquatic Preserve and associated Buffer Preserve System throughout the State.
3. APS is a not for profit Florida corporation incorporated under the provisions of chapter 617, F.S., and approved by the Department of State.
4. APS has been granted the exclusive approval to serve as the Citizen Support Organization for the FCO, in accordance with the provisions of section 20.2551, F.S., subject to all terms and conditions set forth in the Letter of Agreement executed by both parties on 12/5, 2014.

PURPOSE

5. The APS is authorized to: conduct programs and activities; raise funds; request and receive grants, gifts, and bequests of money; acquire, receive, hold, invest, and administer, in its own name, securities, funds, objects of value, or other property, real or personal; make expenditures to or for the direct or indirect benefit of the FCO; and conduct official meetings of APS.
6. Pursuant to Rule 18-20.004(2), F.A.C., in evaluating requests for the sale, lease or transfer of interest within an Aquatic Preserve, the Department or Water Management District, on behalf of the Board of Trustees of the Internal Improvement Trust Fund, will utilize a balancing test to determine whether the social, economic and/or environmental benefits clearly exceed the costs of such a request.
7. The "benefits" referred to above are categorized and exampled in Rule 18-20.004(2)(b) and (d), F.A.C.
8. The Florida Coastal Office's Aquatic Preserve Managers will routinely review the needs of their Aquatic Preserve and, in accordance with the approved management plans for the respective Aquatic Preserve, will provide to the Florida Coastal Office a list of projects needed at their respective Aquatic Preserves that would provide demonstrable environmental, social, and economic benefits which would accrue to the public if selected (hereinafter referred to as "public interest projects"). These public interest projects will be consistent with the public interest assessment criteria of Rule 18-20.004, F.A.C.
9. A permittee/leasee may pursue a public interest project identified by the Florida Coastal Office and may have the option of dedicating funds for the full or partial completion of the project.

NOW THEREFORE, it is agreed:

10. The APS may accept the dedication of funds for approved public interest projects and, if accepted, shall:

a. Establish a bank account specifically for public interest projects.
b. Properly identify the bank account as one to be used for public interest projects, deposit all funds into such account, and keep a full and accurate ledger of all transactions on that account in a format approved by the Department. Ledger must include the name of the individual(s) submitting the funds, the public interest projects it is intended to provide for, the Aquatic Preserve it is intended to benefit.
c. APS must submit to the Department's Florida Coastal Office an updated copy of the ledger within 48 hours of any deposit or withdrawal so that the Department may verify it is properly logged.
d. At no time shall the deposits in these accounts be mingled with the CSOs general revenue.
e. At no time shall the funds in these accounts be withdrawn or used for any other purpose other than that public interest projects for which they were initially deposited, unless upon written approval from the Department to provide for a different selected public interest project.

11. The APS will notify the Department upon receipt of any such funds. The APS will also notify the Department if any deposits are rejected (e.g., un-cleared checks).

12. For projects that require the employment of a contractor:

a. Florida Coastal Office will work with APS to identify a contractor to complete the public interest project selected when funds appear to be sufficient.
b. Once a contractor is selected, the Florida Coastal Office will work with APS and the selected contractor to obtain all necessary permits and authorizations.
c. At no time shall APS select a contractor to begin work without approval of the Florida Coastal Office.
d. APS shall be responsible for entering into an agreement with the contractor.

13. The APS shall provide to the Department a financial report no later than July 15 annually and provide within it:

a. A copy of the ledger required by 10.b., above;
b. A statement listing all public interest projects completed the previous fiscal year or presently in progress;
c. A statement listing all public interest projects anticipated to be completed in the next fiscal year.

14. In the event this Supplemental Agreement is terminated with or without cause, or if APS otherwise ceases to exist or ceases to be an approved Citizen Support Organization, any funds dedicated to public interest projects pursuant to this Supplemental Agreement shall be transferred to another approved entity in the manner specified by the Department at that time. Any funds will remain allocated to the intended project at the time of the transfer.

15. This Supplemental Agreement may be terminated or modified in the manner provided in the Letter of Agreement.

IN WITNESS WHEREOF, the Department and the APS execute this Supplemental Letter of Agreement, effective as of the last date written below.

Approved as to form and legality:

By: Kristine Morris
Attorney

STATE OF FLORIDA, DEPARTMENT OF ENVIRONMENTAL PROTECTION

By: Kevin Claridge
Director
Florida Coastal Office

ATTEST:

By:
Secretary

AQUATIC PRESERVE SOCIETY, INC.
BOARD APRROVED:

Secretary

Appendix B

Resource Data

B.1 / Glossary of Terms

References to these definitions can be found at the end of this list and 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)

anthropogenic - caused or produced through the agency of man. (Lincoln et al., 2003)

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

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 [USFWS], 2015)

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

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)

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

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

intertidal zone - the shore zone between the highest and lowest tides; littoral. (Lincoln et al., 2003)

listed species - a species, subspecies, or distinct population segment that has been added to the Federal list of endangered and threatened wildlife and plants. (USFWS, 2015)

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)

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

neap tide – the tide of small range that occurs every 14 days, near the times of the first and last quarter of the Moon, when the Moon, Earth, and Sun are at right angles. The neap tidal range is 10-30 percent less than the mean tidal range. (Allaby, 2005)

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. "Imperiled species" is another general term for listed as well as unlisted species that are declining. (USFWS, 2015)

spring tide – a tide of greater than the mean range (i.e. the water level rises markedly above and falls markedly below the mean tide level). Spring tides occur about every two weeks, when the Moon is full or new, and are at their maximum when the Moon and the Sun are in the same plane as the Earth. (Allaby, 2005)

stakeholder - any person or organization who has an interest in the actions discussed or is affected by the resulting outcomes of a project or action. (USFWS, 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. (USFWS, 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)

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***

Aguilar-Perera, A. & Tuz-Sulub, A. (2010). Non-native, invasive red lionfish (*Pterois volitans* [Linnaeus, 1758]: Scorpaenidae), is first recorded in the southern Gulf of Mexico, off the northern Yucatan Peninsula, Mexico. *Aquatic Invasions, Vol. 5, Suppl. 1*, S9-S12.

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

Albins, M. A. & Hixon, M. A. (2008). Invasive Indo-Pacific lionfish (*Pterois volitans*) reduce recruitment of Atlantic coral-reef fishes. *Marine Ecology Progress Series*, 367, 233-238. http://dx.doi.org/10.3354/meps07620

Anderson, V. M. (2008, January 22). *Tyndall AFB restores its ecosystem*. Retrieved from http://www.tyndall.af.mil/news/story.asp?id=123083096

Bay County. (2014). History of Bay County. Retrieved November 14, 2015 from http://co.bay.fl.us/about/history.php

Bay County. (2015). *Bay County Community Rating System Report 2015*. Retrieved from http://www.baycountyfl.gov/community/pdf/crs-report.pdf

Bay County Conservancy. (n.d.). Bay County Conservancy, Inc. Retrieved November 25, 2015 from http://www.baycountyconservancy.org/

Bay District Schools. (n.d.). The history of Bay County Florida. Retrieved November 20, 2014 from http://www.beaconlearningcenter.com/weblessons/bayhistory/

Beck, M. W., Odaya, M., Bachant, J. J., Bergan, J., Keller, B., Martin, R., et al. (2000). *Identification of priority sites for conservation in the northern Gulf of Mexico: An eco-regional plan*. Arlington, VA: The Nature Conservancy.

Berg, D., & Berg, D. (1991). Florida shipwrecks: The diver's guide to shipwrecks around the state of Florida and the Florida Keys. Baldwin, NY: Aqua Explorers.

Bertness, M. D. (1999). *The ecology of Atlantic shorelines*. Sunderland, MA: Sinauer Associates.

Bethea, D .M., Hollensead, L. D., Carlson, J. K., Ajemian, M. J., Grubbs, R. D., Hoffmayer, E. R., et al. (2009). *Shark nursery grounds and essential fish habitat studies* (GULFSPAN GULF OF MEXICO-FY08 Cooperative Gulf of Mexico States Shark Pupping and Nursery Survey. Report to NOAA Fisheries, Highly Migratory Species Division). Panama City, FL: National Marine Fisheries Service. Retrieved from http://www.sefsc.noaa.gov/labs/panama/documents/pclc_09-02.pdf

Brim, M. S. (1998). *Environmental contaminants evaluation of St. Andrew Bay, Florida* (Vol. 1). (Publication no. PCFO-EC-98-01, 3 v.) Panama City, FL: U.S. Fish and Wildlife Service.

Brim, M. S. & Handley, L. R. (2007). St. Andrew Bay. 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. 155-169.

Burris, D., Fitzhugh, L., Carmody, G., Collins, A., Theberge, S, Ilami, F., et al. (2014). *St. Andrew Bay water quality report card, St. Andrew Bay, Bay County, FL.* Retrieved from http://www.sabrma.org/waterqualityreportcard.html

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.

Chase, C. & Gore, J. (1989). *Snowy plover breeding distribution: final performance report*. Tallahassee, FL: Florida Game and Freshwater Fish Commission, Nongame Wildlife Division.

Dawes, C. J., Phillips, R. C., Morrison, G. (2004). *Seagrass communities of the Gulf Coast of Florida: Status and ecology – final report*. St. Petersburg, FL: Florida Fish and Wildlife Conservation Commission Fish and Wildlife Research Institute and the Tampa Bay Estuary Program. St. Petersburg, FL.

Dean, R. G., & O'Brien, M. P. (1987). *Florida's west coast inlets: Shoreline effects and recommended action* (UFL/COEL-87/018). Gainesville, FL: University of Florida, Coastal and Oceanographic Engineering Department.

Durako, M. J., Murphy, M. D., & Haddad, K. D. (1988). *Assessment of fisheries habitat, northeast Florida*. St. Petersburg: Florida Department of Natural Resources, Bureau of Marine Research.

Ecological Society of America. (2009). *Invasion* [Brochure]. Retrieved from http://www.esa.org/esa/wp-content/uploads/2012/12/invasion.pdf

Fernald, E. A., & Purdum, E. D., (Eds). (1992). *Atlas of Florida*. Gainesville, FL: University Press of Florida.

Fitzhugh, L. (2012). *An introduction to St. Andrew Bay, Florida*. St. Andrew Bay Resource Management Association. Retrieved from http://www.sabrma.org/images/inroduction_to_St._Andrew_Bay,_FL.pdf

Florida Department of Agriculture and Consumer Services. (n.d.-a). Point Washington State Forest. Retrieved December 10, 2015 from http://www.freshfromflorida.com/Divisions-Offices/Florida-Forest-Service/Our-Forests/State-Forests/Point-Washington-State-Forest

Florida Department of Agriculture and Consumer Services. (n.d.-b). Shellfish harvesting management. Retrieved October 6, 2015 from http://www.freshfromflorida.com/Divisions-Offices/Aquaculture/Agriculture-Industry/Shellfish/Harvesting-Management

Florida Department of Environmental Protection. (2004). *St. Andrews State Park Unit Management Plan.* Retrieved from http://www.dep.state.fl.us/parks/planning/parkplans/StAndrewsStatePark.pdf

Florida Department of Environmental Protection. (2006). *Florida's Aquatic Preserves: A program overview.* Tallahassee, FL: Author.

Florida Department of Environmental Protection. (2008). *St. Joseph Bay Aquatic Preserve management plan.* Tallahassee, FL: Author.

Florida Department of Environmental Protection. (2009). *Mosquito Lagoon Aquatic Preserve management plan*. Tallahassee, FL: Author.

Florida Department of Environmental Protection. (2012). *Site-specific information in support of establishing numeric nutrient criteria for St. Andrew Bay*. Tallahassee, FL: Author.

Florida Department of Environmental Protection. (2014). *Apalachicola National Estuarine Research Reserve management plan*. Tallahassee, FL: Author.

Florida Department of Environmental Protection. (2015). Surface water quality standards - Classes, uses, criteria. Retrieved from http://www.dep.state.fl.us/water/wqssp/classes.htm

Florida Department of Environmental Protection. (2016). *St. Andrews State Park advisory group draft unit management plan.* Tallahassee, FL: Author. Retrieved from http://www.dep.state.fl.us/parks/planning/files/St_Andrews/SASP_AdvisoryGroupDraft.pdf

Florida Department of Environmental Protection. (n.d.-a). Camp Helen State Park. Retrieved December 10, 2015 from https://www.floridastateparks.org/park/Camp-Helen

Florida Department of Environmental Protection. (n.d.-b). Deer Lake State Park. Retrieved December 10, 2015 from https://www.floridastateparks.org/park/Deer-Lake

Florida Department of Environmental Protection. (n.d.-c). St. Andrews State Park. Retrieved from https://www.floridastateparks.org/park/St-Andrews

Florida Department of Environmental Protection. (n.d.-d). St. Joseph Bay Aquatic Preserve. Retrieved January 6, 2016 from http://www.dep.state.fl.us/coastal/sites/stjoseph/

Florida Department of Environmental Protection. (n.d.-e). St. Joseph Bay State Buffer Preserve. Retrieved January 6, 2016 from http://www.dep.state.fl.us/coastal/sites/stjoseph_buffer/

Florida Department of Environmental Protection. (n.d.-f). T. H. Stone Memorial St. Joseph Peninsula State Park. Retrieved January 6, 2016 from https://www.floridastateparks.org/park/St-Joseph

Florida Department of Health. (n.d). Water programs: Florida Department of Health in Bay. Retrieved November 6, 2015 from http://bay.floridahealth.gov/programs-and-services/environmental-health/water-programs/index.html

Florida Department of Highway Safety and Motor Vehicles. (2014). 2014 Alphabetical Vessel Statistics by County. Retrieved from http://www.flhsmv.gov/dmv/TaxCollDocs/vesselstats2014.pdf

Florida Department of Natural Resources. (1991). *St. Andrews State Park Aquatic Preserve management plan*. Retrieved from http://www.dep.state.fl.us/coastal/sites/standrews/

Florida Department of State. (n.d.-a). Florida Maritime Heritage Trail. Retrieved November 18, 2014 from http://info.flheritage.com/maritime-trail/ports/port.cfm?name=St_Andrews_Panama_City

Florida Department of State. (n.d.-b). Florida World War II memorial: northwest region. Retrieved October 1, 2015 from http://museumoffloridahistory.com/exhibits/permanent/wwii/sites.cfm?region=northwest

Florida Fish and Wildlife Conservation Commission. (2007). Marine turtle conservation guidelines. Retrieved from http://myfwc.com/wildlifehabitats/managed/sea-turtles/conservation-guidelines/

Florida Fish and Wildlife Conservation Commission. (2008). *Stabilization of Florida's bay scallop metapopulation: Enhancement of local populations to maintain the subspecies range* (Progress Report Narrative Format F2533-05-08-F). Silver Spring, MD: NOAA Restoration Center Community-based Restoration Program.

Florida Fish and Wildlife Conservation Commission. (2009). *Marine fisheries information system: 2008-2009 license/permit summary*. Retrieved from http://myfwc.com/media/203563/sumcnty_lic_0809.pdf

Florida Fish and Wildlife Conservation Commission. (2013a). *2013 annual commercial fishery landings summary*. Retrieved from http://myfwc.com/research/saltwater/fishstats/commercial-fisheries/landings-in-florida/

Florida Fish and Wildlife Conservation Commission. (2013b). *A boating and angling guide to Bay County*. Retrieved January 21, 2015 from http://ocean.floridamarine.org/boating_guides/bay_county/index.html

Florida Fish and Wildlife Conservation Commission. (2015a). *Florida Bay Scallop 2014 Annual Report.* St. Petersburg, FL: Author. Retrieved from http://myfwc.com/media/2144988/bs_2014_annual_report.pdf

Florida Fish and Wildlife Conservation Commission. (2015b). Harvesting and reporting lionfish. Retrieved January 21, 2015 from http://www.myfwc.com/wildlifehabitats/nonnatives/marine-species/lionfish/

Florida Fish and Wildlife Conservation Commission. (n.d.-a). HAB monitoring. Retrieved March 10, 2015 from http://myfwc.com/research/redtide/monitoring/

Florida Fish and Wildlife Conservation Commission. (n.d -b). Imperiled species profiles: snowy plover. Retrieved on January 22, 2015 from http://myfwc.com/wildlifehabitats/imperiled/profiles/birds/snowy-plover/

Florida Fish and Wildlife Conservation Commission. (n.d.-c). *Karenia brevis* archived status. Retrieved March 10, 2015 from https://www.flickr.com/photos/myfwc/sets/72157635398013168/

Florida Fish and Wildlife Conservation Commission. (n.d.-d). Lionfish recreational regulations. Retrieved January 21, 2015 from http://www.myfwc.com/fishing/saltwater/recreational/lionfish/

Florida Fish and Wildlife Conservation Commission. (n.d.-e). Research and monitoring program. Retrieved March 5, 2015 from http://myfwc.com/research/saltwater/reef-fish/monitoring/program/

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

Florida Natural Areas Inventory and Florida Department of Natural Resources. (1990). *Guide to the natural communities of Florida*. Tallahassee, FL: Author.

Fonseca, M. S., Kenworthy, W. J., & Thayer, G. W. (1998). *Guidelines for the conservation and restoration of seagrasses in the United States and adjacent waters* (Decision Analysis Series No. 12). Silver Spring, MD: National Oceanic and Atmospheric Administration, Coastal Ocean Program.

Foster, E. R., & Cheng, J. (2001). *Shoreline change rate estimates, Bay County* (Report No. BCS-01-01). Tallahassee, FL: Florida Department of Environmental Protection, & Florida State University, Beaches and Shores Resource Center.

Friends of St. Andrew Bay. (n.d.). Welcome to the Friends of St. Andrew Bay. Retrieved January 20, 2015 from http://baybest.org/

Friends of St. Andrews State Park. (n.d.). The Friends of St Andrews State Park. Retrieved January 20, 2015 from http://www.friendsofstandrews.org/welcome.html

Garman, V. (2013, November 15). St. Andrews one of Florida's top parks. *Panama City News Herald.* Retrieved from http://www.newsherald.com/news/st-andrews-one-of-florida-s-top-parks-1.235550

Gudeman, C., Mezich, R, Smith, K, & Carlson, P. (2010). *Restoration, monitoring, and management of boat propeller scars in St. Andrews Bay, Florida.* Tallahassee, FL: Florida Fish and Wildlife Conservation Commission.

Gulf of Mexico Foundation. (n.d.). Gulf Ecological Management Sites. Retrieved November 25, 2015 from http://www.gulfmex.org/conservation-restoration/gems/

Haller, W. T., & Sutton, D. L. (1975). Community and structure competition between *Hydrilla* and *Vallisneria*. *Hyacinth Control Journal, 13,* 48-50.

Hand, J., Col, J. & Lord, L. (1996). *1996 Water quality assessment for the state of Florida* (Section 305 (B) Technical Appendix). Tallahassee, FL: Florida Department of Environmental Protection.

Himes, J. G., Douglass, N. J., Pruner, R. A., Croft, A. M. & Seckinger, E. M. (2006). *Status and distribution of the snowy plover in Florida: 2006 study final report.* Tallahassee, FL: Florida Fish and Wildlife Conservation Commission.

The Historical Marker Database. (n.d.-a). *St. Andrew skirmish*. Retrieved November 13, 2014 from http://www.hmdb.org/marker.asp?marker=8160

The Historical Maker Database. (n.d.-b). *St. Andrew Bay saltworks*. Retrieved November 13, 2014 from http://www.hmdb.org/Marker.asp?Marker=8158

Ichiye, T. & Jones, M. L. (1961). On the hydrography of the St. Andrew Bay system, Florida. *Limnology and Oceanography, 6*, 302-311. http://dx.doi.org/10.4319/lo.1941.6.3.0302

Jacoby, J., Walters, L., Baker, S., & Blyler, K. (2003). *A primer on invasive species in coastal and marine waters* (SGEB 60). Gainesville, FL: University of Florida, Sea Grant, Florida. Retrieved from http://nsgl.gso.uri.edu/flsgp/flsgpg05001.pdf

Keppner, E. J. (2002). *An Inventory of the Biological Resources Reported from the St. Andrew Bay Estuarine System, Bay County, Florida: A revision.* Panama City, FL: St. Andrew Bay Environmental Study Team, Inc.

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

Muller, J. W., Hardin, E. D., Jackson, D. R., Gatewood, S. E., & Caire, N. (1989). *Summary report on the vascular plants, animals and plant communities endemic to Florida* (Technical Report No. 7). Tallahassee, FL: Florida Game and Fresh Water Fish Commission, Nongame Wildlife Program.

National Oceanic and Atmospheric Administration. (2013). NOAA Office of Science and Technology, National Marine Fisheries Service. Commercial fisheries statistics. Retrieved from http://www.st.nmfs.noaa.gov/commercial-fisheries/index

National Oceanic and Atmospheric Administration. (n.d). Marine Mammal Protection Act (MMPA). Retrieved from http://www.nmfs.noaa.gov/pr/laws/mmpa/

Naval Surface Warfare Center. (n.d.). Warfare centers: NSWC Panama City Division. Retrieved January 15, 2015 from http://www.navsea.navy.mil/nswc/panamacity/default.aspx

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. (2000). *St. Andrew Bay Watershed Surface Water Improvement and Management Plan.* Retrieved from http://www.nwfwmd.state.fl.us/system/assets/70/original/St.AndrewBay_SWIM_Plan.pdf

Northwest Florida Water Management District. (n.d.-a). Econfina Creek Water Management Area. Retrieved December 11, 2015 from http://www.nwfwater.com/lands/recreation/area/econfina/

Northwest Florida Water Management District. (n.d.-b). Ward Creek West. Retrieved February 4, 2016 from http://nwfwmdwetlands.com/Site.php?site_id=27

Panama City Beach Chamber of Commerce. (n.d.). Panama City Beach Conservation Park. Retrieved February 18, 2016 from http://www.pcbeach.org/ecotourism/panama_city_beach_conservation_park

Provancha, J. A., Hall, C. R., & Oddy, D. M. (1992). *Mosquito Lagoon environmental resources inventory* (Technical memorandum no. 107548). Washington, DC: National Aeronautics & Space Administration.

Pruner, R. A, Friel, M. J., & Zimmerman, J. A. (2011). *Interpreting the influence of habitat management actions on shorebird nesting activity at coastal state parks in the Florida panhandle: 2010-11 study final report*. Panama City, FL: Florida Department of Environmental Protection, Florida Park Service.

Ray-Culp, M. (2007). A living shoreline initiative for the Florida Panhandle: Taking a softer approach. *National Wetlands Newsletter*, 6(29), 9-11, 19.

Saloman, C. H., & Naughton, S. P., & Taylor, J. L. (1982). *Benthic Faunal Assemblages of Shallow Water Sand and Seagrass Habitats, St. Andrew Bay, Florida*. United States Fish and Wildlife Service.

Salsman, G. G., & Howard, W. W. (1989). *Hydrographic survey report, Watson Bayou Marina in Bay County, Florida.* (Reference No. 0315-66061). Tallahassee, FL: Florida Department of Environmental Resources.

Samuels, A., & Bejder, L. (2004). Chronic interaction between humans and free-ranging bottlenose dolphins near Panama City Beach, Florida, USA. *Journal of Cetacean Research and Management*, *6*(1), 69–77.

Sargent, F. J., Leary, T. J., Crewz, D. W., & Kruer, C. R. (1995). *Scarring of Florida's seagrasses: assessment and management options.* (FMRI Technical Report TR-1). St. Petersburg, FL: Florida Department of Environmental Protection, Florida Marine Research Institute.

Schnell, K. (2015). *Bay County RESTORE Act Direct Component Proposals 2014-2015: Bay County East Pass Project Environmental Impact Study* (Bay PRP 2014-022). Retrieved from http://new.co.bay.fl.us/uploads/documents/1476/file/BayPRP2014-022EastPass-Full.pdf

Scott, T. M. (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

St. Andrew Bay Resource Management Association. (n.d.-a). St. Andrew Bay Resource Management Association. Retrieved January 15, 2015 from: http://www.sabrma.org/

St. Andrew Bay Resource Management Association. (n.d.-b). RMA Baywatch Program: Water quality monitoring in the St. Andrew Bay watershed, Bay County, FL. Retrieved March 5, 2015 from http://www.sabrma.org/standrewbaywatch.html

St. Andrew Bay Resource Management Association. (n.d.-c). Panama City Beach Turtle Watch. Retrieved June 7, 2015 from: http://turtlewatch.org/

St. Joe Company, Inc. (2006, November 27). *The St. Joe Company records conservation easement for Panama City-Bay County International Airport relocation mitigation* [Press release]. Retrieved from http://ir.joe.com/releasedetail.cfm?releaseid=219927

Tolbert, W. H., & Austin, G. B. (1959*). On the nearshore marine environment of the Gulf of Mexico at Panama City, Florida* (Technical Paper TP161). Washington, DC: U.S. Navy Mine Defense Laboratory.

Turner, W. R., Brandon, K., Brooks, T. M., Constanza, R., Da Fonseca, G. A. B., & Portela, R. (2007). Global conservation of biodiversity and ecosystem services. *BioScience, 57*(10), 868-873. Retrieved from http://bioscience.oxfordjournals.org/content/57/10/868.full.pdf+html

University of Florida/Institute of Food and Science Extension. (n.d.). Bay County Artificial Reef Monitoring Program. Available from http://bay.ifas.ufl.edu/seagrant/artificial-reefs/bay-county-artificial-reef-monitoring-plan/

U.S. Census Bureau. (2014). QuickFacts. Retrieved from http://www.census.gov/quickfacts/table/PST045214/12,00

U.S. Department of Agriculture. (1984). *Soil survey of Bay County, Florida*. Retrieved from http://www.nrcs.usda.gov/Internet/FSE_MANUSCRIPTS/florida/FL005/0/bay.pdf

U.S. Environmental Protection Agency. (2000). *Principles for the ecological restoration of aquatic resources (*EPA841-F-00-003). Washington, DC: United States Environmental Protection Agency, Office of Water (4501F).

U.S. Fish and Wildlife Service. (1987). *Recovery plan for the Choctawhatchee, Perdido Key and Alabama beach mouse.* Atlanta, GA: U.S. Department of the Interior, U.S. Fish and Wildlife Service.

U.S. Fish and Wildlife Service. (2014a). *2012 Florida manatee stock assessment report*. Retrieved from http://www.fws.gov/northflorida/manatee/SARS/FR00001606_Final_SAR_WIM_FL_Stock.pdf

U.S. Fish and Wildlife Service. (2014b). *Federal Threatened, Endangered, Candidate and other Species of Concern likely to occur in the Florida Panhandle.* Retrieved from www.fws.gov/panamacity/resources/pdf/Species%20Lists/Species%20List%202014%20Panhandle.pdf

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

U.S. Geological Survey. (2000). *Chinese Tallow: Invading the Southeastern Coastal Plain* (USGS FS-154-00) [Fact Sheet]. Retrieved from http://www.nwrc.usgs.gov/factshts/154-00.pdf

U.S. Geological Survey. (2012). *Non-indigenous aquatic species, Pterois volitans/miles*. Retrieved January 21, 2015 from http://nas.er.usgs.gov/queries/factsheet.aspx?SpeciesID=963

Visit Florida. (2015). *Visit Florida 2014-2015 annual report*. Retrieved from http://www.visitflorida.org/media/19498/yearinreview2015.swf

Walters, L., Roman, A., Stiner, J., & Weeks, D. (2001). *Water resources management plan, Canaveral National Seashore.* Retrieved from U. S. National Park Service website http://www.nature.nps.gov/water/planning/management_plans/cana_final_screen.pdf

West, G. M. (1922). *St. Andrews, Florida; Historical notes upon St. Andrews and St. Andrews Bay and an APPENDIX containing the official record of the vessels employed on the Blockading Fleet of St. Andrews Bay*. St. Andrews, FL: Panama City Publishing Company.

White, A. W. (1970). *The geomorphology of the Florida Peninsula* (Geological Bulletin No. 51). Tallahassee, FL: Florida Department of Natural Resources, Bureau of Geology.

Wolfe, S.H., Reidenauer, J.A., & Means, D.B. (1988). *An ecological characterization of the Florida Panhandle* (USFWS Biological Report 88(12), OCS Study MMS 88-063). New Orleans, LA., U.S. Department of the Interior, U.S. Fish and Wildlife Service, Minerals Management Service.

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.

Young, W. T., Butts, G. L., Donelan, L. W., & Ray, D. H. (1987). *Biological and physico-chemical assessment of St. Andrew Bay estuaries 1986–1987*. Florida Department of Environmental Regulation, Northwest District, Biology Section.

Personal Communication

Atwood, K. (2015). Personal communication, March 30, 2015).

Coger, C. (2015). Personal communication, April 17, 2015.

Couch, P. (2015). Personal communication, December 20, 2015.

Fitzhugh, L. (2015). Personal communication, May 19, 2015.

Fowler, C. G. (2015). Personal communication, January 12, 2015.

Gorecki, R. (2015). Personal communication, March 5, 2015.

Pruner, R. A. (2015). Personal communication, March 2, 2015.

Shoemaker, M. (2015). Personal communication, June 12, 2015.

Stephenson, S. (2015). Personal communication, June 29, 2015.

Watson, K. (2015). Personal communication, June 9, 2015.

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Macroalgae		
	Acanthophora sp.	
Mermaid's wineglass	*Acetabularia crenulata*	
	Acrochaetium sp.	
	Bryopsis pennata	
	Caulerpa sp.	
	Cladophora sericea	
	Cladosiphon sp.	
	Dasya sp.	
	Derbesia vaucheriaeformis	
	Dictyota sp.	
	Ectocarpus sp.	
	Feldmannia sp.	
	Fosliella atlantica	
	Gayliella mazoyerae	
	Gracilaria sp.	
	Halymenia sp.	
	Hypnea sp.	
	Laurencia sp.	
	Padina gymnospora	
	Polysiphonia denudata	
	Polysiphonia sp.	
	Sargassum sp.	
	Ulva flexuosa	
	Ulva linza	
	Ulva prolifera	
Vascular plants		
Bushy bluestem	*Andropogon glomeratus*	
False willow	*Baccharis angustifolia*	
Saltbush	*Baccharis halimifolia*	
Saltwort	*Batis maritima*	
Bushy seaside oxeye	*Borrichia frutescens*	
Sawgrass	*Cladium jamaicense*	
Beach tea	*Croton punctatus*	
Baldwin's flatsedge	*Cyperus globulosus*	
Haspan flatsedge	*Cyperus haspan*	
Fragrant flatsedge	*Cyperus odoratus*	
Pinebarren flatsedge	*Cyperus retrorsus*	
Tropical flatsedge	*Cyperus surinamensis*	
Fourangle flatsedge	*Cyperus tetragonis*	
Saltgrass	*Distichlis spicata*	

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Coast cockspur grass	*Echinochloa walteri*	
Canada spikerush	*Eleocharis geniculata*	
Purple lovegrass	*Eragrostis spectabilis*	
Dixie sandmat	*Euphorbia bombensis*	
Carolina fimbry	*Fimbristylis caroliniana*	
Marsh fimbry	*Fimbristylis castanea*	
Pennywort	*Hydrocotyle bonariensis*	
Pineweed	*Hypericum gentianoides*	
Yaupon	*Ilex vomitoria*	
Marsh elder	*Iva frutescens*	
Black needlerush	*Juncus roemarianus*	
Seashore mallow	*Kosteletzkya virginica*	
Sea-lavender	*Limonium carolinianum*	
Primrose-willow	*Ludwigia alata*	
Seaside primrose-willow	*Ludwigia maritima*	
Saltmarsh loosestrife	*Lythrum lineare*	
Wax-myrtle	*Myrica cerifera*	
Switchgrass	*Panicum virgatum*	
Seashore paspalum	*Paspalum vaginatum*	
Common reed	*Phragmites* spp.	
Choctawhatchee sand pine	*Pinus clausa var. immuginata*	
Salt marsh fleabane	*Pluchea odorata*	
Heart wing sorrel	*Rumex hastatulus*	
Cabbage palm	*Sabal palmetto*	
Rose of Plymouth	*Sabatia stellaris*	
Woody glasswort	*Salicornia virginica*	
Gulf bluestem	*Schizachyrium maritimum*	
Fringed nutrush	*Scleria ciliata*	
Sea-purslane	*Sesuvium portulacastrum*	
Giant bristlegrass	*Setaria magna*	
Marsh bristlegrass	*Setaria parviflora*	
Smooth cordgrass	*Spartina alterniflora*	
Saltmeadow cordgrass	*Spartina patens*	
Gulf cordgrass	*Spartina spartinae*	
Virginia dropseed	*Sporobolus virginicus*	
Annual saltmarsh American aster	*Symphyotrichum subulatum*	
Perennial saltmarsh aster	*Symphyotrichum tenuifolium*	
Sea oats	*Uniola paniculata*	
Submerged Aquatic Vegetation		
Shoal grass	*Halodule wrightii*	
Star grass	*Halophia engelmannii*	
Widgeon grass	*Ruppia maritima*	

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Water spangles	*Salvinia minima*	
Manatee grass	*Syringodium filiforme*	
Turtle grass	*Thallassia testudinum*	
Sponges		
Branching candle sponge	*Aplysina cauliformis*	
Red boring sponge	*Cliona celata*	
	Halichondria melanodocia	
Breadcrumb sponge	*Halichondria panicea*	
Purple encrusting sponge	*Haliclona permollis*	
	Halicometes stellata	
Sheepswool sponge	*Hippospongia lachne*	
Sun sponge	*Hymeniacidon heliophila*	
	Lissodendoryx isodictyalis	
Red beard sponge	*Microciona prolifera*	
	Plakortis halichondrioides	
	Sarcotragus fasciculatus	
Loggerhead sponge	*Spheciospongia vesparium*	
	Suberites aurantiacus	
	Suberites sp.	
	Sycon acanthoxea	
Mollusks		
Atlantic abra	*Abra aequalis*	
Striated glass-hair chiton	*Acanthochitona pygmaea*	
Channeled barrel-bubble	*Acteocina canaliculata*	
Lettered olive	*Americoliva sayana*	
Atlantic paper mussel	*Amygdalum papyrium*	
Fat dovesnail	*Anachis obesa*	
Cut-ribbed ark	*Anadara floridana*	
Buttercup lucine	*Anodontia alba*	
Pointed venus	*Anomalocardia cuneimeris*	
	Anomalocardia puella	
Common jingle	*Anomia simplex*	
Beaded phos	*Antillophos candeanus*	
Mottled seahare	*Aplysia brasiliana*	
Mossy ark	*Arca imbricata*	
Turkey wing ark	*Arca zebra*	
Florida spiny jewel box	*Arcanella cornuta*	
Adam's ark	*Arcopsis adamsi*	
Gem cyclostreme	*Arene tricarinata*	
Atlantic calico scallop	*Argopecten gibbus*	
Bay scallop	*Argopecten irradians*	
Gaudy sanguin	*Asaphis deflorata*	
Rigid penshell	*Atrina rigida*	

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Half-naked penshell	*Atrina seminuda*	
Sawtooth penshell	*Atrina serrata*	
Gould's shipworm	*Bankia gouldi*	
White beard ark	*Barbatia candida*	
Gross cerith	*Bittiolum varium*	
Two-groove odostome	*Boonea bisuturalis*	
Scorched mussel	*Brachiodontes exustus*	
Common Atlantic bubble	*Bulla striata*	
Vera Cruz caecum	*Caecum circumvolutum*	
Cooper's caecum	*Caecum cooperi*	
Florida caecum	*Caecum floridanum*	
Imbricate caecum	*Caecum imbricatum*	
Johnson's caecum	*Caecum johnsoni*	
Beautiful caecum	*Caecum pulchellum*	
Gorgeous tuskshell	*Calliodentalium callipeplum*	
Mottled topsnail	*Calliostoma jujubinum*	
Glory-of-the-sea venus	*Callpita eucymata*	
Little-ribbed cardiomya	*Cardiomya costellata*	
Ornate cardiomya	*Cardiomya ornatissima*	
Broad-ribbed cardita	*Carditamera floridana*	
Contracted corbula	*Caryocorbula contracta*	
Swift's corbula	*Caryocorbula swiftiana*	
Queen helmet	*Cassis madagascariensis*	
Green's cerithiopsis	*Cerithiopsis greeni*	
Dark cerith	*Cerithium atratum*	
Flyspeck cerith	*Cerithium muscarum*	
Eastern beaded chiton	*Chaetopleura apiculata*	
Corrugated jewelbox	*Chama congregata*	
Lace murex	*Chicoreus florifer*	
Florida cross-barred venus	*Chione elevata*	
Gray pygmy venus	*Chioneryx grus*	
	Chlamydopleon dissimile	
Banded tulip	*Cinctura lilium*	
Rusty dovesnail	*Columbella rusticoides*	
Jasper cone	*Conasprella jaspidea*	
Mouse cone	*Conus mus*	
Barratt corbula	*Corbula barrattiana*	
Greedy dovesnail	*Costoanachis avara*	
Florida dovesnail	*Costoanachis floridana*	
Well ribbed dovesnail	*Costoanachis translirata*	
Lunate crassinella	*Crassinella lunulata*	
Martinique crassinella	*Crassinella martinicensis*	
Common Atlantic slippersnail	*Crepidula fornicata*	
Eastern white slippersnail	*Crepidula plana*	
Dwarf tiger lucine	*Ctena orbiculata*	

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Thin cyclinella	*Cyclinella tenuis*	
	Cyclostremiscus pentagonus	
Two-toothed barrel-bubble	*Cylichnella bidentata*	
Yellow pricklycockle	*Dallocardia muricata*	
Gold-line marginella	*Dentimargo aureocinctus*	
Atlantic giant cockle	*Dinocardium robustum*	
Atlantic diplodon	*Diplodonta punctata*	
Texas coquina	*Donax texasianus*	
Variable coquina	*Donax variabilis*	
Inshore squid	*Doryteuthis pleii*	
Disk dosinia	*Dosinia discus*	
Elegant dosinia	*Dosinia elegans*	
Minor jackknife	*Ensis minor*	
Hairy vitrinella	*Episcynia inornata*	
Angulate wentletrap	*Epitonium angulatum*	
Many-ribbed wentletrap	*Epitonium multistriatum*	
Concentric ervilis	*Ervilia concentrica*	
	Eulimastoma engonium	
Sharp-rib drill	*Eupleura sulcidentata*	
True tulip	*Fasciolaria tulipa*	
Pitted murex	*Favartia cellulosa*	
Atlantic figsnail	*Ficus ficus*	
	Finella dubia	
Pear whelk	*Fulguropsis spirata*	
Tinted cantharus	*Gemophos tinctus*	
Ribbed mussel	*Geukensia demissa*	
Snowflake marginella	*Gibberula lavalleeana*	
Giant American bittersweet	*Glycemaris americana*	
Waxy gouldclam	*Gouldia cerina*	
Teardrop marginella	*Granulina ovuliformis*	
Ivory tuskshell	*Graptacme eborea*	
Frosted wentletrap	*Gyroscala rupicola*	
Amber glassy·bubble	*Haminoea succinea*	
Giant eastern murex	*Hexaplex fulvescens*	
Pitted baby-bubble	*Japonactaeon punctostriatus*	
Punctate mangelia	*Kurtziella limonitella*	
Morton eggcockle	*Laevicardium mortoni*	
Painted eggcockle	*Laevicardium pictum*	
Chestnut mussel	*Lioberus castaneus*	
Marsh periwinkle	*Littoraria irrorata*	
Cockscomb hydrobe	*Littoridinops monroensis*	
Atlantic brief squid	*Lolliguncula brevis*	
Elongate macoma	*Macoma tenta*	
Sunray venus	*Macrocallista nimbosa*	
Atlantic deer cowrie	*Macrocypraea cervus*	

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Jamaica eulima	*Melanella eburnea*	
Florida crown conch	*Melongena corona*	
American horsemussel	*Modiolus americanus*	
Dwarf surfclam	*Mulinia lateralis*	
Lateral mussel	*Musculus lateralis*	
Sharp nassa	*Nassarius acutus*	
White nassa	*Nassarius albus*	
Striate nassa	*Nassarius consensus*	
Bruised nassa	*Nassarius vibex*	
Pointed nutclam	*Nuculana acuta*	
Whitened dwarf olive	*Olivella dealbata*	
Rice olive	*Olivella floralia*	
Minute dwarf olive	*Olivella minuta*	
Variable dwarf olive	*Olivella mutica*	
Tiny dwarf olive	*Olivella pusilla*	
Many-line lucine	*Parvilucina crenella*	
California venus	*Phyllonotus pomum*	
Common Atlantic marginella	*Prunum apicinum*	
Little oat marginella	*Prunum bellulum*	
	Prunum succineum	
Lady-in-waiting venus	*Puberella intapurpurea*	
	Retilaskeya bicolor	
Atlantic semele	*Semele proficua*	
Lightning whelk	*Sinistrofulgur perversum*	
White baby-ear	*Sinum perspectivum*	
Florida lucine	*Stewartia floridana*	
Minature moonsnail	*Tectonatica pusilla*	
Eastern auger	*Terebra dislocata*	
Horse conch	*Triplofusus giganteus*	
Gulf oyster drill	*Urosalpinx perrugata*	
Arthropods		
Blue crab	*Callinectes sapidus*	
Lesser blue crab	*Callinectes similis*	
Star-eye hermit crab	*Dardanus venosus*	
Brown shrimp	*Farfantepenaeus aztecus*	
Pink shrimp	*Farfantepenaeus duorarum*	
Stone crab	*Menippe* spp.	
Portunus crab	*Portunus* spp.	
Roughneck shrimp	*Rimapenaeus constrictus*	
Rock shrimp	*Sicyonia brevirostris*	
Kinglet rock shrimp	*Sicyonia typica*	
Fiddler crab	*Uca* spp.	

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Fishes		
Sergeant major	*Abudefduf saxatilis*	
Night sergeant	*Abudefduf taurus*	
Scrawled cowfish	*Acanthostracion quadricornis*	
Doctorfish	*Acanthurus chirurgus*	
Blue tang	*Acanthurus coeruleus*	
Gulf surgeonfish	*Acanthurus randalli*	
Lined sole	*Achirus lineatus*	
Gulf sturgeon	*Acipenser oxyrhinchus desotoi*	FT
Spotted eagle ray	*Aetobatus narinari*	
Key worm eel	*Ahlia egmontis*	
African pompano	*Alectis ciliaris*	
Blueback herring	*Alosa aestivalis*	
Alabama shad	*Alosa alabamae*	
Skipjack herring	*Alosa chrysochloris*	
Orange filefish	*Aluterus schoepfii*	
Longtail filefish	*Aluterus scripta*	
Fringed pipefish	*Anarchopterus criniger*	
Cuban anchovy	*Anchoa cubana*	
Striped anchovy	*Anchoa hepsetus*	
Dusky anchovy	*Anchoa lyolepis*	
Bay anchovy	*Anchoa mitchilli*	
Ocellated flounder	*Ancylopsetta quadrocellata*	
American eel	*Anguilla rostrata*	
Ocellated frogfish	*Antennarius ocellatus*	
Singlespot frogfish	*Antennarius radiosus*	
Spotted cardinalfish	*Apogon maculatus*	
Dusky carndinalfish	*Apogon pigmentarius*	
Twospot cardinalfish	*Apogon pseudomaculatus*	
Blackfin cardinalfish	*Apogonichthys puncticulatus*	
Sheepshead	*Archosargus probatocephalus*	
Hardhead catfish	*Ariopsis felis*	
Bronze cardinalfish	*Astrapogon stellatus*	
Southern stargazer	*Astroscopus y-graecum*	
Frigate mackeral	*Auxis thazard thazard*	
Gafftopsail catfish	*Bagre marinus*	
Silver perch	*Bairdiella chrysoura*	
Grey triggerfish	*Balistes capriscus*	
Whip eel	*Bascanichthys scuticaris*	
Frillfin goby	*Bathygobius soporator*	
Ragged goby	*Bollmannia communis*	
Twospot flounder	*Bothus robinsi*	
Menhaden	*Brevoortia* spp.	
Grass porgy	*Calamus arctifrons*	
Littlehead porgy	*Calamus proridens*	

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Yellow jack	*Caranx bartholomaei*	
Blue runner	*Caranx crysos*	
Crevalle jack	*Caranx hippos*	
Horse-eye jack	*Caranx latus*	
Bar jack	*Caranx ruber*	
Pearlfish	*Carapus bermudensis*	
Blacknose shark	*Carcharhinus acronotus*	
Bull shark	*Carcharhinus leucas*	
Blacktip shark	*Carcharhinus limbatus*	
Sandbar shark	*Carcharhinus plumbeus*	
Bank sea bass	*Centropristis ocyurus*	
Rock sea bass	*Centropristis philadelphica*	
Black sea bass	*Centropristis striata*	
Atlantic spadefish	*Chaetodipterus faber*	
Four-eye butterflyfish	*Chaetodon capistratus*	
Spotfin butterflyfish	*Chaetodon ocellatus*	
Reef butterflyfish	*Chaetodon sedentarius*	
Banded butterflyfish	*Chaetodon striatus*	
Florida blenny	*Chasmodes saburrae*	
Striped burrfish	*Chilomycterus schoepfii*	
Atlantic bumper	*Chloroscombrus chrysurus*	
Spotted whiff	*Citharichthys macrops*	
Bay whiff	*Citharichthys spilopterus*	
Margintail conger	*Conger caudilimbatus*	
Conger eel	*Conger oceanicus*	
Whitenose pipefish	*Cosmocampus albirostris*	
Shortfin pipefish	*Cosmocampus elucens*	
Bluelip parrotfish	*Cryptotomus roseus*	
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*	
Spotfin porcupinefish	*Diodon hystrix*	
Dwarf sand perch	*Diplectrum bivittatum*	
Sand perch	*Diplectrum formosum*	
Spottail pinfish	*Diplodus holbrookii*	
Dwarf wrasse	*Doratonotus megalepis*	
Gizzard shad	*Dorosoma cepidianum*	
Threadfin shad	*Dorosoma petenense*	
Sharksucker	*Echeneis naucrates*	
Whitefin sharksucker	*Echeneis neucratoides*	

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Ladyfish	*Elops saurus*	
Silver anchovy	*Engraulus eurystole*	
Spotted cabrilla	*Epinephelus analogus*	
Goliath grouper	*Epinephelus itajara*	
Red grouper	*Epinephelus morio*	
Jacknife-fish	*Equetus lanceolatus*	
Fringed flounder	*Etropus crossotus*	
Shelf flounder	*Etropus cyclosquamus*	
Round herring	*Etrumeus teres*	
Spotfin mojarra	*Eucinostomus argenteus*	
Silver jenny	*Eucinostomus gula*	
Tidewater mojarra	*Eucinostomus harengulus*	
Mojarra	*Eucinostomus spp.*	
Little tunny	*Euthynnus alletteratus*	
Bluespotted cornetfish	*Fistularia tabacaria*	
Marsh killifish	*Fundulus confluentus*	
Gulf killifish	*Fundulus grandis*	
Longnose killifish	*Fundulus similis*	
Tiger shark	*Galeocerdo cuvier*	
Nurse shark	*Ginglymostoma cirratum*	
Skilletfish	*Gobiesox strumosus*	
Violet goby	*Gobioides broussonneti*	
Ocean goby	*Gobionellus oceanicus*	
Naked goby	*Gobiosoma bosc*	
Code goby	*Gobiosoma robustum*	
Naked sole	*Gymnachirus melas*	
Green moray	*Gymnothorax funebris*	
Spotted moray	*Gymnothorax moringa*	
Blackedge moray	*Gymnothorax nigromarginatus*	
Ocellated moray	*Gymnothorax saxicola*	
Smooth butterfly ray	*Gymnura micrura*	
Tomtate	*Haemulon aurolineatum*	
Sailor's choice	*Haemulon parva*	
White grunt	*Haemulon plumieri*	
Slippery dick	*Halichoeres bivittatus*	
Painted wrasse	*Halichoeres caudalis*	
Clown wrasse	*Halichoeres maculipinna*	
Puddingwife	*Halichoeres radiatus*	
Scaled sardine	*Harengula jaguana*	
Ballyhoo	*Hemiramphus brasiliensis*	
Lined seahorse	*Hippocampus erectus*	
Dwarf seahorse	*Hippocampus zosterae*	
Sargassumfish	*Histrio histrio*	
Blue angelfish	*Holocanthus bermudensis*	
Queen angelfish	*Holocanthus ciliaris*	

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Squirrelfish	*Holocentrus adscensionis*	
Dusky squirrelfish	*Holocentrus vexillarius*	
Barred blenny	*Hypleurochilus bermudensis*	
Crested blenny	*Hypleurochilus geminatus*	
False silver halfbeak	*Hyporhamphus meeki*	
Halfbeak	*Hyporhamphus unifasciatus*	
Feather blenny	*Hypsoblennius hentz*	
Freckled blenny	*Hypsoblennius ionthas*	
Yellow chub	*Kyphosus incisor*	
Bermuda chub	*Kyphosus sectatrix*	
Hogfish	*Lachnolaimus maximus*	
Trunkfish	*Lactophrys trigonus*	
Smooth puffer	*Lagocephalus laevigatus*	
Pinfish	*Lagodon rhomboides*	
Banded drum	*Larimus fasciatus*	
Spot	*Leiostomus xanthurus*	
Spotted gar	*Lepisosteus oculatus*	
Longnose gar	*Lepisosteus osseus*	
Blackedge cusk-eel	*Lepophidium brevibarbe*	
Sailfin eel	*Letharchus velifer*	
Tripletail	*Lobotes surinamensis*	
Rainwater killifish	*Lucania parva*	
Mutton snapper	*Lutjanus analis*	
Schoolmaster	*Lutjanus apodus*	
Red snapper	*Lutjanus campechanus*	
Gray snapper	*Lutjanus griseus*	
Lane snapper	*Lutjanus synagris*	
Manta ray	*Manta birostris*	
Tarpon	*Megalops atlanticus*	
Rough silverside	*Membras martinica*	
Silversides	*Menidia spp.*	
Southern kingfish	*Menticirrhus americanus*	
Gulf kingfish	*Menticirrhus littoralis*	
Northern kingfish	*Menticirrhus saxatilis*	
Clown goby	*Microgobius gulosus*	
Atlantic croaker	*Micropogonias undulatus*	
Fringed filefish	*Monacanthus ciliatus*	
Striped bass	*Morone saxatilis*	
Striped mullet	*Mugil cephalus*	
White mullet	*Mugil curema*	
Fantail mullet	*Mugil trichodon*	
Mexican goatfish	*Mulloidichthys dentatus*	
Red goatfish	*Mullus auratus*	
Smooth dogfish	*Mustelis canis*	
Florida smooth hound	*Mustelus norrisi*	

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Black grouper	*Mycteroperca bonaci*	
Gag	*Mycteroperca microlepis*	
Goldspotted eel	*Myrichthys ocellatus*	
Speckled worm eel	*Myrophis punctatus*	
Lesser electric ray	*Narcine bancroftii*	
Lemon shark	*Negraprion brevirostris*	
Emerald parrotfish	*Nicholsina usta*	
Yellowtail snapper	*Ocyurus chrysurus*	
Polk-dot batfish	*Ogcocephalus cubifrons*	
Shortnose batfish	*Ogcocephalus nasutus*	
Key brotula	*Ogilbia cayorum*	
Leatherjacket	*Oligoplites saurus*	
Shrimp eel	*Ophichthus gomesii*	
Blotched cusk-eel	*Ophidion grayi*	
Bank cusk-eel	*Ophidion holbrooki*	
Striped cusk-eel	*Ophidion marginatum*	
Crested cusk-eel	*Ophidion welshi*	
Atlantic thread herring	*Opisthonema oglinum*	
Spotfin jawfish	*Opistognathus robinsi*	
Gulf toadfish	*Opsanus beta*	
Leopard toadfish	*Opsanus pardus*	
Pigfish	*Orthopristis chrysoptera*	
Polka-dot cusk-eel	*Otophidium omostigma*	
Red porgy	*Pagrus pagrus*	
Seaweed blenny	*Parablennius marmoreus*	
Gulf flounder	*Paralichthys albigutta*	
Southern flounder	*Paralichthys lethostigma*	
High-hat	*Pareques acuminatus*	
Cubbyu	*Pareques umbrosus*	
Gulf butterfish	*Peprilus burti*	
Harvestfish	*Peprilus paru*	
Keeltail needlefish	*Platybelone argalus argalus*	
Black drum	*Pogonias cromis*	
Gray angelfish	*Pomacanthus arcuatus*	
Bluefish	*Pomatomus saltatrix*	
Midshipman	*Poricthyes plectrodon*	
Bigeye	*Priacanthus arenatus*	
Barred searobin	*Prionotus martis*	
Bandtail searobin	*Prionotus ophyras*	
Blackwing searobin	*Prionotus rubio*	
Leopard searobin	*Prionotus scitulus*	
Bighead searobin	*Prionotus tribulus*	
Short bigeye	*Pristigenys alta*	
Clearnose ray	*Raja eglanteria*	
Round skate	*Raja texana*	

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Remora	*Remora remora*	
Atlantic quitarfish	*Rhinobatos lentiginosus*	
Cownose ray	*Rhinoptera bonasus*	
Atlantic sharpnose shark	*Rhizoprionodon terraenovae*	
Vermillion snapper	*Rhomboplites aurorubens*	
Whitespotted soapfish	*Rypticus maculatus*	
Atlantic bonito	*Sarda sarda*	
Spanish sardine	*Sardinella aurita*	
Midnight parrotfish	*Scarus coelestinus*	
Striped parrotfish	*Scarus croicensis*	
Rainbow parrotfish	*Scarus guacamaia*	
Red drum	*Sciaenops ocellatus*	
Chub mackerel	*Scomber japonicus*	
King mackerel	*Scomberomorus cavalla*	
Spanish mackerel	*Scomberomorus maculatus*	
Cero mackerel	*Scomberomorus regalis*	
Barbfish	*Scorpaena brasiliensis*	
Smoothhead scorpionfish	*Scorpaena calcarata*	
Bigeye scad	*Selar crumenophthalmus*	
Atlantic moonfish	*Selene setipinnus*	
Look-down	*Selene volmer*	
Greater amberjack	*Seriola dumerili*	
Pygmy sea bass	*Serraniculus pumilio*	
Belted sandfish	*Serranus subigarius*	
Redband parrotfish	*Sparisoma aurofrenatum*	
Redtail parrotfish	*Sparisoma chrysopterum*	
Bucktooth parrotfish	*Sparisoma radians*	
Redfin parrotfish	*Sparisoma rubripinne*	
Stoplight parrotfish	*Sparisoma viride*	
Southern puffer	*Sphoeroides nephelus*	
Least puffer	*Sphoeroides parvus*	
Bandtail puffer	*Sphoeroides spengleri*	
Great barracuda	*Sphyraena barracuda*	
Northern sennet	*Sphyraena borealis*	
Guachanche barracuda	*Sphyraena guachancho*	
Scalloped hammerhead	*Sphyrna lewini*	
Bonnethead shark	*Sphyrna tiburo*	
Dusky damselfish	*Stegastes fuscus*	
Beaugregory	*Stegastes leucostictus*	
Cocoa damselfish	*Stegastes variabilis*	
Star drum	*Stellifer lanceolatus*	
Longspine porgy	*Stenotomus caprinus*	
Planehead filefish	*Stephanolepis hispidus*	
Atlantic needlefish	*Strongylura marina*	
Redfin needlefish	*Strongylura notata*	

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Dusky flounder	*Syacium papillosum*	
Blackcheeked tonguefish	*Symphurus plagiusa*	
Dusky pipefish	*Syngnathus floridae*	
Chain pipefish	*Syngnathus louisianae*	
Gulf pipefish	*Syngnathus scovelli*	
Inshore lizardfish	*Synodus foetens*	
Bluehead	*Thalassoma bifasciatum*	
Florida pompano	*Trachinotus carolinus*	
Permit	*Trachinotus falcatus*	
Rough scad	*Trachurus lathami*	
Hogchoker	*Trinectes maculatus*	
Houndfish	*Tylosurus crocodilus*	
Southern hake	*Urophycis floridana*	
Pearly razorfish	*Xyrichtys novacula*	
Reptiles		
American alligator	*Alligator mississippiensis*	FT(S/A)
Loggerhead sea turtle	*Caretta caretta*	FE
Green sea turtle	*Chelonia mydas*	FT
Leatherback sea turtle	*Dermochelys coriacea*	FE
Hawksbill sea turtle	*Eretmochelys imbricata imbricata*	FE
Kemp's ridley sea turtle	*Lepidochelys kempii*	FE
Diamondback terrapin	*Malaclemys terrapin*	
Salt marsh snake	*Nerodia clarkii*	
Birds		
Cooper's hawk	*Accipiter cooperii*	
Sharp-shinned hawk	*Accipiter striatus*	
Spotted sandpiper	*Actitis macularia*	
Western grebe	*Aechmophorus occidentalis*	
Red-winged blackbird	*Agelaius phoeniceus*	
Wood duck	*Aix sponsa*	
Northen pintail	*Anas acuta*	
American widgeon	*Anas americana*	
Northern shoveler	*Anas clypeata*	
Green-winged teal	*Anas crecca*	
Blue-winged teal	*Anas discolor*	
Mallard	*Anas platyrhynchos*	
American black duck	*Anas rubripes*	
Gadwall	*Anas strepera*	
Anhinga	*Anhinga anhinga*	
Limpkin	*Aramus guarauna*	
Ruby-throated hummingbird	*Archilochus colubris*	
Great blue heron	*Ardea herodias*	
Ruddy turnstone	*Arenaria interpres*	

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Lesser scaup	*Aythya affinis*	
Redhead	*Aythya americana*	
Ring-necked duck	*Aythya collaris*	
Greater scaup	*Aythya marila*	
Canvasback	*Aythya valisineria*	
Cedar waxwing	*Bombycilla cedrorum*	
American bittern	*Botaurus lentiginosus*	
Canada goose	*Branta canadensis*	
Great horned owl	*Bubo virginianus*	
Cattle egret	*Bubulcus ibis*	
Bufflehead	*Bucephala albeola*	
Common goldeneye	*Bucephala clangula*	
Red-tailed hawk	*Buteo jamaicensis*	
Red-shouldered hawk	*Buteo lineatus*	
Broad-winged hawk	*Buteo platypterus*	
Little green heron	*Butorides striatus*	
Sanderling	*Calidris alba*	
Dunlin	*Calidris alpina*	
Rufa red knot	*Calidris canutus rufa*	FT
White-rumped sandpiper	*Calidris fuscicollis*	
Stilt sandpiper	*Calidris himantopus*	
Western sandpiper	*Calidris mauri*	
Pectoral sandpiper	*Calidris melanotis*	
Least sandpiper	*Calidris minutilla*	
Semipalmated sandpiper	*Calidris pusilla*	
Chuck-will's widow	*Caprimulgus carolinensis*	
Northern cardinal	*Cardinalis cardinalis*	
American goldfinch	*Carduelis tristis*	
Great egret	*Casmerodius albus*	
Turkey vulture	*Cathartes aura*	
Veery	*Catharus fuscescens*	
Hermit thrush	*Catharus guttatus*	
Willet	*Catoptrophorus semipalmatus*	
Brown creeper	*Certhia americana*	
Belted kingfisher	*Ceryle alcyon*	
Chimney swift	*Chaetura pelagica*	
Southeastern snowy plover	*Charadrius alexandrinus tenuirostris*	ST
Piping plover	*Charadrius melodus*	FT
Semipalmated plover	*Charadrius semipalmatus*	
Killdeer	*Charadrius vociferus*	
Wilson's plover	*Charadrius wilsonia*	
Blue goose	*Chen caerulescens*	
Black tern	*Chlidonias niger*	
Common nighthawk	*Chordeiles minor*	
Northern harrier	*Circus cyaneus*	

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Marsh wren	*Cistothorus palustris marianae*	ST
Sedge wren	*Cistothorus platensis*	
Oldsquaw	*Clangula hyemalis*	
Yellow-billed cuckoo	*Coccyzus americanus*	
Black-billed cuckoo	*Coccyzus erythrophthalmus*	
Northern flicker	*Colaptes auratus*	
Eastern wood-pewee	*Contopus virens*	
Black vulture	*Coragyps atratus*	
Fish crow	*Corvus ossifragus*	
Blue jay	*Cyanocitta cristata*	
Prairie warbler	*Dendroica discolor*	
Yellow-throated warbler	*Dendroica dominica*	
Palm warbler	*Dendroica palmarum*	
Chestnut-sided warbler	*Dendroica pensylvanica*	
Yellow warbler	*Dendroica petechia*	
Pine warbler	*Dendroica pinus*	
Black-throated green warbler	*Dendroica virens*	
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*	
White ibis	*Eudocimus albus*	
Merlin	*Falco columbarius*	
Peregrine falcon	*Falco peregrinus*	
Southeastern kestrel	*Falco sparverius paulus*	ST
Magnificent frigatebird	*Fregata magnificens*	
American coot	*Fulica americana*	
Common snipe	*Gallinago gallinago*	
Common moorhen	*Gallinula chloropus*	
Common loon	*Gavia immer*	
Blue grosbeak	*Guiraca caerulea*	
American oystercatcher	*Haematopus palliatus*	ST
Bald eagle	*Haliaeetus leucocephalus*	BGEPA
Barn swallow	*Hirundo rustica*	
Wood thrush	*Hylocichla mustelina*	
Orchard oriole	*Icterus spurius*	
Mississippi kite	*Ictinia mississippiensis*	
Least bittern	*Ixobrychus exilis*	
Laughing gull	*Larus atricilla*	
Ring-billed gull	*Larus delawarensis*	
Great black-backed gull	*Larus marinus*	
Bonaparte's gull	*Larus philadelphia*	
Black rail	*Laterallus jamaicensis*	

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Short-billed dowatcher	*Limnodromus griseus*	
Hudsonian godwit	*Limosa haemastica*	
Hooded merganser	*Lophodytes cucullatus*	
Red-bellied woodpecker	*Melanerpes carolinus*	
Red-headed woodpecker	*Melanerpes erythrocephalus*	
Black scoter	*Melanitta americana*	
White-winged scoter	*Melanitta deglandi*	
Surf scoter	*Melanitta perspicillata*	
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*	
Whimbrel	*Numenius phaeopus*	
Yellow-crowned night-heron	*Nyctanassa violacea*	
Black-crowned night heron	*Nycticorax nycticorax*	
Eastern screech owl	*Otus asio*	
Ruddy duck	*Oxyura jamaicensis*	
Osprey	*Pandion haliaetus*	
Northern parula	*Parula americana*	
Tufted titmouse	*Parus bicolor*	
Carolina chickadee	*Parus carolinensis*	
Savannah sparrow	*Passerculus sandwichensis*	
Indigo bunting	*Passerina cyanea*	
American white pelican	*Pelecanus erythrorhynchos*	
Brown pelican	*Pelecanus occidentalis*	
Double-crested cormorant	*Phalacrocorax auritus*	
Wilson's phalarope	*Phalaropus tricolor*	
Rose-breasted grosbeak	*Pheucticus ludovicianus*	
Downy woodpecker	*Picoides pubescens*	
Rufous-sided towhee	*Pipilo erythrophthalmus*	
Summer tanager	*Piranga rubra*	
Glossy ibis	*Plegadis falcinellus*	
Lesser golden plover	*Pluvialis dominica*	
Black-bellied plover	*Pluvialis squatarola*	
Horned grebe	*Podiceps auritus*	
Red-necked grebe	*Podiceps grisegena*	
Black-necked grebe	*Podiceps nigricollis*	
Pied-billed grebe	*Podilymbus podiceps*	
Blue-gray gnatcatcher	*Polioptila caerulea*	

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Vesper sparrow	*Pooecetes gramineus*	
Purple gallinule	*Porphyrula martinica*	
Sora	*Porzana carolina*	
Purple martin	*Progne subis*	
Prothonotary warbler	*Protonotaria citrea*	
Greater shearwater	*Puffinus gravis*	
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*	
Woodcock	*Scolopax minor*	
Ovenbird	*Seiurus aurocapillus*	
Louisiana waterthrush	*Seiurus motacilla*	
Northern waterthrush	*Seiurus noveboracensis*	
American redstart	*Setophaga ruticilla*	
Red-breasted nuthatch	*Sitta canadensis*	
Brown-headed nuthatch	*Sitta pusilla*	
Yellow-bellied sapsucker	*Sphyrapicus varius*	
Chipping sparrow	*Spizella passerina*	
Field sparrow	*Spizella pusilla*	
Northern rough-winged swallow	*Stelgidopteryx ruficollis*	
Parasitic jaeger	*Stercorarius parasiticus*	
Bridled tern	*Sterna anaethetus*	
Least tern	*Sterna antillarum*	ST
Caspian tern	*Sterna caspia*	
Forster's tern	*Sterna forsteri*	
Common tern	*Sterna hirundo*	
Royal tern	*Sterna maxima*	
Gull-billed tern	*Sterna nilotica*	
Sandwich tern	*Sterna sandvicensis*	
Barred owl	*Strix varia*	
Eastern meadowlark	*Sturnella magna*	
Masked booby	*Sula dactylatra*	
Brown booby	*Sula leucogaster*	
Tree swallow	*Tachycineta bicolor*	
Carolina wren	*Thryothorus ludovicianus*	
Brown thrasher	*Toxostoma rufum*	
Lesser yellowlegs	*Tringa flavipes*	
Greater yellowlegs	*Tringa melanoleuca*	

Common Name	Species Name	Status
Legend: FT = Federally- and State-Designated Threatened • **FE** = Federally-and State-Designated Endangered **ST** = State-Designated Threatened • **SE** = State-Designated Endangered • **SSC** = State Species of Special Concern • **(S/A)** = listed due to similarity of appearance • **BGEPA** = Bald and Golden Eagle Protection Act		
Solitary sandpiper	*Tringa solitaria*	
House wren	*Troglodytes aedon*	
American robin	*Turdus migratorius*	
Gray kingbird	*Tyrannus dominicensis*	
Eastern kingbird	*Tyrannus tyrannus*	
Orange-crowned warbler	*Vermivora celata*	
Tennessee warbler	*Vermivora peregrina*	
Yellow-throated vireo	*Vireo flavifrons*	
White-eyed vireo	*Vireo griseus*	
Red-eyed vireo	*Vireo olivaceus*	
Solitary vireo	*Vireo solitarius*	
Hooded warbler	*Wilsonia citrina*	
Mourning dove	*Zenaida macroura*	
White-throated sparrow	*Zonotrichia albicollis*	
Mammals		
Fin whale	*Balaenoptera physalus*	FE
Coyote	*Canis latrans*	
Virginia opossum	*Didelphis virginiana*	
Big brown bat	*Eptesicus fuscus*	
Red bat	*Lasiurus borealis*	
Yellow bat	*Lasiurus intermedius*	
Seminole bat	*Lasiurus seminolus*	
River otter	*Lontra canadensis*	
Humpback whale	*Megaptera novaeangliae*	FE
Striped skunk	*Mephitis mephitis*	
Southeastern myotis bat	*Myotis austroriparius*	
Evening bat	*Nycticeius humeralis*	
Marsh rice rat	*Oryzomys palustris*	
Choctawhatchee beach mouse	*Peromyscus polionotus allophrys*	FE
Eastern pipistrelle	*Pipistrellus subflavus*	
Raccoon	*Procyon lotor*	
Hispid cottonrat	*Sigmodon hispidus*	
Eastern spotted skunk	*Spilogale putorius*	
Marsh rabbit	*Sylvilagus palustris*	
Mexican free-tailed bat	*Tadarida brasiliensis*	
Florida manatee	*Trichechus manatus latirostris*	FE
Bottle-nosed dolphin	*Tursiops truncatus*	
Gray fox	*Urocyon cinereoargenteus*	

Common Name	Species Name	Status
Legend: FT = Federally- and State-Designated Threatened • **FE** = Federally-and State-Designated Endangered **ST** = State-Designated Threatened • **SE** = State-Designated Endangered • **SSC** = State Species of Special Concern • **(S/A)** = listed due to similarity of appearance		
Fishes		
Gulf sturgeon	*Acipenser oxyrhinchus desotoi*	FT
Reptiles		
American alligator	*Alligator mississippiensis*	FT(S/A)
Loggerhead sea turtle	*Caretta caretta*	FT
Green sea turtle	*Chelonia mydas*	FT
Leatherback sea turtle	*Dermochelys coriacea*	FE
Hawksbill sea turtle	*Eretmochelys imbricata imbricata*	FE
Kemp's ridley sea turtle	*Lepidochelys kempii*	FE
Birds		
Rufa red knot	*Calidris canutus rufa*	ST
Southeastern snowy plover	*Charadrius alexandrinus tenuirostris*	ST
Piping plover	*Charadrius melodus*	FT
Marsh wren	*Cistothorus palustris marianae*	ST
Little blue heron	*Egretta caerulea*	ST
Tri-colored heron	*Egretta tricolor*	ST
Southeastern kestrel	*Falco sparverius paulus*	ST
American oystercatcher	*Haematopus palliatus*	ST
Wood stork	*Mycteria americana*	FT
Black skimmer	*Rynchops niger*	ST
Least tern	*Sterna antillarum*	FT
Mammals		
Fin whale	*Balaenoptera physalus*	FE
Humpback whale	*Megaptera novaeangliae*	FE
Choctawhatchee beach mouse	*Peromyscus polionotus allophrys*	FE
Florida manatee	*Trichechus manatus latirostris*	FE

B.3.2 / Invasive Non-native and/or Problem Species

Common Name	Species Name	Status
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).		
Plants		
Torpedo-grass	*Panicum repens*	I
Common reed	*Phragmites* spp.	Problem
Invertebrates		
Asian tiger shrimp	*Penaeus monodon*	
Green mussel	*Perna viridis*	
Fish		
Common lionfish	*Pterois miles*	
Red lionfish	*Pterois volitans*	
Birds		
Rock dove	*Columba livia*	
House sparrow	*Passer domesticus*	
European collared dove	*Streptopelia decaocto*	
European starling	*Sturnus vulgaris*	
Mammals		
Coyote	*Canis latrans*	Problem
Nine-banded armadillo	*Dasypus novemcinctus*	
Feral cat	*Felis catus*	Problem
Raccoon	*Procyon lotor*	Problem

B.4 / Arthropod Control Plan

Spatial data (e.g. shapefiles) for the aquatic preserve boundaries 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.

St. Andrews State Park, adjacent to the aquatic preserve, currently has an arthropod plan for the mainland section of St. Andrews State Park only. The park is sampled prior to any mosquito control efforts. Once mosquitoes are detected, monitoring and surveillance efforts continue in order to determine mosquito prevalence, abundance, and the effects of control activities on target and non-target species. Depending on the severity of the mosquito problem, mosquitoes will be controlled with ground or aerial spraying of wetland areas. In addition, predacious fish may be stocked to use as a biological control. After heavy rains that leave significant standing water, retention areas between campgrounds are treated by hand and/or aerial larvicide is applied to all ephemerally flooded areas, excluding the park area known as Buttonbush Marsh.

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. Andrews Aquatic Preserve Management Plan Advisory Committee regarding the draft management plan.

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

Member	Affiliation
Jon Brucker	DEP, Florida Coastal Office, St. Andrews Aquatic Preserve manager (lead managing agency)
Guy M. Tunnell	Bay County Board of County Commissioners, Chairman (local elected official)
Lauren Brunson	Bay County Public Works
Brian Addison	DEP, Florida Park Service, St. Andrews State Park manager (co-managing agency)
Julie Espy	DEP, Division of Environmental Assessment and Restoration (co-managing agency)
Katie Konchar	FWC, Marine & Estuarine Habitat Restoration (co-managing agency)
Paul J. Thorpe	NWFLMD, Bureau of Environmental and Resource Planning (co-managing agency)
Karen Kebert	NWFLMD, Bureau of Environmental and Resource Planning (co-managing agency)
Beverly McMurray	Bay County Soil & Water Conservation District (Soil and Water Conservation District)
Melody Ray-Culp	U.S. Fish and Wildlife Service, Florida Panhandle Coastal Program
Donald Jenkin	Tyndall Air Force Base, Natural Resource Liaison (co-managing agency)
Robert Rowe	FWC, Law Enforcement (co-managing agency)
Michelle Sempsrott	FWC (co-managing agency)
Kent Smith	FWC (co-managing agency)
Linda Fitzhugh	St. Andrew Bay Resource Management Association, Inc. (local conservation organization)
Patrice Couch	St. Andrew Bay Resource Management Association, Inc. (local conservation organization)
John Bente	Bay County Conservancy, Inc. (local conservation organization)
Scott Jackson	SeaGrant - UF/IFAS Bay County (academic research)
Cheryl Adams	Sea Dragon Pirate Cruise (private property owner)
Stephanie Somerset	Friends of Shell Island (private property owner)
Mary Sittman	Private Property Owner

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, Jon Brucker at Jonathan.Brucker@dep.state.fl.us or (850)670-7723.
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: Jon Brucker at (850)670-7723. 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, July 14, 2016, 9:00 a.m.
PLACE: Gulf Coast State College, Student Union E, Room 243, 5230 West Highway 98, Panama City, FL 32401
GENERAL SUBJECT MATTER TO BE CONSIDERED: The St. Andrews Aquatic Preserve Management Plan Advisory Committee will meet to discuss comments at the public meeting - scheduled for July 13 and separately noticed - and possible revisions to the draft St. Andrews Aquatic Preserve Management Plan. The draft plan is available for viewing or download at www.dep.state.fl.us/coastal/sites/standrews/default.htm.
A copy of the agenda may be obtained by contacting: Aquatic Preserve Manager, Jon Brucker at Jonathan.Brucker@dep.state.fl.us or (850)670-7723.
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: Jon Brucker at (850)670-7723. 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 Department of Environmental Protection announces a public meeting to which all persons are invited.
DATE AND TIME: June 22, 2016, 9:30 a.m.
PLACE: Seminole County Extension Auditorium, 250 West County Home Road, Sanford, FL 32773
GENERAL SUBJECT MATTER TO BE CONSIDERED: This is a Lake Jesup Basin Management Action Plan (BMAP) technical meeting to which the public is invited. At this meeting the department will provide stakeholders with an update on the associated Lake Jesup basin TMDL model revisions. This is a reposting of the meeting notice published in the Florida Administrative Register on Friday, June 10. 2016 (Volume 42, No. 113), and provides additional information about the June 22 meeting.
A copy of the agenda may be obtained by contacting: Moira Homann, Watershed Planning and Coordination Section, Florida Department of Environmental Protection, 2600 Blair Stone Road, MS 3565, Tallahassee, Florida 32399-2400, Moira.Homann@dep.state.fl.us.
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 days before the workshop/meeting by contacting: Moira Homann, Watershed Planning and Coordination Section, Florida Department of Environmental Protection, 2600 Blair Stone Road, MS 3565, Tallahassee, Florida 32399-2400, Moira.Homann@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).
For more information, you may contact: Moira Homann, Watershed Planning and Coordination Section, Florida Department of Environmental Protection, 2600 Blair Stone Road, MS 3565, Tallahassee, Florida 32399-2400, Moira.Homann@dep.state.fl.us.

DEPARTMENT OF HEALTH
Board of Osteopathic Medicine
The Board of Osteopathic Medicine announces a public meeting to which all persons are invited.
DATE AND TIME: August 26, 2016, 8:00 a.m.
PLACE: Sawgrass Marriott Resort, 1000 PGA Tour Blvd., Ponte Vedra Beach, FL 32082
GENERAL SUBJECT MATTER TO BE CONSIDERED: General business of the Board.
A copy of the agenda may be obtained by contacting: Kama Monroe, Executive Director at (850)245-4161 or 4052 Bald Cypress Way, #C-06, Tallahassee, FL 32399.
Pursuant to the provisions of the Americans with Disabilities Act, any person requiring special accommodations to participate in this workshop/meeting is asked to advise the agency at least 5 days before the workshop/meeting by contacting: Kama Monroe, Executive Director at (850)245-4161 or 4052 Bald Cypress Way, #C-06, Tallahassee, FL 32399. 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

Florida Department of Environmental Protection

Central Panhandle Aquatic Preserves
108 Island Drive
Eastpoint, Florida 32328

St. Andrews Aquatic Preserve Draft Management Plan
Advisory Committee Meeting
Thursday, July 14, 2016, 9:00 a.m.
Gulf Coast State College
Student Union E, Room 243
5230 West Highway 98
Panama City, Florida

Attendees (8): Cheryl Adams, Robert Rowe, Stephanie Somerset, Lauren Brunson, Linda Fitzhugh, Katie Konchar, Karen Kebart, Melody Ray-Culp
Staff: Jon Brucker, Katie Maxwell, Earl Pearson, Penny Isom

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 by the recorder.

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

Linda Fitzhugh asked whether the aquatic preserve would be able to help out with a water quality report card, making it more reader-friendly, and adding information on possible causes, and potential solutions. She would also like the report card to be more frequent. They need marketable stuff – brochures, kiosks, and in a user-friendly format. Katie Konchar suggested adding it as a Performance Measure. Karen Kebart suggested that paper may be more effective. It can be handed to people as they get to the beach. Melody Ray-Culp mentioned that water quality improvement in West Bay is a great story to tell and could be included in the report as a success story. Major Rob Rowe mentioned relating water quality to recreational activities in order to get more user buy-in.

Linda suggested a speed zone in the Grand Lagoon. She mentioned that the excessive boat wake increases the suspended solids in Grand Lagoon and could be effecting water quality in that area. (Grand Lagoon is outside of the aquatic preserve, but flows into it and impacts the aquatic preserve.) Stephanie Somerset asked about a no-wake zone that was proposed by Bay County, but turned down by FWC. Lauren Brunson said that FWC wanted a survey of boater use before approving anything. Linda said that the RMA may be able to get that boating data. It should already be available from the marinas.

Cheryl Adams said that visitors want to get to Shell Island as fast as possible. They're spending a lot of money on the rental, and it's a limited time. They may be unaware of the damage that they're causing (and may not care), but better education is needed. She's personally ok with the no-wake proposal, but jet ski rental companies won't like it since they give two hour tours, and that would slow them down. Too many people don't know the proper procedures; some rental companies are great, some aren't.

Linda suggested using a PSA to help educate boaters. Melody Ray-Culp said that brochures are needed so that at least, there's a clear message that all the interested parties would have access to and suggested that the AP assemble all of the information they would want the rental companies to give out to visitors who are renting boats. She also mentioned tying information into the "Chasin' the Sun" Music Festival held by the Panama City Beach TDC. Katie Konchar said that FWC can look at the no-wake zone again.

Cheryl also said that fish cleaning is an issue in Grand Lagoon, and wondered if it was legal, and who makes that determination. Is it a factor in Clean Marinas? Linda suggested a Best Practices for Bay County (Best Bay Practices?) to help them understand their impacts on the bay (not just cleaning fish) and how they can minimize them. Cheryl said that there should be signs at the fish cleaning stations, more garbage cans for the fish, and to let the fishermen know that Grand Lagoon doesn't flush. So the fish that they toss of the dock is going to be there a while, and there aren't enough crabs in Grand Lagoon to eat them all. Linda and Melody asked if there are containers/or fish digesters that could be added to the marinas. Linda also suggested surveying the marinas to find out where fish cleaning and pump out stations are needed. Jonathan Brucker stated that either the city or county would be responsible for doing compliance checks on marinas.

Stephanie said that the Friends of Grand Lagoon is looking into pumping water through Grand Lagoon, like is done in Destin. Karen Kebart from the NWFWMD said that the water management district encourages sustainable low impact projects for improving water quality. She noted that this project would require a lot of infrastructure.

Melody suggested adding an appendix about the work that is already being done in the AP and including historical information. She then asked about what the plan says about marine debris. Jon answered that the plan mainly discourages illegal dumping and the AP will work with the public to explain why illegal dumping for the purpose of creating an artificial reef is not good for the resource. Improperly sited and designed artificial reefs contribute to water quality issues, as well as damaging habitat, and adding marine debris. Linda suggested building a new properly designed and sited artificial reef first so that snorkelers have a place to go, and then working on removing the trash. Otherwise, people will keep throwing trash. Stephanie gave her support for the idea of a permitted reef in place of the current debris and mentioned partnering with the Bay County TDC to promote a new reef. Melody suggested designing a snorkeling trail that would include the cultural resources, as appropriate. Rob Rowe suggested using current sites and replacing the reefs the right way. It would have less impact on resources, and people already know

where they are. Fish are attracted immediately to the artificial reefs so they would attract snorkelers. They just don't develop the bio-film right away.

Melody pointed out that Map 9 is missing the seagrass beds, probably buried under another layer. Cheryl noted that jet skiiers are using the seagrass restoration bird stakes as a slalom. Sometimes, they bump into the PVC pipe and damage them, and the jet skis can damage the seagrass below. A sturdier sign is needed to discourage people from cutting it so close. Katie said that FWC is interested in outreach at the jet ski rental places since FWC doesn't want to have its restoration project go for nothing.

There was a suggestion to use the same kind of buoy/signs that were just installed in St. Joseph Bay, along with kiosks and a map. Education is a big part of deploying these signs. Boaters need to know why the signs are there so that they don't go up to them to try and read them, or go to the wrong side of the sign. There was a lot of interest in extending this program to St. Andrews Bay, and discussion on possible funding. Melody suggested adding information about the St. Joseph Bay buoy project in an appendix. Linda proposed partnering with RMA for a NRDA project. Karen mentioned that NWFWMD is still taking projects for the SWIMM plan and that it would need to be included in the DEP portal of projects. Linda also mentioned the NFWF Gulf Environmental Benefit Fund which will have funding in January. She asked that the AP send RMA costs for the St. Joe signs and kiosks.

Linda suggested installing the shallow seagrass bed signs at the deep edge of the seagrass bed to let boaters know that they're entering a seagrass bed and that they should turn off their motor or tilt it up. The signs are just warning signs. They don't forbid boaters from entering the seagrass beds, but inform them that they risk damaging seagrass beds and incurring fines. Stephanie voiced concern about defining what the deep edge of the seagrass would be and would want to make it clear that it wouldn't restrict boaters from coming into the area.

Stephanie would like signs that blend in to the natural surroundings better. Jonathan Brucker said that boaters tend to not see those signs, and that they may become navigational hazards.

Linda suggested putting a kiosk on Shell island that would educate users on the nearby seagrass beds and shallow areas. The kiosk should not have brochures as they would be likely to become trash. Jonathan said the AP would need to work with the state park since it's their land. Linda also mentioned putting kiosks at Carl Grey Park and other boat ramps in the area. Jonathan said that the AP would have to work with the city to put kiosks on their property.

Stephanie showed an 1855 map that showed the bay before the pass was dredged, and showed that the bay to the east of the pass was a lot more open back then. Opening the East Pass is artificial, but it would help correct for the effects of the other artificial pass.

Rob said that a New East Pass would likely affect the CWA.

Linda Fitzhugh said there are lots of questions about the pass. Where would it go? Where is the funding? She mentioned that RESTORE funds can be used for a feasibility study, but not for actually dredging the pass. It would probably need to be regularly re-dredged so who would be responsible for that? Stephanie and Linda said that there is some information from the experimental pass in 2001. The general area for the pass already has healthy seagrasses except for prop scars because it's so shallow. Linda also mentioned that the RMA's water quality data does not show a turbidity problem in the area.

Cheryl suggested that websites with water quality data should have pass/fail information. The general public isn't going to be good at interpreting it. The data should be available at the beaches themselves on signs through QR codes so that people can find out whether the beach or pier is safe then. Earl Pearson mentioned that the Department of Health's Florida Healthy Beaches Program already has a website with that information so the signs could point to those. Linda said that there are only 13 sites, but it's a place to start.

Katie Konchar asked about how specific the Performance Measures in the plan are going to be. Right now they are broad. Penny Isom said that the Budget Table will have more specific information about timelines but not the Performance Measures.

Karen said that the SWIM plan is still open for recommendations. It doesn't have to be just for restoration, but can be educational instead. The plan doesn't have funding tied to it, but it is for those that do.

Stephanie suggested having a seagrass hotline for people to call FWC when they see damage to the resource. Rob said that FWC has a general hotline that could be used for that, and is already used for a much broader group of issues, including many that are not emergencies. This hotline would be appropriate. However, the seagrass damage has to be observed by an officer. Fines for damaging seagrass beds go up to $1000, but that's on the fourth offense, and only within aquatic preserves.

Stephanie said that she doesn't favor additional FWC patrols just for seagrass protection.

Stephanie brought up that Tyndall AFB wants to patrol in the water around their property. Her group wants them to stick to the land, not 500' out into the water looking for threats. The patrols are a threat to seagrass beds, and military police shouldn't be interacting with the regular public.

Rob said that FWC will be working with Tyndall to train their boaters and make sure they're aware of the CWA. They can also teach them about the shallow seagrass areas, and expects that they'll be receptive since those shallow areas will also damage the boats.

Rob asked for help in assessing the cost of damage/restoration to seagrass beds in the case of groundings, but not just for fines. He'll check with other parts of the state as well. Linda mentioned a Constanza study that calculated the ecological value of seagrass acreage.

Melody suggested integrating with existing efforts on seagrass restoration.

Stephanie suggested allowing spearfishing for lionfish at jetties, perhaps by getting special credentials for those lionfish spearfishers. Rob said that a special activities license for each lionfish spearfisher would be the way to go. The license would be for a specific area, and for a specific period of time, and the application should give the credentials of the diver since there are safety issues.

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 July 27. The advisory committee members were thanked for their time and input.

Meeting was adjourned around noon.

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. Andrews 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.

REGIONAL PLANNING COUNCILS
North Central Florida Regional Planning Council
The North Central Florida Regional Planning Council announces a public meeting to which all persons are invited.
DATE AND TIME: June 23, 2016, 6:30 p.m.
PLACE: Holiday Inn Hotel and Suites, Suwannee Room, 213 Southwest Commerce Boulevard, Lake City, Florida.
GENERAL SUBJECT MATTER TO BE CONSIDERED: To conduct the regular business of the Regional Planning Committee of the North Central Florida Regional Planning Council.
A copy of the agenda may be obtained by contacting: North Central Florida Regional Planning Council, 2009 NW 67th Place, Gainesville, Florida 32653-1603.
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 2 business days before the workshop/meeting by contacting: (352)955-2200. 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.

REGIONAL PLANNING COUNCILS
North Central Florida Regional Planning Council
The North Central Florida Regional Planning Council announces a public meeting to which all persons are invited.
DATE AND TIME: June 23, 2016, 6:00 p.m.
PLACE: Holiday Inn Hotel and Suites, Suwannee Room, 213 Southwest Commerce Boulevard, Lake City, Florida
GENERAL SUBJECT MATTER TO BE CONSIDERED: To conduct the regular business of the Clearinghouse Committee of the North Central Florida Regional Planning Council.
A copy of the agenda may be obtained by contacting: North Central Florida Regional Planning Council, 2009 NW 67th Place, Gainesville, Florida 32653-1603.
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 2 business days before the workshop/meeting by contacting: (352)955-2200. 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).
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REGIONAL PLANNING COUNCILS
South Florida Regional Planning Council
The South Florida Regional Council announces a public meeting to which all persons are invited.
DATE AND TIME: June 24, 2016, 10:00 a.m.
PLACE: South Florida Regional Council, 3440 Hollywood Boulevard, Suite 140, Hollywood, FL 33021
GENERAL SUBJECT MATTER TO BE CONSIDERED: The Executive Committee will meet to review and adopt the South Florida Regional Council's Financial Statements for the Year Ended September 30, 2015. Call in number: 1(888)670-3525. Conference Code: 2488435943 then #.
A copy of the agenda may be obtained by contacting: South Florida Regional Council, 3440 Hollywood Boulevard, Suite #140, Hollywood, Florida 33021.
Pursuant to the provisions of the Americans with Disabilities Act, any person requiring special accommodations to participate in this workshop/meeting is asked to advise the agency at least 5 days before the workshop/meeting by contacting: South Florida Regional Council, 3440 Hollywood Boulevard, Suite #140, Hollywood, Florida 33021. 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.

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, July 13, 2016, 6:00 p.m. – 7:30 p.m.
PLACE: Gulf Coast State College, Gibson Lecture Hall, Student Union E, Room 231; 5230 West Highway 98; Panama City, FL 32401
GENERAL SUBJECT MATTER TO BE CONSIDERED: A draft St. Andrews 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/standrews/default.htm. The Florida Coastal Office seeks public comment on the draft. Members of the St. Andrews 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, Jon Brucker at Jonathan.Brucker@dep.state.fl.us or (850)670-7723.
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: Jon Brucker at (850)670-7723. 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, July 14, 2016, 9:00 a.m.
PLACE: Gulf Coast State College, Student Union E, Room 243, 5230 West Highway 98, Panama City, FL 32401
GENERAL SUBJECT MATTER TO BE CONSIDERED: The St. Andrews Aquatic Preserve Management Plan Advisory Committee will meet to discuss comments at the public meeting - scheduled for July 13 and separately noticed - and possible revisions to the draft St. Andrews Aquatic Preserve Management Plan. The draft plan is available for viewing or download at www.dep.state.fl.us/coastal/sites/standrews/default.htm.
A copy of the agenda may be obtained by contacting: Aquatic Preserve Manager, Jon Brucker at Jonathan.Brucker@dep.state.fl.us or (850)670-7723.
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: Jon Brucker at (850)670-7723. 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 Department of Environmental Protection announces a public meeting to which all persons are invited.
DATE AND TIME: June 22, 2016, 9:30 a.m.
PLACE: Seminole County Extension Auditorium, 250 West County Home Road, Sanford, FL 32773
GENERAL SUBJECT MATTER TO BE CONSIDERED: This is a Lake Jesup Basin Management Action Plan (BMAP) technical meeting to which the public is invited. At this meeting the department will provide stakeholders with an update on the associated Lake Jesup basin TMDL model revisions. This is a reposting of the meeting notice published in the Florida Administrative Register on Friday, June 10. 2016 (Volume 42, No. 113), and provides additional information about the June 22 meeting.
A copy of the agenda may be obtained by contacting: Moira Homann, Watershed Planning and Coordination Section, Florida Department of Environmental Protection, 2600 Blair Stone Road, MS 3565, Tallahassee, Florida 32399-2400, Moira.Homann@dep.state.fl.us.
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 days before the workshop/meeting by contacting: Moira Homann, Watershed Planning and Coordination Section, Florida Department of Environmental Protection, 2600 Blair Stone Road, MS 3565, Tallahassee, Florida 32399-2400, Moira.Homann@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).
For more information, you may contact: Moira Homann, Watershed Planning and Coordination Section, Florida Department of Environmental Protection, 2600 Blair Stone Road, MS 3565, Tallahassee, Florida 32399-2400, Moira.Homann@dep.state.fl.us.

DEPARTMENT OF HEALTH
Board of Osteopathic Medicine
The Board of Osteopathic Medicine announces a public meeting to which all persons are invited.
DATE AND TIME: August 26, 2016, 8:00 a.m.
PLACE: Sawgrass Marriott Resort, 1000 PGA Tour Blvd., Ponte Vedra Beach, FL 32082
GENERAL SUBJECT MATTER TO BE CONSIDERED: General business of the Board.
A copy of the agenda may be obtained by contacting: Kama Monroe, Executive Director at (850)245-4161 or 4052 Bald Cypress Way, #C-06, Tallahassee, FL 32399.
Pursuant to the provisions of the Americans with Disabilities Act, any person requiring special accommodations to participate in this workshop/meeting is asked to advise the agency at least 5 days before the workshop/meeting by contacting: Kama Monroe, Executive Director at (850)245-4161 or 4052 Bald Cypress Way, #C-06, Tallahassee, FL 32399. 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

Florida Department of Environmental Protection • Florida Coastal Office

St. Andrews Aquatic Preserve

Public Meeting

Wednesday, July 13, 2016
6:00 pm - 7:30 pm

Gibson Lecture Hall
Gulf Coast State College
5230 West Highway 98
Panama City, FL 32401

To view the draft plan, please visit:
www.dep.state.fl.us/coastal/sites/standrews/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. Andrews Aquatic Preserve management plan.

Meeting objectives:

1. Review purpose and process for revising the St. Andrews 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 Jon Brucker (850)670-7723, Jonathan.Brucker@dep.state.fl.us or visit our website at www.dep.state.fl.us/coastal/sites/standrews/ for more information or to request a written copy of the plan. Written comments are welcome and can be submitted by email to FloridaCoasts@dep.state.fl.us on or before **July 27, 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 Jon Brucker at (850)670-7723 or Jonathan.Brucker@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 to the Florida Department of Environmental Protection from the National Fish and Wildlife Foundation - the project, titled St. Andrews and St. Joseph Bay Aquatic Preserve Program (FL), is detailed in agreement #8006.14.040888 - and also 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. NA15NOS4190096(CM621). 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, the National Fish and Wildlife Foundation, or any of its subagencies. June 2016.

The News Herald

501 W. 11th Street
P.O. Box 1940, Panama City, FL 32401
Published Daily
Panama City, Bay County, Florida

State of Florida
County of Bay

Before the undersigned authority personally appeared Angella Clagg, who on oath says that she is a Legal Advertising Representative of The News Herald, a newspaper published at Panama City in Bay County, Florida; that the attached copy of advertisement, being a Legal Advertisement **#11344** in the matter of **PUBLIC NOTICE - Central Panhandle Aquatic Preserves** in the Bay County Court, was published in said newspaper in the issue of **July 6, 9, 2016**.

Affiant further says that the said The News Herald is a newspaper published at Panama City, in said Bay County, Florida, *is a direct successor of the Panama City News* and that the said newspaper, *together with its direct predecessor,* has heretofore been continuously published in said Bay County, Florida, each day *(except that the predecessor, Panama City News, was not published on Sundays)* and has been entered as periodicals matter at the post office in Panama City, in said Bay County, Florida, for a period of one year next preceding the first publication of the attached copy of advertisement, and affiant further says that (s)he has neither paid nor promised any person, firm or corporation any discount, rebate, commission or refund for the purpose of securing this advertisement for publication in said newspaper.

Angella Clagg

State of Florida
County of Bay

Sworn to and subscribed before me this **11th** day of **July**, A.D., **2016**. By Angella Clagg, Legal Advertising Representative of The News Herald, who is personally known to me or has produced N/A as identification.

Marie Forrest
Notary Public, State of Florida at Large

MARIE FORREST
Notary Public - State of Florida
Commission # FF 230321
My Comm. Expires May 13, 2019
Bonded through National Notary Assn.

11344
PUBLIC NOTICE

The Florida **Department of Environmental Protection**, Florida Coastal Office announces a public meetings to receive comments on the St. Andrews Aquatic Preserve draft management plan. The meetings will be held in Bay County on July 13, 2016, 6:00-7:30 p.m. at Gulf Coast State College, Gibson Lecture Hall, Student Union E, Room 231, 5230 West Highway 98, Panama City, FL 32401. A copy of the draft plan is posted at www.dep.state.fl.us/coastal/sites/standrews/. For the agenda, contact the preserve Manager, Jonathan Brucker by e-mail: Jonathan.Brucker@dep.state.fl.us, by phone (850)670-7723, or by mail: 108 Island Drive, Eastpoint, FL 32328.
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).
Pub: July 6, 9, 2016

Florida Department of Environmental Protection

Central Panhandle Aquatic Preserves
108 Island Drive
Eastpoint, Florida 32328

Rick Scott
Governor

Carlos Lopez-Cantera
Lt. Governor

Jonathan P. Steverson
Secretary

St. Andrews Aquatic Preserve Draft Management Plan
Public Meeting
Wednesday, July 13, 2016, 6:00 – 7:30 p.m.
Gulf Coast State College
Gibson Lecture Hall, Student Union E, Room 231
5230 West Highway 98
Panama City, Florida

Attendees (17): Kelly Baumgarner, Susan Llorca, Robert Rowe, Tracy Rudhall, Stephanie Somerset, Lauren Brunson, Linda Fitzhugh, Frank Dama, Katie Konchar, Mike Mathis, Ed and Mary Pipkin, Karen Kebart, John Lewis, Patricia Couch, Melody Ray-Culp, Leelon Edwards
Staff: Jon Brucker, Katie Maxwell, Kim Wren, Earl Pearson, Penny Isom

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

Jon gave a PowerPoint presentation about St. Andrews Aquatic Preserve, its challenges, and work being conducted.

After the presentation, Penny explained the commenting process. The room was set up so there were three stations, one for each of the three issues identified in the management plan. Attendees were split into two groups. Each group started at one of the issues stations. Staff gave each group a little background on the issue and recorded comments the public had pertinent to each issue (listed below). The groups rotated every 15 minutes so each group had an opportunity to comment at each station.

Issue one: Water Quality (WQ)

- Carl Grey Park flunked data (ties into 2nd comment)
- Refine test sites. If one flunks regularly, set up additional stations to determine extent
- Work with local municipalities on discharges from stormwater and finding solutions
- Specify means of making data available and locations (better outreach)
- Define or establish TMDLs

- Work data collection into public outreach
- Work with local schools, either through presentations or enlisting them as citizen scientists
- Be sure to approach communities (municipalities) with runoff issues by encouraging proper buffers and reduction of toxins and waste
    - For example, taking down trees on Beach Drive and replacing with impervious surfaces will have a huge impact
- Open the other pass to restore flow, reduce stagnation
- More pump-out stations
    - Find grant money for it
- Problems from surrounding waters can effect aquatic preserve
- Determine which surrounding properties/areas are on septic/sewer
- Grand Lagoon effected – causes issues with surrounding area
- Opening East Pass to improve water flow/quality
- Aquatic preserve providing support for feasibility study (of East Pass)
- Hydrographic study needed
- Look at successes in other parts of Florida (Tampa Baywatch example)

Issue two: Protection of Seagrass Habitat

- Education and outreach on the water on weekends during summer months
- Working with boat rental companies and personal watercraft rentals to educate users on proper boating to protect seagrass
    - Video on repeat loop
- Marking the seagrass areas near Shell Island
- Promote anchoring in bare sand and/or using copper anchors
- Promote ecotourism/snorkeling in order to educate public about importance of seagrass
- Promote volunteer opportunities
- Outreach/seining events with volunteers
- Education instead of enforcement more effective
- Temporary closure of severely scarred areas
- Seagrass buoys that blend in more with the natural area
- Tying in with a map of buoys/signs
    - Recommend places to go/not go
- Seagrass app (IRL as a model)
- Recreational app with seagrass/artificial reefs
- Mechanism for assessment of damage from prop scars to the habitat, and tied to the vessel
    - A calculation of how much money to remediate the damage
- Mooring buoys in seagrass areas
- Encourage docking in areas with no, or less, seagrass – State Park?
- More education outreach at boat ramps

- Designate an area for accessing Shell Island
  - Could rotate at different times
- Most rental agreement/instruction happens on the dock, have a map with seagrass/shallow areas to keep on boat

Issue three: Sustainable Public Use

- Use/develop an app to help people connect with the natural resources; know what's there and where and why it's important (or something to download)
- Work with fishing organizations or others that already have maps (boaters guides)
- Cooperate with park, Tyndall, and other agencies on target audiences and reduce redundancies
- Provide educational materials to law enforcement to distribute
- Law enforcement should be a last resort; not harassing public
- Encourage kayaking in the proper places- not in the pass
- Educate vendors on proper anchoring of recreational equipment such as slides; repeating locations (plus foot traffic) may damage resources (esp. seagrass)
- Mooring stations may help
- Assessment of commercial activities
- Lionfish need to be a high priority- lionfish rodeo and/or special permission to spearfish lionfish at jetties or elsewhere in state park
- Work with Florida Fish and Wildlife Conservation Commission on lionfish rules in bay; also look to Florida Keys National Marine Sanctuary
- Put seagrass stuff in boater license classes and angling guide
- Seagrass presentation with Tourist Development Council and Bay County Chamber
- Establish a grasses to classes- helps educate local kids (who will then educate parents and/or their own kids) about seagrasses
- Have a program on Beach TV to target tourists who may get missed by county/school presentations
- Hit all the boat ramps (more signage, information)
- Work with/support CSO who can help get the word out
- Increase outreach, with more info as well, on harassing/feeding wildlife

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 July 27. They were thanked for taking time out of their busy schedules to attend and provide valuable feedback.

Meeting was adjourned.

Appendix D

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. Andrews 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: Develop a strategic, long-term water quality monitoring program within St. Andrews Aquatic Preserve.															
Objective 1: Analyze and interpret the status and trends of water quality in St. Andrews Aquatic Preserve.															
Strategy 1: Develop a strategic long-term water quality monitoring program that includes the use of dataloggers at priority locations.	Ecosystem Science	2017	Ongoing	$13,500	O	$0	$35,000	$35,000	$35,000	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000
Strategy 2: Monitor nutrients and water clarity in St. Andrews Aquatic Preserve through a partnership with the RMA Baywatch team.	Ecosystem Science	2016	Ongoing	$12,500	F/O	$12,500	$12,500	$12,500	$12,500	$12,500	$12,500	$12,500	$12,500	$12,500	$12,500
Strategy 3: Evaluate and, if needed, expand Baywatch water quality sampling in St. Andrews Aquatic Preserve.	Ecosystem Science	2016	Ongoing	To be determined											
Objective 2: Identify specific and emerging water quality issues.															
Strategy 1: Identify potential point and non-point sources of pollution.	Ecosystem Science	2016	Ongoing	$1,000	F/O	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000
Strategy 2: Support the development of nutrient criteria.	Resource Mgmt.	2016	Ongoing	$12,500	F/O	$12,500	$12,500	$12,500	$12,500	$12,500	$12,500	$12,500	$12,500	$12,500	$12,500
Strategy 3: Support the development of TMDLs.	Resource Mgmt.	2016	Ongoing	Cost in water quality monitoring	F/O	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0

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: Develop a tiered approach to water quality monitoring that integrates biological assessments to define a core set of baseline indicators.															
Strategy 1: Assist in the monitoring the distribution and abundance of specific indicator species, including scallops and seagrass, to determine the ecological health of the bay system.	Ecosystem Science	2016	Ongoing	$4,000	F/O	$4,000	$4,000	$4,000	$4,000	$4,000	$4,000	$4,000	$4,000	$4,000	$4,000
Strategy 2: Determine the biodiversity of St. Andrews Aquatic Preserve by establishing baseline data and broad scale characterizations of benthic communities.	Ecosystem Science	2016	Ongoing	$2,000	F/O	$2,000	$2,000	$2,000	$2,000	$2,000	$2,000	$2,000	$2,000	$2,000	$2,000
Strategy 3: Develop a biological assessment report.	Resource Mgmt.	2016	Ongoing	Cost in Strat. 1	F/O	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Goal 2: Provide timely and accurate water quality data to public and other agencies.															
Objective 1: Acquire a repository to store water quality data in a centralized database.															
Strategy 1: Contribute to a centralized water quality storage database and website.	Education and Outreach	2016	Ongoing	To be determined											
Objective 2: Utilize a variety of methods to inform the public and other entities regarding water quality conditions.															
Strategy 1: Utilize educational signage at strategic access points to St. Andrews Aquatic Preserve to educate the public.	Education and Outreach	2017	Ongoing	To be determined											
Strategy 2: Coordinate and participate in public lectures to address water quality issues and discuss methods for improving water quality.	Education and Outreach	2016	Ongoing	$500	F/S	$500	$500	$500	$500	$500	$500	$500	$500	$500	$500
Strategy 3: Provide and/or create opportunities for the public to volunteer to assist with monitoring efforts and unique events (i.e. Earth Day, citizen scientist opportunities, etc.).	Education and Outreach	2016	Ongoing	$500	F/S	$500	$500	$500	$500	$500	$500	$500	$500	$500	$500
Issue 2: Protection of Seagrass Habitat															
Goal 1: Manage seagrass communities through research and monitoring, education and outreach efforts, continued resource management and collaborative mapping efforts to effectively protect and maintain this habitat throughout St. Andrews Aquatic Preserve.															
Objective 1: Monitor the status and trends of seagrass distribution within St. Andrews Aquatic Preserve to determine the overall health and identify potential threats to the habitat.															
Strategy 1: Develop and implement a Seagrass Monitoring Plan for St. Andrews Aquatic Preserve.	Ecosystem Science	2016	Ongoing	$15,000	F/S	$15,000	$15,000	$15,000	$15,000	$15,000	$15,000	$15,000	$15,000	$15,000	$15,000

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 2: Collaborate with FWC on the Seagrass Integrated Mapping and Monitoring report.	Resource Mgmt.	2016	Ongoing	$1,000	F/S	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000
Strategy 3: Utilize advanced GIS technology and hyperspectral imagery to assess seagrass habitat health.	Resource Mgmt.	2017	Ongoing	$10,000	O	$0	$50,000	$0	$0	$0	$0	$50,000	$0	$0	$0
Strategy 4: Establish and maintain close communication with land managers that are responsible for making resource management decisions that could affect water quality or seagrass habitat in St. Andrews Aquatic Preserve.	Resource Mgmt.	2016	Ongoing	No addit. cost	N/A	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
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 St. Andrews Aquatic Preserve.															
Strategy 1: Design and distribute brochures and other outreach material that include information on the importance of seagrass habitat, water quality, and sound user practices.	Education and Outreach	2016	Ongoing	$3,000	F/O	$3,000	$3,000	$3,000	$3,000	$3,000	$3,000	$3,000	$3,000	$3,000	$3,000
Strategy 2: Repair, replace, or install education signage pertaining to resource protection.	Education and Outreach	2016	Ongoing	$1,000	F/O	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000
Strategy 3: Provide educational and informational materials to local government, businesses, marinas, and tour operators	Education and Outreach	2016	Ongoing	Cost in Strat. 1	F/O	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Strategy 4: Continue to organize and participate in education and outreach events throughout the Panhandle.	Education and Outreach	2016	Ongoing	$1,000	F/S	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000
Strategy 5: Coordinate with local tourism-driven businesses to inform visitors of proper boating practices to reduce the amount of propeller scarring in seagrasses.	Education and Outreach	2016	Ongoing	$500	F/S	$500	$500	$500	$500	$500	$500	$500	$500	$500	$500

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: To restore areas of severely scarred seagrass and prevent further damage from propeller scars.															
Objective 2: Develop a seagrass restoration plan for St. Andrews Aquatic Preserve.															
Strategy 1: Survey the most severely scarred areas to prioritize areas with the greatest need for restoration.	Resource Mgmt.	2016	Ongoing	$1,000	F/O	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000
Strategy 2: Seek funding for future seagrass habitat restoration projects in St. Andrews Aquatic Preserve.	Resource Mgmt.	2017	Ongoing	No addit. cost	F/O	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Strategy 3: Coordinate with FWC law enforcement to ensure enforcement of the seagrass law prohibiting destruction of seagrasses in St. Andrews Aquatic Preserve.	Resource Mgmt.	2016	Ongoing	No addit. cost	F/O	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Issue 3: Sustainable Public Use															
Goal 1: Encourage user experiences and public recreation opportunites consistent with natural resource conservation.															
Objective 1: Inform residents and visitors about actions they can take to conserve and restore resources of St. Andrews Aquatic Preserve.															
Strategy 1: Develop and distribute information identifying potential user conflicts and methods of prevention.	Education and Outreach	2016	Ongoing	$1,000	F/O	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000
Strategy 2: 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.	Education and Outreach	2016	Ongoing	$2,000	F/O	$2,000	$2,000	$2,000	$2,000	$2,000	$2,000	$2,000	$2,000	$2,000	$2,000
Strategy 3: Post educational signage at public access points.	Education and Outreach	2017	Ongoing	Cost in other strategies	F/O	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Objective 2: Examine public use patterns and trends within the St. Andrews Aquatic Preserve.															
Strategy 1: Create and implement an aquatic preserve visitor use survey.	Public Use	2017	Ongoing	$1,000	O	$0	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000
Objective 3: Encourage an increase in the amount and frequency of law enforcement within SAAP.															
Strategy 1: Facilitate regular communication with law enforcement for rapid response to illegal activities.	Public Use	2016	Ongoing	No addit. cost	F/O	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0

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: Promote low-impact, sustainable recreational opportunites															
Objective 1: Increase awareness of non-consumptive use opportunites such as paddleboarding, sailing, kayaking, etc.															
Strategy 1: Promote the Florida Circumnavigational Trail.	Public Use	2016	Ongoing	$100	F	$1,000	$0	$0	$0	$0	$0	$0	$0	$0	$0
Goal 3: Address areas impacted by human use while educating users of effects of improper use.															
Objective 1: Develop and implement restoration goals for areas impacted by human use or areas of concern.															
Strategy 1: Support efforts to address derelict and/or illegal fisheries gear and harvesting activities and to assist in the removal of derelict fishing gear and/or illegal fisheries gear in St. Andrews Aquatic Preserve.	Public Use	2016	Ongoing	$500	F	$500	$500	$500	$500	$500	$500	$500	$500	$500	$500
Strategy 2: Promote awareness of the detrimental effects of illegal dumping and marine debris to the natural resources of St. Andrews Aquatic Preserve.	Education and Outreach	2016	Ongoing	$1,000	F/S	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000
Strategy 3: Secure funding for and develop habitat restoration projects involving the removal of marine debris.	Resource Mgmt.	2017	Ongoing	To be deter-mined											

*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	Annual Total
2016-2017	$34,500	$14,500	$10,500	$1,500	$61,000
2017-2018	$69,500	$64,500	$13,500	$2,500	$150,000
2018-2019	$69,500	$14,500	$13,500	$2,500	$100,000
2019-2020	$69,500	$14,500	$13,500	$2,500	$100,000
2020-2021	$39,500	$14,500	$13,500	$2,500	$70,000
2021-2022	$39,500	$14,500	$13,500	$2,500	$70,000
2022-2023	$39,500	$64,500	$13,500	$2,500	$120,000
2023-2024	$39,500	$14,500	$13,500	$2,500	$70,000
2024-2025	$39,500	$14,500	$13,500	$2,500	$70,000
2025-2026	$39,500	$14,500	$13,500	$2,500	$70,000
Ten Year Totals	**$480,000**	**$245,000**	**$132,000**	**$24,000**	**$881,000**

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

- Seagrass restoration – Partnered with St. Andrews State Park and FWC to protect and restore seagrass in St. Andrews Aquatic Preserve by posting “Shallow Seagrass” signs in the aquatic preserve.
- Seagrass monitoring – Assisted RMA with annual seagrass monitoring in St. Andrews Aquatic Preserve.
- Benthic ecological baseline survey – Sampled benthic habitat in conjunction with a beach renourishment project.

*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 three projects are proposed by the Florida Coastal Office as top priorities for St. Andrews Aquatic Preserve in regards to creating and maintaining healthy ecosystems and economies. Following the three projects is a table listing the projects, including the top three, that were reviewed and are supported by St. Andrews Aquatic Preserve. In addition, the table also crosswalks the St. Andrews Aquatic Preserve management plan's issues, goals, objectives, and strategies with the projects.

CPAP Priority Restoration Projects

Mapping and Monitoring Seagrass Habitat

Submitted by:
FDEP, FCO

Partners:
FDEP/FCO

Proposed Funding:
$200,000

Location:
Franklin, Gulf, Bay Counties
29.8981° N, 84.3801° W
29.6851° N, 85.3171° W
30.0701° N, 85.7000° W

Project Timeline:
Unspecified

Project Objectives:

Utilizing Unmanned Aerial Systems (UAS) technology and high resolution imagery sensors to adequately map and monitor seagrass habitat and the extent of prop scar damage across the Central Panhandle Aquatic Preserves is a major priority. This project would focus specifically on the extent of prop scar damage with the goal of mapping additional seagrass habitat mapped if funding allowed. This project budget would include data collection, analysis, and products in a usable format as well as ground-truthing efforts.

A major objective of this project is to improve the effectiveness of state and federal programs related to habitat conservation and restoration strategies.

Project Outcomes:

State agencies will have data in a usable format that can be analyzed to further understand the extent of prop scar damage in the panhandle aquatic preserves.

Staff will be able to expand monitoring initiatives to further assess the health of seagrass beds in the Central Panhandle.

Areas of high priority will be identified for future restoration projects.

24

CPAP PRIORITY RESTORATION PROJECTS

Extend and Enhance Water Quality Monitoring

Partners:
FDEP/FCO/CAMA

Funding Required:
$200,000

Location: Franklin, Gulf, Bay Counties
29.8981° N, 84.3801° W
29.6851° N, 85.3171° W
30.0701° N, 85.7000° W

Project Timeline:

Project Objectives:

Gulf Coast communities face a number of pressing challenges, such as storm risk, sea-level rise, land loss, depletion of natural resources, and compromised water quality. A major focus of this project is to reduce the amount of nutrients flowing into the Gulf and to undertake other measures to enhance water quality. Within this goal, projects will aim to integrate the creation of resilient communities with ecosystem restoration through the development of comprehensive coastal planning programs.

This project aims to further develop and expand water quality monitoring efforts across the Florida Panhandle AP's. The objective of this effort is to quantify the spatial/temporal variability and trends, both seasonally and as a function of tidal forcing, of selected abiotic parameters (e.g. establish baseline data) within the preserve. Through the implementation of a long-term, community-based water quality monitoring initiative, the development of long-term database of baseline water quality conditions and trends can be established. Public outreach and education programs will be developed and enhanced to compliment this monitoring effort.

Project Outcomes:

Coordinate and expand existing water quality monitoring efforts supporting adaptive management of programs and projects designed to improve water quality.

This project will enhance and create programs that monitor and preserve high water quality for a sustainable environment and economic growth in and around the Aquatic Preserves, resulting in better quality of life for the residents and improved environment for the general public.

CPAP will coordinate with local governments and the public, implement contribute to estuarine habitat restoration projects, and provide supporting public outreach.

CPAP PRIORITY RESTORATION PROJECTS

Panhandle Bay Watch

Partners:
St. Andrew Bay Watch, Panhandle Watershed Alliance, Choctawhatchee Basic Alliance, Friends of the St. Joseph Bay Friends, University of Florida, CPAP

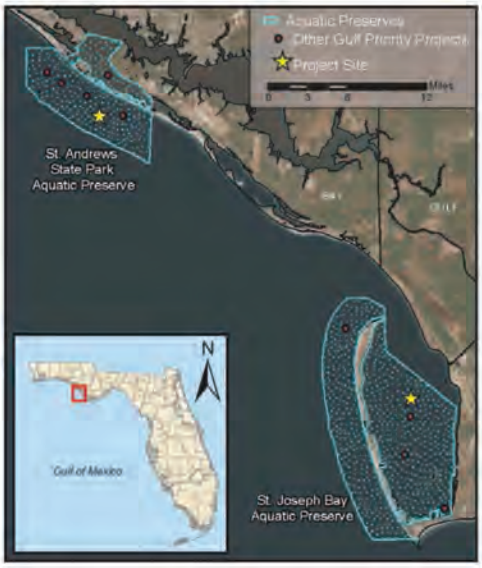
Funding Required:
$200,000

Location:
Gulf and Bay County
29.6851° N, 85.3171° W
30.0701° N, 85.7000° W

Project Objectives:

The project is designed to restore and protect the natural resources, ecosystems, fisheries, marine and wildlife habitats, beaches, coastal wetlands and the economy that thrives off these resources in the Panhandle region of Florida. This project will serve highlight areas in need and will significantly extend and enhance several years of water quality monitoring, habitat restoration, efforts to build resiliency, disaster preparations, and environmental outreach/education in each watershed. Partners: St. Andrew Bay Watch, Panhandle Watershed Alliance, Choctawhatchee Basic Alliance, Friends St. Joseph Bay Preserves, University of Florida, CPAP.

This project focuses on monitoring and restoring water quality. Restoration of water quality in Gulf, Bay, Walton, Okaloosa, Santa Rosa, and Escambia counties would help restore and protect natural resources such as scallops and seagrasses. Since high quality seagrass habitat supports our local fisheries, improved water quality will also help restore and protect our fisheries. Public outreach and education programs will be developed and enhanced to compliment this monitoring effort.



Project Outcomes:

Water quality monitoring and data analysis can be used to determine the health of the Bays and Aquatic Preserves. This information will be used to educate the public about water quality issues, and it will also educate tourists and community members about the biological resources in the APs.

This project will enhance and create programs that monitor and preserve high water quality for a sustainable environment and economic growth in and around the Bays and Aquatic Preserves, resulting in better quality of life for the residents and improved environment for the general public.

CPAP will coordinate with local governments and the public, implement contribute to estuarine habitat restoration projects, and provide supporting public outreach.

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

Project Name	Amount	Partners	Location in aquatic preserve mgmt plan
Mapping and Monitoring Seagrass Habitat	$200,000	FDEP/FCO/CAMA	Issue II, Goal I, Objective I, Int. Strategy II & III
Extend and Enhance Water Quality Monitoring	$200,000	FDEP/FCO/CAMA	Issue I, Goal I, Objective II, Int. Strategy I, II, and III **AND** Issue I, Goal II, Objective I, Int. Strategy I
Panhandle Bay Watch	$200,000	St. Andrew Bay Resource Management Association, Panhandle Watershed Alliance, University of Florida, and FDEP	Issue I, Goal I, Objective I, Int. Strategy II **AND** Issue I, Goal I, Objective III, Int. Strategy I
Marine Debris Prevention	$250,000	FWC & FDEP/FCO/CAMA	Issue III, Goal III, Objective I, Int. Strategy I, II, III
Promoting use of Shoreline Stabilization Techniques	$200,000	FDEP/FCO/CAMA	Issue III, Goal I, Objective I, Int. Strategy I **AND** Issue III, Goal I, Objective II, Int. 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. 11-12
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. 12
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. 35-36
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. 33-35
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, 14, 26, 30-31, 35-36, 60-61
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, 37-63
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. 33-35, 39-45, 49-43, 61
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. 59-63
18	A finding regarding whether each planned use complies with the 1981 State Lands Management Plan, particularly whether such uses represent "balanced public utilization," specific agency statutory authority and any other legislative or executive directives that constrain the use of such property.	18-2.021	p. 6-8
19	Letter of compliance from the local government stating that the LMP is in compliance with the Local Government Comprehensive Plan.	BOT requirement	App. E.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. 14-20, 37-63

Land Management Plan Compliance Checklist Required for State-owned conservation lands over 160 acres			
Item	**Requirement**	**Statute/Rule**	**Pg#/App**
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. 60-62
**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
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

Land Management Plan Compliance Checklist Required for State-owned conservation lands over 160 acres			
Item	**Requirement**	**Statute/Rule**	**Pg#/App**
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. 16-17
33	Insert FNAI based natural community maps when available.	ARC consensus	p. 21
34	Location and description of known and reasonably identifiable renewable and non-renewable resources of the property regarding outstanding native landscapes containing relatively unaltered flora, fauna and geological conditions.	18-2.021	Ex Sum
35	Location and description of known and reasonably identifiable renewable and non-renewable resources of the property regarding unique natural features and/or resources including but not limited to virgin timber stands, scenic vistas, natural rivers and streams, coral reefs, natural springs, caverns and large sinkholes.	18-2.018 & 18-2.021	p. 20-27
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. 14-16, 21, 26, 33-35
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. 16-17
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. 20-30, 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. 20-30, 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. 20-26
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. 30-31, 37-63, 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. 20-26, 30-31, 37-63
42-B.	Provide a detailed description of both short (2-year planning period) and long-term (10-year planning period) management goals, and a priority schedule based on the purposes for which the lands were acquired and include a timeline for completion.	259.032(10) & 253.034(5)	App. D.1
42-C.	The associated measurable objectives to achieve the goals.	259.032(10) & 253.034(5)	App. D.1
42-D.	The related activities that are to be performed to meet the land management objectives and their associated measures. *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

Land Management Plan Compliance Checklist Required for State-owned conservation lands over 160 acres			
Item	**Requirement**	**Statute/Rule**	**Pg#/App**
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. 20-30, 37-63
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 requirement via lease language	App. B.4
48	Exotic and invasive species maintenance and control	259.032(10) & 253.034(5)	
48-A.	Management needs, problems and a desired outcome (see requirement for # 42-A).	259.032(10) & 253.034(5)	p. 30, 53
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, 17-20
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. 25

Land Management Plan Compliance Checklist Required for State-owned conservation lands over 160 acres			
Item	**Requirement**	**Statute/Rule**	**Pg#/App**
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. 30-31
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. 30-31
56	A description of actions the agency plans to take to locate and identify unknown resources such as surveys of unknown archeological and historical resources.	18-2.021	App. D.1
57	Cultural and Historical Resources	259.032(10) & 253.034(5)	
57-A.	Management needs, problems and a desired outcome (see requirement for # 42-A).	259.032(10) & 253.034(5)	App. D.1
57-B.	Detailed description of both short and long-term management goals (see requirement for # 42-B).	259.032(10) & 253.034(5)	App. D.1
57-C.	Measurable objectives (see requirement for #42-C).	259.032(10) & 253.034(5)	App. D.1
57-D.	Related activities (see requirement for #42-D).	259.032(10) & 253.034(5)	App. D.1
57-E.	Budgets (see requirement for #42-E).	259.032(10) & 253.034(5)	App. D.1
***While maps of Native American sites should not be included in the body of the management plan, the DSL urges each managing agency to provide such information to the Division of Historical Resources for inclusion in their proprietary database. This information should be available for access to new managers to assist them in developing, implementing and coordinating their management activities.*			
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. 67
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. 65-67, 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

Land Management Plan Compliance Checklist Required for State-owned conservation lands over 160 acres			
Item	**Requirement**	**Statute/Rule**	**Pg#/App**
60	*** Quantitative data description of the land regarding an inventory of recreational facilities and associated acreage.	253.034(5)	p. 59-61, App. D.1
61	Public Access and Recreational Opportunities	259.032(10) & 253.034(5)	
61-A.	Management needs, problems and a desired outcome (see requirement for # 42-A).	259.032(10) & 253.034(5)	App. D.1
61-B.	Detailed description of both short and long-term management goals (see requirement for # 42-B).	259.032(10) & 253.034(5)	App. D.1
61-C.	Measurable objectives (see requirement for #42-C).	259.032(10) & 253.034(5)	App. D.1
61-D.	Related activities (see requirement for #42-D).	259.032(10) & 253.034(5)	App. D.1
61-E.	Budgets (see requirement for #42-E).	259.032(10) & 253.034(5)	App. D.1
Section H: Other/ Managing Agency Tools			
62	Place this LMP Compliance Checklist at the front of the plan.	ARC 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. 37-63
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
Tallahassee, Florida 32399-3000

Rick Scott
Governor

Carlos Lopez-Cantera
Lt. Governor

Jonathan P. Steverson
Secretary

November 2016

Bay County Planning and Zoning Department
840 West 11th Street
Panama City, Florida 32401

Dear Planning and Zoning Department:

Attached is a copy of the draft St. Andrews Aquatic Preserve Management Plan. (The plan can also be found at http://www.dep.state.fl.us/coastal/sites/standrews/) The plan was developed with input from the public and the St. Andrews Aquatic Preserve Management Plan Advisory Group. It is anticipated to be reviewed and approved by the Acquisition and Restoration Council at the February 2016 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 Bay 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
DEP, Florida Coastal Office
3900 Commonwealth Boulevard, MS 235
Tallahassee, Florida 32399-3000

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

February 17, 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. Andrews Aquatic Preserve Management Plan

Dear Ms. Isom:

On **February 17, 2017**, the Acquisition and Restoration Council recommended approval of the **St. Andrews 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. Andrews Aquatic Preserve
Management Plan

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