St. Joseph Bay Aquatic Preserve

Management Plan • September, 2008 - August, 2018

Florida Department of
Environmental Protection

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September, 2008

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Mission Statement

The mission of the Office of Coastal and Aquatic Managed Areas in relation to Florida's 41 aquatic preserves, 3 National Estuarine Research Reserves, National Marine Sanctuary, and Coral Reef Conservation Program is to protect Florida's coastal and aquatic resources.

Long-term goals of the Aquatic Preserve Program

- Protect and enhance the ecological integrity of the aquatic preserves.
- Restore areas to their natural condition.
- Encourage sustainable use and foster active stewardship by engaging local communities in the protection of aquatic preserves.
- Improve management effectiveness through a process based on sound science, consistent evaluation, and continual reassessment.

Executive Summary

St. Joseph Bay Aquatic Preserve Management Plan	
Lead Agency	Florida Department of Environmental Protection's (DEP) Office of Coastal and Aquatic Managed Areas (CAMA)
Common Name of Property	St. Joseph Bay Aquatic Preserve
Location	Gulf County, Florida
Acreage Total	73,000
Acreage Breakdown According to Florida Natural Areas Inventory (FNAI) Natural Community Types	
FNAI Natural Communities	*Acreage according to GIS*
Seagrass Bed	9,669 acres
Tidal Marsh	762.58 acres
Algal Bed	Unknown acreage
Composite Substrate	Unknown acreage
Mollusk Reef	Unknown acreage
Octocoral Bed	Unknown acreage
Sponge Bed	Unknown acreage
Unconsolidated Substrate	Unknown acreage
Mudflats	*52.51 acres*
Total acreage	Approximately 73,000 acres consisting of each of these natural communities
Management Agency	DEP's CAMA
Designation	Aquatic Preserve
Unique Features	St. Joseph Bay is host to one of the richest and most abundant concentrations of marine grasses along the Northwest Florida coast. In addition, St. Joseph Peninsula supports the highest density of nesting loggerhead sea turtles (*Caretta caretta*) in the panhandle and is indicated as critical habitat for the piping plover (*Charadrius melodus*) and the St. Andrew's beach mouse (*Peromyscus polionotus*). Furthermore, there are more species of plants and animals found in this region of Florida than any other comparable region within the United States.
Archaeological/Historical Sites	The Department of State's Division of Historical Resources has identified nine archaeological sites in the immediate coastal areas of St. Joseph Bay. They include the Confederate Salt Works, Cape San Blas Lighthouse, four shell middens, and three settlement sites.
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. Joseph Bay is valuable to Gulf 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, fugitive sediments, prop scarring and dredging are some of the potential factors that result in cumulative impacts to this valuable community. Water quality monitoring must include resource assessment as well as pollution and contamination source control. The introduction of exotic or non-native species to the bay habitat is also a concern with increasing visitor use. Many species of commercial and recreational fish and invertebrate species not only rely on the seagrass for nursery habitat and feeding grounds, but saltmarsh habitat is just as vital to a variety of these species. Saltmarsh habitat serves as the natural interface between the aquatic ecosystem and upland habitat. The decline in saltmarsh habitat in St. Joseph Bay has been observed since the early 1990s and further investigation is needed to determine the causes and consequences of this habitat loss. The development of a restoration plan for seagrass and saltmarsh habitat will be needed to repair damaged areas in order to protect vital coastal habitats and those commercial and recreational industries that depend on them.

Education & 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 informed and responsible stakeholders 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	The shallow, crystal clear waters of St. Joseph Bay offer excellent fishing opportunities and the major uses of the bay continue to revolve around commercial and recreational fishing activities as well as uses of the adjacent uplands. A high priority management need is to properly mark the navigational channels and shallow seagrass habitat in the southern portion of the bay to provide a safe environment for recreational boaters and to protect the bay's valuable natural resources.
Public Involvement	Public support is vital to the success of government conservation programs. The goal is to foster understanding of the problems facing these fragile ecosystems and the steps needed to adequately manage this important habitat. The St. Joseph Bay Aquatic Preserve formed an advisory committee group consisting of a variety of stakeholders to provide guidance during the planning phases of the management plan development. The preserve also held a Public Scoping Meeting to assist in crafting the content for the management plan and a Formal Public Meeting to solicit public comment on the draft plan.

Coastal Zone Management Issues - The State of Florida has over 17 million residents and over 76 million visitors annually. 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 (Florida Department of Environmental Protection [DEP], 2006a). Current management issues and concerns facing the St. Joseph Bay Aquatic Preserve include hands-on management and restoration of resources, resource protection, effective education and outreach efforts, and public use evaluations. 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. Joseph Bay Aquatic Preserve will emphasize and provide a better understanding of the functioning and interrelationships of the preserve's natural systems, show the status and trends of the natural resources within the 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. Joseph Bay 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.

CAMA / BTIITF Approval

CAMA approval date: June 12, 2008 **BTIITF approval date:** September 16, 2008

Comments:

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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) Office of Coastal and Aquatic Managed Areas (CAMA) as part of a network that includes 41 aquatic preserves, 3 National Estuarine Research Reserves (NERRs), a National Marine Sanctuary, the Coral Reef Conservation Program (CRCP), and the Florida Oceans and Coastal Council. This provides for a system of significant protections to ensure that our most popular and ecologically important underwater ecosystems are cared for in perpetuity. Each of these special places is managed with strategies based on local resources, issues, and conditions.

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

Title to submerged lands not previously 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 which include areas of sovereignty lands that have been "set

aside forever as aquatic preserves or sanctuaries for the benefit of future generations" due to "exceptional biological, aesthetic, and scientific value" (Florida Aquatic Preserve Act of 1975, §258.36, F.S.).

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

Aquatic Preserves layer maintained by: Office of Coastal and Aquatic Managed Areas, 3900 Commonwealth Blvd, MS 235, Tallahassee, FL 32399-3000, 850-245-2094

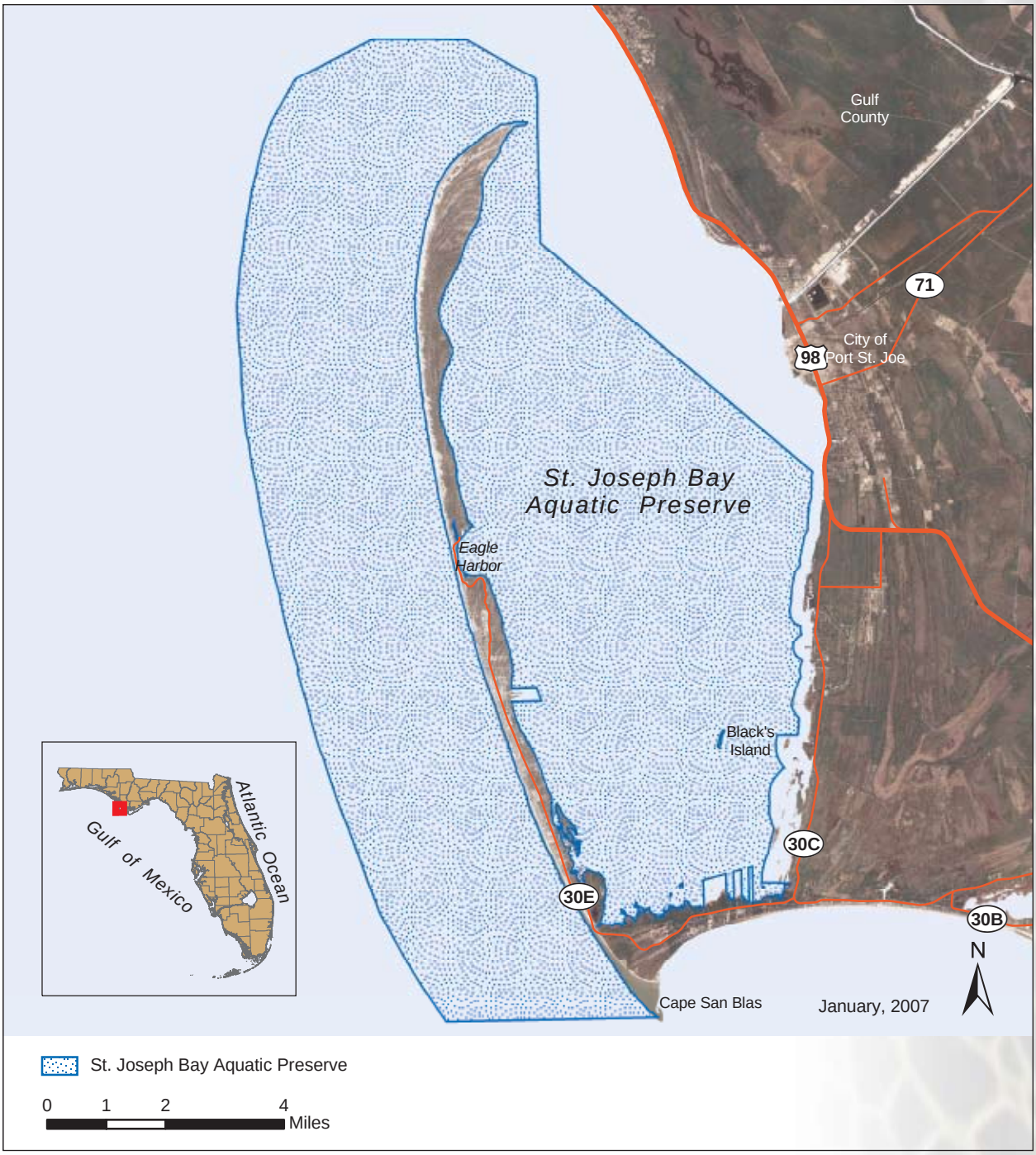
Aquatic Preserves include all the state-owned submerged lands within their boundaries. This map is not intended for use for determination of wetlands or land ownership.

Map 1 / Coastal and Aquatic Managed Areas System

1.1 / Management Plan Purpose and Scope

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

The mandate for developing aquatic preserve management plans is outlined in Section 18-20.013 and Subsection 18-18.013(2) of the Florida Administrative Code (F.A.C.). Management plan development and review begins with collecting resource information from historical data, research and monitoring and



Map 2 / St. Joseph Bay was designated as an aquatic preserve in 1969 for the purpose of protecting the bay's unique and valuable coastal resources.

includes input from individual CAMA managers and staff, area stakeholders, and members of the general public. The statistical data, public comment, and cooperating agency information is then used to identify management issues and threats affecting the present and future integrity of the site, its boundaries, and adjacent areas. This information is used in the development and review of the management plan, which is examined for consistency with the statutory authority and intent of the Aquatic Preserve Program. Each management plan is evaluated periodically and revised as necessary to allow for strategic improvements. Intended to be used by site managers and other agencies or private groups involved with maintaining the natural integrity of these resources, the plan includes scientific information about the existing conditions of the site and the management strategies developed to respond to those conditions.

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

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

In addition, unique local and regional issues are identified, and goals, objectives, and strategies are established to address these issues. Finally, the program and facility needs to meet these goals as identified. These components are all key elements in an effective coastal management program and for achieving the mission of the sites.

*1.2 / **Public Involvement***

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

- meetings of public boards or commissions must be open to the public;
- reasonable notice of such meetings must be given; and
- minutes of the meetings must be recorded.

Several key steps are to be taken during management plan development. First, staff organizes an advisory committee comprised of key stakeholders. Next, staff advertises and conducts one or more public meetings to receive input from stakeholders on the concerns and perceived issues affecting each of the sites. This input is used in the development of a draft management plan that is reviewed by CAMA staff and the advisory committee. After the initial reviews, the staff advertises and conducts, in conjunction with the advisory committee, additional public meetings to engage the stakeholders for feedback on the draft plan and the development of the final draft of the management plan. For additional information about the advisory committee and the public meetings refer to Appendix C - Public Involvement.

The endless blue vista of the Gulf of Mexico beyond the dunes in T. H. Stone Memorial St. Joseph Peninsula State Park.

Chapter Two

The Florida Department of Environmental Protection's Office of Coastal and Aquatic Managed Areas

*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 Planning and Management. 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 Office of Coastal and Aquatic Managed Areas (CAMA) 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, 3 National Estuarine Research Reserves (NERRs), the Florida Keys National Marine Sanctuary and the Coral Reef Conservation Program (CRCP). The three NERRs, the Florida Keys National Marine Sanctuary, and the CRCP are managed in cooperation with the National Oceanic and Atmospheric Administration (NOAA).

CAMA 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. CAMA is a strong supporter of the NERR system and its approach to coastal ecosystem management. The State of Florida has three designated NERR sites, each encompassing at least one aquatic preserve within its boundaries. Rookery Bay NERR includes Rookery Bay Aquatic Preserve and Cape Romano - Ten Thousand Islands Aquatic Preserve; Apalachicola NERR includes Apalachicola Bay Aquatic Preserve; and Guana Tolomato Matanzas NERR includes Guana River Marsh Aquatic Preserve and Pellicer Creek Aquatic Preserve. These aquatic preserves provide discrete areas designated for additional protection beyond that of the surrounding NERR and may afford a foundation for additional protective zoning in the future.

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

*2.2 / **Management Authority***

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

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

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

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

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

In 1980, the Trustees adopted the first aquatic preserve rule, Chapter 18-18, Florida Administrative Code (F.A.C.), for the administration of the Biscayne Bay Aquatic Preserve. All other aquatic preserves are administered under Chapter 18-20, F.A.C., which was originally adopted in 1981. These rules apply standards and criteria for activities in the aquatic preserves, such as dredging, filling, building docks and other structures that are stricter than those of Chapter 18-21, F.A.C., which apply to all sovereignty lands in the state. These rules are intended to be cumulative, meaning that Chapter 18-21, F.A.C., should be read together with Chapter 18-18, F.A.C., or Chapter 18-20, F.A.C., to determine what activities are permissible within an aquatic preserve. If Chapter 18-18, F.A.C., or Chapter 18-20, F.A.C., are silent on an issue, Chapter 18-21, F.A.C., will control; if a conflict is perceived between the rules, the stricter standards of Chapter 18-18, F.A.C., or Chapter 18-20, F.A.C., supersede those of Chapter 18-21, F.A.C.

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 CAMA 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 Marine Patrol, DEP law enforcement, and local law enforcement agencies. Enforcement of administrative remedies rests with CAMA, the DEP Districts, and Water Management Districts.

One of the most pristine coastal bays in all of Florida, the shallow, crystal clear waters of St. Joseph Bay support a biologically diverse ecosystem.

*2.3 / **Statutory Authority***

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

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

Management responsibilities for aquatic preserves may be fulfilled directly by the Trustees or by staff of the DEP through delegation of authority. Other governmental bodies may also participate in the management of aquatic preserves under appropriate instruments of authority issued by the Trustees. CAMA staff serves as the primary managers who implement provisions of the management plans and rules applicable to the aquatic preserves. CAMA 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 aquacultural 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.

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

Many provisions of the Florida Statutes that empower non-CAMA programs within DEP or other agencies may be important to the management of CAMA sites. For example, Chapter 403, F.S., authorizes DEP to create rules concerning the designation of "Outstanding Florida Waters" (OFWs), a program that provides aquatic preserves with additional regulatory protection. Chapter 370, F.S., regulates saltwater fisheries, and provides enforcement authority and powers for law enforcement officers within the Florida Fish and Wildlife Conservation Commission. Likewise, Chapter 372, F.S., provides similar powers relating to wildlife management. The sheer number of statutes that affect aquatic preserve management prevents an exhaustive list of all such laws from being provided here.

*2.4 / **Administrative Rules***

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

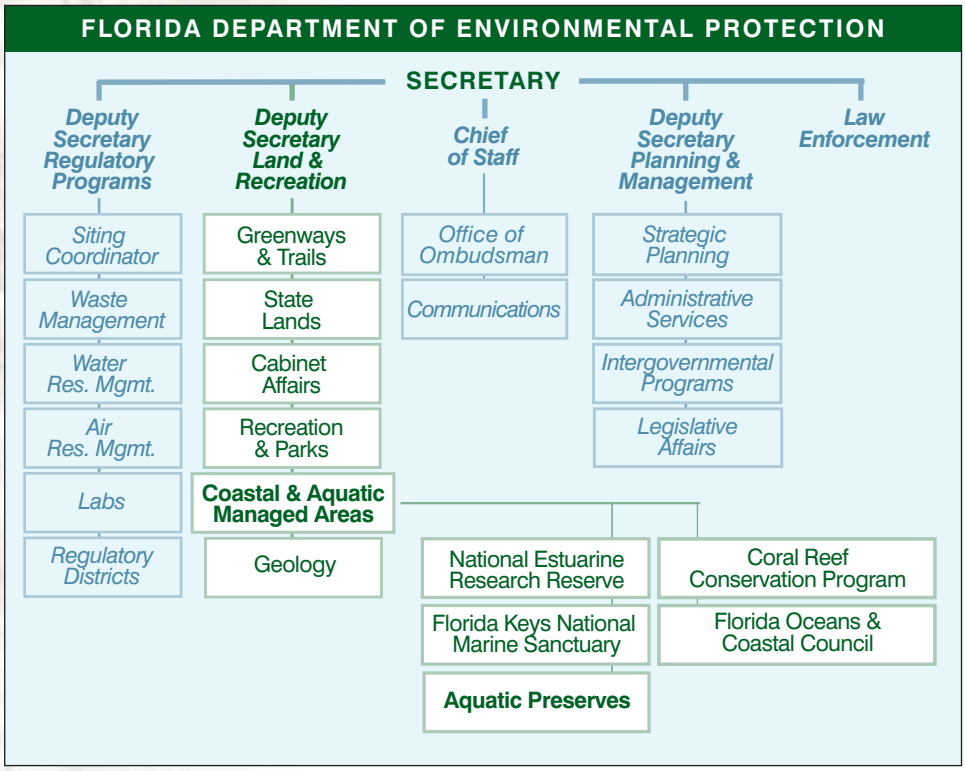


Figure 1 / State structure for managing aquatic preserves.

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

To that end, Chapter 18-21, F.A.C., contains provisions on general management policies, forms of authorization for activities on sovereignty lands, and fees applicable for those activities. "Activity," in the context of the rule, includes "construction of docks, piers, boat ramps, boardwalks, mooring pilings,

dredging of channels, filling, removal of logs, sand, silt, clay, gravel or shell, and the removal or planting of vegetation" (Rule 18-21.003, F.A.C.). To be authorized on sovereignty lands, activities must be not contrary to the public interest (Rule 18-21.004, F.A.C.).

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

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

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

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

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

The first Cape San Blas Lighthouse was built on the end of St. Joseph Point in 1838.

Chapter Three

The St. Joseph Bay Aquatic Preserve

*3.1 / **Description of Representative Ecosystem Region***

3.1.1 / Historical Background

Native Americans once inhabited the St. Joseph Peninsula and gathered shellfish for meals from the bay's shallow, clear waters. Prehistoric and Indian occupations included the Woodland stage, the third major stage of cultural development in eastern North America. This first stage of habitation is marked by population increases along the coast, probably because sea levels stabilized around 400 B.C. More burial mounds were constructed and trade networks increased (DEP, 2006b).

The Weeden Island people (A.D. 200 to 1000) utilized shellfish, fish, deer and nuts as primary food resources. The Mississippian culture (A.D. 1000 to 1500) developed along the Apalachicola River around A.D. 1000. Contacts between the Weeden Island culture and the emerging Mississippian groups brought new ideas; however, coastal groups seem to have continued a subsistence strategy. There are no definitive archaeological or historic evidence about Indian groups at the spit when Europeans arrived (DEP, 2006b). St. Joseph Bay appears to have been reported first by Spaniards from Pensacola in 1699 who reported seeing the prow of a shipwreck. Named San Joseph de Vallardes in honor of Comte de Moctezuma, the bay was occupied by 1701 in order to prevent the French from interrupting the Spanish supply route to Pensacola (DEP, 2006b).

Historically called St. Joseph, this small coastal community, which is presently known as Port St. Joe, is rich in both history and resources. St. Joseph was founded in 1835 on the shores of St. Joseph Bay. As no rivers flowed into St. Joseph Bay, two railroads were built connecting St. Joseph with the Apalachicola River in an attempt to siphon off some of the cotton and lumber being shipped down the river to the Port of Apalachicola. By 1837, St. Joseph had become the largest town in the Territory of Florida, with approximately 6,000 residents. In 1838, the town hosted the first Constitutional Convention for Florida, which shaped the constitution used when Florida became a state in 1845. In 1839 a lighthouse began operating at the tip of the spit and guided local shipping. St. Joseph became known as the "Constitutional City" and even transferred the name to the new Port St. Joe. The town served as a seaport until 1841 when

a ship docked with occupants carrying yellow fever. Over 75% of the town died of the disease and the rest of the population fled, abandoning the city only seven years after it was founded. In 1843, a hurricane destroyed the abandoned city. The lighthouse ceased operation in 1847 and was leveled by another hurricane in 1851. This same storm forced the grounding of the *S.S. Florida* on the east side of the St. Joseph Peninsula. Only the metal firebox remains in the bay waters (DEP, 2006b).

The historical town of St. Joseph remained uninhabited for the rest of the 19th century. In the early 20th century, Port St. Joe was founded about two miles north of the site of old St. Joseph. The only remains of Old St. Joseph are tombstones in the Old St. Joseph Cemetery in present-day Port St. Joe. The cemetery is a historical site and serves as a grim reminder of the yellow fever epidemic and the hurricane that destroyed the town known as St. Joseph. Today, many of the streets in Port St. Joe are named after the prominent citizens that perished in these events (Gulf County Tourism Development Council [TDC], 2006). In the panhandle, as elsewhere, real estate development was inextricably linked with transportation improvements. The revival of the town along the shores of St. Joseph Bay where the old town of St. Joseph had briefly flourished was directly tied to the arrival in 1909 of a new railroad, the Apalachicola Northern Railroad. The railroad went 99 miles from River Junction, just south of present-day Chattahoochee (where it connected with the east-west line to Pensacola) to St. Joseph Bay, by way of Apalachicola. Its cars carried lumber from the panhandle's longleaf pine forests to markets on the East Coast and abroad. The railroad was essential to both developing and serving deep-water docks that revived the shipping trade at St. Joseph Bay. With the addition of docks, St. Joseph Bay presented a nearly perfect shipping harbor protected by the St. Joseph Peninsula from severe weather in all directions except due north and lacking inflowing rivers that would deposit silt that interfered with navigation. By July 1, 1913, when the settlement was incorporated with the new name of Port St. Joe, local trade products included sawn lumber, tobacco, sugar cane, fish oil, rosin, pitch, and turpentine. The town had a large sawmill, an ice plant, and an oyster packing house. Sunday was the prime day, when the train would bring hundreds of day-trippers to picnic, swim, fish, crab, scallop and enjoy the shore. Large slides and a merry-go-round set up in the water provided early water-park amusement for children and adults. Like other parts of the rural South, however, the region struggled with the poverty, disease, and limited educational opportunities that went hand-in-hand with geographical isolation and a slow economy (Ziewitz & Wiaz, 2004).

In 1925 Gulf County was created and named for the Gulf of Mexico. Port St. Joe, the largest city in Gulf County, serves as the county seat. In the early 20th century a bathhouse was constructed at Eagle Harbor by T. H. Stone so that tourists from the mainland could change clothes for swimming and sailing. Fish camps arose on the east side of the peninsula and a house for local bar pilots was built near the tip. The peninsula was used by the U.S. Army as a training facility for gunnery and bombing practice during World War II. In 1962 and 1963, the U.S. Army Reserve took over the remaining military lands for training exercises (DEP, 2006b). To date, a large camp area and bulldozed roads are still evident within the Wilderness Preserve at the state park. In 1967, as a result of local interest, the site was dedicated as the T. H. Stone Memorial St. Joseph Peninsula State Park. On October 21, 1969, the Governor and Cabinet adopted by resolution 18 water bodies to become aquatic preserves, including St. Joseph Bay.

Over the years, Gulf County has experienced relatively slow growth accompanied by a minimal tourism base, which can be attributed to large land ownership patterns and minimum employment opportunities. In the past, the county's economy was dominated by the paper mill in Port St. Joe until the early 1990s when several mills experienced shutdowns and the Port St. Joe mill was closed in 1998. Soon after, Governor Jeb Bush designated Gulf County as a "rural area of economic concern." Since the 1990s however, the shift in the county's economy from a paper production related industry to a tourism industry has resulted in a steady increase in the number of tourists. The increase in tourism has brought about a demand for homes. Coastal development within Gulf County is primarily related to the construction of beach vacation homes that are typically used as rental property throughout much of the year. In the mid-1990s the St. Joseph Peninsula State Park saw a 50% increase in number of annual visitors and in 2002, the park was named Top American Beach. Promotional marketing has brought about slogans such as, Florida's Forgotten Coast, Florida's Great Northwest, and Pearl of the Panhandle. Increasing national familiarity has continued to bring visitors to the area and the population continues to steadily increase. For six decades, the St. Joe Paper Company grew and harvested pines in the panhandle and turned them into pulp at its mill in Port St. Joe. The company's shift to real estate dates back to the 1980s and began in Walton and Okaloosa counties. As of 2003, the St. Joe Company owned approximately one million acres of Florida land, a Green Empire with roughly 900,000 acres concentrated in the panhandle (Ziewitz & Wiaz, 2004). Most of these acres are concentrated in Bay and Gulf counties.

Along with being an aquatic preserve, St. Joseph Bay is also designated as a Class II Shellfish Harvesting Waterbody, Outstanding Florida Waterbody (OFW), and a Gulf of Mexico Ecological Management Site (GEMS).

3.1.2 / General Description

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. The Apalachicola River drainage basin supports more than 40 amphibian and 80 reptilian species (Apalachicola National Estuarine Research Reserve [ANERR], 1998). In addition, over 788 native vertebrate species and over 2,000 native plants inhabit the Florida Panhandle from the Perdido River eastward to the Suwannee River.

Gulf fisheries are some of the most productive in the world. In 2002, the commercial fish landings of the northern Gulf region totaled over 1.7 billion pounds accounting for nearly $705 million in revenues (National Marine Fisheries Service, 2003). 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, Odaya, Bachant, Bergan, Keller, Martin et al., 2000).

St. Joseph Bay is a small embayment that lies just west of Apalachicola, Florida. St. Joseph Bay and Apalachicola Bay are directly adjacent to one another, but provide a great contrast in condition because all the freshwater of the region goes to Apalachicola Bay. Partially isolated from the Gulf of Mexico, St. Joseph Bay extends from Cape San Blas in the south to the tip of the St. Joseph Peninsula in the north. St. Joseph Bay is the only body of water in the eastern Gulf of Mexico not influenced by the inflow of freshwater. Because of this, these coastal waters tend to be clearer with sandier sediments than in the north central Gulf of Mexico. 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 saltmarsh and seagrass habitats that serve as nursery and foraging grounds for a variety of commercial and recreational fish and invertebrate species, sea turtles, scallops and birds. Seagrasses cover one-sixth of the bay and expand approximately 9,669 acres (Sargent, Leary, Crewz & Kruer, 1995). Saltmarsh habitat spans approximately 762 acres.

The protection and where necessary, restoration of these interdependent habitats is crucial to the health of the ecosystem (Northwest Florida Water Management District [NWFWMD], 2000). To effectively manage a natural resource, one must be knowledgeable about the resource function and composition and be able to transmit this knowledge to people who use and/or can potentially affect the resource, and be willing to take necessary actions to manage and protect the resource. Therefore, the

management strategies for an aquatic preserve must consist of a variety of programs including direct, hands-on management of the resources, resource protection, environmental education and research. The emphasis of the Aquatic Preserve Program in resource management is to conduct management activities and to coordinate the network of federal, state, regional, and local agencies with the authority to manage and protect natural resources. Through both of these strategies, a cohesive management program that leads to the long-term conservation of the natural system may be attained (DEP, 1997a).

Location/Boundaries

St. Joseph Bay is located in Gulf County along Highway 98 near the community of Port St. Joe which is approximately 35 miles southeast of Panama City and approximately 100 miles southwest of Tallahassee. Gulf County consists of two municipalities, Port St. Joe, located on the coastline, and Wewahitchka, located northeast of Port St. Joe. There are several established communities that are unincorporated in Gulf County, including, Beacon Hill, St. Joe Beach, Highland View, Overstreet, Dalkeith, Howard Creek, White City, Simmons Bayou, Cape San Blas, and Indian Pass.

Map 2 / St. Joseph Bay was designated as an aquatic preserve in 1969 for the purpose of protecting the bay's unique and valuable coastal resources.

St. Joseph Bay is bound on the eastern shoreline by the city of Port St. Joe and St. Joseph Bay State Buffer Preserve lands and on the west by the St. Joseph Peninsula and St. Joseph Peninsula State Park. Map 2 illustrates the St. Joseph Bay Aquatic Preserve boundaries. The bay is approximately 15 miles long north to south, with a maximum width of 6 miles, and opens north to the Gulf of Mexico, thru a relatively narrow opening. The aquatic preserve boundaries encompass 73,000 acres of state-owned sovereign submerged lands occurring below the mean high water line to which the state holds title. Uplands and manmade canals are excluded from the preserve. Other areas that are not included within the preserve's boundaries include a linear band of privately owned submerged lands and marsh running along the eastern shore of St. Joseph Bay, six private in-holdings that occur along the southern and western shore, the area of the bay located north of the Port St. Joe navigation channel, and the immediate area of the channel. Some of this land is included in the St. Joseph Bay Buffer Florida Forever Project and the state is pursuing acquisition of these areas.

Moderate human development is steadily increasing around the bay with major industries located adjacent to the bay that include a wastewater treatment plant with permitted discharge into the Gulf County Canal, two chemical companies, a coal handling facility, and a former paper mill. Gulf County accommodates barge traffic via the Gulf Intracoastal Waterway providing access from St. Marks, Florida to Brownsville, Texas. The Port St. Joe shipping channel is congressionally authorized to a depth of 37 feet and connects to the shipping lanes of the Gulf of Mexico. The Gulf County Canal is maintained to the same standards as the Gulf Intracoastal Waterway and connects the shipping channel to the Intracoastal Waterway (TDC, 2006). Public boat access to the preserve is available at the city ramp in Port St. Joe (Frank Pate Park), two private fish camps on the eastern shore of the bay, the Overstreet Boat Ramp located on County Road (CR) 386 on the Intracoastal Waterway, and at Eagle Harbor in the state park. Kayak and canoe access only is located at the St. Joseph Bay Kayak/Canoe Launch located off of Cape San Blas Road near the Stumphole area, which is located approximately 6 miles south of the state park entrance. Refer to Map 17 to view the Stumphole location.

3.1.3 / Resource Description

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

Surrounding Population Data and Future Projected Changes

Over 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. Port St. Joe is a small, predominately rural community. According to the U.S. Census Bureau, in 2006, the city of Port St. Joe had a population of 3,635. The estimated Gulf County population as of 2007 was 14,039. Gulf County has a population density of approximately 24 persons per square mile. Tourism is a vital element in the economy of Gulf County, and will continue to grow for years to come. Plans for future development include large-scale, residential, commercial and resort development. The Port St. Joe Master Plan describes future plans for the development of a waterfront village that includes large-scale, residential, commercial, and resort development surrounded by green space. This will include a 50 wet-slip and 300 dry-slip marina. According to the Gulf County 2005-2006 profile, the projected population is expected to increase to 16,566 by 2010.

Physiography

According to the U.S. Census Bureau, Gulf County has a total area of 745 square miles. This includes 555 square miles of land and 190 square miles of water. St. Joseph Bay lies on an offshore extension of the Gulf Coast Lowlands geomorphic province, which is characterized by low elevations and poor drainage. Numerous relict bars and dunes are associated with this province, indicating historic fluctuations in sea level. Along the coast, fluvial deposition and shore zone processes are active in developing and maintaining beaches, swamps, and mudflats (McNab & Avers, 2006). The onshore terrain consists of a flat, frequently swampy plain sloping gently towards the coast. Near-surface sediments are Pleistocene and Holocene deltaic and marine sands which are generally over 100 feet thick. These overlay Upper Miocene limestone, clays, and shell beds (Schmidt, 1978). Relict marine bars, dunes, and spits, formed during high Pleistocene sea level stands, are superimposed on the otherwise flat landscape. Land slope near the coast averages 2 to 3 feet per mile. Offshore, the submarine plain slopes seaward at a rate of 4 to 5 feet per mile for at least 10 miles. The shallow nearshore gulf in the region is a drowned alluvial plain grading into a limestone plateau to the east and south (McNulty, Lindall & Sykes, 1972). The north gulf coast sedimentary province contains relict sand west of the Apalachicola delta.

St. Joseph Bay is formed by a narrow spit of land extending out from Cape San Blas, the southernmost part of the St. Joseph Peninsula. Cape San Blas is the elbow of an L-shaped coastal barrier of beach and coastal upland habitats extending from the Florida panhandle into the Gulf. The peninsula is 17 miles

Virtually the entire rim of St. Joseph Bay is bordered by saltmarsh habitat which plays an important role in the food web of the bay.

long and has an average width of 1,000 feet. Eagle Harbor, midway up the spit, forms a natural cove on the bay side. This feature may represent an ancient pass which once divided the spit into two islands (Stapor, 1973).

The bay owes its existence to the Cape San Blas shoals and the historical migration of the Apalachicola River (Stewart, 1962). Before sea level rise, these shoals are believed to have been a barrier island system (Schnable & Goodell, 1968). The shoals extend about 10 miles into the Gulf of Mexico and are marked by a series of broad ridges and troughs. They have caused wave action to deflect littoral drift, which in turn has resulted in the emergence of the St. Joseph spit or peninsula. Cape San Blas formed as a result of westward shifting mainland sediments during a time when sea level was on the rise, and the spit formation is attributed to sediments being eroded from the westward beaches of the cape and deposited even further westward. This lengthening of the spit enclosed a large area of water, thus creating St. Joseph Bay (Gulf County Coastal Habitat Conservation Plan [HCP], 2004). The cape and the spit sediments are primarily composed of quartz sands, originally supplied by the Apalachicola River, which is approximately 20 miles to the east (Florida Department of Natural Resources [DNR], 1987).

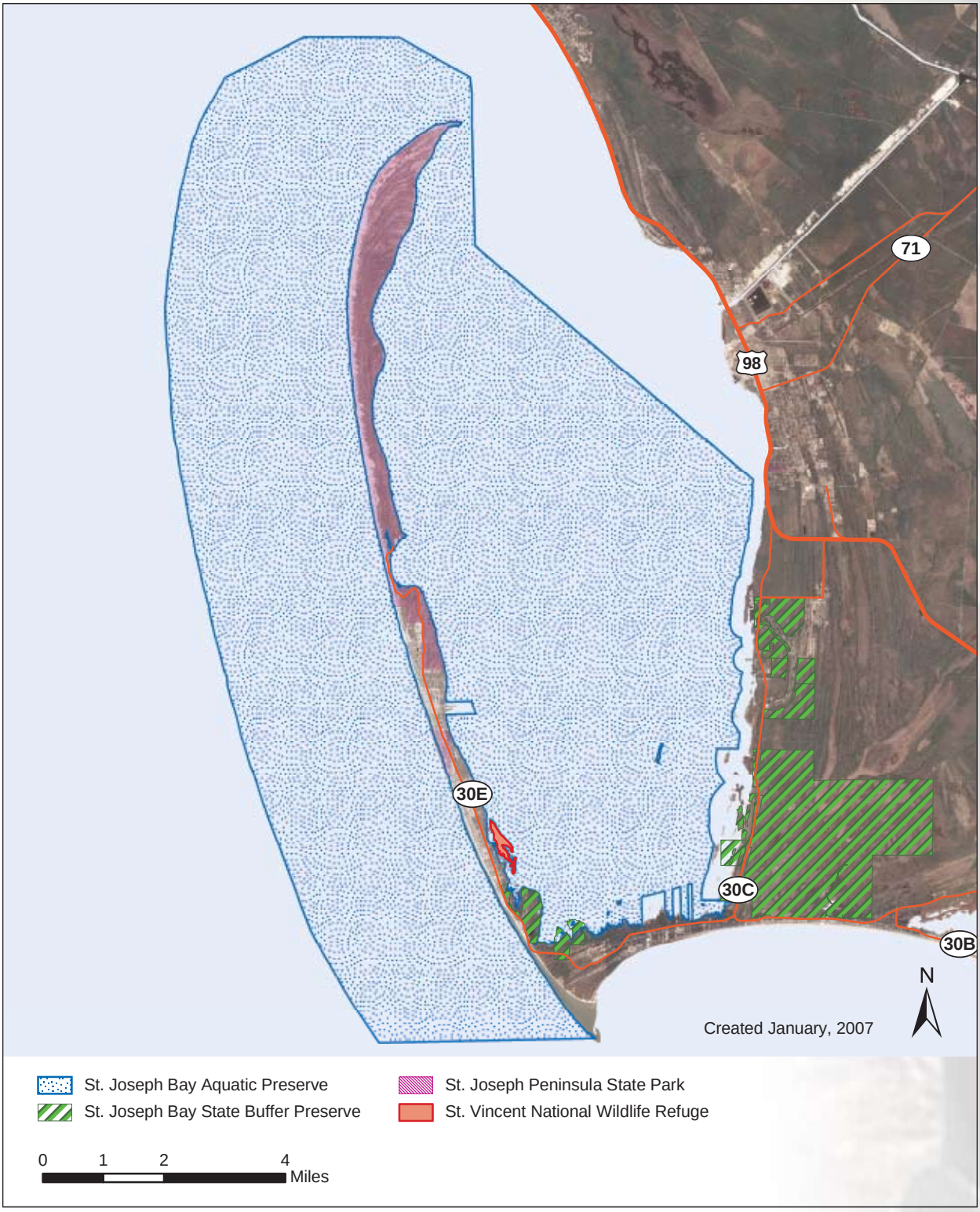
An analysis of the coastal sand budgets for Northwest Florida suggests that the region has shifted from historically having an excess of sand to a current shortage (Stapor, 1973). The beach habitat on St. Joseph Peninsula has experienced a continuous balance of erosion and deposition over the last 100 years. Some sections have experienced long-term recession and have contributed sand to other areas that have a history of accretion (Beaches and Shores Resource Center, 1985). The primary causes of beach and dune erosion in the area is periodic storm events and long-term sea level rise (DNR, 1990).

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. Joseph Peninsula is located within the Gulf Coast 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. Cape San Blas occupies the portion of the Gulf Coast Lowlands known as the Silver Bluff Terrace, an area extending from the modern Gulf coast to approximately 8 feet below mean sea level. Dune systems, relict beach ridges, and swales typify the Silver Bluff Terrace.

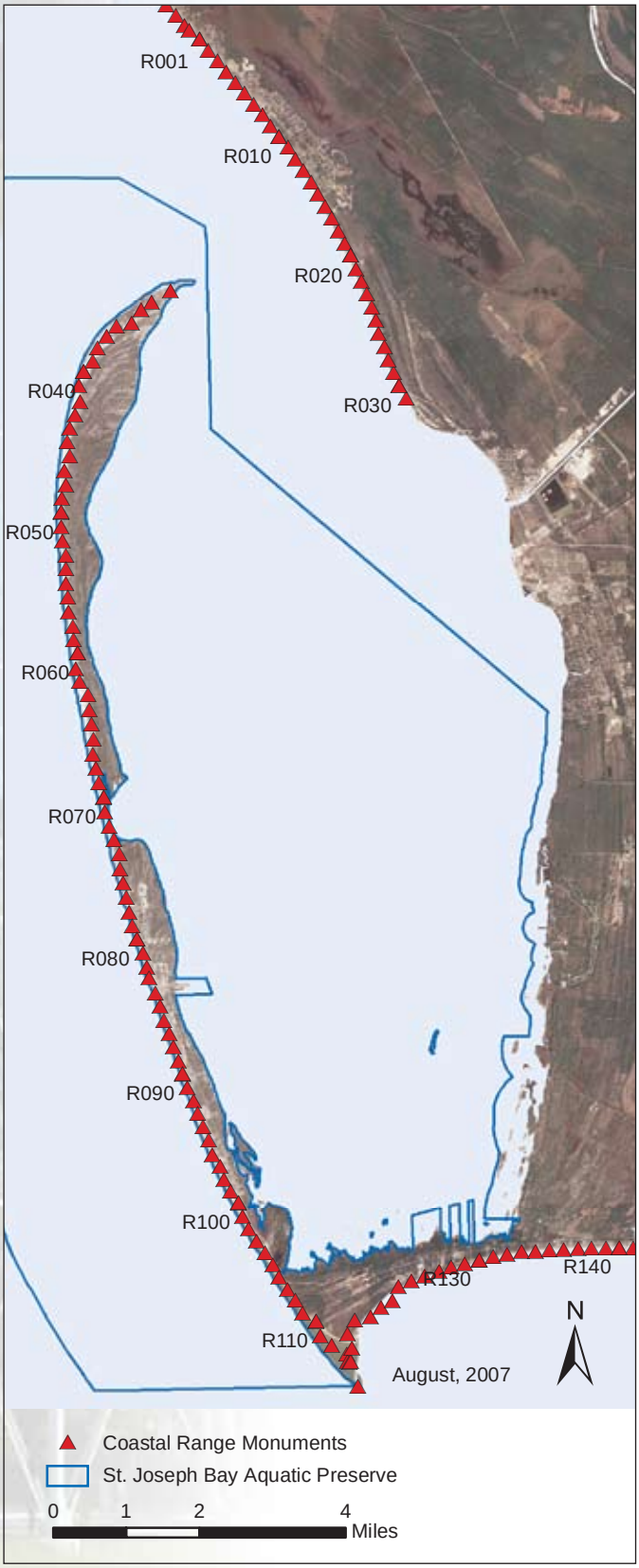
The shoreline topography of this coastal barrier system has been in a state of change with varying rates of accretion and erosion. Between 1875 and 1942, 36 feet of shoreline per year was lost along the spit adjacent to Cape San Blas. At the northern tip of the St. Joseph Peninsula, a gain of 29 feet per year was experienced between 1875 and 1970 (HCP, 2004). Currently, Cape San Blas is considered one of the most critically eroding shorelines in Florida.

Gulf County includes three distinct open coast segments. The first is a 5.9 mile (9.5 km) shoreline segment extending from the Bay County line southeastward. This area is exposed to Gulf waves entering the gap between St. Joseph Point and the Crooked Islands of Bay County. The second segment is



Map 3 / Conservation Lands Adjacent to St. Joseph Bay Aquatic Preserve

the St. Joseph Peninsula, approximately 17 miles long, extending from Cape San Blas to St. Joseph Point. This area is the most exposed to higher wave energy of the three segments. The third segment is approximately 8.5 miles in length and extends from Cape San Blas eastward to Indian Pass and the Franklin County line. This area is within an embayment bounded by two large offshore shoal systems: those off Cape San Blas on the west, and those off Cape St. George on the east (Foster & Cheng, 2001).



Map 4 | DEP Coastal Reference Points for Gulf County ("R" Monuments)

There are 162 sequentially numbered Florida Department of Environmental Protection (DEP) survey reference points, generally referred to as "R" monuments, spaced approximately 1,000 ft (300 m) apart in Gulf County. Map 4 illustrates these reference points in order to locate various items along the St. Joseph Peninsula. There is no coastal armoring of significance within Gulf County, with the exception of a rock revetment fronting the road between approximately R-105 and R-106.5 on St. Joseph Peninsula, an area commonly referred to as the Stumphole.

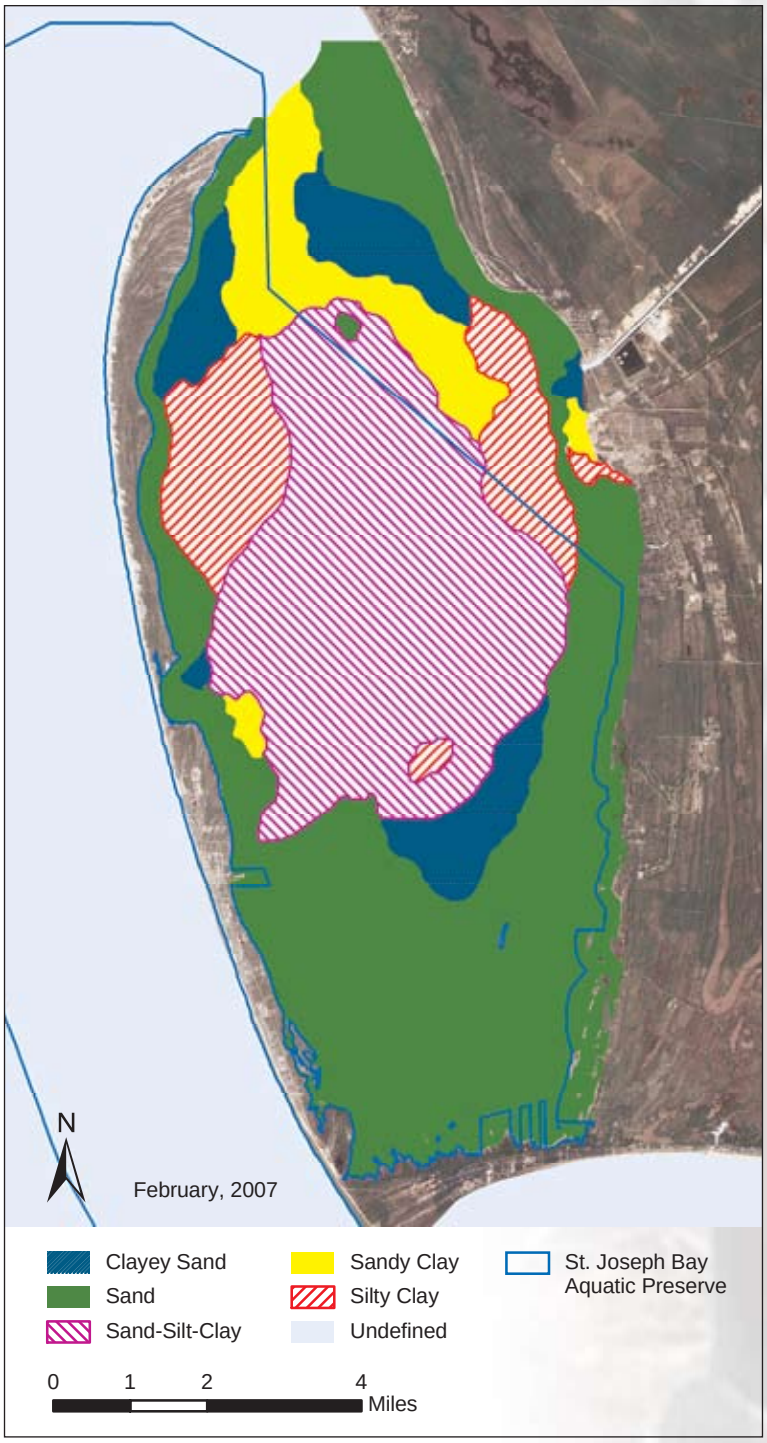
According to the Shoreline Change Rate Report (DEP, 2001b) coastal Gulf County has a complex geomorphology. The barrier islands of Gulf County and western Franklin County, including St. Joseph Peninsula, and the extensive shoals of Cape San Blas and Cape St. George, and the islands within the embayment between them, all appear to be related to a complex deltaic history of the Apalachicola River. It is important to note the presence of the extensive offshore shoals because they refract and diffract the wave energy reaching this area, controlling the wave climate between and to either side of Cape San Blas and Cape St. George. These major shoals can be viewed in any navigational chart of the area. In addition, there are two other items of significance to include. First, there are extensive peat deposits just below a surface veneer of sand between approximately R-100 and R-113. Second, sand in that area eastward to Cape San Blas and all the way to Indian Pass, appears finer and darker in color than on St. Joseph Peninsula in general. The peat is noted because it is not sand and therefore erodes differently. It has probably been a significant factor in preventing an island break-through with a new inlet in the Stumphole area (R-105), thus far. The sand difference is noted because it strongly suggests different sources of material and possibly different directions of net transport (Foster & Cheng, 2001).

The shoreline segment extending from R-1 to R-31, because of its location at the entrance to St. Joseph Bay, is affected primarily by waves out of the west and northwest, as refracted and diffracted through the gap between the Crooked Islands (in Bay County) and St. Joseph

Point (Foster & Cheng, 2001). Tide gauges at Mexico Beach, St. Joseph Point, and Port St. Joe indicate diurnal tides with similar mean tidal ranges of 1.19 ft, 1.16 ft, and 1.15 ft, respectively (National Ocean Service, 1988). Most of the shoreline of St. Joseph Peninsula is affected primarily by waves out of the south-southwest, the longest fetch direction. The U.S. Army Corps of Engineers Wave Information Studies Station 37 located at 62 ft deep offshore of St. Joseph Peninsula, experienced a mean significant wave height of 2.0 ft and a mean period of four seconds from 1976 to1995 (Foster & Cheng, 2001).

Net longshore transport along the majority of St. Joseph Peninsula is from south to north, consistent with the direction of longest wave fetch and the observed growth of St. Joseph Point as well as its shoals (Foster & Cheng, 2001). Sand in the cape area and eastward appears finer and darker in color than elsewhere on the peninsula. It is probable that a point where net transport direction changes on the peninsula exists in the vicinity of R-100 to R-110, due to shoal sheltering and refraction around the shoals off Cape San Blas. The above interpretation of net northerly transport over most of St. Joseph Peninsula is consistent with the totality of available information. It is also the only physical explanation that matches the observed shoreline erosion pattern between approximately R-107 and R-75, as determined by a numerical modeling study by Foster (1991). In that study it was shown that the tapered pattern of higher erosion to lesser erosion from south to north is a sand supply deficit-induced erosion pattern equivalent to those found elsewhere in the state down drift of inlet jetties (Foster & Cheng, 2001). The Entrance Channel to St. Joseph Bay is a federal navigation project that is regularly dredged, and has a controlling effect on the northernmost tip of St. Joseph Peninsula. Before 1970, all of the dredged sand was disposed of in deep water (Dean & O'Brien, 1987). Since that time there have been several placements of sand offshore, nearshore, and onto St. Joseph Point.

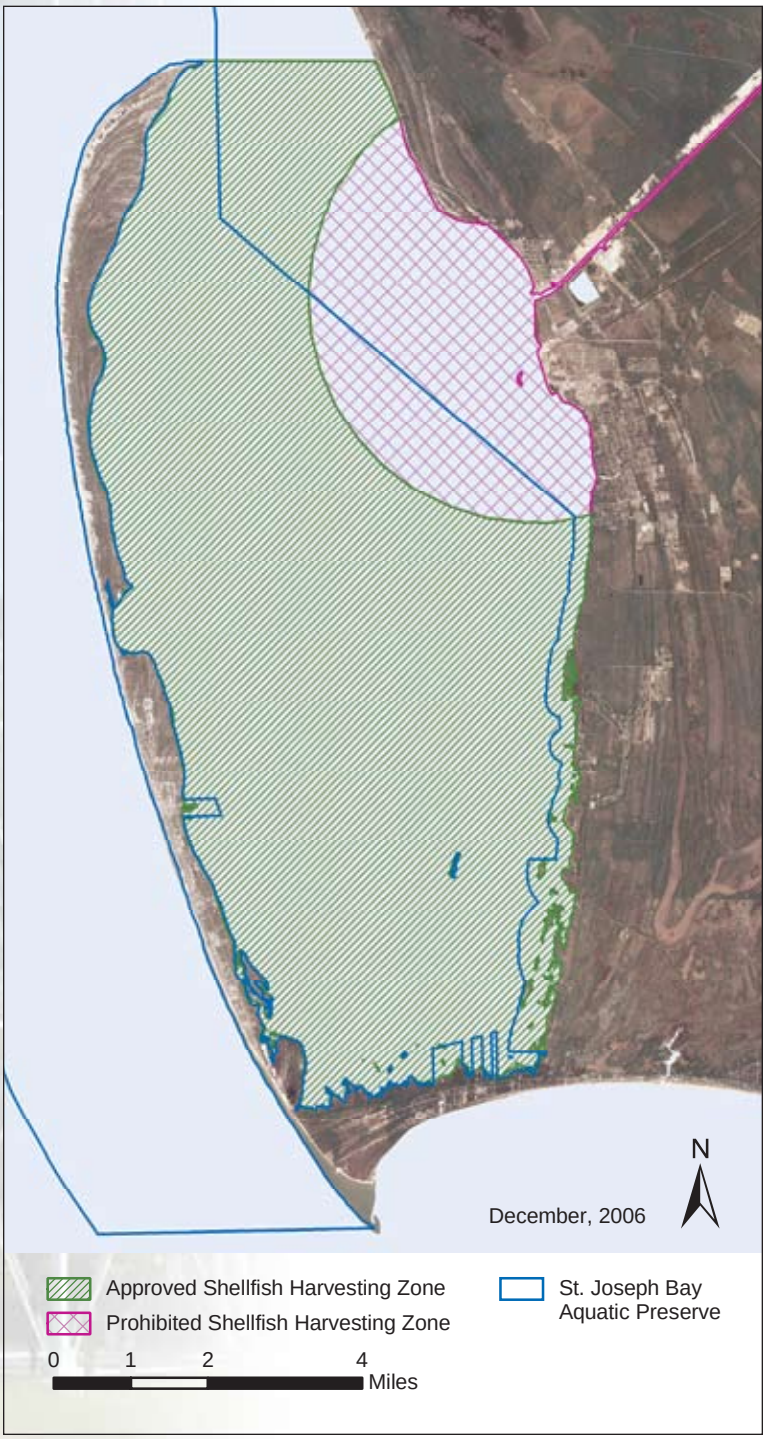
Hurricanes occur frequently in this area and both the storms and their effects can remain for long periods of time. However, storms are just peaks in the total normal wind and wave climate record (Foster & Cheng, 2001). Observations indicate that severe storms can temporarily disrupt or obscure the long-term erosion pattern, perhaps for up to a decade (Foster & Cheng, 2001). In some situations, if a major factor such as the sand supply is altered, or if an inlet is significantly changed, coastal processes can be permanently affected by a storm. Major storms continue to cause significant dune erosion and add to ongoing beach erosion.



Map 5 / Bottom Sediments of St. Joseph Bay

Geology

The bottom sediments of St. Joseph Bay are predominantly sand, sand-silt-clay, sandy clay and silty clay (Isphording, 1993). Map 5 illustrates the sediment types in St. Joseph Bay. Present day sedimentation in St. Joseph Bay may be attributed to the coastal transport of sand from the east and biological activity within the bay itself. Since the spit enclosed the bay, the rate of sedimentation has been slow. Therefore, the central portion of the bay has a depth and gradient which is in close agreement with that of the offshore slope. The large accumulation of clay in the central portion of the bay has led to the conclusion that these fine sediments represent a relic surface produced by the discharge of old distributaries of the Apalachicola River (Stewart & Gorsline, 1962). More recent sediment studies reveal that St. Joseph Bay has a large area, in excess of approximately 20,000 acres, below the 20-foot contour, consisting of sediments with high percentages of silt, clay, and total organic carbon that were apparently deposited thousands of years ago (Hemming, Brim, & Jarvis, 2000). Such sediments can quite easily accumulate chemical contaminants, and contaminants associated with these sediments can be accumulated by biological organisms inhabiting the bay (Hemming et al., 2002).



Map 6 / Shellfish Harvesting Zones in St. Joseph Bay

Mineral Resources

There are no known commercially viable mineral resources in this area of the panhandle.

Hydrology and Watershed

St. Joseph Bay is unique in being the only sizeable embayment body of water in the eastern portion of the Gulf of Mexico that is not markedly influenced by the inflow of freshwater. Therefore, the salinity of the bay is essentially the same as the Gulf, averaging 35 parts per thousand (ppt). The total surface area of the bay at mean high water is approximately 43,872 acres (Hemming et al., 2002). Numerous small bayous, creeks, and ditches drain into the bay, but the principal sources of freshwater include rainfall, the underlying confined Upper Floridan Aquifer, overland drainage and the Gulf County Canal, a constructed waterway that connects the bay with the Gulf Intracoastal Waterway and adjacent shallow ground water (Berndt & Franklin, 1999). Estimates for Upper Floridan Aquifer discharge rates for the St. Joseph Bay area range from 0.5 to 2 inches per year (Bush & Johnson, 1988). Net precipitation, defined as the difference between precipitation and lake evaporation, for the St. Joseph Bay area are estimated between 8 and 9 inches per year (Visher & Hughes, 1975). One preliminary estimate of a long-term average annual freshwater flow from the canal is 1,740 cubic feet per second. On a daily basis,

this inflow would amount to less than one percent (0.56%) of the bay's total volume (Hemming et al., 2002). Because of this minimal freshwater influence, St. Joseph Bay essentially remains a high salinity coastal lagoon, with some estuarine qualities near the mouth of the canal. Sediment loading, a phenomenon related to inflow, topography, and terrestrial geologic conditions, has no significant impact on the bay and thus it has remained quite deep since a rise in sea level flooded the coastal plain approximately 5,000 years ago (Stewart & Gorsline, 1962). The bay has a mean depth of 21 feet, with the deepest parts being approximately 35 feet near the northern tip of the spit. The southern portion of the bay is shallow and has an average depth of 3 feet, which is consistent with most of the bay's shallow shoreline. The bay is considered a coastal lagoon primarily because it functions as a closed system, and currents do not have any impacts at depths greater than 5.5 feet (1.7 meters) (Stewart & Gorsline, 1962).

All surface waters of the state have been classified by the DEP according to their designated use, as required by the Clean Water Act. Florida has five classes with associated designated uses, which are arranged in order of degree of protection required. St. Joseph Bay is classified as a Class II Waterbody. Class II waters are those coastal waters where shellfish propagation or harvesting occurs. Class II water standards are more stringent concerning bacteriological quality 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 maintains a lab in Apalachicola and conducts surveys to determine water quality in shellfish waters. All Class II waters are additionally classified by the department as approved, conditionally approved, or prohibited based upon these surveys (ANERR, 1998). As conditions change, areas are closed or open based on bacterial surveys and major rainfall events which increase bacterial levels due to stormwater runoff (DEP, 1997a).

St. Joseph Bay Aquatic Preserve is also designated as an Outstanding Florida Waterbody (OFW) by the 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.

Map 7 / Bathymetry of St. Joseph Bay

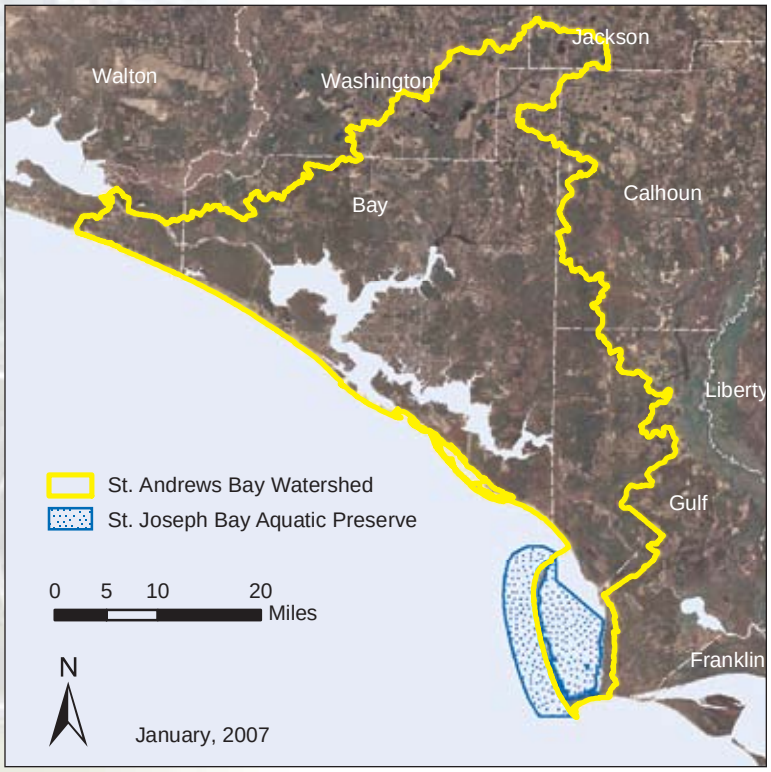
In addition, St. Joseph Bay is designated by the U.S. Environmental Protection Agency as a Gulf of Mexico Ecological Management Site (GEMS). GEMS are geographic areas that have special ecological significance to the continued protection of fish, wildlife, and other natural resources or that represent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

The gulf coast falls within a moderate energy coastal area (Tanner, 1960), with average breaker heights of 4 to 20 inches. Waves traveling northward through the Gulf of Mexico are refracted clockwise around the Cape San Blas shoals in such a manner as to arrive nearly parallel to the beach. This results in a bi-directional littoral drift system which runs northward along the northern half of the spit and southward along the southern portion (Tanner, 1966). In general, the currents in St. Joseph Bay sweep around the St. Joseph Peninsula and a counter-clockwise circulation pattern occurs in the central portion of the bay. This movement is disrupted only during the maximum flood tide when currents flow from the bay and outer basin via the channel at the peninsula tip and across the shoal in the vicinity of the boat channel. Current movement occurs on the surface throughout a major portion of the bay, diminishing rapidly below the 5 foot depth contour. In most of the extensive shallow reaches of the southern end of the bay there is no appreciable current except for the daily tide. Therefore, this most productive area of the bay functions largely as a closed system (Stewart, 1962). Map 7 illustrates the bathymetry of St. Joseph Bay.

The St. Andrew 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. Andrew, West, East, and North bays; St. Joseph Bay; and Deer Point Reservoir as well as the respective surface water basins of each of these water bodies (NWFWMD, 2000). Map 8 illustrates the drainage basin for the St. Joseph Bay Aquatic Preserve. This is consistent with the St. Andrew Bay watershed described in "1996 Water quality assessment for the State of Florida" (Hand, Col & Lord, 1996) and the U.S. Geological Survey (2001) Hydrologic Unit 03140101. The overall watershed covers approximately 749,663 acres in six Florida counties (NWFWMD, 2000). Sixty-one percent of the watershed is located in Bay County, with 20% in Gulf County, 9% in Washington County, 4% in Calhoun County, 4% in Walton County, and 2% in Jackson County.

Climate

The climate of Gulf 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. Over a 500-year period it is estimated that a total of 90 land falling hurricanes will occur within a distance of 270 nautical miles of Gulf County (Dean & Chiu, 1985). 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



Map 8 / Drainage Basin for St. Joseph Bay

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 the Florida Department of Environmental Protection (DEP). 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 & DNR, 1990). 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). Appendix B.6 provides an explanation of the FNAI Community Types and the ranking system.

FNAI Natural Community Type	# Acres	%of Area	Federal Rank	State Rank	Comments
Algal Bed	Unknown	Unknown	G2	S2	Characterized as large populations of nondrift macro or micro algae.
Composite Substrate	Unknown	Unknown	G3	S5	Consist of a combination of natural communities such as “beds” of algae and seagrasses.
Mollusk Reef	Unknown	Unknown	G2	S1	Typically characterized as expansive concentrations of sessile mollusks occurring in intertidal and subtidal zones to a depth of 40 feet.
Octocoral Bed	Unknown	Unknown	G2	S2	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.
Seagrass Bed	9669.00	13	G4	S4	Typically characterized as expansive stands of vascular plants that occur in subtidal (rarely intertidal) zones, in clear, coastal waters where wave energy is moderate.
Sponge Bed	Unknown	Unknown	G3	S2	Characterized as dense populations of sessile invertebrates of the phylum Porifera, Class Demospongiae.
Tidal Marsh	762.58	1	G3	S3	Generally characterized as expanses of grasses, rushes and sedges along coastlines of low wave energy and river mouths.
Unconsolidated Substrate	Unknown	Unknown	G3	S3	Generally characterized as expansive, relatively open areas of subtidal, intertidal, and supratidal zones which lack dense populations of sessile plant and animal species.
• *Mudflats*	52.51	0.07	G3	S2	Categorized as an Unconsolidated Substrate. Mudflats are created by sediment that is deposited by the changing tides and Gulf of Mexico.

Table 1 / Summary of Natural Communities in St. Joseph Bay Aquatic Preserve

The marine communities in St. Joseph Bay Aquatic Preserve are ecologically valuable habitat to a variety of species. Approximately one-sixth of the bay bottom is seagrass habitat and saltmarsh communities provide a transition zone between the terrestrial and aquatic habitats. The following are community types found within the aquatic preserve.

Algal Bed - (synonyms: algal mats, periphyton mats). Marine and Estuarine Algal Beds are floral based natural communities characterized as large populations of nondrift macro or micro algae. The dominant 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. Lithophytic Algal Beds are thought to be less widespread within Florida than psammophytic Algal Beds. The precise distribution of both kinds is not known; however,

the distribution is thought to be less than for Marine and Estuarine Seagrass Beds. Marine and Estuarine Algal Beds may grade into Seagrass Beds, Tidal Marsh, Tidal Swamp, or many of the other Marine or Estuarine natural communities. Supratidal Algal Beds such as periphyton beds (e.g., blue-green algal mats) may grade into various coastal Palustrine and Terrestrial natural communities. Distribution information for Algal Beds is lacking. The location of major beds must be determined before this natural community can be managed adequately. Existing state dredge and fill laws provide specific protection for Marine and Estuarine Seagrass Beds but not for Algal Beds. The correction of this deficiency could prove to be the most effective management tool available. The primary threat to Marine and Estuarine Algal Beds are dredging and filling activities which physically remove or bury the beds. Other damage occurs from increased turbidity in the water column which reduces available light; pollution, particularly from oil spills; and damage from boats.

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. 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 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.

Mollusk Reef - (synonyms: oyster bar, oyster reef, oyster bed, oyster rock, oyster grounds, mussel reef, worm shell reef, Vermetid reef). Marine and Estuarine Mollusk Reefs are faunal based natural communities typically characterized as expansive concentrations of sessile mollusks occurring in intertidal and subtidal zones to a depth of 40 feet. In Florida, the most developed Mollusk Reefs are generally restricted to estuarine areas and are dominated by the American oyster. Less common are Mollusk Reefs dominated by mussels and others dominated by Vermetid worm shells. Numerous other sessile and benthic invertebrates live among, attached to, or within the collage of mollusk shells. Most common are burrowing sponge, anemones, mussels, clams, boring clam, oyster drill, lightning whelk, polychaetes, mud worms, oyster leech, barnacles, bluecrab, mud crab, stone crab, pea crab, amphipods, and starfish. Several fish also frequently occur near or feed among Mollusk Reefs, including cow-nosed ray, menhaden, lizardfish, gafftopsail catfish, pinfish, sea trout, spot, black drum, and mullet. Mollusk Reefs that are exposed during low tides (e.g., coon oysters) are frequented by a multitude of shorebirds, wading birds, raccoons, and other vertebrates. Reef-building mollusks require a hard (consolidated) substrate on which the planktonic larvae (i.e., spat) settle and complete development. The spat dies if it settles on soft (unconsolidated) substrates, such as mud, sand or grass. Hard substrates include rocks, limestone, wood and other mollusk shells. Hard substrates are often limited in estuarine natural communities because of the large amounts of silt, sands and muds that are deposited around river mouths. Once established, however, Mollusk Reefs can generally persist and often expand by building upon themselves. The most common kind of Mollusk Reef, oyster Mollusk Reefs, occur in water salinities from just above fresh water to just below full strength sea water, but develop most frequently in estuarine water with salinities between 15 and 30 ppt. Their absence in marine water is largely attributed to the many predators, parasites, and diseases of oysters that occur in higher salinities. Prolonged exposure to low salinities (less than 2 ppt) is also known to be responsible for massive mortality of oyster reefs. Thus, significant increases or decreases in salinity levels through natural or unnatural alterations of freshwater inflow can be detrimental to oyster Mollusk Reef communities. Mollusk Reefs occupy a unique position among estuarine invertebrates and have been an important human food source since prehistoric times. They present a dynamic community of estuarine ecology, forming refugia, nursery grounds, and feeding areas for a myriad of other estuarine organisms. The major threats to mollusk reefs continue to be pollution and substrate degradation due, in large part, to upland development. Mollusks are filter feeders, filtering up to 100 gallons of water a day. In addition to filtering food, they also filter and accumulate toxins from polluted waters. Sources of these pollutants can be from considerably distant areas, but are often more damaging when nearby. Substrate degradation occurs when silts, sludge and dredge spoils cover and bury the Mollusk Reefs. Declining oyster and other Mollusk Reef populations

can be expected in coastal waters that are being dredged or are receiving chemicals mixed with rainwater flowing off the land, or from drainage of untreated residential or industrial sewage systems.

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. Specific species of interest living on or among the soft corals include the flamingo tongue shell, the purple shrimp, and the basket starfish. Sessile and drift algae can also be found scattered throughout Octocoral Beds. Octocoral Beds require hard bottom (consolidated) substrate (i.e., coquina, limerock, relic reefs) on which to anchor. Hard bottom substrate occurs sparsely throughout Florida in marine and estuarine areas; however, soft corals prefer the warmer waters of the southern portion of the state, severely limiting the distribution. Octocoral Beds may grade into other marine and estuarine hard bottom subtidal, intertidal, and supratidal communities (i.e., Consolidated Substrate, Sponge Bed, Coral Reef, Mollusk Reef, Worm Reef, lithophytic Algal Bed) as well as soft bottom communities (i.e., Unconsolidated Substrate, sammophytic Algal Bed, Seagrass Bed, Tidal Marsh, Tidal Swamp).

St. Joseph Bay supports one of the healthiest bay scallop (Argopecten irradians) populations in the state of Florida.

Management considerations should include locating all true Octocoral Beds within the state, thought to be more prevalent off the Southeast coast, and providing protection for them from external degradation. Primary threats to Octocoral Beds include siltation from beach renourishment or 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. The three most common species of seagrasses in Florida are turtle grass, manatee grass, and shoal grass. 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 can also be found occurring with the previously listed seagrasses although they occur primarily under high salinities while widgeon grass occurs in areas of lower salinity.

Attached to the seagrass leaf blades are numerous species of epiphytic algae and invertebrates. Together, seagrasses and their epiphytes serve as important food sources for manatees, marine turtles, and many fish, including spotted sea trout, spot, sheepshead, and redfish. The dense seagrasses also serve as shelter or nursery grounds for many invertebrates and fish, including marine snails, clams, scallops, polychaete worms, pink shrimp, blue crab, starfish, sea urchins, tarpon, bonefish, seahorses, pompano, jack, permit, snapper, grunt, mullet, barracuda, filefish, and cowfish. Marine and Estuarine Seagrass Beds

As populations continue to rise along Florida's coast, the need and demand for development, infrastructure, and services increases, which could lead to environmental and economic impacts to valuable natural resources.

occur most frequently on Unconsolidated Substrates of marl, muck or sand, although they may also occur on other Unconsolidated Substrates. The dense blanket of leaf blades reduces the wave-energy on the bottom and promotes settling of suspended particulates. The settled particles become stabilized by the dense roots and rhizomes of the seagrasses. Thus, Marine and Estuarine Seagrass Beds are generally areas of soil accumulation. Other factors affecting the establishment and growth of Seagrass Beds include water temperature, salinity, wave-energy, tidal activity, and available light. Generally, seagrasses are found in waters with temperatures ranging from between 68 and 86°F (20° and 30°C). Seagrasses occur most frequently in areas with moderate current velocities, as opposed to either low or high velocities. Although Marine and Estuarine Seagrass Beds are most commonly submerged in shallow subtidal zones, they may be exposed for brief periods of time during extreme low tides. One of the more important factors influencing seagrass communities is the amount of solar radiation reaching the leaf blades. In general, the water must be fairly clear because turbidity blocks essential light necessary for photosynthesis. The rapid growth rate of seagrass under optimum conditions rivals that of most intensive agricultural practices, without energy input from man. Marine and Estuarine Seagrass Beds are often associated with and grade into Unconsolidated Substrate, Coral Reefs, Tidal Swamps, and Tidal Marshes, but may also be associated with any other marine and estuarine natural community.

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

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, Florida loggerhead sponge and sheepswool sponge. 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. Sponge Beds require hard bottom (consolidated) substrate (i.e., coquina, limerock, relic reefs) on which to anchor. Hard bottom substrate occurs sparsely throughout Florida in marine and estuarine areas; however, sponges prefer the warmer waters of the southern portion of the state, significantly limiting the distribution severely. Sponge Beds may grade into other marine and estuarine hard bottom subtidal, intertidal and supratidal communities (i.e., Consolidated Substrate, Sponge Bed, Coral Reef, Mollusk Reef, Worm Reef, lithophytic Algal Bed) as well as soft bottom communities (i.e., Unconsolidated Substrate, ammophytic Algal Bed, Seagrass Bed, Tidal Marsh, Tidal Swamp). Management considerations should include locating all true Sponge Beds within the state, thought to be more prevalent off the Southwest coast, and providing protection for them from external degradation. Primary threats to Sponge Beds include siltation from beach renourishment or 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: saltmarsh, 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. They are most abundant and most extensive in Florida north of the normal freeze line, being largely displaced by and interspersed among Tidal Swamps below this line. Black needlerush and smooth cordgrass 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 are 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 may occur in dense stands. Sawgrass is the least salt tolerant of these Tidal Marsh species. Other typical plants include saltgrass, saltmeadow cordgrass (marsh hay), gulf cordgrass, soft rush and other rushes, salt myrtle, marsh elder, saltwort, sea oxeye, cattail, big cordgrass, bulrushes, seashore dropseed, seashore paspalum, shoregrass, glassworts, seablight, seaside heliotrope, saltmarsh boltonia, and marsh fleabane. Typical animals include marsh snail, periwinkle, mud snail, spiders, fiddler crabs, marsh crab, green crab, isopods, amphipods, diamondback terrapin, saltmarsh snake, wading birds, waterfowl, osprey, rails, marsh wrens, seaside sparrows, muskrat and raccoon. Fishes frequently found in this community include blacktip shark, lemon shark, bonnethead shark, hammerhead shark, southern stingray, yellow spotted ray, tarpon, ladyfish, bonefish, menhaden, sardines, anchovy, catfish, needlefish, killifish, bluefish, blue runner, lookdown, permit, snapper, grunts, sheepshead, porgies, pinfish, seatrout, red drum, mullet, barracuda, blenny, goby, trigger fish, filefish, and puffers. Tidal Marsh soils are generally very poorly drained muck or sandy clay loams with substantial organic components and often a high sulfur content. The elevation of Tidal Marshes range from just below sea level to slightly above sea level with vegetation occupying the intertidal and supratidal zones. The frequently high density of plant stems and roots effectively traps sediments derived from upland runoff or from littoral and storm currents. The decaying, dead marsh plants and the transported detritus which the living plants trap, accumulate to form peat deposits. Together, these accretion processes may build land. Tidal Marsh plants live under conditions which would stress most plants. High salt content in the soil, poor soil aeration, frequent submersion and exposure, intense sunlight, and occasional fires make the Tidal Marsh community inhospitable to most plants and require a wide tolerance limit for its inhabitants. The landward extent of Tidal Marsh along the shoreline is directly related to the degree of bottom slope; the more gradual the slope the broader the community band. Typical zonation in this community includes smooth cordgrass in the deeper edges, grading to salt tolerant plants such as black needlerush that withstand less inundation. Tidal fluctuation is the most important ecological factor in Tidal Marsh communities, cycling nutrients and allowing marine and estuarine fauna access to the marsh. This exchange helps to make Tidal Marsh one of the most biologically productive natural communities in the world. In fact, primary productivity in Tidal Marshes surpasses that of most intensive agricultural practices. The former operates at no cost because of free energy subsidies from tides, while the latter requires costly energy subsidies in the form of fuels, chemicals, and labor. A myriad of invertebrates and fish, including most of the commercially and recreationally important species such as shrimp, blue crab, oysters, sharks, grouper, snapper and mullet, also use Tidal Marshes throughout part or all

of their life cycles. Tidal Marshes are also extremely important because of their storm buffering capacity and their pollutant filtering actions. The dense roots and stems hold the unstabilized soils together, reducing the impact of storm wave surge. The plants, animals, and soils filter, absorb, and neutralize many pollutants before they can reach adjacent marine and estuarine communities. These factors make Tidal Marshes extremely valuable as a natural community. Adverse impacts of urban development of Tidal Marshes include degradation of water quality, filling of marshes, increased erosion, and other alterations such as bulkheading and beach renourishment. The most attractive coastal areas for development activities frequently are the most ecologically fragile and are extremely vulnerable to development of any kind. Offshore pollution in the form of oil spills and various forms of litter jettisoned from shipping traffic also impact Tidal Marsh.

Unconsolidated Substrate - (synonyms: beach, shore, sand bottom, shell bottom, sandbar, mudflat, 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). Marl and coralgal substrates are primarily restricted to the southern portion of the state. The remaining four kinds of Unconsolidated Substrate, mud, mud/sand, sand, and shell, are found throughout the coastal areas of Florida. While these areas may seem relatively barren, the densities of infaunal organisms in subtidal zones can reach the tens of thousands per meter square, making these areas important feeding grounds for many bottom feeding fish, such as redfish, 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.

Another type of disturbance involves the accumulation of toxic levels of heavy metals, oils, and pesticides within Unconsolidated Substrates. Significant amounts of these compounds in the sediments will kill the infaunal organisms, thereby eliminating a food source for certain fishes, birds, and other organisms. Such problems occur in some of the major port cities, in areas where there is heavy industrial development, and along major shipping channels where oil spills are likely to occur.

St. Joseph Bay has approximately 53 acres of tidal flats that support a wide range of marine life and a large population of migratory birds. Mudflats are categorized as an Unconsolidated Substrate and are created by sediment that is deposited by the changing tides and Gulf of Mexico. Mudflats serve as important habitat in preventing coastal erosion and act as natural filters for polluted waters. Mudflats worldwide are under threat from predicted sea level rises, land claims for development, dredging due to shipping purposes, and chemical pollution.

Other Habitats

Open water - Approximately half of St. Joseph Bay consists of sediments of a fine grain nature with dominant amounts of silts and clays. These sediment types are found primarily below the 5.5 meter (18 foot) contour and represent approximately 20,000 acres of deep-water habitat (Hemming et al., 2002).

Staff monitors 16 coastal seagrass sites in the bay to determine seagrass distribution, abundance, and overall health of the habitat.

Many of the commercially important benthic invertebrates are harvested from this habitat. Blue crabs (*Chaeopleura apiculata*) and several variety of shrimps (*Penaeus aztcus, Penaeus setiferus, Penaeus duorarum*) are not restricted to this environment but feed and burrow extensively here when they leave the protection of the marshes. Spot (*Leiostomus xanthurus)*, spotted seatrout *(Cynoscion nebulosus)*, and many other dominant fish in the system feed extensively in this habitat.

Wetlands - For more than 200 years, Florida's wetlands, once disparaged as nothing more than a swamp, have been drained and filled to make way for rapid growth and development. Fortunately, today there is a greater understanding of and attention to the protection of wetlands and the critical functions they perform. Wetlands are the transitional link between water and land. They are among the most biologically productive natural ecosystems in the world and adjacent wetlands play a vital role in the ecological health of St. Joseph Bay. Wetlands help control flooding and erosion, remove and retain excessive nutrients, such as nitrogen and phosphorus, from the water, and provide vital habitat for terrestrial and aquatic wildlife including shrimp, fish, crabs, waterfowl, wading birds and mammals. Estuarine wetlands are tidally flooded by salt or brackish water and are found chiefly along the shores of the bay. In 1995, the Northwest Florida Water Management District reported that Gulf County had approximately 120,229 acres of wetland habitat. Map 9 illustrates the natural habitats adjacent to St. Joseph Bay Aquatic Preserve.

Archaeological and Historical Resources

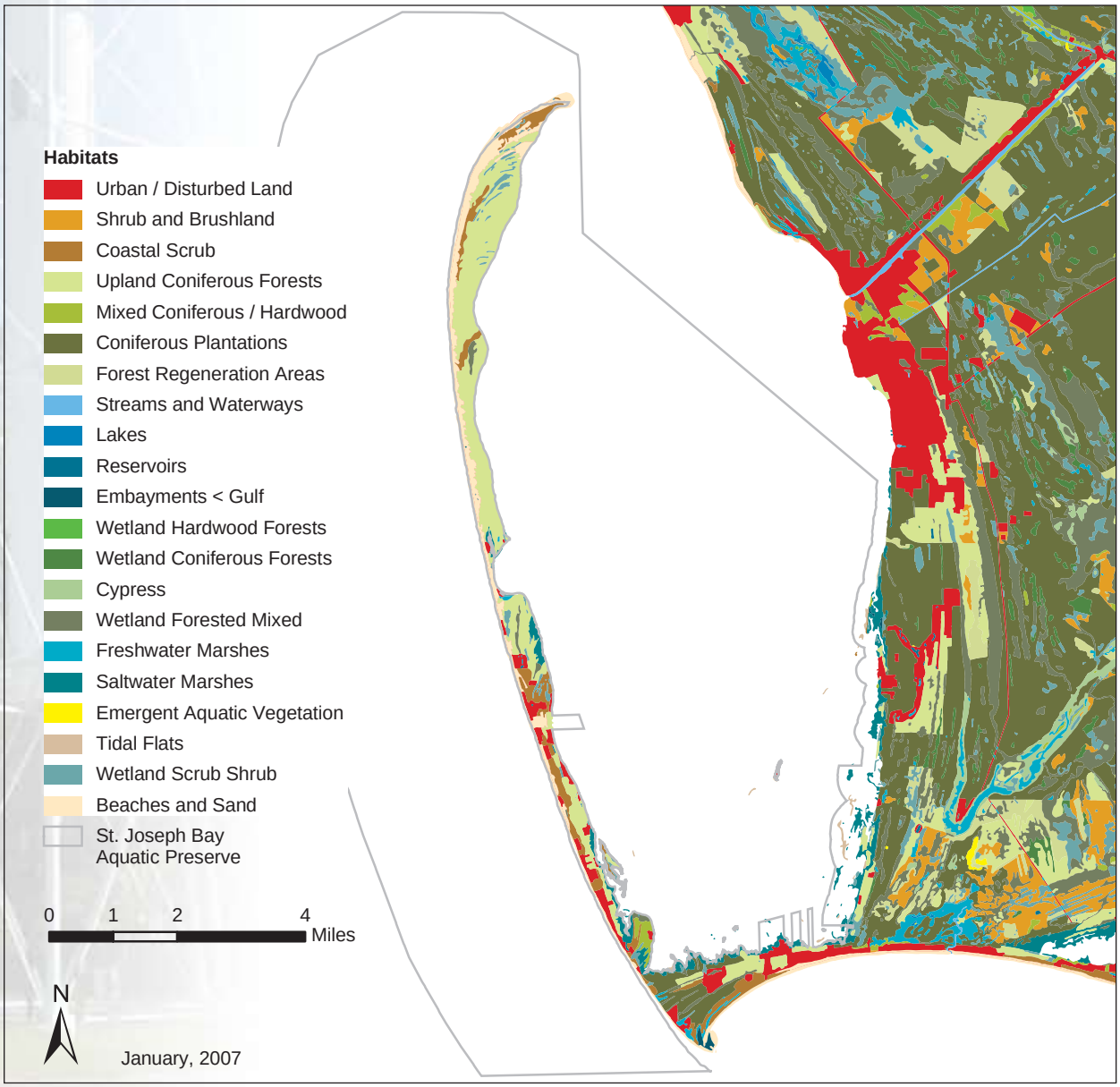
Aquatic preserves offer a window into Florida's cultural and historical past. The Division of Historical Resources, Department of State, has identified nine archaeological sites in the immediate coastal areas of St. Joseph Bay. They include the Confederate Salt Works, the Cape San Blas Lighthouse, four shell middens, and three old house or settlement sites. Due to the moderate energy nature of the coastline, most relict Indian sites were probably either buried by sand or destroyed by wave action. Notable among the cultural sites is Richardson Hammock, a large, well preserved shell midden site representative of the Deptford, Swift Creek, Weeden Island, and Fort Walton cultural periods (500 B.C. to A.D. 1500). This site is known to contain human burials and is believed to be one of the largest and best preserved archaeological sites of its kind in the northwest Florida Gulf coast region. In 1999, the State of Florida purchased a major archaeological site and adjacent wetlands for preservation as part of the St. Joseph Bay State Buffer Preserve.

Other Associated Resources

The St. Joseph Bay ecosystem is viewed by many as one of the most diverse, productive, and important natural areas in Florida. The crystal clear waters of the bay support an abundant and biologically diverse ecosystem that includes lush seagrass habitat, saltmarsh, coral, mangroves, benthic communities, commercial and recreational fish species, sea turtles, rays, sharks, and dolphins. Seagrasses cover approximately one-sixth of the bay bottom and virtually the entire rim of the bay is bordered by saltmarsh habitat. Seagrasses and saltmarsh habitat play an important role in the food web of St. Joseph Bay. A variety of commercial and recreational fish and invertebrate species utilize the bay's extensive habitat for nursery and foraging grounds. This area also serves as an important feeding, breeding, nesting and stop-over area for a variety of bird species. At the present date there are no known aquatic exotic species in St. Joseph Bay. Appendix B.4 identifies the flora and fauna that are located within or adjacent to the preserve.

3.1.4 / Values

One of the most pristine coastal bays in all of Florida, the coastal waters of St. Joseph Bay supports a diverse ecosystem. It is rare to have conditions of high salinity and clear water immediately nearshore in a shallow, low-energy environment in the northern Gulf of Mexico (Beck et al., 2000). These conditions permit a high diversity of plants and animals to thrive. St. Joseph Bay offers great value as a natural laboratory for scientific research relating to biodiversity, high productivity and ecological relations within seagrass and saltmarsh habitat. The overall high water quality and extensive seagrass habitat offer a



Map 9 / Habitats Adjacent to St. Joseph Bay

unique source of information on a relatively undisturbed ecosystem. The productivity of invertebrates within St. Joseph Bay is the highest ever recorded in seagrass beds (Valentine & Heck, 1993). These species are reliable indicators of habitat quality in an aquatic environment. There are a number of animals that appear to occur at greater densities in St. Joseph Bay than in most other places in the northern Gulf of Mexico including stone crabs *(Menippe mercinaria)* bay scallops *(Argopecten irradians)* horse conchs (*Pleuroploca gigantean)*, the largest gastropod in North America, lightening whelks *(Busycon perversum pulleyi)*, and pen shells *(Atrina rigida)*. Pen shells are abundant in the waters of the bay and develop and maintain rich communities of sessile and motile species (Munguia, 2004). Pen shell communities reflect how dynamic and complex marine systems can be and they represent the most abundant source of hard substrate for many fouling organisms in St. Joseph Bay. Historically, scallops once thrived in the eastern Gulf of Mexico, but now they are only found in abundance in St. Joseph Bay and the Steinhatchee area (Beck et al., 2000).

Gulf County residents and tourists enjoy the aesthetic values and natural coastal resources surrounding the beaches of the Gulf of Mexico and St. Joseph Bay. These beaches encompass nearly 58 coastal miles of marine and estuarine waterfront (HCP, 2004). Although Gulf County is predominately rural, there is a diversity of lifestyles and activities. St. Joseph Bay is located in one of the least populated areas in the state and the clear waters and adjacent conservation lands provide a variety of year-round recreational activities to nature enthusiasts including fishing, boating, snorkeling, scalloping, birding, kayaking, canoeing, hiking, or just exploring.

Florida ranks first in the nation in boating activity. In 2003, Florida's shoreline counties contributed an estimated $402 billion to the Florida economy, 77% of the state's total economy. The Gulf of Mexico, freshwater lakes and rivers, St. Joseph Bay and the Intracoastal Waterway provide excellent fishing opportunities, and recreational fishing is an important source of revenue for Gulf County with both in- and out-of-state anglers contributing to the local economy. Sport and shellfishing are the most active forms of tourism throughout the year. Although live shelling is prohibited within the aquatic preserve, discarded shells of over 30 species of bivalves are actively collected by tourists and commercial retailers in the region. St. Joseph Bay offers some of the world's best fishing grounds for a variety of species including spotted seatrout *(Cynoscion nebulosus)*, king mackerel *(Scomberomorus cavalla)* and spanish mackerel *(Scomberomorus maculatus)*, red drum *(Scienops ocellatus)*, southern flounder *(Paralichthys lethostigma)*, red fish (*Sciaenops ocellatus*), tarpon (*Megalops atlanticus*), mullet (*Mugil cephalus, Mugil curema*) and bay scallops *(Argopecten irradians).* Recreational fishing is supported by seagrass habitat which increases tourism and benefits the local economy. Tourists spend hundreds of millions of dollars annually at hotels, restaurants, and outdoor outfitting shops along the coast (DEP, 2001a). In 2000, DEP reported that Florida's seagrass communities supported commercial harvests of fish and shellfish valued at over $124 billion. Adding the economic value of the nutrient cycling function of seagrasses, and the value of recreational fisheries to this number, the DEP has estimated that each acre of seagrass in Florida has an economic value of approximately $20,500 per year, which translates into a statewide economic benefit of $55.4 billion annually. Based on this assessment the economic value of seagrasses within Gulf County totals approximately $185 million annually. Gray snapper *(Lutjanus griseus)*, black sea bass *(Centropristis striata)*, shrimp (*Penaeus aztcus, Penaeus setiferus, Penaeus duorarum*), and blue crab (*Chaeopleura apiculata*) are among the many species that contribute to the overall value of commercial fishing in the region. Between 70 and 90% of commercial and recreational fish spend some portion of their life cycle in seagrass habitat (DEP, 2001a).

Boat registrations, visitation records at the state park, and violation citations issued by law enforcement suggests that recreational use of the aquatic preserve area is on the rise. Visitors to Cape San Blas total over 150,000 annually, many being property owners or renters of privately owned structures that contribute almost $29 million annually to Gulf County's economy.

3.1.5 / Citizen Support Organization

In 1969 the St. Joseph Bay Aquatic Preserve was established to protect the important natural resources of St. Joseph Bay. Recognizing the importance of the protection of surrounding uplands to the preservation of the outstanding water quality and natural resources of the bay, the St. Joseph Bay State Buffer Preserve was created in 1995 with an initial 702 acres. Preserve acreage currently totals approximately 5,018 acres. Together, these preserves help protect a regionally significant natural area with outstanding ecological, economic and historical, and cultural values.

The Friends of the St. Joseph Bay Preserves, Inc. is a nonprofit 501(c)(3) Citizen Support Organization that was established in 2003 to protect, preserve, and support the St. Joseph Bay State Buffer Preserve and the St. Joseph Bay Aquatic Preserve. The Friends group raises funds, provides volunteer services,

and promotes environmental awareness of the aquatic and buffer preserves. Citizens can help by volunteering to work at the preserves. Opportunities are available for a wide variety of interests and expertise. Becoming a member, making a donation or memorial gift are some of the ways that the public's generosity will benefit the St. Joseph Bay preserves. For more information please visit The Friends of St. Joseph Bay Preserves website at: www.stjosephbaypreserves.org.

3.1.6 / Adjacent Public Lands and Designated Resources

The St. Joseph Bay Aquatic Preserve is located in Gulf County, on the northwest coast of Florida, in one of the least populated coastal areas in the state. St. Joseph Bay and Apalachicola Bay sit shoulder to shoulder, but provide a great contrast in condition because most of the freshwater of the region goes to Apalachicola Bay (Beck et al., 2000). Map 3 illustrates the conservation lands adjacent to St. Joseph Bay Aquatic Preserve. Gulf County operates a number of parks throughout the county facilitating a variety of outdoor recreation and leisure opportunities. For more information please visit www.gulfcountygovernment.com/countyparks.cfm. Additional nearby public lands include:

The Apalachicola Bay Aquatic Preserve (ABAP) and the **Apalachicola National Estuarine Research Reserve (ANERR)** are located approximately 28 miles east of Port St. Joe. ANERR is one of 27 sites around the United States designated by the National Oceanic and Atmospheric Administration as a Research Reserve. The Reserve consists of over 246,000 acres which includes barrier island, estuarine, riverine, floodplain, and upland environments that are closely interrelated and influenced by each other. Apalachicola Bay is an exceptionally important nursery area for the Gulf of Mexico. Over 95% of all species harvested commercially and 85% of all species harvested recreationally in the open Gulf have to spend a portion of their life in estuarine waters (ANERR, 1998).

Billy Joe Rish State Park
Billy Joe Rish State Park is a state-owned 100-acre park located on Cape San Blas Road, approximately 3 miles south of the T.H. Stone Memorial St. Joseph Peninsula State Park entrance. Rish Park is run by the state under the Department of Children and Family Services, Agency for Persons with Disabilities. The park caters to young children with disabilities and hosts several camps and events throughout the year. The park is closed to the public.

St. Joseph Bay State Buffer Preserve
Approximately 5,000 acres of coastal natural forests and native plants buffer the St. Joseph Bay Aquatic Preserve and offer additional protection to the water quality in the bay and nearby drainages of Money Bayou and Depot Creek. The St. Joseph Bay Buffer Florida Forever Project has acquired 52% of the priority lands adjacent to St. Joseph Bay. A portion of the lands purchased includes the St. Joseph Bay State Buffer Preserve. The primary purpose of the St. Joseph Bay State Buffer Preserve is to protect and preserve the wetlands and water resources of the adjacent aquatic preserve. By limiting development along the preserve's shores, the buffer prevents additional degradation of the water quality within the aquatic preserve. The management strategies outlined in the St. Joseph Bay State Buffer Preserve Management Plan work cooperatively with the management needs of the aquatic preserve to fulfill this goal.

St. Vincent National Wildlife Refuge
The St. Vincent National Wildlife Refuge in Franklin County, is an undeveloped barrier island just offshore from the mouth of the Apalachicola River with representative native animals. The refuge was established in 1968 and consists of approximately 12,490 acres. The refuge is managed by the U.S. Fish and Wildlife Service to preserve its highly varied plant and animal communities and public use opportunities including fishing, hunting, wildlife observation, hiking trails, and photography.

T.H. Stone Memorial St. Joseph Peninsula State Park
The T.H. Stone Memorial St. Joseph Peninsula State Park offers miles of white sand beach, remarkable dune formations, heavily forested interiors and favorable climates for year-round recreation. The park encompasses 2,516 acres and was ranked as America's Top Beach in 2002 by Dr. Stephen Leatherman (Dr. Beach) because it consists of the finest, whitest sand in the world and is not overdeveloped. The park is bounded on two sides by the waters of St. Joseph Bay and the Gulf of Mexico. Recreational activities include fishing, boating, sunbathing, snorkeling, swimming, surfing, kayaking, canoeing, camping, hiking, bicycling, wildlife viewing, and birding (over 240 species have been sighted in the park). The number of visitors to the park has continued to increase since the mid-1990s when the park had a 50% increase in the annual number of visitors. From 2005 to 2006, the state park received 138,929 visitors (B. Burch, personal communication, 2006).

Sea oats (Uniola paniculata) on St. Joseph Peninsula aid in preventing erosion to the beach habitat.

Part Two

Management Programs

Chapter Four

CAMA's Management Programs

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

*4.1 / **The Ecosystem Science Management Program***

The Ecosystem Science Management Program supports science-based management by providing resource mapping, modeling, monitoring, research, and scientific oversight. The primary focus of this program is to support an integrated approach (research, education and stewardship) for adaptive management of each site's unique natural and cultural resources. CAMA 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. Joseph Bay Aquatic Preserve

Historically, marine research and monitoring conducted in association with the aquatic preserve was the responsibility of the Division of Marine Resources. The preserve's research and monitoring efforts have included limited, internal research projects, research projects lead by other agencies, and contracts with outside entities to accomplish necessary research. Due to limited staff and funding, much of the historical research in St. Joseph Bay was conducted by graduate students or professors

from Florida State University. Past research projects have focused mainly on fisheries, seagrasses, and the geology of the bay. Water quality monitoring stations located in the vicinity of the Gulf County Canal and the city of Port St. Joe have been monitored since 1973 by Port St. Joe's Water Pollution Control Department. In addition, the Florida Department of Natural Resources (DNR), now the Florida Department of Environmental Protection (DEP), conducted a long-term beach and offshore profile monitoring project that included 85 monitoring stations along the gulf shoreline of the preserve as well as obtaining aerial videos of the coastline. Data collected through this monitoring provided baseline information on the status of the preserve and indicated changes over time. This information has been used to determine the best management practices to protect the natural resources of the preserve. St. Joseph Bay was established as an aquatic preserve for biological/scientific purposes, therefore research and monitoring conducted within the preserve has been compatible with the protection of natural resources.

In 1980, a St. Joseph Bay Seagrass Mapping Project was performed by the U.S. Environmental Protection Agency, the U.S. Fish and Wildlife Service (FWS) and the Florida Marine Research Institute, now the Fish and Wildlife Research Institute (FWRI). This mapping effort was conducted in part for the Minerals Management Service as part of the Environmental Impact Statement for offshore oil and gases. In 2001, this data was updated. In 1995, a Florida Marine Research Institute Technical Report, "Scarring of Florida's Seagrasses: Assessment and Management Options," indicated that Gulf County had 8,170 acres of seagrass habitat. The studies in this report found that 4,840 acres of this habitat were lightly-to-severely scarred by vessels. Research goals included documenting the long-term impacts of prop scar damage and development activities on seagrass habitat. In an effort to preserve and protect the seagrasses in the bay, the preserve introduced a seagrass monitoring project in 2002.

St. Joseph Bay has been and continues to be a popular site for the recreational fishing of the bay scallop *(Argopecten irradians)*. Historically, commercial and recreational bay scalloping occurred throughout Northwest Florida. By the late 1980s, however, only a few high–density populations remained in Florida waters, one of which is included in the waters of St. Joseph Bay (Arnold, Geiger, Parker, Peters, Cobb, Pittinger et al., 2006). In 1991, bay scallop populations had been severely depleted over a substantial portion of the animal's range in Florida waters (Arnold & Marelli, 1991) to the point that the recreational fishery was threatened. In 1991, a small bay scallop project was initiated through FWRI to determine the status of the bay scallop population in Florida. The project provided a "rough" assessment based upon recent and historic commercial landings and interviews with a variety of people along the coast. Commercial fishery landings data for the west coast of Florida indicated a consistent trend of decreasing landings for more than 30 years. Significant problems were apparent, resulting in an emergency closure of the commercial harvest of bay scallops. In 1994, the length of recreational harvest was reduced and funding for the project was increased to include St. Joseph Bay. The project's direction was refocused to restore scallop populations and to monitor adult scallop populations, spat recruitment rates, and calculate the timing of mortality of the adult bay scallop populations in order to compare fished areas with unfished areas throughout Florida.

Since 1998, the preserve has performed beach and bird surveys on the six-mile section of beach adjacent to the preserve between the state park boundary and Stumphole area. Comprehensive logs on beach driving incidents, along with sand fencing violations and anything related to negative impacts on sea turtle habitat is documented during these surveys. The incident documentation forms are filed with the FWS and the Gulf County Sheriff's Office. Prior to severe beach erosion from recent storms, the preserve was responsible for displaying and establishing buffer signs and zones along the beach adjacent to the preserve in an attempt to keep vehicles from damaging foredunes, pioneer dune vegetation and sea turtle nesting habitat due to the narrow beach conditions. Bird surveys continue to be completed on a monthly basis and signs are displayed near nesting areas. In 2004, the beach access gate at Stumphole was no longer accessible and has not been passable to vehicular traffic since. Beach traffic, including all-terrain vehicles entering the beach through illegal access points continues to be an issue and continues to damage the fragile dune areas and vegetation that aid against erosion.

In the past, research and monitoring goals and objectives have included conducting the necessary research and monitoring activities to understand the ecological functioning of the preserve so it can be managed and used in an ecologically sound and wise manner, and restored and maintained in its natural condition for future generations (DEP, 1997b). While these same goals continue to be relevant to the management of the St. Joseph Bay Aquatic Preserve, the program has grown to include a more ecosystem-based management approach to protecting the biological and physical aspects of the ecosystem and focuses on the unique attributes and challenges of the aquatic preserve.

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

Science is the foundation of resource management. It provides information about natural processes and the effects of our activities, thus providing the knowledge we need to make effective resource management decisions. Monitoring helps recognize changes or trends over time. By regularly measuring specific environmental conditions, early detection of improvement or decline to resources is possible. Research and monitoring programs conducted through the St. Joseph Bay Aquatic Preserve are developed based on the uses of, and potential impacts to, the natural resources of the system and vary based on the issues and priorities that currently face the bay. These issues include impacts to seagrass beds from increased boater use, changes in water quality from increased development pressures, land use changes, rapid erosion rates on the St. Joseph Peninsula, archaeological site protection, and habitat and species protection. Florida is undergoing tremendous growth and development pressure is affecting important habitats along our coasts. Through effective resource management practices, education and outreach, environmental research and monitoring, partnerships and volunteers, these resources can be protected for generations to come. Current Ecosystem Science Programs within the St. Joseph Bay Aquatic Preserve and the future needs of the program are discussed in the following sections.

St. Joseph Bay Water Quality Monitoring

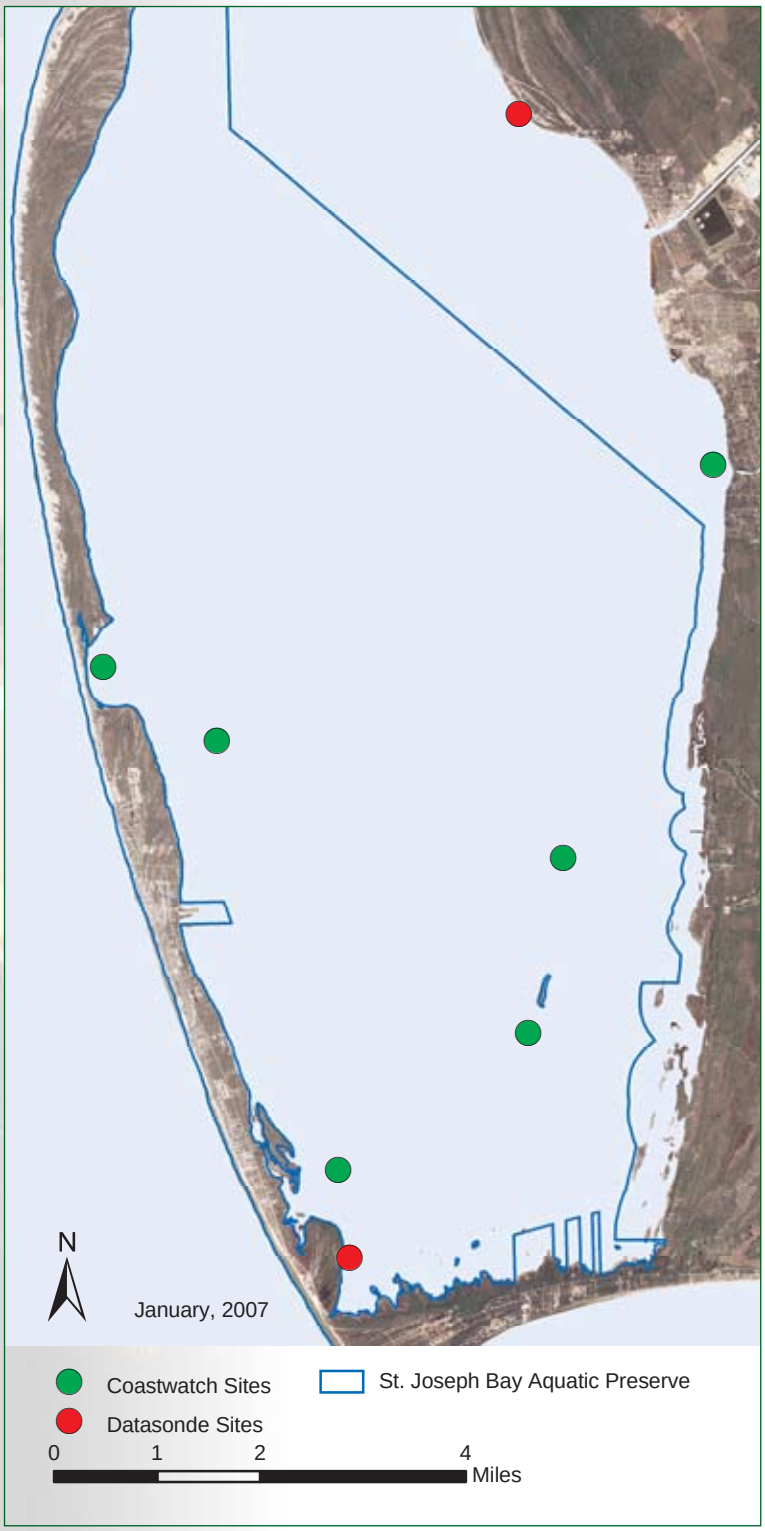
The preserve's water quality monitoring program utilizes several methods to examine the bay's water column characteristics. Over time, a baseline of data has been established providing one of the useful tools for managing the water quality in the bay. In 2001, the aquatic preserve partnered with the University of Florida's LAKEWATCH/COASTWATCH program which had expanded to include bay systems and began a water quality monitoring project focused on nutrients. This data has been used to document nutrient levels, including total nitrogen and phosphorous, algae content, and water clarity. Water samples are collected at seven sites within the bay on a monthly basis and are analyzed by the University of Florida's water chemistry lab at the Department of Fisheries and Aquatic Sciences. The data acquired is stored in a computerized database and is available to the public. This data has established a baseline record of nutrient concentrations in the bay for comparison with future data. Results indicate a slight increase in the amount of total nitrogen and phosphorous over the last five years at specific sites within the bay and indicate the critical need to continue monitoring these nutrients and the future need to identify sources of this pollution. Appendix B.5 includes a graphical representation of the average total nitrogen and total phosphorous concentrations within St. Joseph Bay.

In July 2005 as a CAMA-wide initiative, the St. Joseph Bay Aquatic Preserve began monitoring water quality with the use of dataloggers. The preserve has modeled its datalogger water quality monitoring project after the National Estuarine Research Reserve's (NERR) System-Wide Monitoring Program (SWMP) that uses nationally-standardized methods of data collection to ensure continuity and accuracy. Two stations have been established in St. Joseph Bay and abiotic factors including dissolved oxygen, salinity, temperature, conductivity, pH, turbidity and water level are continuously monitored every 30 minutes. The data is downloaded and reviewed as part of quality assurance and quality control, then analyzed and plotted in order to determine trends. At this time the aquatic preserve does not have a data management office providing archival storage; therefore, the information is stored on a local server. This data is used to identify trends in water quality for specific areas and allows the preserve to track environmental changes in the ecosystem. In addition, water quality parameters are collected using a handheld multiparameter instrument (YSI) that measures dissolved oxygen, salinity, temperature and pH in the water column. Meteorological data is collected monthly by the buffer preserve weather station located on the southeastern shoreline, which is correlated with the water quality monitoring data. This data is stored in a water quality database along with the date/time, tide and weather conditions.

In 2005, due to the increased occurrence of red tide *(Karenia brevis)* in St. Joseph Bay, the preserve partnered with FWRI to begin collecting water samples at five sites within the bay on a monthly basis. These samples are used to detect any concentrations of brevitoxins and domoic acid in the water column and to determine what time of year these numbers may escalate or be absent. This information is placed on the Florida Fish and Wildlife Conservation Commission (FWC) Red Tide Status Report for Northwest Florida. If not for these efforts, red tide events would be monitored in this area only as a response to the obvious presence of red tide via fish kills or respiratory irritation.

Florida red tide occurs in the Gulf of Mexico almost every year, generally in the late summer or early fall season. The Florida red tide organism was identified in 1947, but anecdotal reports of the effects of red tide in the Gulf of Mexico date back to the 1530s. Most blooms last three to five months and may affect hundreds of square miles. Red tide can kill fish, turtles, birds, and marine mammals, cause health problems for humans, and adversely affect local economies (FWRI, 2006). Bottom-dwellers

such as groupers and grunts are usually the first fish to die in a Florida red tide, although most fish are probably susceptible. Mortality, in terms of numbers killed and species affected, can be severe and is dependent upon factors such as bloom density and the length of time animals are exposed to the toxins (FWRI, 2006). The preserve continues to assist in this monitoring effort to understand the fate and effects of toxins on living marine resources. The preserve also assists with data collection in fish kill and unusual mortality events that occur within St. Joseph Bay. In addition, the preserve will continue efforts to educate the public on red tide through participation in local festivals, presentations, posters, workshops and information distribution. Map 10 documents the locations of the water quality monitoring sites within St. Joseph Bay.



Map 10 / Water Quality Monitoring Sites in St. Joseph Bay

Fecal coliform and *enterococci* are both enteric bacteria that normally inhabit the intestinal tract of humans and animals. The presence of high levels of enteric bacteria is an indication of fecal pollution, which may come from stormwater runoff, pets and wildlife, or human sewage. Under Florida's Healthy Beaches Program, administered by the Florida Department of Health, coastal beach water samples are collected by the county health department and are analyzed for *enterococci* and fecal coliform bacteria. Gulf County currently collects surface water samples from six locations around St. Joseph Bay. The Gulf County Health Department issues health advisories or warnings when high levels of bacteria are confirmed. Since the program began in 2002, there have been a total of 55 health advisories posted. Out of the 55 advisories, 42 were posted at the St. Joseph Bay Monument Beach Site Sample Point 6 (SP 6), which is adjacent to the Patton Bayou canal. This site is illustrated on Map 11. The need to rehabilitate the sewer collection system and stormwater treatment facility is a high priority, not only for the well-being of the citizens, but to ensure high water quality in the bay. The preserve will continue to assist the local government with plans to rehabilitate the sewer collection system and establish a stormwater retrofit and treatment program to provide effective management of urban stormwater runoff. In addition, the preserve will continue to track the results of the Healthy Beaches Program to correlate this data with other water quality monitoring efforts in regards to nutrient loading in the bay. See Appendix B.5 for additional monitoring data.

The recognition that chemical water quality analyses alone does not

adequately reflect or predict the condition of living aquatic resources has led to the development of measures of biological integrity that can be expressed in biological criteria (U.S. Environmental Protection Agency [EPA], 2000). The preserve is in the process of establishing a tiered approach to water quality monitoring that includes using multiple tools to support management decisions at multiple scales. This tiered approach to monitoring includes a strategy to define a core set of baseline indicators to help explain causes and/or sources of any impairments and to assess whether physical, chemical and biological integrity are supported. Biological surveys, criteria, and assessments complement physical and chemical assessments of water quality by reflecting the cumulative effects of human activities and natural disturbances on the biological community in a water body, and can be used to help identify the causes of these effects (EPA, 2000). Furthermore, monitoring efforts should be expanded to assess point and nonpoint sources of pollution in the bay and increased nutrients. This information will be critical in determining future management needs and in devising means to eliminate pollution issues.

As part of this effort, there is a need to evaluate sediments within the bay for contaminants including analysis of metals and dioxins, and for the effect on marine species. Until the paper mill was closed, mill effluent was discharged directly into St. Joseph Bay. By the late 1970s treatment was accomplished by a municipal wastewater treatment system and lagoon operated by the City of Port St. Joe (Hemming et al., 2002). Sediments are an important habitat for hundreds of species of wildlife including marine mammals, birds, sea turtles, fishes and invertebrates found in St. Joseph Bay. The biological productivity associated with the sediments is of tremendous recreational and economic importance (Hemming et al., 2002). Therefore, the maintenance of these thousands of acres of sediments in an uncontaminated and productive condition is vitally important to the overall welfare of the St. Joseph Bay ecosystem (Hemming et al., 2002).

There are currently no known exotic or invasive aquatic species located within the bay, but further research is needed to determine the potential for these species to occur in the bay.

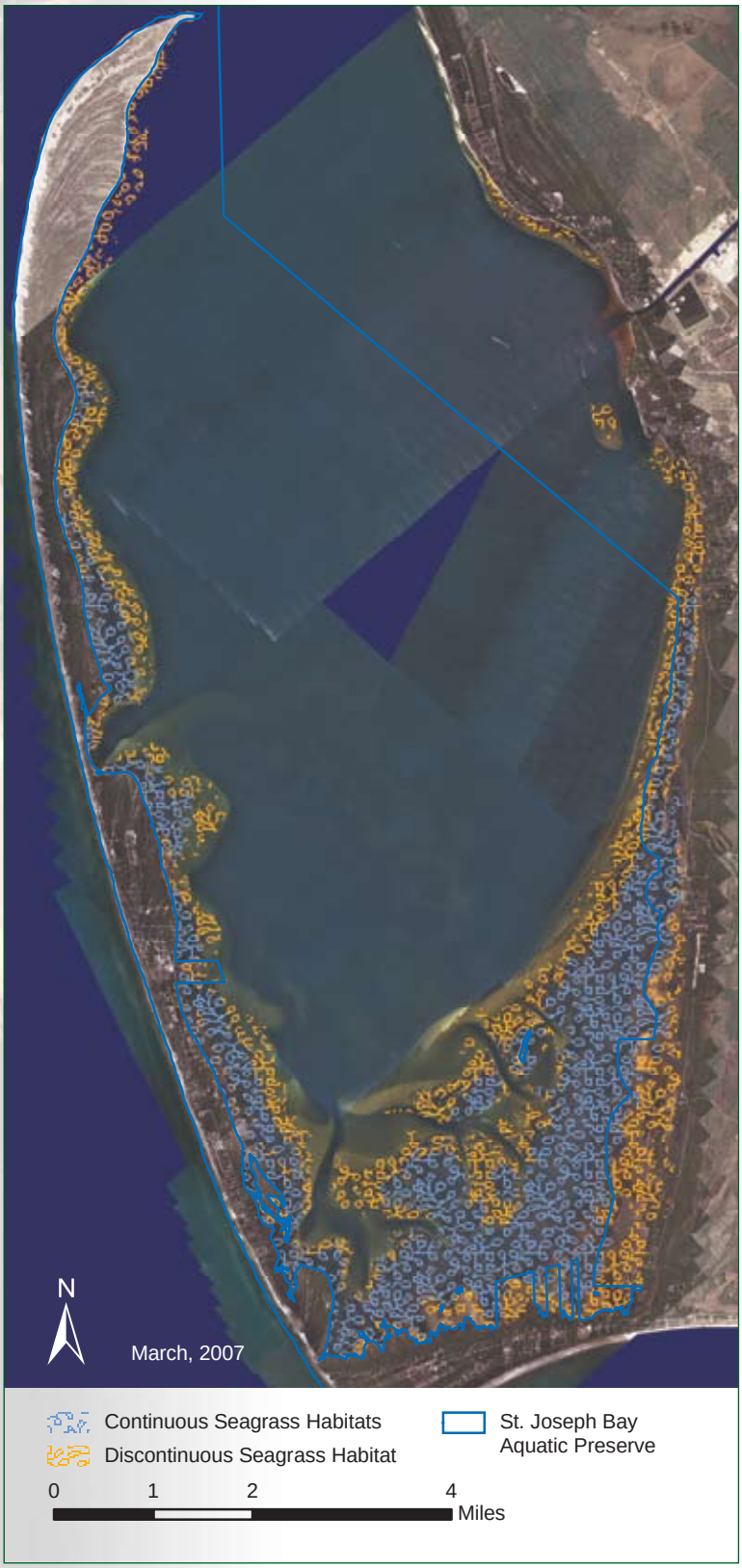
Finally, there is a need to make water quality data available to the public and other agencies in a timely, user-friendly manner, through the use of a standardized database repository. The preserve will continue to explore effective methods to disseminate water quality data through reports, publications, newsletters and presentations and will continue participation in the Florida Water Resources Monitoring Council to help develop a data warehouse and website to store this information.

In an effort to develop an adequate water quality monitoring program, the preserve must not only investigate physical and chemical characteristics of the water column, but must also address watershed characteristics, sediment characterization and possible contamination, point and nonpoint sources of pollution, stormwater treatment, pathogen indicators and increased development along the bay's shoreline.

Map 11 / Beach Monitoring Sites in St. Joseph Bay

St. Joseph Bay Seagrass Monitoring

Seagrass communities are considered to be the most productive ecosystems in the world and monitoring this habitat has quickly become one of the best methods to determine the overall health and condition of the aquatic environment. Seagrasses have shown particular promise in detecting specific factors that may influence both short and long-term changes to nearshore aquatic ecosystems. Seagrasses serve as indicator species since they are very sensitive to changes in water quality. A decline in seagrass coverage could be a sign of decreased water quality. In St. Joseph Bay, these communities are critically important to the health and vitality of the waters of the bay. One-sixth of the bay bottom is seagrass meadows. Seagrass meadows provide a protected nursery and foraging area for numerous marine species, and their extensive root system aids in stabilizing sediments on the bay bottom, helping to keep the water clear. Map 12 illustrates the seagrass habitat of St. Joseph Bay.



Map 12 / Seagrass Habitat of St. Joseph Bay

The preserve's objectives focus on management issues regarding the seagrass communities in St. Joseph Bay and the environmental and human surroundings that impact them. As human populations concentrate along our coastlines, anthropogenic impacts to seagrass habitats increase through nutrient loading from runoff, light reduction from increased turbidity and phytoplankton blooms, increased boat traffic, and more direct vessel impacts such as propeller scarring (Fonseca, Kenworthy & Thayer, 1998). Prop 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 8 to 10 years to repair and areas with severe scarring may never completely recover.

In 2002, the preserve began a seagrass monitoring project at specific sites to determine the current health of the ecosystem and provide insight for seagrass decline in the bay. The goals of the project are to determine seagrass distribution and abundance, trends in seagrass conditions throughout the bay, determine the health of these beds through baseline water quality monitoring efforts, and use ground-truth information to update seagrass coverage maps to compare to historical maps. Survey methods have changed over the years to

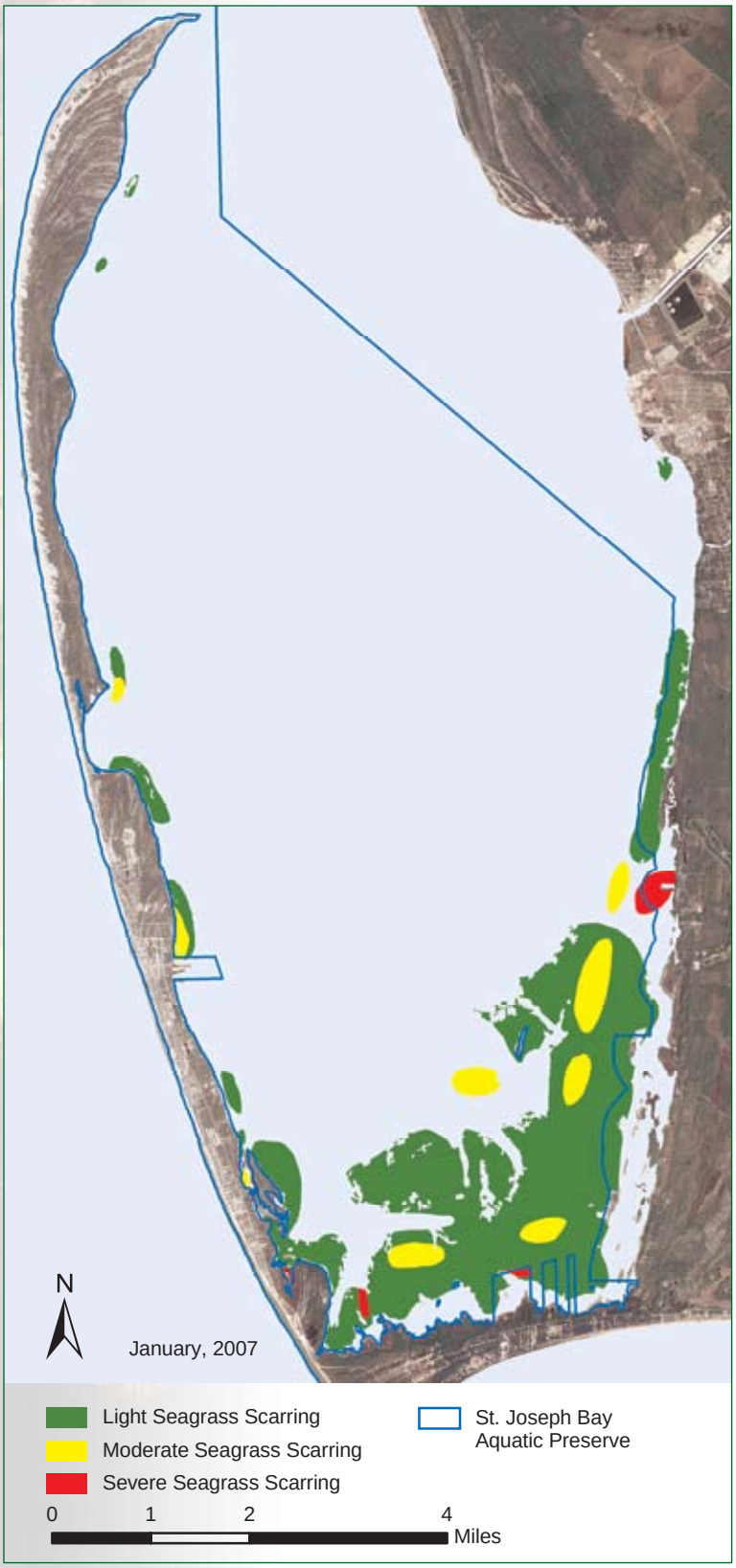
develop a more precise monitoring program, and a variety of site specific techniques are currently being utilized to determine the health and status of these communities. The preserve is currently monitoring 16 seagrass sites within the bay twice a year, at the beginning and end of the growing season. Monitoring methods used include fixed-transect monitoring, abbreviated quad transects, aerial photography, and hyperspectral imagery. At each location, seagrass species are identified and the percent coverage of each species is determined using Braun-Blanquet coverage estimates. Blade lengths are measured and epiphyte coverage is identified as light, medium or heavy. At specific sites, cores are taken to determine above and below ground biomass and a sediment and epiphyte sample is also collected for lab analysis. In addition, water quality information, including, dissolved oxygen, salinity, temperature, turbidity, pH and photosynthetic active radiation is collected and weather, wind and tide conditions are recorded. Map 13 illustrates the seagrass monitoring sites in St. Joseph Bay.

In October 2006, through a Coastal Zone Management (CZM) grant, hyperspectral aerial images were taken of St. Joseph Bay. These images will be used to assess the extent, distribution and health of the seagrass and saltmarsh communities of St. Joseph Bay. The preserve has implemented the use of handheld computer with differential geographical positioning systems technology (GeoXT Trimble Unit TM) to collect and map seagrass data. Customized geodatabases were created and resources can be mapped simultaneously in order to assess changes over time and link historical data with current data. This data will be used to determine if restoration or management efforts are successful.

Future needs for the seagrass monitoring project include the necessity to develop a Seagrass Management Plan to address specific issues in regards to the seagrass communities of the bay. Prominent and increasing prop scar damage is evident in St. Joseph Bay and with increased visitor use this trend is expected to continue. The extent of this damage must be mapped, documented and monitored and efforts to mark these shallow, sensitive areas should be a high priority effort. In addition, educating the public on the significance of the habitat, and how to protect it while enjoying the

Map 13 / Seagrass Monitoring Sites in St. Joseph Bay

bay, will be essential in protecting the resource. Impaired water clarity due to turbidity, algal blooms and excessive nutrients may also impact seagrass habitat. An adequate water quality monitoring project, algae identification project, and indicator species monitoring will also be necessary in determining the overall health of the habitat. All seagrass data is in the process of being analyzed and seasonal comparisons and trends are being determined. The collected data has supplied valuable information on the dominant species in the bay, which include turtle grass *(Thalassia testudinum*), Cuban shoal grass *(Halodule wrightii*) and manatee grass (*Syringodium filiforme*) as well as the depths and conditions at which these species thrive. Further data analysis, together with hyperspectral mapping, advanced GeoXT technology, and biological and water quality monitoring efforts will give an excellent overview of the current status and health of the seagrass community in St. Joseph Bay. Map 14 illustrates seagrass scarring in St. Joseph Bay according to a 1995 Florida Wildlife Research Institute study.



Map 14 / Seagrass Scarring in St. Joseph Bay

Algae Monitoring

The many species of algae within the bay need to be identified. The functional roles of algae within seagrass meadows are numerous. They include increased habitat complexity, primary production and trophic cycling, as well as sediment stabilization. Seagrass communities include many species of algae that can be coarsely grouped into drift algae, rhizophytic algae (e.g. benthic macroalgae, *Caulerpa* spp.), psammophytic algae (e.g. *Acetabularia* spp.), and epiphytes. Macroalgae may be present in seagrass beds as large clumps of detached drift algae and the factors that control the drift algal distribution and abundance are not fully known. Drift algae have been found to be important contributors to primary production and have also been recognized as important habitat for numerous benthic fish and invertebrate species. The preserve's monitoring efforts have indicated an increase in the amount of algae in St. Joseph Bay over the last several years. This may be a result of an increase in nutrients in the bay from stormwater runoff. It will be important to identify the algae species within the bay and to determine the seasonal dynamics, biomass and productivity of the specific algal groups. In 2007, the aquatic preserve expanded the partnership with the University of Florida's LAKEWATCH program to include the identification of algae in the

bay. The various species of algae will be identified and research will continue to determine potential effects that a particular species may have on the health of the bay system.

St. Joseph Bay Scallop Spat Recruitment Monitoring

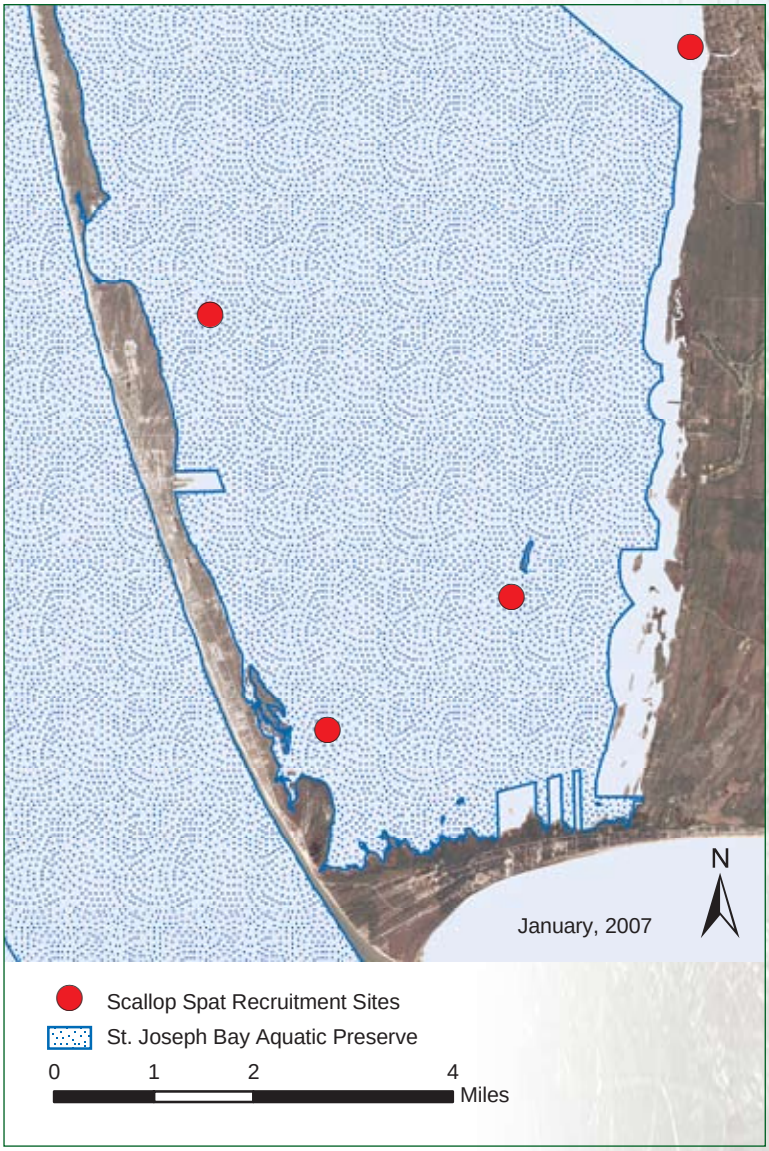
Scallop numbers fluctuate from year to year in St. Joseph Bay but this area continues to have one of the healthiest populations of bay scallops in Florida. Bay scallops are generally distributed within the shallow waters along the southeastern, southern, and southwestern shores of the bay. In 1995 through a partnership established with the FWRI, the preserve began assisting with the monitoring of bay scallop (*Argopecten irradians)* recruitment rates using spat collectors in St. Joseph Bay. The spat collectors are constructed of a mesh polypropylene onion or citrus bag attached at one end to a crab trap float and at the other end with a cinder block anchor. The scallop spat will settle on these bags during a recruitment event. Upon recovery, the spat collectors are returned to the FWRI laboratory for visual examination and enumeration of all recruits.

The preserve currently monitors 24 spat collectors at 4 sites in this southern portion of the bay, at a depth of approximately one meter. Traps are allowed to soak for six to eight weeks prior to retrieval. There is an overlapping deployment/retrieval schedule to ensure that any recruitment event that occurs just prior to recovery of one series of collectors can be detected on the overlapping collector. The daily recruitment rate is found by dividing the total number of spat from each collector by the number of days deployed. Daily recruitment rates are compared among stations in St. Joseph Bay. Because larval supply may be a primary determinant of the following adult abundance, a more complete understanding of scallop larval dispersal patterns and scales, and subsequent larval supply, is necessary for the proper ecological and economic management of this marine resource. Through this study information will be obtained that will aid in the effective restoration and management of this important marine resource. Map 15 illustrates the scallop spat recruitment monitoring sites in St. Joseph Bay.

The bay scallop season is from July 1st through September 10th each year. Residents and visitors come to the bay in large numbers every year to participate in the season. Under FWC rules, (Scallops, Bay 68-B-18), the daily bag limit is one pint of dressed meat or two gallons of scallops in the shell per person per day. With five or more people on board a vessel, the maximum limit is 10 gallons of scallops in the shell or .5 gallon of meat. Law enforcement officers continue to encounter problems with visitors taking more than their daily limit and will continue to issue fines for this violation in the bay. Please refer to Map 6 for approved shellfish harvesting locations in St. Joseph Bay.

St. Joseph Bay Fish Distribution and Abundance Monitoring

In January 2006, the preserve established seven monitoring stations in St. Joseph Bay to collect data on the abundance, size structure and habitat associations of fishes and selected invertebrates. Each of these sites is monitored on a monthly basis and will identify essential habitat that species requiring protection use during



Map 15 / Scallop Spat Recruitment Sites in St. Joseph Bay

critical life stages. A 70 foot (21.3 meter) seine net is used to collect species. Fish standard length measurements are taken for up to 20 individuals per species and the rest are counted. This project is modeled after the juvenile fish-sampling project that the Fisheries Independent Monitoring of FWRI has conducted for 15 years in systems throughout the state. Water quality parameters, including, salinity, temperature, dissolved oxygen, and pH are collected at each site with a hand-held YSI meter. In addition water samples are collected for turbidity measurements and tides, weather, wind speed and direction are noted. The goal of the project is to describe the major trends in the spatial and temporal distribution of major fish and invertebrate species between habitats within the St. Joseph Bay system and relate the occurrence, abundance, and seasonality of fish and invertebrate species to natural environmental variations such as temperature and salinity regimes and periodic events such as storms (relationships to environmental factors). This project will also estimate relative abundance and monitor the size class distribution of economically important fish species in seagrass areas. Map 16 illustrates the fish monitoring sites within St. Joseph Bay.

St. Joseph Bay Coral Assessment Monitoring

The coral monitoring project was initiated in 2006 after preserve staff observed a stony coral species, ivory bush coral *(Oculina diffusa)*, along the western shoreline of the bay. Goals of the project are to determine the distribution and abundance of the species through mapping efforts as well as to determine how it may be affected by future development pressures. This species provides habitat for a variety of commercially and recreationally important invertebrate and fish species and, therefore, has a positive economic impact on the bay. It will be important to examine how this species of coral may act as an indicator in determining the health of the bay system and its water quality. Underwater video documentation will provide a permanent record of the species and an education component will be added to the project once baseline data is established and a better understanding of the species is obtained.

St. Joseph Bay Benthic Invertebrate Monitoring

Benthic invertebrates are reliable and sensible indicators of habitat quality in an aquatic environment. These species live in bottom sediments where exposure to contaminants and oxygen stress are most frequent and they indicate local conditions because they have limited mobility and cannot migrate to avoid stressful situations. Benthic invertebrates are ecologically important in serving as food for bottom-feeding fish and affecting nutrient recycling. The biomass of benthic invertebrates in coastal embayments is often high and will decline if communities are affected by prolonged periods of poor water quality. There is a need to research and monitor these communities within St. Joseph Bay for the purpose of creating a baseline inventory of the species present and how they relate to the bay's water quality and the functioning of the bay system.

Listed Species Research and Monitoring

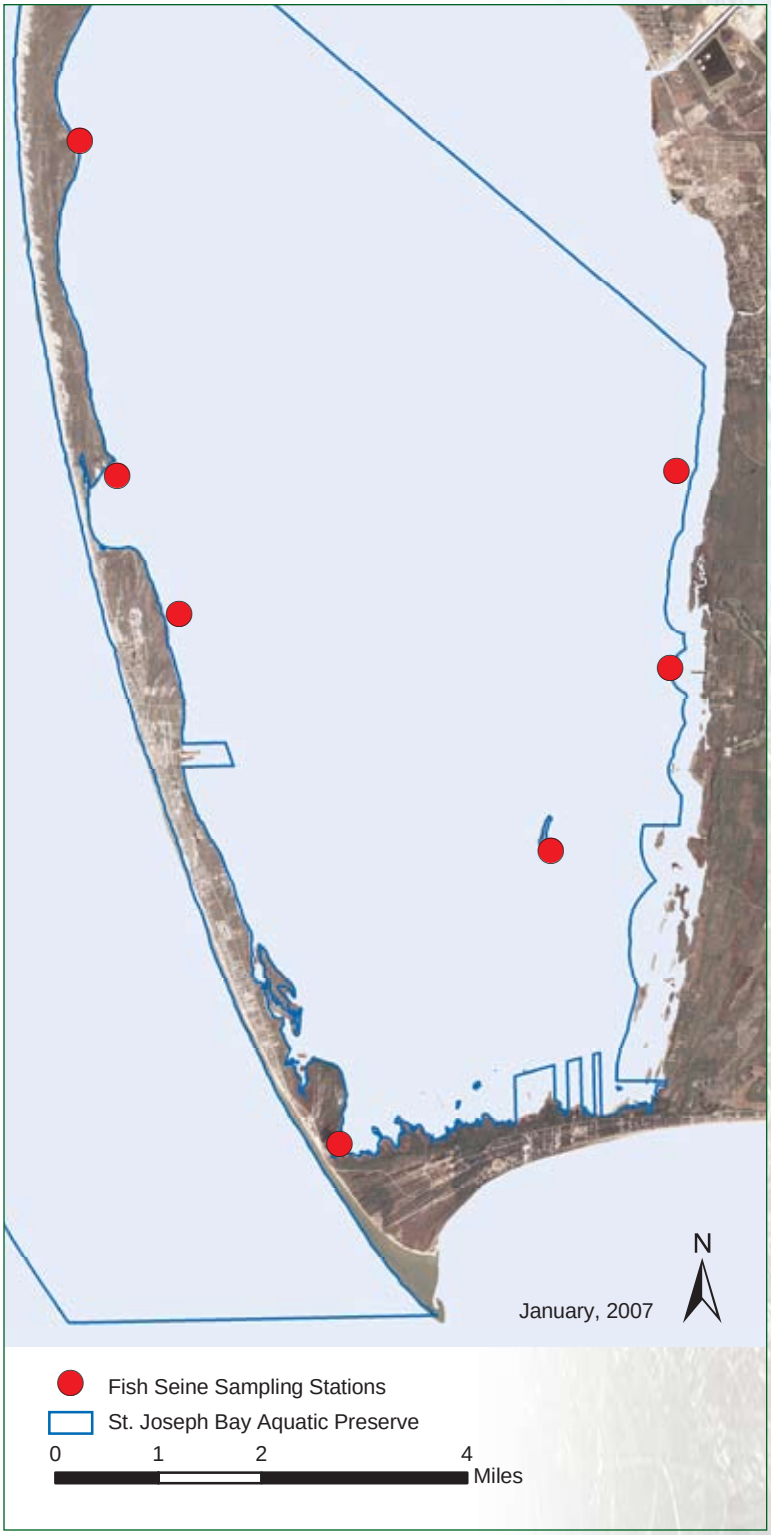
A species must be federally listed as endangered or threatened to be protected under the Endangered Species Act. An endangered species is in danger of extinction throughout all or a significant portion of its living range. A threatened species is likely to become endangered in the foreseeable future. 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 preserve. Listed species currently monitored within the preserve are discussed in the following sections.

Sea Turtle Monitoring - The beaches adjacent to the preserve on the St. Joseph Peninsula serve as valuable nesting habitat for the threatened loggerhead sea turtle (*Caretta caretta*) and the endangered green sea turtle (*Chelonia mydas*). These turtles nest along the entire 17-mile stretch of

the peninsula. Appendix B.5 illustrates the sea turtle nesting numbers on the St. Joseph Peninsula. The six mile stretch of beaches adjacent to the preserve from the state park boundaries to the Stumphole is monitored by a volunteer-based turtle patrol that is sponsored by the Gulf Coast Conservation Association. This group has monitored loggerhead and green turtle nesting on this portion of the beach since 2002. All sea turtles are protected under the Endangered Species Act of 1973 and the nesting season runs from May 1st to October 31st. Genetic studies have shown that the loggerhead sea turtles nesting in the Florida Panhandle are a separate population from those nesting in other parts of the Southeast United States (Gulf Coast Conservation Association, 2004). This means that the loggerheads that nest along the St. Joseph Peninsula do not nest anywhere else in the world. If the turtles disappear from these beaches, they are not likely to ever return or repopulate. St. Joseph Peninsula, in Gulf County, has the highest density of nesting loggerheads in the panhandle. With an average of about 250 nests on the peninsula each year, this area receives about a third of the nesting in the panhandle. Since 2002 sea turtle nesting numbers have drastically declined. Increasing development, lighting issues, recreational impacts due to beach driving and severely eroded shorelines may all play a role in this decline. Human presence on beaches during the nesting season can negatively impact sea turtles. Human activity including noise, use of flashlights, campfires and construction on the beach at night can deter nesting females and disorientate hatchlings. The nesting female may then shift to other nesting beaches, delay nesting, or choose poor nesting sites. Litter left by humans can obstruct both nesting females and hatchlings and food may attract predators to the nest area. Litter and recreational beach equipment left on the beach at night, including beach furniture, cabanas, umbrellas, small boats, and beach cycles can obstruct both nesting females and hatchlings, damage nests, and hamper hatchlings' progress towards the sea (Butler, 1998). In areas where motor vehicles are allowed on the beach or where illegal beach driving occurs, the use of headlights during night driving can disrupt the nesting process and disorient hatchlings. Tire ruts can interfere with the hatchlings' ability to reach the sea and vehicles can damage nests and run over hatchlings. Beach cleaning equipment may also cause similar



Map 16 / Fish Monitoring Sites in St. Joseph Bay

The decline in saltmarsh habitat in St. Joseph Bay has been observed since the early 1990's and further investigation is needed to determine the causes and consequences of this habitat loss.

problems. In addition to the creation of ruts and compaction of nests by heavy machinery, beach cleaning rakes can penetrate or uncover nests.

In 2001, Gulf County established a lighting ordinance to create regulations for the protection of sea turtles and other enumerated species within certain beaches of the county (see Appendix E). The intent of this ordinance is to protect state and federally listed species that utilize the beach habitat of Gulf County, more specifically, nesting female and hatchling marine turtles, beach mice and shorebirds, from the adverse effects of artificial lighting and from injury or harassment caused by such lighting and its effects. Artificial light or lighting refers to light emanating from any device other than natural celestial light sources. Beachfront lighting on or near beaches can deter female sea turtles from emerging from the sea to nest and can interfere with their sea-finding ability after nesting is completed. Emergent sea turtle hatchlings rely on visual brightness cues to find the sea and artificial beachfront lighting causes hatchlings to become misdirected during their crucial and dangerous trip from the nest to the water. Hatchlings in this situation often die from exhaustion, dehydration, predation, entrapment in vegetation or debris, or wandering onto roadways and parking lots where they are struck by vehicles (Butler, 1998). Artificial lighting can also cause hatchling disorientation while in the surf and even draw them back out of the water. Although some beachfront lighting is necessary for safety and security, light management measures can help prevent interference with sea turtle nesting habitat while still addressing human safety concerns (Butler, 1998). These measures include turning off unnecessary lights during the nesting season; using a smaller number or lower lumens of lights; repositioning, shielding, redirecting, lowering, or recessing fixtures so light does not reach the beach; using timers and motion detector switches; planting native dune vegetation to screen light; and reducing interior lighting by moving lights from windows, drawing curtains or blinds after dark, and tinting windows (Butler, 1998). In addition, sea turtles are less affected by red, yellow, and low-pressure sodium-vapor lights, which can be substituted for ordinary lights. It is important to educate residents and renters to the impacts of lighting on these species to avoid manipulation of nests and hatchlings as much as possible.

In addition to the valuable habitat on the Gulf side beaches adjacent to the preserve, the extensive seagrass beds of St. Joseph Bay provide significant foraging habitat for the endangered juvenile green sea turtle and for the Kemp's ridley sea turtle (*Lepidochelys kempii*), the most endangered turtle in the world. Juvenile green turtles use specific foraging habitats, and are capable of navigating to specific habitats if artificially displaced due to cold stunning events. St. Joseph Bay has recently been documented as a very important developmental habitat for green turtles in the northeastern Gulf of Mexico (McMichael, 2004). Population models have suggested that the most crucial stages for sea turtle population recovery include juveniles, which rely on the nearshore environment (Crouse, Crowder & Caswell, 1987). Juveniles utilize nearshore habitats as development grounds, while larger juveniles or sub-adults use them as foraging areas (McMichael, 2004). In January 2001, when water temperatures in St. Joseph Bay dropped below normal, 403 marine turtles were found stranded and cold-stunned within the bay. Ten Kemp's ridley, 5 loggerhead and 388 green turtles were collected, making this the largest stranding event ever documented in the United States (Blackwelder, 2001). In 2003, 42 juvenile turtles stranded in St. Joseph Bay, including 39 green turtles, 2 Kemp's ridleys, and 1 loggerhead. The presence of juvenile turtles in northwestern Florida waters at this time of year suggests that these turtles were overwintering in this area and entered a lethargic state once water temperatures decreased below an unspecified threshold temperature (McMichael, 2004). This information, therefore, indicates that this valuable endangered, green sea turtle population is utilizing the bay habitat year-round. Further in-water research is needed to fully understand how sea turtles utilize near shore habitats throughout their life cycle so that adequate protection can be given to these threatened and endangered species.

Listed Shorebird Monitoring - The preserve currently conducts weekly surveys on the adjacent St. Joseph Peninsula between the state park boundaries and the Stumphole area to monitor beach activities and perform shorebird surveys. The St. Joseph Peninsula is indicated as critical habitat for the piping plover (*Charadrius melodus*) and the St. Andrew's beach mouse (*Peromyscus polionotus peninsularis*). Shorebird survey data is reported to the U.S. Fish and Wildlife Service. Participating in these surveys has greatly improved our understanding of shorebird migration requirements. The land surrounding the preserve is an important stopover during the gulf coast fall and spring bird migrations. St. Joseph Bay lies between the Mississippi and east coast flyways, and therefore, receives birds from both the Midwest and Atlantic seaboard. These surveys are important and necessary because many of these species are of special interest due to their scarcity or declining populations.

Other Ecosystem Science Efforts in St. Joseph Bay

Wildlife Stranding Response - Dead, sick or injured wildlife are documented by the preserve and data is forwarded to the FWRI for sea turtles and the National Marine Fisheries Service (NMFS) for marine mammals. The collected data from these events is compiled and put into an online database. Strandings in the panhandle region have been documented since 1980. Live strandings are rescued and transported to properly permitted rehabilitation facilities. Preserve staff currently assists and responds to stranding events in Franklin and Gulf counties and will assist with unusual mortality events that may occur as well. Preserve staff will continue to assist with strandings in these counties and will coordinate with the appropriate agencies and attend the appropriate training workshops to keep staff updated on the correct procedures to use while documenting a stranding event.

Mapping - The protection of critical resources is a high priority item for St. Joseph Bay Aquatic Preserve. In order to adequately manage the preserve, natural and historical resources, which are integral to maintaining the productivity of the bay, must be monitored, documented and mapped. This will allow for the identification of areas within the preserve where increased management emphasis is necessary. Existing resource maps are limited in accuracy and coverage and the mapping of seagrass and saltmarsh is much needed. It is a goal for CAMA to create current and accurate submerged resource maps of its aquatic preserves and National Estuarine Research Reserves.

Hyperspectral imagery has been chosen as the most effective method of remotely sensing the spatial extent of seagrass meadows in St. Joseph Bay. In 2006 CAMA secured a CZM grant for hyperspectral mapping of St. Joseph Bay Aquatic Preserve. Because of the good water clarity in the bay, St. Joseph Bay was chosen as the pilot project for these mapping efforts in coordination with the Florida Environmental Research Institute. The maps produced from this project will serve to inform resource managers as to the coverage and extent of the seagrass communities and will provide an indicator of the bay's health. They will also present a tool that may be used by regulatory, research, and recreational communities. Maps can be used to identify "good" areas, which can be targeted for protection, and "poor" areas, which can be targeted for restoration. Ideally mapping efforts should continue to be

performed approximately every three years to determine changes in the amount and condition of the submerged habitats.

In 2006, the preserve began mapping the natural resources of St. Joseph Bay using differential geographical positioning systems technology. As mentioned in the St. Joseph Bay Seagrass Monitoring Program above, this information is very useful in monitoring a variety of resources in the bay, and will continue to be a useful tool for the preserve in collecting valuable data and mapping the natural resources of the bay.

Modeling - Modeling can be a powerful tool to support sustainable management and can be used as an environmental assessment tool. There are no current modeling efforts established for the St. Joseph Bay Aquatic Preserve, however, with development rapidly increasing, there may be a future need to establish appropriate models to examine carrying capacities. Ideas may include creating a conceptual model of St. Joseph Bay and the effects that natural phenomenon, water management, growth, and land use intensification can have on the bay by altering hydrology and freshwater inflow, changing the water quality and increasing contaminants, altering habitat, and the effect that these activities may have on fisheries, wading bird communities, coral habitat, algal blooms, and seagrass and saltmarsh habitat.

*4.2 / **The Resource Management Program***

The Resource Management Program addresses how CAMA manages the St. Joseph Bay Aquatic Preserve and its resources. The primary concept of St. Joseph Bay Aquatic Preserve Resource Management projects and activities are guided by CAMA's mission statement: "To protect Florida's coastal and aquatic resources." CAMA'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. CAMA managed areas are especially sensitive to upstream activities affecting water quality and quantity. CAMA works to ensure that the most effective and efficient techniques used in management activities are used consistently within our sites, throughout our program, and when possible, throughout the state. The strongly integrated Ecosystem Science, Education and Outreach and Public Use Programs, provide guidance and support to the Resource Management Program. These programs work together to provide direction to the various agencies that manage adjacent properties, our partners and our stakeholders. The St. Joseph Bay Aquatic Preserve also collaborates with these groups by reviewing various protected area management plans. The sound science provided by the Ecosystem Science Program is critical in the development of effective management projects and decisions. The nature and condition of natural and cultural resources within St. Joseph Bay 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. Joseph Bay Aquatic Preserve

Historically, the role of the aquatic preserve in resource management has included:

1) serving as an informed source on the ecological components and cultural resources within the preserve;
2) overseeing those activities that affect the natural resources within the preserve;
3) ensuring that accurate information is used in resource-related permitting, management, and planning decisions;
4) ensuring that all laws and rules regarding the natural resources are obeyed and that violations are enforced by the appropriate authorities;
5) conducting on-site surveys for specific activities;
6) coordinating with other resource management and enforcement agencies;
7) coordinating with other educational programs to inform the public on the inherent values associated with natural resources
8) conducting or cooperating with other entities to conduct pertinent research projects; and
9) developing, and periodically updating, a comprehensive management program.

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, 1997a). In addition, preserve

The beach dune community along the St. Joseph Peninsula consists of approximately 1,095 acres that aid in preventing further erosion to the cape.

staff has been responsible for reviewing and commenting on permits. In serving as technical support, staff evaluated development proposals within the preserve in regard to adverse impacts on natural and cultural resources and consistency with established laws and rules; conducted field assessments and prepared comments and recommendations to appropriate agencies. Staff was also responsible for maintaining good communication with local, state, and federal environmental regulatory agencies and for notifying appropriate regulatory agencies of violations or illegal activities, as the preserve has no enforcement authority.

Agencies with enforcement authority in the preserve included the Department of Natural Resources (currently DEP), the Department of Environmental Regulation (currently DEP), the Game and Freshwater Fish Commission (currently FWC), the Florida Department of Agriculture and Consumer Services, and local law enforcement officers.

Over the years, the preserve has continued to grow and expand. After 1998, additional monitoring projects were developed that were specific to St. Joseph Bay. Programs were developed and prioritized based on the uses of and threats to the natural resources of St. Joseph Bay. Many of the needs have remained the same and include documenting the long-term impacts of powerboat propellers on seagrass beds and the ecological productivity of the bay, and establishing a means to evaluate the cumulative impact of development activities on adjacent uplands.

One of the best ways to protect the bay waters and resources is to conserve the adjacent lands that drain into the bay. In 1995 the St. Joseph Bay State Buffer Preserve was established with an initial purchase of 700 acres directly on the bay. The buffer preserve is also managed by CAMA as part of Apalachicola National Estuarine Research Reserve. Together, these preserves help protect a regionally significant natural area with outstanding ecological, economic and historical/cultural values. The preserve serves to protect the bay water quality and conserve and promote coastal natural forests and native plants. More than 16 very rare plants occur on preserve lands, some being globally imperiled and endangered species. The buffer preserve has continued to expand and currently consists of over 5,000 acres of conservation lands. The buffer preserve provides protection to St. Joseph Bay's water quality and also provides protection for native species habitat and archaeological and historical sites, as well as opportunities for natural resource-based recreation.

In 2006, the preserve established six monitoring sites in St. Joseph Bay to collect data on the abundance, size structure, and habitat associations of fishes and selected invertebrates.

Additionally, in 1999, through coordination with the U.S. Coast Guard, U.S. Army Corp of Engineers, and what is now the FWC, the aquatic preserve established 23 seagrass navigational buoy markers between Presnell's Marina channel and the southwest point of Black's Island. The buoys used were 61 inches high and 9 inches in diameter. These navigational markers read "Shallow-Seagrass." Educational signage provided information on the value of seagrass and provided the locations of the buoys. By 2003, most of the buoys had been destroyed or washed away during storms.

With increased funding and recognition, the St. Joseph Bay Aquatic Preserve has begun to accomplish its goals and is making a profound difference in the protection of the natural resources in the bay.

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

To effectively manage a natural resource, one must know how the resource functions and what composes the resource, be able to transmit this knowledge to people who use and/or can potentially affect the resource, and be willing to take necessary actions to manage and protect the resource. The current status of resource management programs within the preserve as well as future needs are described in the following sections.

Habitat Restoration

The extensive seagrass habitat in St. Joseph Bay is valuable to Gulf 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 prop scarring and dredging are some of the potential factors that result in secondary and cumulative impacts to these seagrass communities. Another commonly overlooked impact to seagrass habitat is the standard practice of installing docks or piers where this grass is present. The standard practice of installing pilings in seagrass communities causes a displacement of the grasses within the piling footprint and the decking material can detrimentally shade the seagrass. Seagrasses typically take a long time 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.

To date, the aquatic preserve has not completed any seagrass restoration efforts in the bay. St. Joseph Bay is an important area for seagrass beds because it supports the greatest acreage in the Florida

Panhandle, while maintaining the least amount of scaring in the entire state (Sargent et al., 1995). The increase in prop scar damage from boats that has been seen over the last few years, however, causes concern. Determining the extent of this damage and planning a restoration program remains a high priority. The aquatic preserve is establishing a GIS database of seagrass prop scar damage and is assessing management options for protecting these valuable habitats. The preserve has also developed a partnership with the Seagrass Salvage Program to work together to enhance seagrass ecosystems, by utilizing material of opportunity from marine construction. Seagrass that would otherwise be destroyed during marine construction is salvaged and transplanted to permitted areas with the goal of restoring previous seagrass habitat. The seagrass salvage sites associated with this project will vary depending on the areas permitted for dock or other marine contractor impacts. The project will focus on permitted impacts and coordination with contractors to salvage material prior to impacts (Schneider, 2006). Staff will continue to coordinate with the salvage program in their effort to transplant these grasses and restore these damaged areas. After determining the extent of the damage, the preserve will assess what areas may benefit from restoration efforts and create a priority list to restore these areas back to their natural state. Another method of restoration to consider is the use of bird-roosting stakes in damaged areas. These stakes serve as a resting platform for roosting birds. The birds defecate while resting on the stakes, which provides rich nutrients that foster the growth of seagrass plants. The use of other new technologies in seagrass restoration efforts will continue to be explored.

Exotic Species

Every year, the introduction of harmful, non-native species into the U.S. has been increasing. Collectively, these nuisance species make tremendous impacts to a variety of resources that are valued by many Americans. These species may impact the bay by reducing game fish populations, reducing native species and degrading the ecosystem. These species may ruin boat engines, jam steering equipment, and make waterways unusable by boaters and swimmers. In addition, invasive species can dramatically increase the operating costs of drinking water plants, power plants, and industrial processes. These species may also affect human health, reduce property values and impact local economies of water-dependent communities.

There are currently no known exotic species of aquatic plants or animals located within the aquatic preserve boundaries. The potential exists, however, in St. Joseph Bay for species such as the Asian green mussel *(Perna viridis)* to occur. The preserve will continue to research the potential of invasive and exotic species in this area to determine which species the bay may be susceptible to. The preserve will also continue to review scientific literature on potential nuisance species and will develop a response plan if any of these species appears in the bay. In addition, educating the local community regarding the impacts of invasive non-native species can assist the preserve in controlling immigration from adjacent lands or waters. This will be accomplished through signage placed at local boat ramps that explains the impacts these species can have on the natural communities in the bay.

Permitting and Enforcement

Regulatory decisions within the aquatic preserve for regulating and managing docks and piers, including the standards and criteria for docking facilities are based on the rule at Chapter 18-20, Florida Administrative Code (F.A.C.), for Florida's aquatic preserves. Biological impacts, amount of seagrass to be impacted, mitigation requirements, and benefits versus costs are all issues that need to be closely examined before any permits are issued. In 2004, there were 78 docks along the shoreline of the bay and this number will continue to increase. The St. Joseph Bay Aquatic Preserve will continue to maintain effective partnerships with interagency permitting personnel and will closely coordinate with these offices in regards to permit reviews, on-site evaluations, and necessary documentation of site characteristics or violations on all proposed projects located within the preserve boundaries. The preserve will also continue to encourage the placement of docks and piers in locations that transverse the least amount of saltmarsh and seagrass and will encourage property owner associations to incorporate the communal use of an individual private residential dock or a private residential multi-slip dock, within their community, as opposed to the building of numerous personal docks to aid in the protection of valuable habitat. The preserve does not have enforcement authority and relies on the regional regulatory offices and local law enforcement officers to assist with violations within and adjacent to the preserve. Please refer to Appendix E for a list of agencies and contact information.

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.

*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. Joseph Bay Aquatic Preserve

Education and outreach efforts conducted by the St. Joseph Bay Aquatic Preserve have been designed to meet the overall program goal of maintaining aquatic preserves at their current level of environmental quality for future generations. The target population of education and outreach efforts has concentrated on nearby upland landowners and developers, commercial and recreational resource users, students at all grade levels, organized groups, and local, regional, and state government agencies. The Friends of the St. Joseph Bay Preserves, Inc. is a nonprofit 501(c)(3) Citizen's Support Organization that was established in 2003 to protect, preserve, and support the St. Joseph Bay State Buffer Preserve and the St. Joseph Bay Aquatic Preserve. The Friends group raises funds, provides volunteer services to help manage the preserves, and promotes environmental awareness of the aquatic and buffer preserves.

Specific areas of staff involvement have included coordinating volunteer networks, developing informational brochures, designing educational signage, participating in local festivals and events, conducting interpretive tours, conducting lectures, developing public service announcements for

television and radio, displaying posters, distributing flyers, brochures and guides at local boat ramps and businesses and participating in a variety of workshops and conferences.

Additional efforts include the development of a St. Joseph Bay Boater's Guide which was created through grant funding in 1999 to increase the public's knowledge of resource protection measures, sensitive natural areas, and proper boating etiquette. In an effort to maintain good water quality, the guide also informs boaters of local sewage pump-out facilities. In 2002, a St. Joseph Bay Aquatic Preserve brochure was also developed.

4.3.2 / Current Status of Education and Outreach at St. Joseph Bay 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. The preserve is currently accomplishing this goal through outreach efforts including participation in coastal training program workshops, local festivals and events such as Estuaries Day, Seagrass Awareness Month, the Panhandle Birding and Wildflower Festival, the Apalachicola Seafood Festival, and the Carrabelle River Festival. In addition, St. Joseph Bay boater's guides and aquatic preserve brochures are distributed at the local city ramp and the kayak and canoe launch area. They are also distributed at the St. Joseph Peninsula state park's visitor center as well as to the Port St. Joe Marina and other local businesses in town. Flyers with information regarding scallop season and Seagrass Awareness Month are distributed and displayed at local businesses in town during the appropriate season. The preserve continues to give presentations, write articles for local newspapers and a variety of newsletters, design educational signage for local kiosks, display posters and judge science fairs at local schools. In regards to sea turtles, the preserve developed an educational billboard that is placed on Cape San Blas Road, near County Road C-30E, each season to warn visitors to turn their lights out during the sea turtle nesting season.

There is a need to develop a school-based program to bring the bay to the local students. The preserve is currently coordinating with local schools 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. The St. Joseph Bay boater's guides will also need to be updated to display new seagrass buoy locations and updated information.

In an effort to protect St. Joseph Bay, the preserve will continue to be actively involved in a variety of education and outreach opportunities. These efforts will focus on the current issues and potential impacts to the system. A fact sheet is being developed that will describe the current research and monitoring activities that are being conducted throughout the bay and will give additional information on how the public can support the protection of the natural resources in the bay.

In addition, there is a need to develop educational kiosks at local boat ramps that provide information on protecting the bay's natural resources as well as information on invasive species and dolphin friendly fishing and viewing tips. A brochure holder for boater's guides and preserve brochures will be included.

With increasing development pressure in the area, it will be critical for the preserve to continue education and outreach efforts by a variety of means to protect the habitat of the bay.

*4.4 / **The Public Use Management Program***

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

While access by the general public has always been a priority, the conservation of CAMA's sites is the primary management concern for CAMA. 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,

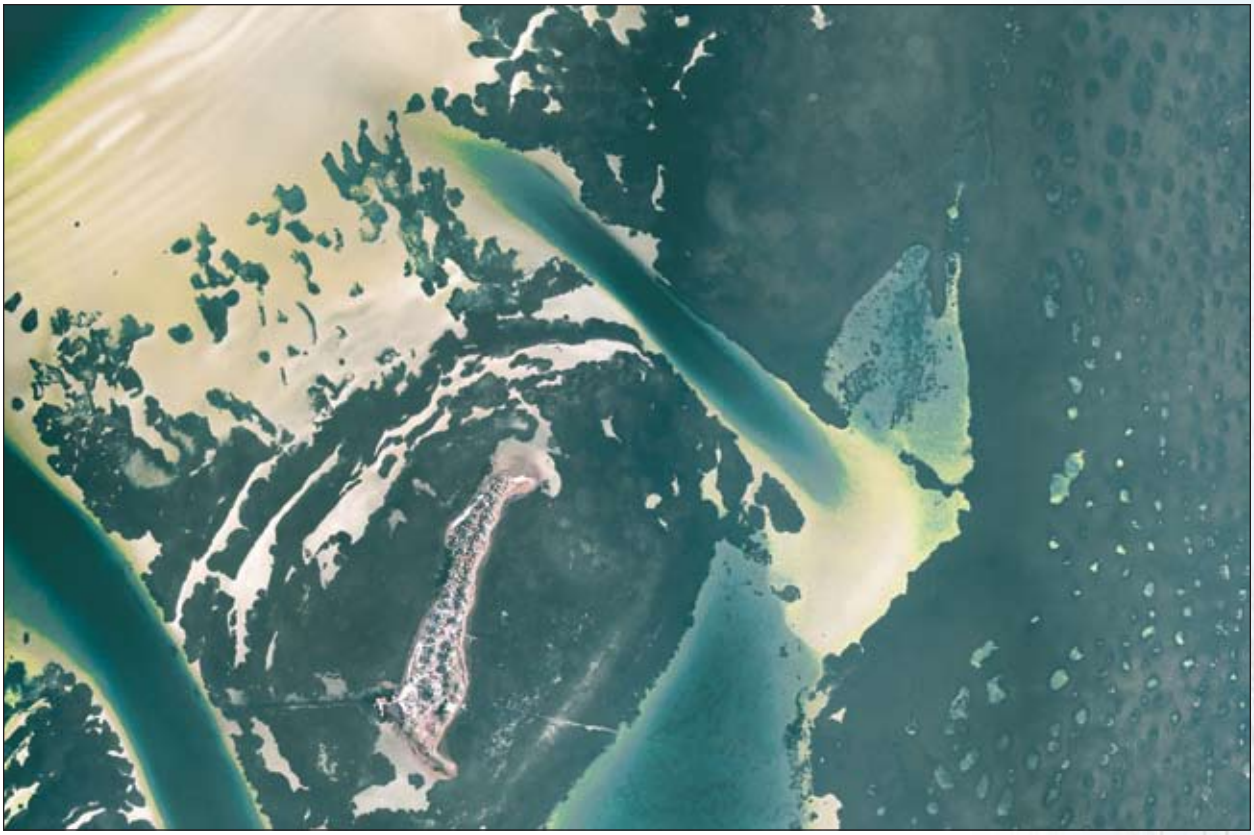
Rapid erosion rates on St. Joseph Peninsula have left areas of the beach extremely narrow and not suitable for driving.

wetland and submerged habitats. This includes the coordination of visitor program planning with social science research. One of CAMA'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. Joseph Bay Aquatic Preserve

The extensive seagrass habitat in the bay has supported commercial and recreational fishing activities for years. As of 1986, there were no wet storage facilities or shellfish propagation leases located in St. Joseph Bay, 11 mechanical clam harvesting permits had been issued, and there were six certified shellfish processing plants in Gulf County. Species harvested commercially within the aquatic preserve included bay scallops, mullet, hardshell clams, blue crabs, and shrimp. The primary species of shellfish harvested were the hardshell clam or quahog. Sunray venus clams were also available in the bay, but not in commercial quantities. Hardshell clams congregated in large numbers buried in firm mud and sand substrates and were harvested by permitted dredging from the central portion of the bay. Commercial harvesting of bay scallops was also 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. This issue was manifested locally in the early 1980s through a petition by county residents to their Board of County Commissioners to stop commercial harvesting. A compromise was eventually reached in which commercial scalloping was banned in the earlier part of the scallop season and on weekends until Labor Day, and with a limit placed on recreational harvesters. By 1994, however, commercial scalloping was banned completely.

The Port St. Joe Marina was completed in 1999 and lies along the northeastern shoreline of the bay which is adjacent to the preserve boundaries. This six-acre marina overlooking St. Joseph Bay features 128 wet slips, 79 dry storage units, fuel pumps, pump out facilities, ship store and dockside café. Presnell's Marina and RV Campground lies along the eastern shoreline and offers boat access to the bay. Black's Island is a seven-acre private island that lies within the southern portion of the bay. Historically, the island thrived as a semi-tropical garden with several freshwater springs and vegetation including over 700 palm trees, flowering cactus, yaupon holly and the black mangrove trees (Black's Island, 2006). A large variety of birds including egrets, osprey and pelicans once nested on the island and it served



Black's Island is a seven-acre private island that is located in the southeastern portion of the bay. The island has an extensive history that dates back to 400 B.C.

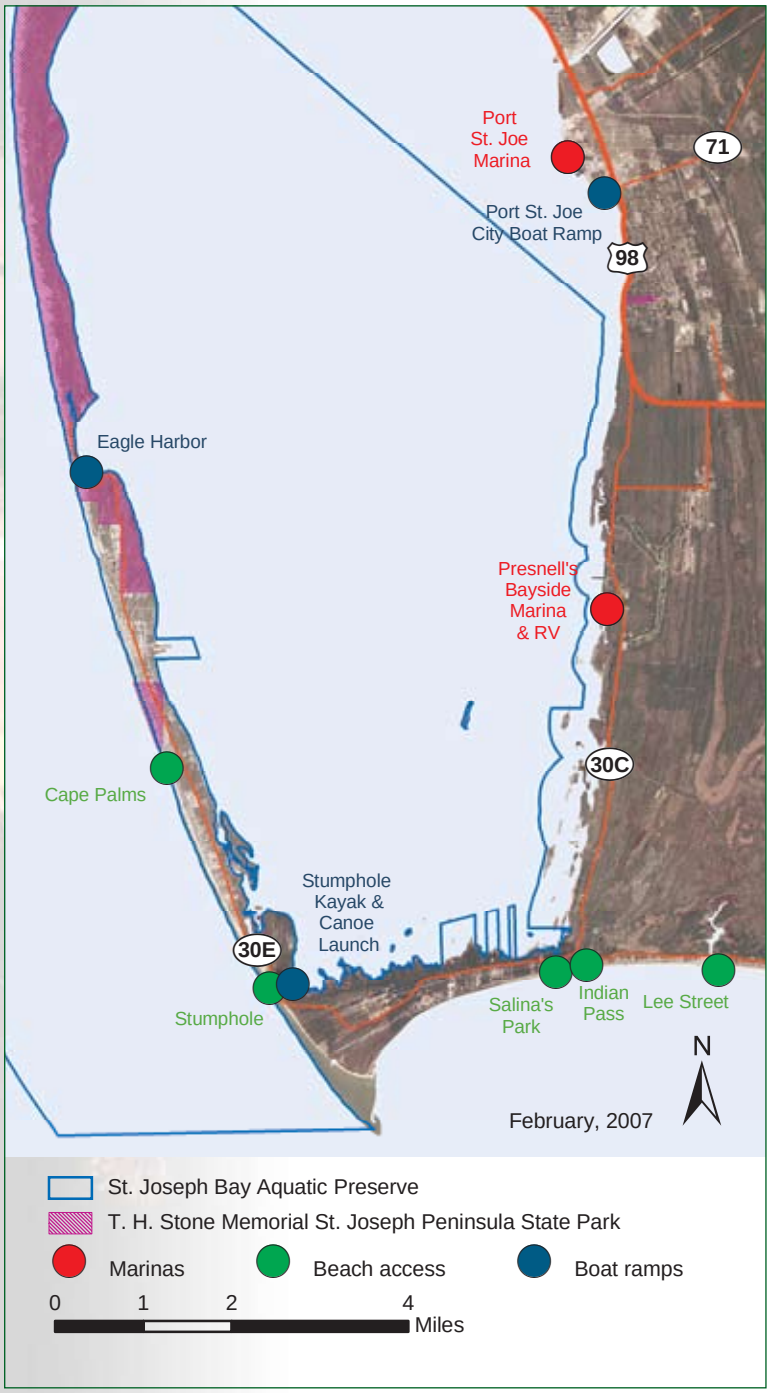
as a valuable bird rookery. In the past there was no electricity on the island and in the 1970s a youth camp was established to educate young men to the mysteries of the sea (Black's Island, 2006). In 2002, a permit was granted to run a utility cable to Black's Island and 26 single family homes with cottages, community center, restaurant, bar and public restrooms are currently being developed. In 2006, the Gulf County Department of Health issued multiple aerobic treatment units and drip irrigation permits to serve as the island's wastewater treatment. There are concerns for this type of development within the preserve because of potential impacts that may be caused due to low elevation levels, the ability of the island to handle this kind of development, storm events and emergency response and wastewater leakage, etc. The preserve will continue to monitor the seagrasses and water quality in this area and will establish additional monitoring sites to detect any changes in the resources as a result of this development. It is a high priority of the preserve to develop an effective partnership with the owner and developer of Black's Island to coordinate on an outreach program that will educate visitors to the island on the importance of the surrounding habitat and how they can help to protect the resources of St. Joseph Bay.

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

The aquatic preserve encourages sustainable use of the natural resources while minimizing adverse user impacts. Obtaining support from the public through their participation in resource management and their assumption of appropriate responsibility for the protection of the aquatic preserve, particularly coastal homeowners/residents, coastal managers, and coastal developers, will result in an active and strong citizen support network that will increase the awareness of the ecological and economical importance of the system. Public support of government conservation programs is vital to the success of those programs. 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. A wide array of information is distributed to a variety of audiences in the form of educational presentations, poster displays, local committee meetings, international symposia, state sponsored workshops, regional festivals and distribution of informational brochures and materials. A goal is to provide factual, timely information that is appropriate to the target user

groups, coastal managers, citizens and developers. 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. Joseph Bay continue to revolve around commercial and recreational fishing activities and uses of the adjacent uplands. Sport and shellfishing is the most active form of tourism throughout the year. Live shelling is prohibited within the preserve and state park boundaries. The crystal-clear and shallow waters of St. Joseph Bay offer excellent fishing opportunities because of the lush and extensive seagrass habitat that supports a variety of commercial and recreational fish species. Popular sought after species include redfish, trout, shark, mullet, flounder and tarpon. Gulf County also has an active reef building program insuring that future generations will be able to enjoy deep sea fishing at its finest. The majority of the vessels in St. Joseph Bay are recreational boaters. Florida's recreational fishery is among the largest in the country and is an important component of the state's tourism economy. Close to half the estimated recreational fishing trips in Florida are made by visitors to the state (FWRI, 2007). The Marine Recreational Fisheries Statistics Survey was developed by the NMFS to monitor recreational fisheries. The survey estimates more than 6.5 million recreational anglers took more than 27.4 million saltwater fishing trips statewide in Florida during 2004. The estimated number of trips made by anglers in west Florida from private or rental boats increased from approximately 5 million in 1981 to more than 9.2 million in 2004 (FWRI, 2007). According to the Florida Department of Highway Safety and Motor Vehicles, there were more than one million vessel registrations issued for the state in 2005. Out of this number, 3,183 were issued in Gulf County.



Map 17 / Public Access Points to St. Joseph Bay

Current public boat access is available at the city ramp in Port St. Joe, two private fish camps on the eastern shore of the bay, the Overstreet Boat Ramp located on CR-386 on the Intracoastal Waterway, and a launching area at Eagle Harbor in the state park.

The environment within the preserve boundaries and on surrounding managed land, such as the buffer preserve land and the St. Joseph Peninsula State Park, provides a wide variety of outdoor, resource-based recreational opportunities including bay and offshore fishing, diving, snorkeling, scalloping, beach-going activities, birding, hiking and boating. In

2002 the preserve developed a kayak and canoe launch in the southern portion of the bay that is accessible from Cape San Blas Road. This area, also known as Richardson's Hammock, offers an excellent paddling opportunity. Future goals include the development of a paddling trail guide that links the three aquatic preserves in this region of the panhandle and the buffer preserve.

As public use continues to increase in these sensitive areas, it is important to continue monitoring a variety of environmental conditions to detect improvements or declines, so appropriate management actions can aid in the protection of these natural resources.

Much of the authority necessary to protect St. Joseph Bay exists outside of CAMA, therefore, it is critical for the preserve's management plans to include coordination and partnerships with other entities/agencies which have the necessary jurisdiction to enforce violations. The most common incidents that occur in the bay involve recreational boaters and tend to be prop scar damage to seagrass habitat during low tides. Many of these incidents go unnoticed, and in high vessel traffic areas, can cause catastrophic seagrass damage that could take up to 10 years to recover. Non-permitted activities within the preserve may cause additional stress or declines in natural resources and may include vessel groundings, anchoring injuries, fishing gear impacts, illegal dumping, military activity, or cable drags from towing operations.

Many users of the bay may not be aware of how their daily activities impact the natural resources associated with St. Joseph Bay. Therefore, an education and outreach component to accomplishing the preserve's goals and objectives is crucial to ensuring effective management of the bay system from future impacts.

Increased use of the preserve, for recreation and visitation, results in development pressure on the peninsula. 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 and in some cases commercial access that is consistent with resource protection. To develop a management program for the resources of the St. Joseph Bay Aquatic Preserve it is essential to understand how humans use the resource in addition to the biology and ecology of the bay. The 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. The preserve will also continue close coordination with the St. Joseph Bay Advisory Committee to prioritize strategies presented in this management plan to accomplish future goals. Map 17 illustrates the public access points for St. Joseph Bay and the St. Joseph Peninsula.

The classic emerald seawater and white-sand beach that attract thousands of tourists to the area each year.

Chapter Five

Issues

*5.1 / **Introduction to Issue Based Management***

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

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

This section will explore issues that impact the management of St. Joseph Bay Aquatic Preserve directly, or are of significant local or regional importance that the 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. Joseph Bay Aquatic Preserve will characterize each of its issues and delineate the unique goals, objectives and strategies that will set the framework for meeting the challenges presented by the issues.

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

5.2 / ***Issues***

5.2.1 / Issue One: 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 bays waterways and having an adequate monitoring program is essential to being able to recognize and prevent contamination problems. Good water quality is essential to the production of healthy seafood, enjoyable recreational activity and many other aspects of our valued Florida lifestyle (DEP, 2006a).

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 you see a rainbow-colored sheen on water flowing across the surface of a road or parking lot, you are actually looking at nonpoint source pollution (NOAA, 2007). 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.

St. Joseph Bay offers some of the world's best fishing grounds for a variety of species including red drum (Sciaenops ocellatus), gulf flounder (Paralichthys albigutta), spotted sea trout (Cynoscion nebulosus) and striped mullet (Mugil cephalus).

The City of Port St. Joe in Gulf County received funding for the St. Joseph Lake Regional Stormwater Facility, which will naturally filter stormwater for approximately 70% of the county before it enters the St. Joseph Bay. The project includes the retrofit of a mosquito control/stormwater area in order to help slow stormwater runoff, trap sediment, and reduce the volume of runoff by allowing some infiltration to occur. Reducing the velocity of stormwater runoff eases soil erosion processes and increases runoff contact time with soil and vegetative surfaces. Increased contact of stormwater runoff with the soils and vegetation in a riparian area can result in the infiltration of runoff and the filtration or uptake of stormwater associated pollutants. In 1937, Port St. Joe was placed on central sewer and the lines are currently cracked and in need of repair. A project has been funded to replace the central sewer lines and will be

completed by 2011. The preserve will continue to support local government plans to rehabilitate the sewer collection system and the stormwater retrofit and treatment program that will provide for effective management of urban stormwater runoff. In early 2007, the county completed one of its ongoing projects to improve stormwater runoff in the bay.

The preserve's current water quality monitoring project utilizes several methods to examine water column characteristics. Basic water quality parameters are monitored to provide a record of environmental conditions at the time of sampling and this data provides information to assess the condition of biological assemblages. To properly characterize many water quality conditions, long-term data sets are required. While routine water quality monitoring detects effects of nutrient enrichment, it is not designed to detect trace levels of toxicants or contaminants. Biological assessments, coupled with habitat assessment, such as physical and chemical measurements, will aid in identifying probable causes of impairment not detected by physical and chemical water quality analyses alone, such as nonpoint source pollution and contamination, erosion, or poor land use practices (EPA, 2000).

Current water quality trends in the bay indicate a slight increase in total nitrogen and phosphorous throughout the bay system (see Appendix B.5). Continued long-term water quality monitoring is therefore necessary and essential to protect the valuable natural resources in the bay.

Staff deploys scallop spat collectors to study scallop populations in St. Joseph Bay.

Goal One / Develop a better understanding of the bay's water quality to maintain and/or improve water quality within the aquatic preserve while providing for the safety and enjoyment of those who use the marine resources.

Objective One / Regularly assess the status and trends of water quality throughout St. Joseph Bay with adequate monitoring protocols to identify potential impacts to the natural resources and provide sound scientific data and recommendations on methods to eliminate impacts to the system's water quality for current and future management needs.

Integrated Strategies

• Maintain a strategic long-term water quality monitoring program that includes biotic and abiotic parameters of the community to adequately monitor and assess the status of the bay's water quality (Ecosystem Science). 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: dissolved oxygen, salinity, temperature, pH, turbidity, and depth. This project will remain a high priority over the next 10 years as coastal development continues to increase. FY 2005-2006, ongoing.

Performance Measures: 1. Development of an annual assessment report and metadata that will detail scientific data, results, conclusions, and recommendations concerning the water quality in St. Joseph Bay Aquatic Preserve. 2. Additional water quality monitoring sites added to evaluate impacted natural resources.

Staff monitors water quality with the use of dataloggers that record continuous data including dissolved oxygen, salinity, temperature, pH and turbidity every thirty minutes.

• Continue to monitor nutrients in the bay through a partnership with the University of Florida's LAKEWATCH/COASTWATCH program to determine total nitrogen and phosphorous, chlorophyll and water clarity (Ecosystem Science). Additional stations may be added to the current monitoring protocol if necessary to cover high priority locations. This project will also remain a high priority over the next 10 years as coastal development continues to increase. FY 2001-2002, ongoing.

Performance Measures: 1. Determining the natural background levels of nutrients for the bay from comparisons of current and historical data and the development of a total nitrogen load allocation strategy through coordination with the University of Florida.

• Acquire additional dataloggers to expand water quality monitoring efforts within the preserve (Ecosystem Science). FY 2010-2011, ongoing.

Performance Measures: 1. Development of an annual assessment report and metadata that will detail scientific data, results, conclusions, and recommendations concerning the water quality in St. Joseph Bay Aquatic Preserve.

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 Strategies

• Identify potential point and nonpoint sources of pollution in St. Joseph Bay and develop a monitoring plan to effectively evaluate the impacts from this type of pollution (Ecosystem Science). Efforts may include integrating current water quality data with GIS technology to trace possible pollution sources. FY 2009-2010, ongoing.

Performance Measures: 1. Development of a model that will include additional scientific data on the potential response of the bay to an increase in pollutants. 2. Development of a report that indicates the current status of the bay's health in regards to these sources of pollution, along with results of the study and recommendations for protecting the valuable natural resources of the bay.

• Coordinate with the Northwest Florida Water Management District (NWFWMD) and U.S. Fish and Wildlife Service (FWS) in efforts to monitor chemical contaminants, including analysis of metals and dioxins, to identify the extent of these contaminants within sediments and biota, and in creating and implementing a plan to reduce and/or eliminate chemical contamination loading into the bay (Partnering). FY 2007-2008, ongoing.

Performance Measures: 1. Assisting with the development of a designated chemical contaminant sub-committee to make recommendations on reducing or eliminating chemical contaminant loading into the bay as well as expanding monitoring efforts to evaluate and update historical research.

• Coordinate with Gulf County Department of Health (GCDOH) to add additional sites to the already existing Healthy Beaches Program, in order to assess fecal coliform and *enterococcus* bacteria in the southern portion of the bay, a popular scalloping site (Partnering). FY 2007-2008, ongoing.

Performance Measures: 1. Providing this information to the public on the Healthy Beaches website. 2. Analysis of historical and current data that will be presented in a water quality technical report.

• Coordinate with the Florida Department of Agriculture and Consumer Services, Division of Aquaculture to assist in maintaining an approved Shellfish Harvesting Area (Partnering). Assist local government decision-making, land use, planning and zoning, or comprehensive planning entities to address pollution, source prevention, and rehabilitation. FY 2007-2008, ongoing.

Performance Measures: 1. Development of an annual assessment report and metadata that will detail scientific data, results, conclusions, and recommendations concerning the water quality in St. Joseph Bay Aquatic Preserve.

Objective Three / Ensure the sustainability of scallop, fish, benthic invertebrates, coral, saltmarsh, seagrass habitat and concerned species 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 to the bay system.

Integrated Strategies

• Continue to determine the biodiversity of the bay system by establishing baseline data and broad scale characterizations of benthic communities which are sensible indicators of habitat quality in an aquatic environment (Ecosystem Science). FY 2006-2007, ongoing.

Performance Measures: 1. Analysis of collected species in regards to the health of the bay and the development of a biological assessment report.

• Continue to monitor the distribution and abundance of specific indicator species including scallops, fish, and coral to determine the ecological health of the bay system (Ecosystem Science). FY 1995-1996; FY 2006-2007, ongoing.

Performance Measures: 1. Development of a technical report that will discuss the project's background, status of the resource, data collection methods, results, areas of concern, recommendations and conclusions on the project. This report will be updated every three to five years. 2. Annual bay scallop report supplied by FWRI that discusses the status and trends of bay scallop populations throughout the state.

• Continue to assist with local marine mammal and sea turtle stranding events (Partnering). FY 1995-1996, ongoing.

Performance Measures: 1. Responding to all strandings within an appropriate timeframe and reporting accurate documentation and required data to NMFS and FWRI. 2. Complete annual assessment report for Franklin and Gulf counties to review and document increases or decreases in stranding events over the years and possible causes. 3. Continued participation in the Florida Dolphin Consortium to provide information on minimizing human interactions on dolphins in the panhandle region.

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

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

Integrated Strategies

• Participate in the annual Florida Water Resources Monitoring Council conference to assist in the development of a centralized water quality storage database and website (Partnering). FY 2004-2005, ongoing as necessary.

Performance Measures: 1. Completion of a list of water quality monitoring efforts underway throughout Florida. 2. Establishment of a working storage database and website that provides data to the public in a timely manner. 3. Increase in partners sharing data throughout the water monitoring network.

Objective Two / Utilize a variety of methods to develop information outlets to the public related to the importance of water quality in the bay.

Integrated Strategies

• Utilize educational signage at strategic access points to the aquatic preserve to educate the public on the ecological significance of the bay and how the public can assist in conserving natural resources (Education and Outreach). FY 2008-2009.

Performance Measures: 1. Receiving public feedback at various workshops and events through the use of public satisfaction surveys.

• Provide a hands-on opportunity for the public to become involved in the protection of the preserve by developing a volunteer network to assist with monitoring projects, unique events, and the creation of an email newsletter (Education and Outreach). FY 2009-2010, ongoing.

Performance Measures: 1. Annual review of the number of participating volunteers as well as annual review of the number of newsletter subscribers.

5.2.2 / Issue Two: 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. Joseph 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.

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 et al., 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 et al., 1995). Prop 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 8 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 prop 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 prop scar (FWC, 2004). According to a 1995 Florida Marine Research Institute Technical Report, "Scarring of Florida's Seagrasses: Assessment and Management Options," Gulf County has 4,840 acres of seagrass habitat that has been lightly to severely scarred by vessels. Scarred seagrasses have been observed in all areas of the state, mostly in shallow coastal waters less than six feet deep. According to the 1995 study, more than 173,000 acres of Florida's 2.7 million acres of seagrasses were scarred, most of it lightly. This is a conservative estimate of scarring because groups of scars were mapped, not isolated, individual, propeller scars. Please refer to Map 14 which illustrates the location of seagrass prop scar damage in St. Joseph Bay from this 1995 study. Repairing damaged areas will, in turn, protect vital coastal habitats and those commercial and recreational industries dependent on them. Latest figures show that seagrass habitats support a $53.5 million commercial fishing industry including blue crab,

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

shrimp, spiny lobster, yellowtail snapper, gray snapper and stone crab. 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.

St. Joseph Bay is a unique and fragile ecosystem that is host to one of the richest and most abundant concentrations of marine grasses along the north Florida coast. Five different species of seagrasses are known to occur within theses vast meadows that cover approximately one-sixth of the bay bottom. These species include Cuban shoal grass (*Halodule wrightii),* manatee grass (*Syringodium filiforme*), turtle grass (*Thalassia testudinum*), widgeon grass (*Ruppia maritima*), and star grass (*Halophila engelmanni*). These communities are critically important to the health and vitality of the waters of the bay; however, prominent and increasing prop 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 sound scientific research and monitoring, resource management, and education and outreach efforts, to effectively protect and maintain this habitat as a valuable, natural resource in St. Joseph Bay.

Objective One / Evaluate the status and trends of seagrass habitat distribution and density throughout St. Joseph Bay to determine the health of the system and to document the extent of prop scar damage to determine the best management practices to protect this habitat.

Integrated Strategies

• Develop and implement a Seagrass Monitoring Plan for St. Joseph Bay 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, blade lengths, sediment quality indicators, biomass, light quantity, underwater video documentation, and prop scar documentation (Ecosystem Science). This will include maintaining consistent mapping techniques of seagrass beds at appropriate temporal and spatial scales using GIS technology (GeoXT Trimble Unit ™) to produce maps that will aid resource managers in making informed decisions. These maps will also be used as a tool for regulatory, research, management and recreational opportunities. This project will remain a very high priority for the preserve. FY 2002-2003, ongoing.

Performance Measures: 1. Development of a St. Joseph Bay Seagrass Monitoring Technical Report in FY 2008-2009. 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.

• Accurately map the spatial extent of seagrass habitat in St. Joseph Bay utilizing hyperspectral imagery every three to five years and update and compare historical data (Ecosystem Science). FY 2006-2007, ongoing.

Performance Measures: 1. Development of a Seagrass Monitoring Technical Report that compares hyperspectral imagery mapping efforts with groundtruthing mapping efforts to accurately portray the distribution and improvement or decline of seagrass habitat in the bay.

• Utilize advanced GIS technology and hyperspectral imagery to identify severely scarred areas to determine restoration needs, assess management options and develop a seagrass restoration plan for St. Joseph Bay (Resource Management). FY 2007-2008, ongoing.

Performance Measures: 1. Development of a seagrass restoration plan for St. Joseph Bay.

• Utilize seagrass buoys in the southern portion of St. Joseph Bay near Black's Island, Richardson Hammock and Presnell's Marina to clearly mark this habitat and warn boater's about the shallowness

of the area to protect it from further damage (Partnering). FY 2010-2011. This activity will require approval through the U.S. Coast Guard and FWC.

Performance Measures: 1. Annual documentation of damaged areas following the placement of the buoys and monitoring efforts will continue in these areas to document improvements or additional damage to habitat.

• Coordinate with the Seagrass Salvage Program to extract seagrasses in areas that may be damaged due to the installation of dock structures and collaborate on relocation sites (Partnering). FY 2005-2006, ongoing.

Performance Measures: 1. Overall success rate of the transplanted resources.

• Establish and maintain close communication with all federal, state, regional, and local governmental agencies which have an authority in natural resource management decisions that can affect the St. Joseph Bay Aquatic Preserve (Partnering). This will include close coordination with DEP permitting and regulatory offices to review and comment on proposed projects in the bay, assist with site inspections, supply documentation on site characteristics, and report violations to the appropriate enforcement offices. FY 2000-2001, ongoing.

Performance Measures: 1. Quarterly meetings with regulatory staff to provide updates and discuss relevant issues within the preserves. 2. Providing timely and accurate technical information to the appropriate agencies or offices.

Objective Two / Utilize a variety of methods to develop an information outlet to target user groups related to the value of seagrass and the importance of this habitat to the bay system.

Integrated Strategies

• Update the current St. Joseph Bay Aquatic Preserve brochure to include additional information on the importance of seagrass habitat, water quality and methods the public can use to protect these resources (Education and Outreach). FY 2006-2007, ongoing as necessary.

Performance Measures: 1. Based on the amount of brochures that are distributed annually and the requests for additional materials as well as through community feedback.

• Utilize educational signage at local ramps and marinas to inform the public on the importance of the bay's resources as well as identify shallow areas and seagrass buoy locations (Education and Outreach). FY 2010-2011.

Performance Measures: 1. Based on the number of brochures that are distributed annually at local kiosks as well as through community feedback.

• Produce an interactive CD or DVD to educate the public on the value of the natural resources in St. Joseph Bay (Education and Outreach). FY 2013-2014. (Funding will be sought through grant opportunities).

Performance Measures: 1. Based on the number of media distributed annually, public demand, and community feedback.

• Continue to provide educational and informational materials, such as boater's guides and brochures to local businesses, marinas, St. Joseph Peninsula State Park, and Black's Island community center (Education and Outreach). FY 2000-2001, ongoing.

Performance Measures: 1. Based on the number of materials distributed annually, public demand, and community feedback.

• Update the St. Joseph Bay Aquatic Preserve Boater's Guide in coordination with FWC (Partnering). FY 2011-2012, following the installation of seagrass buoys.

Performance Measures: 1. Based on the number of materials distributed annually, public demand, and community feedback.

5.2.3 / Issue Three: Coastal Development

Population growth and development have many implications for Florida's coastal areas. As populations continue to rise, the need and demand for development, infrastructure, and services increases, which could lead to environmental and economic impacts. Population increase exerts additional pressure on natural resource consumption. Land use planning for the protection of natural resources and the associated ecosystems is based on the principle that a location's environmental characteristics render the area inherently more suitable for some land uses than others (NWFWMD, 2000). Impacts on marine resources from adjacent land uses may result from either the direct use of the marine resources through such structures as docks, piers, and marinas or through effects from upland activities through means such as stormwater runoff and septic tank drainage (point and nonpoint sources of pollution). The ability to anticipate land use change and predict the consequences of the changes will depend on the ability to understand the past, current, and future drivers of land use change. These factors as well as other emerging social and political factors may have significant effects on future land use. Patterns of land use, land cover change, and land management are shaped by the interaction of economic, environmental, social, political, and technological forces on local to global scales.

Local government comprehensive plans are intended to guide future development so as to "preserve and enhance present advantages; encourage the most appropriate use of land, water and resources, consistent with the public interest; overcome present handicaps; and deal effectively with future problems that may result from the use and development of land within their jurisdictions" (Section 163.3161(3), Florida Statutes [F.S.]). The largest landowner in the watershed is the St. Joe Company. The majority of the St. Joe Company land has traditionally been used to grow trees as a source of pulpwood for the production of paper products (NWFWMD, 2000). Recent reorganization of the company changed the company's focus, however, to large-scale, residential, commercial, resort and related development. The following table provides the current permitted land use summary for Gulf County.

Land Use	Acres	Percent
Agriculture	283,814.5590	76.78%
Conservation	51,642.6794	13.97%
Industrial	425.7382	0.12%
Mixed Comm/Res	5,583.8497	1.51%
Municipal	8,998.1929	2.43%
Public	1,459.8366	0.39%
Recreation	944.6403	0.26%
Residential	13,614.7885	3.68%
Water	3,181.2682	0.86%
Total	369,665.5528	100.00%

SOURCE: Gulf County, 2006

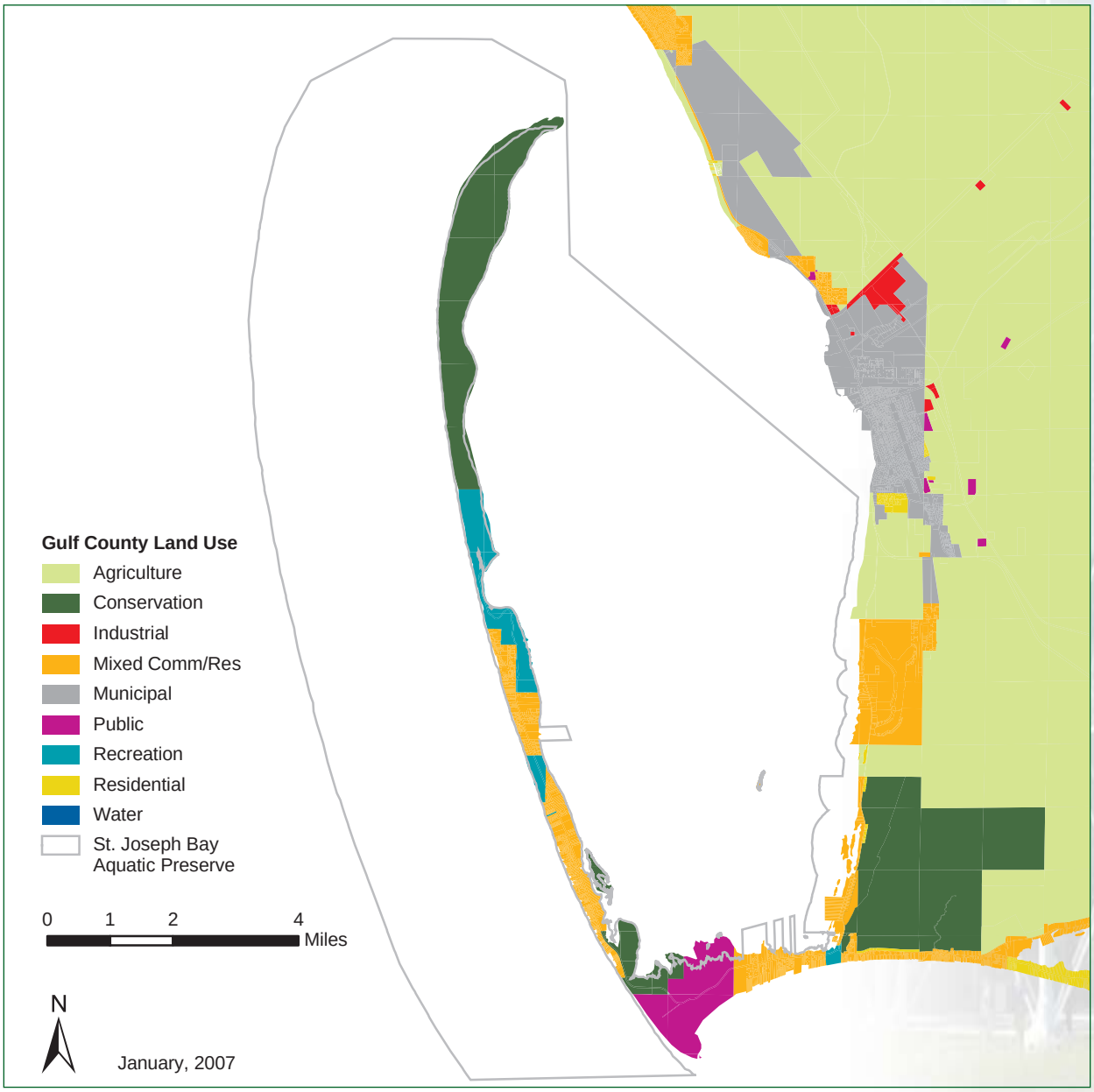
Table 2 / Current Land Use in Gulf County 2006

Table 2 provides a general view of land use in Gulf County, Florida. The data was developed in 2004 using the Gulf County Property Appraisers parcel data. According to the Gulf County, the majority of the land is classified as agriculture (76.78%) which includes private forest lands that cover a major portion of the county. Conservation land comprises approximately 14% of the county and is mainly adjacent to the Apalachicola River. Map 18 Illustrates the Gulf County Permitted Zoning Land Use.

In 1995, the NWFWMD used a statewide Florida Land Use and Cover Classification System which is maintained by the Florida Department of Transportation to determine the land use within Gulf County. The 1995 residential land use for the county was 1.71% according to the NWFWMD. As of 2006, 3.7% of the county's zoned land use was residential. Gulf County includes the coniferous plantations (private forest lands) in the agriculture land use section shown in Table 2, which explains the differences in agriculture percentage between Map 18 and Map 19. According to the U.S. Fish and Wildlife Service National Wetlands Inventory, it is estimated that approximately 70% of Gulf County consists of wetlands. Evaluations of the relationship between land use and water quality consistently report that urban

land uses have the greatest nonpoint source pollutant loading per unit of area, generally followed by agricultural and lower intensity land uses (Harper, 1994; NWFWMD, 1998). Map 19 illustrates the Land Use Surrounding St. Joseph Bay.

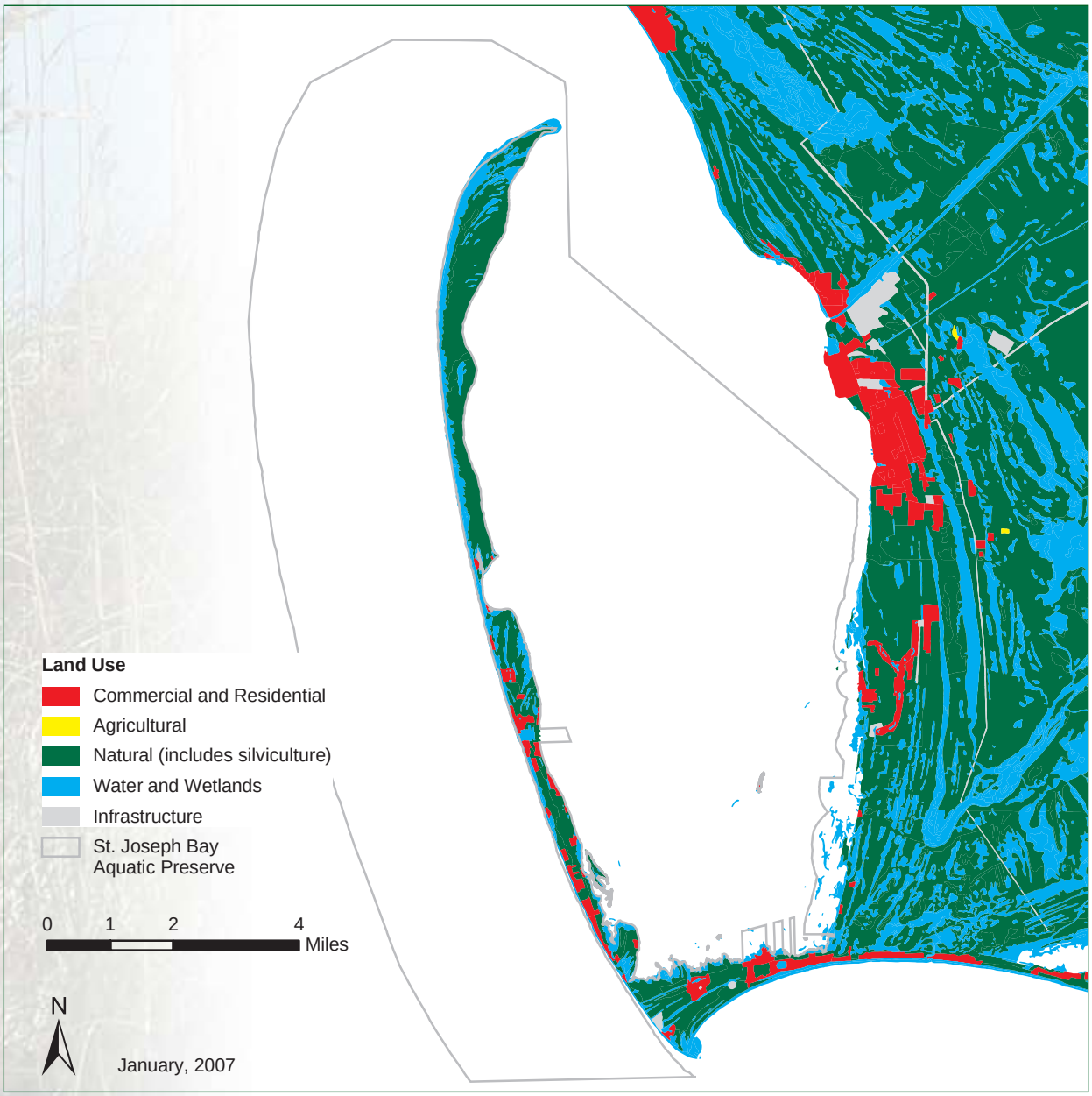
The margins of St. Joseph Bay are surrounded by the city of Port St. Joe along the eastern shoreline near the mouth of the canal and by St. Joseph Peninsula State Park located on the western shoreline. Residential development is steadily increasing around the bay and along St. Joseph Peninsula. Major industries located adjacent to the bay, or along the nearby Gulf County Canal, include a former paper mill site, two chemical companies and a coal-handling facility (Hemming et al., 2002). The Gulf County Canal is maintained to the same standards as the Gulf Intracoastal Waterway and connects the shipping canal to the Intracoastal Waterway. The shipping channel is congressionally authorized to a depth of 37 feet. Commercial fishing vessels and associated fish-processing facilities are also located on the canal. The City of Port St. Joe operates an Industrial Wastewater Treatment Plant with a permitted discharge into the Gulf County Canal. The point of discharge is located on the south side of the canal approximately 0.42 miles above the point where the canal empties into the bay (Hemming et al., 2002). Discharge volume is approximately 39.5 million gallons per day (EPA, 1996). Point sources are permitted to discharge certain



Map 18 / Gulf County Permitted Land Use

pollutants in specific amounts to the land or surface waters. The National Pollutant Discharge Elimination System is administered by the EPA, but the permitting of discharges within Florida has been delegated to the DEP. These permits are reviewed and renewed at designated intervals. The overall assimilative capacity of the system is unknown, although specific permits are issued based on the results of water quality based effluent limit studies (NWFWMD, 2000). Waste created by the pulp-bleaching process was a major cause of point source pollution to St. Joseph Bay during the 61 years of operation. Map 20 illustrates the locations of all the facilities within Gulf County.

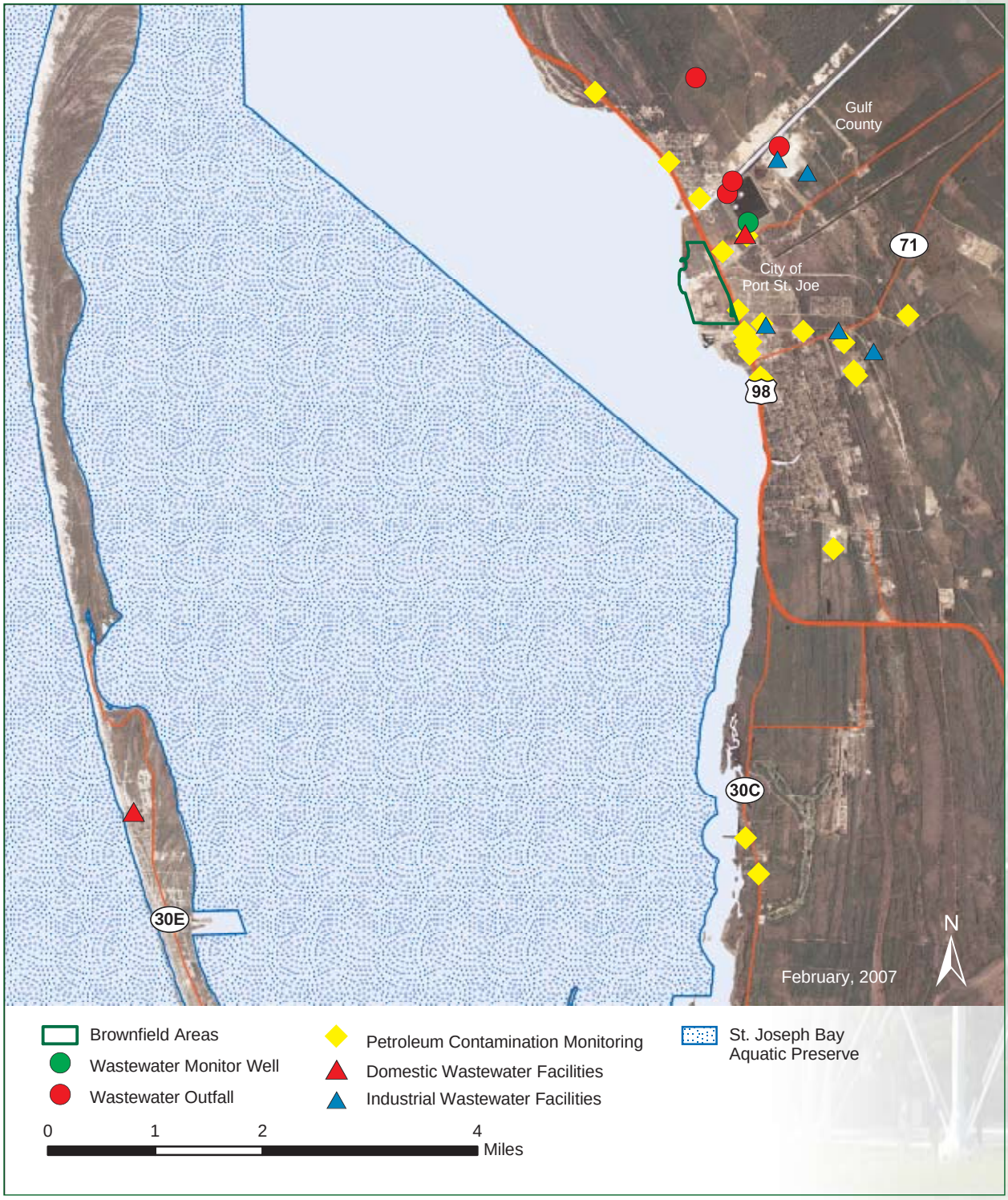
In order to ensure that water quality does not further diminish, it is imperative that we preserve the surrounding wetlands directly adjacent to the bay. Continued land acquisitions for the purposes of conservation in areas that directly protect the neighboring wetlands from nonpoint sources of pollution will ensure high water quality standards. Consequentially, obtaining additional, remaining undeveloped shoreline surrounding the bay is a high priority. Priority land acquisition parcels have been developed, with an emphasis on the most productive ecosystems that border St. Joseph Bay. Aquatic buffer zones serve as natural boundaries that aid in water quality protection by filtering pollutants, sediments, and nutrients from stormwater runoff as well as providing erosion control and habitat for native species of plants and



Map 19 / Land Use Surrounding St. Joseph Bay

animals. In 1995, the St. Joseph Bay State Buffer Preserve was established with the initial purchase of 700 acres. The primary purpose of the buffer preserve land is to protect and preserve the wetlands and water resources of the adjacent aquatic preserve. Today, the buffer preserve consists of over 5,000 acres of conservation lands. Map 21 illustrates priority land acquisition parcels for St. Joseph Bay.

Goal One / Protect the natural ecological functions of St. Joseph Bay from impacts due to increased adjacent land use and coastal development.

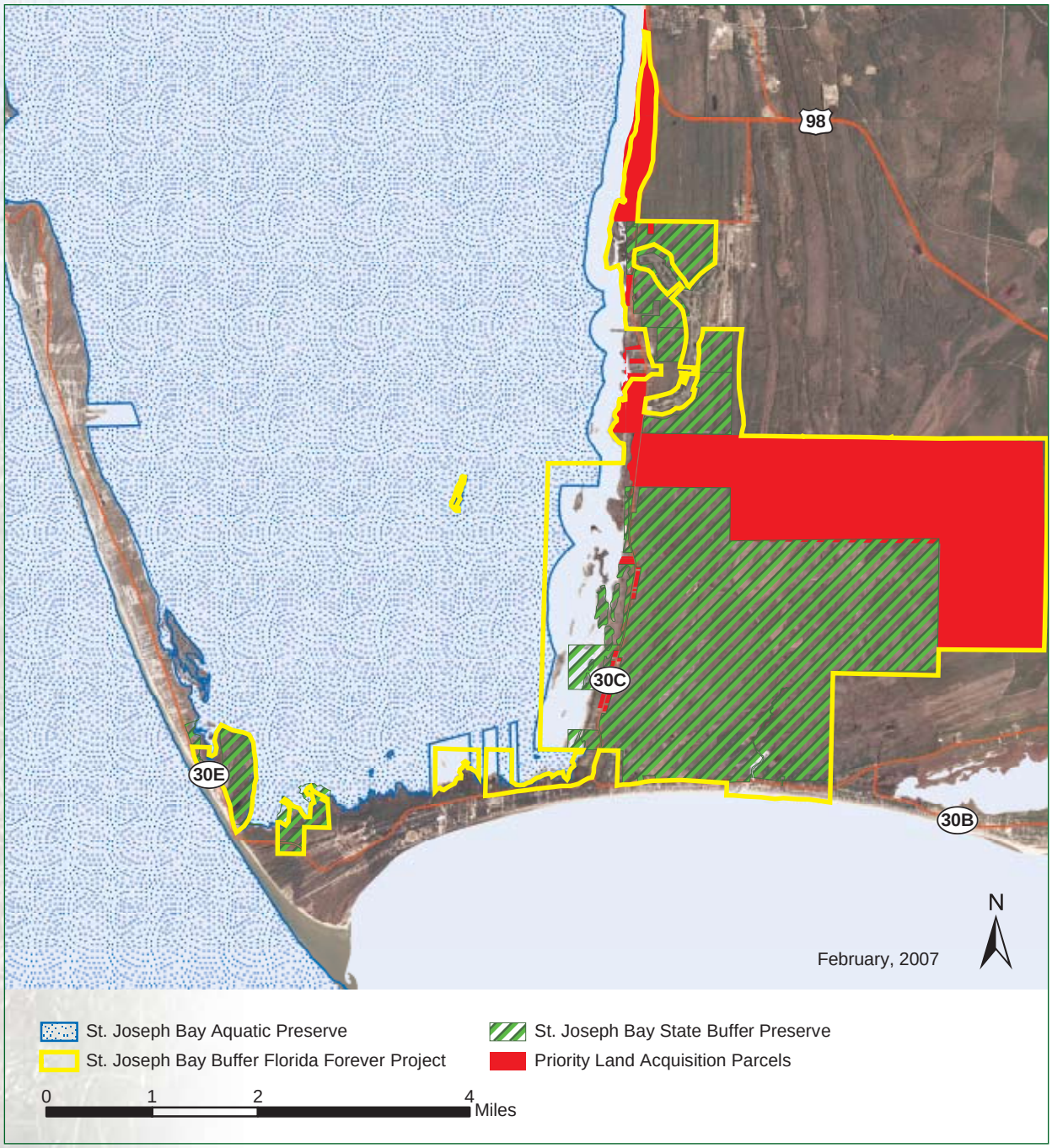


Map 20 / Point Sources of Pollution in St. Joseph Bay

Objective One / Retain the natural biological and ecological diversity of the bay system and to evaluate the cumulative impacts of coastal development on adjacent lands. Establish monitoring projects/protocols to evaluate the cumulative impacts of development activities on adjacent lands and support land acquisition opportunities that protect the buffer, in order to retain the diversity and unique visual character of the bay.

Integrated Strategies

- Establish effective monitoring projects/protocols to determine potential impacts from adjacent land use activities (Ecosystem Science). This will include identifying, developing, and implementing additional water quality monitoring sites as needed. This strategy was discussed previously in Section 5.2 Water Quality. FY 2009-2010, ongoing.



Map 21 / Priority Land Acquisition Parcels for St. Joseph Bay

• Review and provide comments on permits related to construction and development activities within and adjacent to the aquatic preserve (Resource Management). This will include reviewing upland land use actions, comprehensive plans, and county or municipal ordinances which have the potential to impact natural resources. The preserve will promote living shorelines as a means to decrease erosion and protect water quality and resources in the bay and will continue to encourage the placement of docks and piers in locations that transverse the least amount of saltmarsh and seagrass habitat. In addition, the preserve will continue to encourage property owner associations to incorporate the communal use of an individual private residential dock or a private residential multi-slip dock within their community, as opposed to the building of numerous personal docks to aid in the protection of valuable habitat. FY 1998-1999, ongoing.

Performance Measures: 1. Quarterly regulatory meetings to coordinate with district staff on specific issues as well as documentation on the annual number of permits issued within the preserve and whether recommendations have been considered and implemented in the process. 2. Permit compliance and the rate of compliance will be looked at and compared to the number of violations reported to the preserve and whether these numbers are increasing or decreasing on an annual basis.

• Continue to participate in the National Estuarine Research Reserve's Coastal Training Program local workshops by giving presentations and distributing information which targets coastal development issues (Education and Outreach). FY 2004-2005, ongoing.

Performance Measures: 1. Evaluation of workshop feedback surveys in regards to topics and presented information.

• Promote compatible, non-impactive recreational opportunities within the aquatic preserve's boundaries that balance public use and the need to protect and preserve site resources through participation in local workshops, festivals, and local events (Public Use). FY 1998-1999, ongoing.

Performance Measures: 1. Participation in at least six events per year.

• The preserve will continue close coordination with the St. Joseph Bay State Buffer Preserve which supports bay-related research in regards to the effects of sea level rise on habitats in and adjacent to the bay and will provide assistance to additional ongoing research topics related to the transitional zone between land and water (Partnering). This may include assisting the buffer preserve in the identification of priority land acquisition parcels with an emphasis on the most productive ecosystems adjacent to the bay, maintaining and updating GIS data layers of these parcels, and assisting with listed species mapping efforts located within these areas. FY 2006-2007, ongoing.

Performance Measures: 1. Completed resource inventories. 2. Annual gain/loss of valuable adjacent habitat.

• Maintain effective partnerships with local, state and federal regulatory programs, local government, and adjacent land owners to monitor development activities adjacent to St. Joseph Bay that may cause impacts to natural resources and/or a loss of biodiversity (Partnering). Maintaining partnerships is associated with other goals, objectives and strategies throughout the management plan and is an ongoing activity. FY 1998-1999, ongoing.

Performance Measures: 1. Annual reviews and assessments of environmental conditions in the bay as well as public feedback through community events.

• Establish an effective partnership with the Black's Island community to promote non-impactive recreational activities to visitors through presentations, educational signage, and brochure distribution (Partnering). FY 2008-2009, ongoing.

Performance Measures: 1. Based on the number of public participants at each workshop and the amount of educational materials distributed annually. 2. Development of a St. Joseph Bay Aquatic Preserve Public Use Report.

Saltmarsh habitat in Simmons Bayou serves as exclusive habitat for a variety of juvenile fish, invertebrates, birds, reptiles, and mammals.

5.2.4 / Issue Four: Saltmarsh Decline

Saltmarshes dominate temperate, coastal regions of the United States. Saltmarsh vegetation is adapted to withstand inundation by salt water during high tide and is divided into two areas based on flooding cycles. The low marsh is flooded frequently by tidal cycles and is composed of species able to withstand the tidal flooding and changes in salinity, temperature, and water levels. The high marsh is flooded less frequently and is composed of species less tolerant to hypersaline conditions (Atlantic States Marine Fisheries Commission [ASMFC], 2006). Saltmarsh vegetation controls erosion by four mechanisms. First, marsh vegetation traps sediment in the root matrix and provides stability by holding sediment in place. Second, marsh vegetation dissipates wave energy. Third, vegetation slows the velocity of the water to allow sediment deposition; and fourth, marsh systems use dunes as sand storage units that act as reservoirs of sand for erosion and offshore bar formation during storms (ASMFC, 2006). Saltmarshes also sequester sediment and pollutants from upland runoff, which removes nutrients that contribute to eutrophication. By trapping and retaining sediment, saltmarshes can actually lead to shoreline accretion (ASMFC, 2006).

Human interaction has the potential to cause immediate and long-term changes to the saltmarsh. Many disturbances can relate to a multitude of stressors to the saltmarsh habitat, such as filling, the impacts of tidal restrictions, land use and long-term impacts from global climate change. Erosion is a natural, ongoing process in coastal areas in which sand is taken from one part of the shore and transported and deposited further along the shore. As this natural process progresses, some beaches or shores are reduced in size while others may grow in size. Because humans now use large portions of our shorelines for housing, fishing, or other recreational and commercial activities, the loss of shoreline is seen as a detriment (ASMFC, 2006). Sea level rise and wave action are the predominant long-term, passive processes that drive shoreline erosion. Resource managers must work to meet the sometimes divergent goals of maintaining quality habitat and preserving private property and public infrastructure.

According to the "Living Shorelines: Habitat Impacts of Erosion Control Measures" report by the Atlantic States Marine Fisheries Commission, living shorelines using marsh grass can be established on shorelines naturally devoid of vegetation or used to restore a marsh in a declining state. Planted marshes should account for slope, exposure to wave action, soil characteristics, nutrient supply and salinity. They should also take into account the tidal regime of the area. Planted marshes mimic the life cycle of natural marshes. Marshes establish, become stable then eventually erode. The functional life of a marsh is the period of time it prevents erosion. Manmade marsh systems may have a shorter functional life because they are planted in areas with harsh conditions that do not naturally support marsh systems (ASMFC, 2006).

The entire shoreline of St. Joseph Bay is bordered by saltmarsh habitat, which plays an important role in the food web of St. Joseph Bay. This habitat generally develops along low-energy coasts under stable or emergent conditions. Saltmarsh habitat constitutes an extremely productive ecosystem. Black needlerush (*Juncus roemerianus*) and smooth cordgrass (*Spartina alterniflora*) are the dominant species found in St. Joseph Bay. The ecological significance of saltmarsh habitat to the bay is that it serves as the exclusive habitat for a variety of invertebrates, birds, reptiles and mammals. This habitat in the bay provides protection to adjacent low-lying uplands from saltwater intrusion and coastal erosion and is an important nursery ground and refuge for valuable commercial and recreational species. In the early 1990s, the saltmarsh surrounding St. Joseph Bay began showing signs of stress and started dying off.

These areas of stressed saltmarsh may appear brown and there is little or no live above-ground vegetation. Causes of marsh die-off may be drought related or caused by biotic or other stressors including pathogens, chemical spills, or sediment starvation (Flory & Alber, 2002). Studies conducted by the FWRI in the early 1990s indicated that the die-off was a result of an undetermined and recurring pathogen.

Goal One / Determine the current status of the saltmarsh ecosystem.

Objective One / Complete an accurate assessment of the saltmarsh habitat in St. Joseph Bay through mapping and monitoring efforts to identify the status/trends of the ecosystem.

Integrated Strategies

• Establish a Saltmarsh Monitoring Plan for St. Joseph Bay utilizing advanced GIS technology, hyperspectral imagery, historical aerial photographs and historical research data to provide baseline data on the status and trends of the saltmarsh ecosystem and identify areas of critical concern (Ecosystem Science). FY 2007-2008, ongoing.

Performance Measures: 1. Development of a Saltmarsh Monitoring Plan that will discuss the current status of the habitat and will explore future monitoring and/or restoration needs and opportunities as well as reasons and consequences behind declines in habitat.

• Develop and implement a Saltmarsh Restoration Plan preceding initial assessments and monitoring activities to identify critical areas (Resource Management). FY 2012-2013.

Performance Measures: 1. Development of a restoration plan that will identify critical habitat locations, reasons for die-off, and restoration plans for St. Joseph Bay.

• Coordinate with FWRI in the implementation of the Saltmarsh Monitoring Plan through planned site inspections and review of historical data in FY 2007-2008 (Partnering). The preserve will also seek guidance and assistance from FWRI with any restoration efforts that may occur following the analysis of the technical report in FY 2012-2013.

Performance Measures: 1. Analysis of the project's success in determining the cause and consequences behind saltmarsh habitat loss in St. Joseph Bay and the ability to restore this habitat. This information will be included in the restoration plan.

Cape San Blas is one of the quickest eroding beaches in the state. The narrowed beaches and minimal dunes provide inadequate protection to upland property.

5.2.5 / Issue Five: Beach Impacts on St. Joseph Peninsula

Beach Erosion

Beach erosion threatens the very resource that residents and visitors enjoy. Over 409 miles, or approximately 50% of the state's beaches, are experiencing erosion. At present, about 299 of the state's 825 miles of sandy beaches are experiencing critical erosion, a level of erosion which threatens substantial development, recreational, cultural, and environmental interests (DEP, 2006a). In 1995, Hurricane Opal ravaged the beaches of the St. Joseph Peninsula, displacing thousands of tons of sand and destroying the dune system. Between 1995 and 2005, repetitive damaging storms have continued to erode sand from the already depleted peninsula beaches. Cape San Blas is designated as one of the most severely eroding areas in Florida. It is currently eroding at a pace of about 40 feet per year, and more severely with each passing storm. A combination of storm events and beach erosion has resulted in narrowed beach widths and minimal or non-existent dunes adjacent to the aquatic preserve on St. Joseph Peninsula. These conditions provide inadequate protection to upland property from damage due to storm-induced erosion. The present condition of the shoreline has resulted in the destruction and relocation of a number of structures. Further, the narrowed beaches are often inadequate to support recreational use and constitute stressed habitat for sea turtles, beach mice, and marine life. Continued erosion on the peninsula has significantly reduced the amount of beach available for public use and for recreation such as beach driving.

On June 20, 2006 the Gulf County Board of Commissioners applied to the DEP for a permit/water quality certification and authorization to use sovereign submerged lands owned by the Board of Trustees of the Internal Improvement Trust Fund to restore 7.5 miles of shoreline from R-67 to R-105 using beach compatible sand from two offshore borrow areas (Area A and Area C). Borrow Area C is located approximately 0.6 to 2.8 miles offshore of St. Joseph Peninsula between R-84 and R-97, within the St. Joseph Bay Aquatic Preserve boundaries. Refer to Map 4 for DEP "R" Monument locations.

Based on the ecological characteristics within the proposed project area there is concern as to how this project may affect the existing environmental resources on the peninsula. The placement of sand may increase sea turtle nesting habitat provided that the sand is highly compatible with naturally occurring beach sediments and that compaction and escarpment remediation measures are incorporated into the

project (Coastal Tech, 2006). Potential negative effects to sea turtles include possible nest destruction, harassment in the form of disturbing or interfering with female turtles attempting to nest within the construction area or on adjacent beaches, disorientation of hatchlings on beaches adjacent to the construction area, and behavior modification of nesting female turtles due to escarpment formation within the project area during the nesting season, resulting in false crawls or situations where they choose marginal or unsuitable nesting areas to deposit their eggs (Coastal Tech, 2006). A Sea Turtle Mitigation Plan is in the process of being developed for the beach renourishment by Gulf County in coordination with other agencies. This plan will detail sea turtle mitigation efforts to occur during the construction project. The St. Joseph Bay Aquatic Preserve is actively participating in this process and has provided comments related to the project to the appropriate regulatory offices. The preserve will continue to assist the county and FWS with necessary environmental monitoring, data, and technical support and recommends that this project take place outside of sea turtle nesting season (May 1 – October 31).

Beach Driving

Historically, motorized vehicular traffic has been permitted by county ordinance below the natural vegetation line on the beaches adjacent to the aquatic preserve on St. Joseph Peninsula. Rapid erosion rates, however, have left areas of the beach extremely narrow in this area. Because of this, high tides and exposed tree stumps often force drivers up onto the dry, sand area, damaging fore-dunes, pioneer dune vegetation, sea turtle nesting habitat as well as other important wildlife habitat. St. Joseph Peninsula adjacent to the preserve serves as valuable nesting habitat for the threatened loggerhead sea turtle (*Caretta caretta*) and the endangered green sea turtle (*Chelonia mydas*). This area has the highest density of loggerhead sea turtle nesting in the panhandle. Since 2002, however, sea turtle nesting numbers have drastically declined. Increasing development, lighting issues, recreational impacts due to beach driving and severely eroded shorelines may all play a role in this decline. Over the last 10 years, the number of incident reports involving sea turtle adults and hatchlings, destruction of dune habitat and vegetation by vehicles, vehicles accessing the beach at illegal access points and habitat damage due to all-terrain vehicles has continued to increase. In areas where motor vehicles are allowed on the beach or where illegal beach driving occurs, the use of headlights during night driving can disrupt the nesting process and disorient hatchlings. Tire ruts can also interfere with the hatchlings' ability to reach the sea and vehicles can damage nests and run over hatchlings. In 2001, Gulf County established a lighting ordinance to create regulations for the protection of sea turtles and other enumerated species within certain beaches of the county (see Appendix E). The intent of this ordinance is to protect state and federally listed species that utilize the beach habitat of Gulf County, more specifically, nesting female and hatchling marine turtles, beach mice and shorebirds, from the adverse effects of artificial lighting and from injury or harassment caused by such lighting and its effects. Artificial light or lighting refers to light emanating from any device other than natural celestial light sources. Because nesting sea turtles and hatchlings are sensitive to the effects of light it is important to turn off all beachfront lighting during the evening and night time hours. It is also important to educate residents and renters to the impacts of lighting on these species.

St. Joseph Peninsula has the highest density of nesting loggerhead sea turtles in the panhandle. This area also provides critical nesting habitat for the endangered green sea turtle which nests here every other year.

In 2003, in an effort to reduce the adverse impacts to the natural resources on the peninsula from vehicular traffic, the aquatic preserve coordinated with FWS and Gulf County to develop a Memorandum

St. Joseph Peninsula serves as valuable nesting habitat for threatened and endangered sea turtles. Tire ruts pose hazards to turtle hatchlings by trapping them and preventing them from making their way to the water.

of Agreement (MOA). This MOA outlines necessary requirements for beach driving on the six-mile stretch of beach between the Stumphole area and the state park boundaries which lie adjacent to the preserve. Provisions of this agreement include the establishment of a buffer zone; closing the beach to vehicular traffic on certain high tides; provision of extra law enforcement on public holidays; and closing the beach at night during sea turtle nesting season, with the exception of emergency vehicles, law enforcement, and permitted turtle patrol. Additionally, in April 2004, Gulf County and the DEP collaborated to install a second beach gate approximately 150 yards north of the Stumphole access.

Allowing vehicles to continue to attempt to drive on this portion of the beach between the state park boundaries and Stumphole poses hazards to pedestrians, personal vehicles, dune systems, and vegetation that aids in preventing further erosion. In addition, this activity leads to the damage of critical beach habitat that supports sea turtle nesting, shorebirds and beach mice. Furthermore, although archaeological sites tend to be located more towards the bay than the gulf, beach driving between the Stumphole and the entrance to the state park may have a direct or indirect adverse impact on any historical resources, either known or unknown, that occur there. Gulf County has submitted an application to the FWS for an Incidental Take Permit for allowing the public to drive on the beaches within the project area. The county will continue to coordinate with the FWS to complete the incidental take permitting process and shall continue to implement the Gulf County Habitat Conservation Plan (HCP) dated January 2004 as well as current agreements related to the enforcement of the Gulf County Beach Driving Ordinance (see Appendix E). The HCP focuses on assessing and reducing potential impacts resulting from coastal artificial lighting, beach driving, and other related recreational activities through avoidance, minimization, and mitigations (HCP, 2004). In addition, the HCP provides a management strategy under which vehicular access and restricted beach driving may continue in a manner that is compatible with sea turtle and piping plover protection (HCP, 2004).

The aquatic preserve recognizes the importance of the traditional uses of the local beaches and resources adjacent to the preserve. Therefore the preserve will continue to coordinate with Gulf County, FWS, the Gulf Coast Conservation Association (GCCA), and the local community to find a solution that will serve the people and this essential habitat to threatened and endangered nesting sea turtles.

Goal One / Protect and conserve the natural dune vegetation sea turtle nesting and shorebird habitat as well as other critical species habitat from further impacts due to beach driving, erosion, and artificial lighting on the beaches adjacent to the aquatic preserve.

Objective One / Complete an assessment of the affects of beach erosion and recreational impacts to threatened and endangered sea turtle nesting habitat.

Integrated Strategies

• Perform biweekly beach surveys on the St. Joseph Peninsula between the state park boundaries and Stumphole to document recreational impacts on sea turtle nesting habitat (Ecosystem Science). This project will remain a high priority due to ongoing erosion concerns and the current beach nourishment project. FY 1998-1999, ongoing.

Performance Measures: 1. Development of a St. Joseph Bay Listed Species Report that will provide an assessment of nesting data, environmental conditions, survey results, and program implementation needs.

• Provide review, comments and necessary data on permits, progress reports and environmental impact studies related to the beach nourishment project and the protection of nesting sea turtle habitat (Resource Management). This will include continued participation in the St. Joseph Peninsula Beach Advisory Committee to offer guidance as needed on environmental issues, site characteristics, and public access issues. FY 2006-2007, ongoing for the duration of the project.

Performance Measures: 1. Evaluation of permit compliance via the number of violations reported.

• Develop an MOA in coordination with Gulf County and FWS to establish techniques for the management of vehicular traffic to reduce adverse impacts to natural resources and essential sea turtle nesting habitat (Partnering). This will include close coordination with local law enforcement to develop a response plan for preserve staff and citizens to report beach violations. FY 2007-2008, ongoing.

Performance Measures: 1. Completion of the MOA and an annual evaluation of local citizens designed to indicate where protection efforts are working and where additional attention is needed.

• Continue close coordination with the University of Florida, GCCA, and FWC in efforts to monitor and protect sea turtle nesting habitat on beaches adjacent to the preserve (Partnering). Regularly scheduled meetings to discuss concerns on habitat impacts, decreased nesting numbers, and increased disorientations and recreational beach equipment issues are needed. FY 2007-2008, ongoing.

Performance Measures: 1. The reporting of accurate data in regards to monitoring, disorientations, hatch success, and violations to appropriate agencies or offices in a timely manner and assessing the progress of these activities through the development of a sea turtle monitoring status report in FY 2008-2009.

Objective Two / Coordinate with Gulf County and the GCCA to assist in actively enforcing beach lighting on new and existing construction on beaches adjacent to the preserve and to ensure that the lighting ordinance is provided to contractors upon submission of building permits.

Integrated Strategies

• Establish a volunteer network in coordination with the Friends of the St. Joseph Bay Preserves and GCCA to educate residents and visitors to the impacts of artificial lighting and the effects to nesting sea turtles and hatchlings (Education and Outreach). This will include producing and distributing educational materials to local real estate offices. This will also include publishing notices and articles in the local newspaper and presenting information to the local television station to educate the public on the importance of St. Joseph Peninsula to nesting sea turtles. FY 2008-2009, ongoing. (Funding will be accomplished through grant opportunities and partnerships.)

Performance Measures: 1. Development of a survey that will be distributed at local events and in rental properties to assess the preserve's progress in delivering educational materials to the appropriate users.

Many technologies are employed by staff in testing, surveying, and monitoring assets of the aquatic preserve.

Part Three

Additional Plans

Chapter Six

Administrative Plan

Successful implementation of the St. Joseph Bay 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. The aquatic preserve is currently housed under a portion of the Apalachicola National Estuarine Research Reserve's (ANERR) program administration. As per the ANERR Management Plan 1998-2003, objectives of the program included 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 preserve.

Staffing

The Central Panhandle Aquatic Preserves Office is responsible for the management of three aquatic preserves in Franklin and Gulf counties. These include Alligator Harbor Aquatic Preserve (14,366 acres), Apalachicola Bay Aquatic Preserve (80,000 acres), and St. Joseph Bay Aquatic Preserve (73,000 acres). As of FY 2007-2008, staff includes the aquatic preserve manager (FTE) and two Other Personal Services (OPS) Environmental Specialist I positions. Each of these positions is state-funded. In order to run an effective program and accomplish the goals set out in this plan, the preserve must offer some kind of incentive to retain talented and dedicated staff. Converting one of these OPS positions to FTE status would be a benefit for the program and will remain a high priority for the preserve. The cost of living in Franklin and Gulf counties is relatively high and will continue to increase with new development. Over the next 10 years as development increases along the coast additional OPS staff may be necessary to continue adequate research and monitoring efforts within the Central Panhandle Aquatic Preserves.

Staff analyze seagrass samples in the lab for biomass and epiphyte coverage to determine the health of these valuable communities.

Chapter Seven

Facilities Plan

Facilities

The St. Joseph Bay Aquatic Preserve office is currently housed within the Apalachicola National Estuarine Research Reserve's (ANERR) Eastpoint, Florida facility. This includes an 8,000 square foot complex that is located on the east side of Apalachicola Bay. The facility includes 4,000 square feet of office space, a 1,000 square foot laboratory and a 3,000 square foot maintenance shop (ANERR, 1998). Upon the occasion of a hurricane storm event, all vessels and vehicles of the preserve will follow the procedures outlined in the ANERR Hurricane Plan, which is updated yearly.

Vehicles

The Central Panhandle Aquatic Preserves Office acquired a 2001 Chevy 4WD Blazer in February 2007. Prior to this, the preserve borrowed a vehicle from ANERR. The Blazer has over 100,000 miles and needs extensive labor to tow a boat long distances. Due to extensive problems with this vehicle, the preserve will surplus this vehicle and receive a new vehicle in FY 2007-2008. Future needs will include increased funding for fuel costs. Maintenance costs are estimated at $2,000 a year. Fuel costs are estimated at $4,000 a year and may exceed the preserve's base budget.

Vessels

- **19' Twin Vee Bay Cat** – In 2004, the preserve acquired a 19 foot Twin Vee Bay Cat Skiff and trailer that are utilized to accomplish program management goals. This vessel is maintained through monthly inspections performed by staff and through scheduled hourly maintenance as it pertains to the warranty. Future expenses over the next 10 years may include replacing the boat, motor and/or trailer.

  Future expenses also include vessel and trailer maintenance as well as fuel and will cost approximately $3,000 per year pending an increase in fuel prices.
- **Tandem Kayak** – Acquired in 2002 to use while monitoring seagrass habitat in shallow areas.

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Appendix A

Legal Documents

A.1 / ***Aquatic Preserve Resolution***

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

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

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

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

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

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

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

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

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

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

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

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

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

(6) Neither the establishment nor the management of an aquatic preserve shall infringe upon the lawful and traditional riparian rights 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
EARL FAIRCLOTH, Attorney General
BROWARD WILLIAMS, Treasurer
DOYLE CONNER, Commissioner of Agriculture

TOM ADAMS, Secretary of State
FRED O. DICKINSON, JR., Comptroller
FLOYD T. CHRISTIAN, Commissioner of Education

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

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

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

- ***Florida Statutes, Chapter 253: State Lands***
- ***Florida Statutes, Chapter 258: State Parks and Preserves***

  Part II (Aquatic Preserves)
- ***Florida Statutes, Chapter 370: Saltwater Fisheries***
- ***Florida Statutes, Chapter 372: Wildlife***
- ***Florida Statutes, Chapter 403: Environmental Control***
  (Statute authorizing Florida Department of Environmental Protection to create Outstanding Florida Waters is at 403.061(27))
- ***Florida Statutes, Chapter 597: Aquaculture***

A.3 / ***Florida Administrative Codes***

- ***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***
  http://www.dep.state.fl.us/legal/Rules/shared/18-21.pdf
- ***Florida Administrative Code, Chapter 62-302: Surface Water Quality Standards***
  (Rule designating Outstanding Florida Waters is at 62-302.700)
  www.dep.state.fl.us/legal/Rules/shared/62-302/62-302.pdf

Appendix B

Resource Data

*B.1 / **Acronym List***

Acronyms	Definitions
ANERR	Apalachicola National Estuarine Research Reserve
ASMFC	Atlantic States Marine Fisheries Commission
BTIITF	Board of Trustees of the Internal Improvement Trust Fund
CAMA	DEP, Office of Coastal and Aquatic Managed Areas
CRCP	Coral Reef Conservation Program
CTP	Coastal Training Program
CZM	Coastal Zone Management
DACS	Florida Department of Agriculture and Consumer Services
DEP	Florida Department of Environmental Protection
DNR	Florida Department of Natural Resources (now DEP)
DOH	Florida Department of Health
DOT	Florida Department of Transportation
EPA	U.S. Environmental Protection Agency
F.A.C.	Florida Administrative Code
F.A.W.	Florida Administrative Weekly
FNAI	Florida Natural Area Inventory
FMRI	FWC, Florida Marine Research Institute (now FWRI)
F.S.	Florida Statutes
FTE	Full-Time Equivalent
FWC	Florida Fish and Wildlife Conservation Commission
FWS	U.S. Fish and Wildlife Service
FWRI	FWC, Florida Wildlife Research Institute
FY	Fiscal Year
GEMS	Gulf Ecological Management Sites
HCP	Gulf County Habitat Conservation Plan
NERR	National Estuarine Research Reserve
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NWFWMD	Northwest Florida Water Management District
OFW	Outstanding Florida Water
OPS	Other Personal Services
ppt	parts per thousand
SWMP	System-Wide Monitoring Program
TDC	Gulf County Tourism Development Council

aboriginal - The original biota of a geographical region.

alluviation - The deposition of sediment by a river at any point along its course.

anaerobic - Growing or occurring in the absence of molecular oxygen.

aquaculture - The cultivation of aquatic organisms.

barrier island - A sand body that is essentially parallel to the shore, the crest of which is above normal high water level.

beach - The zone of unconsolidated material that extends landward from the mean low water line to the place where there is marked change in material or physiographic form, or to the line of permanent vegetation (usually the effective limit of storm waves).

beach renourishment - Pumping sand onto the beach and building up former dunes and upper beach after construction of an initial nourishment.

benthic community - Organisms that live on the sea floor.

borrow site - Site identified for, or remaining after, borrow material has been removed for placement onto a beach. In upland areas, the site frequently becomes a body of water. In marine areas, the site becomes a hole in a bay or nearshore area.

brevotoxin - Neurotoxins produced by the red tide *Ptychodiscus brevis Davis;*. responsible for large fish kills and mollusk and human food poisoning.

coastal geology - Origin, structure, and characteristics of the sediments that make up the coastal region, from the uplands to the nearshore region. Sediments can vary from small particles of silt or sand to larger particles of gravel and cobble, to formations of consolidated sediments and rock.

coastal plain - A broad, low relief region composed of horizontal or gently sloping strata of clastic materials fronting the coast, and generally representing a strip of sea bottom that has emerged from the sea in recent geologic time.

codify - To arrange laws and rules systematically.

coliform - Bacteria that live in the intestines (including the colon) of humans and other animals: used as a measure of the presence of feces in water or soil.

Clean Water Act (CWA) - The Clean Water Act is a 1977 amendment to the federal Water Pollution Control Act of 1972, which sets the basic structure for regulating discharges of pollutants to waters of the United States.

dioxin - An exceptional toxic and environmentally persistent chemical; one of the most powerful poisons known.

dissolved oxygen - The amount of oxygen gas dissolved in a given volume of water at a particular temperature and pressure, often expressed as a concentration in parts of oxygen per million parts of water.

diversity - A measure of the number of species and their relative abundance in a community.

domoic acid - A deadly neurotoxin which causes amnesic shellfish poisoning when consumed in contaminated mussels, clams, crabs, and anchovies; associated with algal blooms.

drainage basin (catchment) - The area from which a surface watercourse or a groundwater system derives its water; watershed.

dune - A ridge or mound of loose, wind-blown material, usually sand.

effluent - Wastewater that flows into a receiving stream by way of a domestic or industrial point source.

easement - A right that one may have in another's land.

ecosystem - A community of organisms and their physical environment interacting as an ecological unit.

emergent - An aquatic plant having most of the vegetative parts above water; a tree which reaches above the level of the surrounding canopy.

endangered species - An animal or plant species in danger of extinction throughout all or a significant portion of its range.

endemic - Native to, and restricted to, a particular geographical region.

enteric - Pertaining to the intestine.

estuary - 1) A coastal embayment where there is freshwater input that is influenced by tides. 2) The part of a river that is affected by tides. 3) The region near a river mouth in which the fresh water of the river mixes with the salt water of the sea.

eutrophication - Depletion of oxygen in water: the process by which a body of water becomes rich in dissolved nutrients from fertilizers or sewage, thereby encouraging the growth and decomposition of oxygen-depleting plant life and resulting in harm to other organisms.

extinction - The disappearance of a species from a given habitat.

fauna - The animal life of a given region, habitat or geological stratum.

flora - The plant life of a given region, habitat or geological stratum.

fluvial - Pertaining to rivers and river action.

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.

hydric - Pertaining to water; wet.

infauna - The animal life within a sediment; epifauna.

intertidal zone - The shore zone between the highest and lowest tides; littoral.

listed species - A species, subspecies, or distinct population segment that has been added to the federal list of endangered and threatened wildlife and plants.

longshore transport - A wave and/or tide-generated movement of shallow-water coastal sediments parallel to the shoreline.

low energy environments - Coastlines where wave and tidal forces are typically relatively small due to the climate, the location of the site and/or due to nearshore submerged features that function to reduce incoming wave energy.

mandate - An order or command; the will of constituents expressed to their representative, legislature, etc.

marsh - An area of soft, wet, or periodically inundated land, generally treeless and characterized by grasses.

mesic - Pertaining to conditions of moderate moisture or water supply; used of organisms occupying moist habitats.

mosaic - An organism comprising tissues of two or more genetic types; usually used with reference to plants.

mudflats - A wide area of fine sediment exposed at low tide, on the seaward side of a coast in sheltered waters.

modeling - Designing and analyzing a mathematical representation of an economic system to study the effect of changes to system variables.

National Pollutant Discharge Elimination System - The permitting process by which technology-based and water quality based controls are implemented.

nearshore - In beach terminology, an indefinite zone extending seaward from the shoreline well beyond the breaker zone.

nearshore zone - In beach terminology, the zone that extends seaward from the low tide line including the bar and trough topography that commonly extends well beyond the breaker zone.

net sediment transport - The difference between the sediment transport magnitude in the dominant direction and the transport magnitude in the secondary direction. Sediment transport is usually considered to be positive to the right as an observer looks seaward. The net sediment transport can be positive, negative, or zero.

nonpoint sources - Diffuse runoff without a single point of origin that flows over the surface of the ground by stormwater and is then introduced to surface or ground waters. Nonpoint sources include atmospheric deposition and runoff or leaching from agricultural lands, urban areas, unvegetated lands, onsite sewage treatment and disposal systems, and construction sites.

point source - An identifiable and confined discharge point for one or more water pollutants, such as a pipe, channel, vessel, or ditch.

pollutant - Generally any substance, such as a chemical or waste product into the environment that adversely affects the usefulness of a resource.

pollution - An undesirable change in the physical, chemical, or biological characteristics of air, water, soil, or food that can adversely affect the health, survival, or activities of humans or other living organisms.

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.

psammophyte - A plant growing or moving in unconsolidated sand.

relict - Remnant left after decay, disintegration, or disappearance.

revetment - a retaining wall to protect an embankment.

ruderal -Ppertaining to or living amongst rubbish or debris, or inhabiting disturbed sites. (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.

salinity - A measure of the total concentration of dissolved salts in seawater.

shoreline stabilization - Measures to retard erosion to protect upland property. Recognized erosion control measures include seawalls, revetments, jetties, groins, breakwaters, and beach nourishment.

sessile - Non-motile; permanently attached at the base.

species - A group of organisms, minerals or other entities formally recognized as distinct from other groups; the basic unit of biological classification.

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.

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.

storm tide - A rise above normal water level on the open coast due to the action of wind stress on the water surface. Storm surge resulting from a hurricane also includes that rise in level due to atmospheric pressure reduction as well as that due to wind stress.

subtidal - Environment which lies below the mean low water level.

supratidal - The zone on the shore above mean high tide level.

Surface Water Quality Standards - State-adopted and EPA approved ambient standards for water bodies. The standards prescribe the use of the waterbody (such as drinking, fishing and swimming, and shellfish harvesting) and establish the water quality criteria that must be met to protect designated uses.

threatened species - An animal or plant species likely to become endangered within the foreseeable future throughout all or a significant portion of its range.

tidal flat - Unvegetated sandy or muddy land area that is covered and uncovered by the rise and fall of the tide.

tire ruts - Caused by vehicle tires driving on soft beach sand. These ruts can be over a foot deep and a foot wide. Tire ruts in the sand may trap, misdirect, or detain hatchling sea turtles. Sea turtle hatchlings may be physically unable to climb out of the tire rut or, if they are able to do so, expend additional energy in their attempt to reach the water.

turbid - Cloudy; opaque with suspended matter.

upland - Land elevated above other land.

vegetation - Plant life or cover in an area; also used as a general term for plant life.

water column - The vertical column of water in a sea or lake extending from the surface to the bottom.

watershed - An elevated boundary area separating tributaries draining in to different river systems; drainage basin.

wetland - An area of low lying land, submerged or inundated periodically by fresh or saline water.

wildlife - Any undomesticated organisms; wild animals.

xeric - Having very little moisture; tolerating or adapted to dry conditions.

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*B.4 / **Species Lists***

B.4.1 / St. Joseph Bay Aquatic Preserve Native Species List

This is an incomplete species inventory of currently known flora and fauna in and adjacent to St. Joseph Bay. The preserve will continue to update this list as needed.

Common Name	Scientific name	State Status	FWS Status
Legend: T = Threatened • E = Endangered • SSC = Species of Special Concern			
Amphibians			
Salamanders			
Flatwoods Salamander	*Ambystoma cingulatum*	SSC	T
Marbled Salamander	*Ambystoma opacum*		
Mole Salamander	*Ambystoma talpoideum*		
Eastern Tiger Salamander	*Ambystoma tigrinum tigrinum*		
Two-toed Amphiuma	*Amphiuma means*		
One-toed Amphiuma	*Amphiuma pholeter*		
Southern Dusky Salamander	*Desmognathus auriculatus*		
Dusky Salamander	*Desmognathus fuscus*		
Southern Two-lined Salamander	*Eurycea bislineata cirrigera*		
Three-lined Salamander	*Eurycea longicauda guttolineata*		
Dwarf Salamander	*Eurycea quadridigitata*		
Alabama Waterdog	*Necturus alabamensis*		
Central Newt	*Notophthalmus viridescens louisianensis*		
Slimy Salamander	*Plethodon glutinosus glutinosus*		
Slender Dwarf Siren	*Pseudobranchus striatus spheniscus*		
Gulf Coast Mud Salamander	*Pseudotriton montanus flavissimus*		
Southern Red Salamander	*Pseudotriton ruber vioscai*		
Eastern Lesser Siren	*Siren intermedia intermedia*		
Greater Siren	*Siren lacertina*		
Toads			
Oak Toad	*Bufo quercicus*		
Southern Toad	*Bufo terrestris*		
Eastern Spadefoot Toad	*Scaphiopus holbrooki holbrooki*		
Frogs			
Florida Cricket Frog	*Acris gryllus dorsalis*		
Eastern Narrow-mouthed Frog	*Gastrophryne carolinensis*		
Western Bird-voiced Treefrog	*Hyla avivoca avivoca*		
Cope's Gray Treefrog	*Hyla chrysoscelis*		
Green Treefrog	*Hyla cinerea*		

Common Name	Scientific name	State Status	FWS Status
Legend: T = Threatened • E = Endangered • SSC = Species of Special Concern			
Southern Spring Peeper	*Hyla crucifer bartramiana*		
Pine Woods Treefrog	*Hyla femoralis*		
Barking Treefrog	*Hyla gratiosa*		
Squirrel Treefrog	*Hyla squirella*		
Gray Treefrog	*Hyla versicolor*		
Little Grass Frog	*Limnaoedus ocularis*		
Southern Chorus Frog	*Pseudacris nigrita nigrita*		
Ornate Chorus Frog	*Pseudacris ornata*		
Florida Crawfish Frog	*Rana areolata aesopus*		
Gopher Frog	*Rana capito*	SSC	
Bullfrog	*Rana catesbeiana*		
Bronze Frog	*Rana clamitans clamitans*		
Pig Frog	*Rana grylio*		
River Frog	*Rana heckscheri*		
Florida Bog Frog	*Rana okaloosa*	SSC	
Southern Leopard Frog	*Rana sphenocephala*		
Birds			
Cooper's Hawk	*Accipter cooperii*		
Sharp Shinned Hawk	*Accipter striatus*		
Spotted Sandpiper	*Actitus macularia*		
Bachman's Sparrow	*Aimophila aestivalis*		
Wood Duck	*Aix sponsa*		
Northern Pintail	*Anas acuta*		
American Widgeon	*Anas americana*		
Northern Shovel	*Anas clypeata*		
Green Winged Teal	*Anas crecca*		
Blue Winged Teal	*Anas discors*		
Mallard	*Anas platyrhyncos*		
American Black Duck	*Anas rubripes*		
Gadwell	*Anas strepa*		
Anhinga	*Anhinga anhinga*		
Brown Noddy	*Anous stolidus*		
American (Water) Pipit	*Anthus spragueii*		
Sprague's Pipit	*Anthus spragueii*		
Golden Eagle	*Aquilla chrysaetos*		
Limpkin	*Aramus guarauna*	SSC	
Black Chinned Hummmingbird	*Archilochus alexandri*		
Ruby Throated Hummingbird	*Archilochus colubris*		
Great Egret	*Ardea alba*		
Great Blue Heron	*Ardea herodias*		
Ruddy Turnstone	*Arenaria interpres*		
Short Eared Owl	*Asio flammeus*		
Lesser Scaup	*Aythya affinis*		
Redhead	*Aythya americana*		
Ring Necked Duck	*Aythya collaris*		
Canvasback	*Aythya valisineria*		
Tufted Titmouse	*Baeolophus bicolor*		
Upland Sandpiper	*Bartramia longicauda*		

Common Name	Scientific name	State Status	FWS Status
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Cedar Waxwing	*Bombycilla cedrorum*		
American Bittern	*Botaurus lentiginosus*		
Great Horned Owl	*Bubo virginiatus*		
Cattle Egret	*Bubulcus ibis*		
Bufflehead	*Buceohala albeola*		
Common Golden-eye	*Bucephala clangula*		
Red Tailed Hawk	*Buteo jamaicensis*		
Red Shouldered Hawk	*Buteo lineatus*		
Broad Winged Hawk	*Buteo platypterus*		
Swainson's Hawk	*Buteo swainsoni*		
Green Heron	*Butorides virescens*		
Sanderling	*Calidris alba*		
Dunlin	*Calidris alpina*		
Baird's Sandpiper	*Calidris bairdii*		
Red Knot	*Calidris cantus*		
White Rumped Sandpiper	*Calidris fuscicollis*		
Purple Sandpiper	*Calidris maritima*		
Western Sandpiper	*Calidris mauri*		
Pectoral Sandpiper	*Calidris melanotos*		
Least Sandpiper	*Calidris minutilla*		
Semipalmated Sandpiper	*Calidris pusilla*		
Chuck Will's Widow	*Caprimulgus carolinensis*		
Whip Poor Will	*Caprimulgus vociferus*		
American Egret	*Casmerodius albus*		
Veery	*Catharus fuscescens*		
Hermit Thrush	*Catharus guttatus*		
Gray Cheeked Thrush	*Catharus minimus*		
Swainson's Thrush	*Catharus ustulatus*		
Willet	*Catoptrophorus semipalmatus*		
Brown Creeper	*Certhia americana*		
Belted Kingfischer	*Ceryle alcyon*		
Chimney Swift	*Chaetura pelagica*		
Southeastern/Cuban Snowy Plover	*Charadrius alexandrinus tenuirostris*	T	
Piping Plover	*Charadrius melodus*	T	T
Semipalmated Plover	*Charadrius semipalmatus*		
Killdeer	*Charadrius vociferus*		
Wilson's Plover	*Charadrius wilsonia*		
Black Tern	*Chilodonias niger*		
Lark Sparrow	*Chondestes grammacus*		
Common Night Hawk	*Chordeilis minor*		
Northern Harrier	*Circu cyaneus*		
Marsh (Long Billed Marsh) Wren	*Cistothorus palustris*		
Sedge (Short Billed Marsh) Wren	*Cistothorus platensis*		
Long Tailed Duck	*Clangula hyemalis*		
Yellow Billed Cuckoo	*Coccyzus americanus*		
Black Billed Cuckoo	*Coccyzus erythropthalmus*		
Northern Flicker	*Colaptes auratus*		
Northern Bobwhite	*Colinus virginianus*		

Common Name	Scientific name	State Status	FWS Status
Legend: T = Threatened • E = Endangered • SSC = Species of Special Concern			
Rock Dove	*Columba liva*		
Common Ground Dove	*Columbia passerina*		
Eastern Wood Pewee	*Contopus virens*		
Black Vulture	*Coragyps atratus*		
Turkey Vulture	*Coragyps aura*		
American Crow	*Corvus brachyrhynchos*		
Fish Crow	*Corvus ossifragus*		
Groove Billed Ani	*Crotophaga sulcirostris*		
Blue Jay	*Cyanocitta cristata*		
Fulvus Whistling Duck	*Dendrocynga bicolor*		
Black Throated Blue Warbler	*Dendroica caerulescens*		
Bay Breasted Warbler	*Dendroica castanea*		
Cerulean Warbler	*Dendroica cerulea*		
Yellow Rumped (Myrtle) Warbler	*Dendroica coronata*		
Prairie Warbler	*Dendroica discolor*		
Yellow Throated Warbler	*Dendroica dominica*		
Blackburnian Warbler	*Dendroica fusca*		
Magnolia Warbler	*Dendroica magnolia*		
Black Throated Gray Warbler	*Dendroica nigrescens*		
Palm Warbler	*Dendroica palmarum*		
Chestnut Sided Warbler	*Dendroica pensylvanica*		
Yellow Warbler	*Dendroica petechia*		
Pine Warbler	*Dendroica pinus*		
Blackpoll Warbler	*Dendroica striata*		
Cape May Warbler	*Dendroica tigrina*		
Black Throated Green Warbler	*Dendroica virens*		
Pileated Woodpecker	*Dryoopus pileatus*		
Gray Catbird	*Dumetella carolinensis*		
Little Blue Heron	*Egretta caerulea*	SSC	
Reddish Egret	*Egretta rufescens*	SSC	
Snowy Egret	*Egretta thula*	SSC	
Tricolored (Louisiana) Heron	*Egretta tricolor*	SSC	
Swallow Tailed Kite	*Elanoides fortificatus*		
Yellow Bellied Flycatcher	*Empidonax flaviventris*		
Least Flycatcher	*Empidonax minimus*		
Acadian Flycatcher	*Empidonax virescens*		
Horned Lark	*Eremophila alpestris*		
White Ibis	*Eudocimus albus*	SSC	
Merlin	*Falco columbarius*		
Artic Peregrine Falcon	*Falco peregrinus tundrius*	E	
Southeastern American Kestrel	*Falco sparverius paulus*	T	
Magnificent Frigatebird	*Frigata magnificens*		
American Coot	*Fulica americana*		
Wilson's (Common) Snipe	*Gallinago delicata*		
Common Moorhen (Gallinule)	*Gallinula chloropus*		
Common Loon	*Gavia immer*		
Red Throat Loon	*Gavia stellata*		
Common Yellowthroat	*Geothlypisd trichas*		

Common Name	Scientific name	State Status	FWS Status
Legend: T = Threatened • E = Endangered • SSC = Species of Special Concern			
Florida Sandhill Crane	*Grus canadensis pratensis*	T	
American Oystercatcher	*Haematopus palliatus*	SSC	
Bald Eagle	*Haliaeetus leucocephalus*	T	T
Worm Eating Warbler	*Helmitheros vermivorus*		
Black Necked Stilt	*Himantopus mexicanus*		
Barn Swallow	*Hirundo rustica*		
Wood Thrush	*Hylocichla mustelina*		
Yellow Breasted Chat	*Icteria virens*		
Mississippi Kite	*Ictinia mississippienisis*		
Least Bittern	*Ixobrychus elixis*		
Varied Thrush	*Ixoreus naevius*		
Loggerhead Shrike	*Lanius ludovicanus*		
Laughing Gull	*Larus atricilla*		
Ring Billed Gull	*Larus delawarensis*		
Iceland Gull	*Larus glaucoides*		
Great(er) Black-backed Gull	*Larus marinus*		
Bonaparte's Gull	*Larus philidelphia*		
American Herring Gull	*Larus smithsonianus*		
Black Rail	*Laterallus jamaicensis*		
Short Billed Dowitcher	*Limnodromus griseus*		
Long Billed Dowitcher	*Limnodromus scolopaceus*		
Swainson's Warbler	*Limnothlypis swainsonii*		
Marbled Godwit	*Limosa fedoa*		
Hudsonian Godwit	*Limosa haemastica*		
Hooded Merganser	*Lophodytes cucullatus*		
Red Bellied Woodpecker	*Melanerpes carolinus*		
Red Headed Woodpecker	*Melanerpes ertyhrocephalus*		
White winged Scoter	*Melanitta fusca*		
Black Scoter	*Melanitta nigra*		
Surf Scoter	*Melanitta perspicillata*		
Wild Turkey	*Meleagris gallopavo*		
Red Breasted Merganser	*Mergus serrator*		
Stilt Sandpiper	*Micropalmama himantopus*		
Northern Mockingbird	*Mimus polyglottos*		
Black and White Warbler	*Mniotilta varia*		
Northern Gannet	*Morus bassanus*		
Wood Stork	*Mycteria americana*	E	E
Great Crested Flycatcher	*Myiarchus crinitus*		
Whimbrel	*Numenius phaeopus*		
Yellow Crowned Night Heron	*Nyctanassa violacea*		
Black Crownerd Night Heron	*Nycticorax nicticorrax*		
Kentucky Warbler	*Oporornis formosus*		
Mourning Warbler	*Oporornis philadelphia*		
Eastern Screech Owl	*Otus asio*		
Rudduy Duck	*Oxyura jamaicensis*		
Osprey	*Pandion haliaetus*	SSC	
Northern Parula	*Parula americana*		
American White Pelican	*Pelecanus erythrorhyncus*	SSC	

Common Name	Scientific name	State Status	FWS Status
Legend: T = Threatened • E = Endangered • SSC = Species of Special Concern			
Brown Pelican	*Pelecanus occidentalis*	SSC	
Cliff Swallow	*Petrochelidon pyrrhonota*		
Double Crested Cormorant	*Phalacrocorax auritus*		
Wilson's Phalarope	*Phalarope tricolor*		
Ruff	*Philomachus pugnax*		
Red Cockaded Woodpecker	*Picoides borealis*	SSC	E
Downy Woodpecker	*Picoides pubescens*		
Hairy Woodpecker	*Picoides villosus*		
Eastern (Rufous-sided) Towhee	*Pipilo erythrophthalmus*		
Western Tanager	*Piranga iudoviciana*		
Scarlet Tanager	*Piranga olivacea*		
Summer Tanager	*Piranga rubra*		
Glossy Ibis	*Plegadis falcinellus*		
American (Lesser) Golden Plover	*Pluvialis dominica*		
Black Bellied Plover	*Pluvialus squatarola*		
Horned Grebe	*Podiceps auritus*		
Red Necked Grebe	*Podiceps grisegena*		
Eared Grebe	*Podiceps nigrilcollis*		
Pied Billed Grebe	*Podilymbus podiceps*		
Carolina Chickadee	*Poecile carolinensis*		
Blue Gray Gnatcatcher	*Polioptila caerulea*		
Vesper Sparrow	*Pooecetes gramineus*		
Purple Gallinule	*Pophyrio martinica*		
Sora	*Porzana carolina*		
Purple Martin	*Progne subis*		
Prothonotary Warbler	*Protonotaria citrea*		
Vermillion Flycatcher	*Pyrocephalus rubinus*		
King Rail	*Rallus elagans*		
Virginia Rail	*Rallus limicola*		
Florida Clapper Rail	*Rallus longirostris scotti*		
American Avocet	*Recurvirostra americana*		
Ruby Crowned Kinglet	*Regulus calendula*		
Golden Crowned Kinglet	*Regulus satrapa*		
Bank Swallow	*Riparia riparia*		
Black Legged Kittiwake	*Rissa tridactyla*		
Black Skimmer	*Rynchops niger*	SSC	
Eastern Phoebe	*Sayornis phoebe*		
American Woodcock	*Scolopax minor*		
Ovenbird	*Seiurus aurocapillus*		
Louisiana Waterthrush	*Seiurus motacilla*		
Northern Waterthrush	*Seiurus noveboracensis*		
Rufous Hummningbird	*Selasphorus rufus*		
American Redstart	*Setophaga ruticilla*		
Eastern Bluebird	*Sialia sialis*		
Red Breasted Nuthatch	*Sitta canadensis*		
White Breasted Nuthatch	*Sitta carolinensis*		
Brown Headed Nuthatch	*Sitta pusilla*		
Yellow Bellied Sapsucker	*Sphrapicus varius*		

Common Name	Scientific name	State Status	FWS Status
Legend: T = Threatened • E = Endangered • SSC = Species of Special Concern			
Clay Colored Sparrow	*Spizella pallida*		
Chipping Sparrow	*Spizella passerina*		
Field Sparrow	*Spizella pusilla*		
Northern Rough Winged Swallow	*Stelgidopteryx serripennis*		
Parasitic Jaeger	*Stercorarius parasiticus*		
Bridled Tern	*Sterna anaethetus*		
Least Tern	*Sterna antillarum*	T	
Caspian Tern	*Sterna caspia*		
Roseate Tern	*Sterna dougallii*	T	T
Forester's Tern	*Sterna foresteri*		
Sooty Tern	*Sterna fuscata*		
Common Tern	*Sterna hirundo*		
Royal Tern	*Sterna maxima*		
Gull Billed Tern	*Sterna nilotica*		
Sandwich Tern	*Sterna sandvicensis*		
Eurasion Collared-dove	*Streptopelia decaoto*		
Barred Owl	*Strix varia*		
Masked Booby	*Sula dactylatra*		
Brown Booby	*Sula leucogaster*		
Tree Swallow	*Tachycineta bicolor*		
Bewick's Wren	*Thryomanes bewickii*		
Carolina Wren	*Thryothoorus ludovicianus*		
Brown Thrasher	*Toxostoma rufum*		
Lesser Yellowlegs	*Tringa flavipes*		
Golden Yellowlegs	*Tringa melanoleuca*		
Solitary Sandpipier	*Tringa solitaria*		
House Wren	*Troglodytes aedon*		
Winter Wren.	*Troglodytes troglodytes*		
Buff Breasted Sandpiper	*Tryngites subruficollis*		
American Robin	*Turdus migratorius*		
Gray Kingbird	*Tyrannus dominicensis*		
Scissor Tailed Flycatcher	*Tyrannus forticatus*		
Eastern Kingbird	*Tyrannus tyrannus*		
Western Kingbird	*Tyrannus vertcalis*		
Common Barn Owl	*Tyto alba*		
Bachman's Warbler	*Vermivora bachmanii*	E	E
Orange Crowned Warbler	*Vermivora celata*		
Golden Winged Warbler	*Vermivora chrysoptera*		
Tennessee Warbler	*Vermivora peregrina*		
Blue Winged Warbler	*Vermivora pinus*		
Nashville Warbler	*Vermivora ruficapilla*		
Black Whiskered Vireo	*Vireo altiloquus*		
Yellow Throated Vireo	*Vireo flavifrons*		
White Eyed Vireo	*Vireo griseus*		
Red Eyed Vireo	*Vireo olivaceus*		
Philadelphia Vireo	*Vireo philadelphicus*		
Blue-headed Vireo	*Vireo solitarius*		
Canada Warbler	*Wilsonia canadensis*		

Common Name	Scientific name	State Status	FWS Status
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Hooded Warbler	*Wilsonia citrina*		
Wilson's Warbler	*Wilsonia pusilla*		
White Winged Dove	*Zenaida asciatca*		
Mourning Dove	*Zenaida macroura*		
Common (European) Starling			
Crow			
Red Winged Black Bird			
Savannah Sparrow			
Fishes			
Gulf Sturgeon	*Acipenser oxyrinchus desotoi*	SSC	T
Spotted Eagle Ray	*Aetobatus narinari*		
Orange Filefish	*Aluterus schoepfi*		
Striped Anchovy	*Anchoa hepsetus*		
Bay Anchovy	*Anchoa mitchilli*		
Ocellated Flounder	*Ancylopsetta quadrocellata*		
Sheepshead	*Archosargus probatocephalus*		
Hardhead Catfish	*Arius felis*		
Gafftopsail Catfish	*Bagre marinus*		
Silver Perch	*Bairdiella chrysoura*		
Menhaden	*Brevoortia spp.*		
Crevalle Jack	*Caranx hippos*		
Bull Shark	*Carcharhinus leucas*		
Blacktip Shark	*Carcharhinus limbatus*		
Florida Blenny	*Chasmodes saburrae*		
Striped Burrfish	*Chilomycterus schoepfi*		
Atlantic Bumper	*Chloroscombrus chrysurus*		
Spotted Whiff	*Citharichthys macrops*		
Bay Whiff	*Citharichthys spilopterus*		
Sand Seatrout	*Cynoscion arenarius*		
Spotted Seatrout	*Cynoscion nebulosus*		
Sheepshead Minnow	*Cyprinodon variegatus*		
Atlantic Stingray	*Dasyatis sabina*		
Bluntnose Stingray	*Dasyatis say*		
Ladyfish	*Elops saurus*		
Fringed Flounder	*Etropus crossotus*		
Silver Jenny	*Eucinostomus gula*		
Spotfin Mojarra	*Eucinostomus harengulus*		
Mojarra	*Eucinostomus spp.*		
Gulf Killifish	*Fundulus grandis*		
Longnose Killifish	*Fundulus majalis*		
Skilletfish	*Gobiesox strumosus*		
Darter Goby	*Gobionellus boleosoma*		
Naked Goby	*Gobiosoma bosc*		
Smooth Butterfly Ray	*Gymnura micrura*		
Scaled Sardine	*Harengula jaguana*		
Lined Seahorse	*Hippocampus erectus*		
Dwarf Seahorse	*Hippocampus zosterae*		
American Halfbeak	*Hyporhamphus meeki*		
Scrawled Cowfish	*Lactophyrs quadricornis*		

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Pinfish	*Lagodon rhomboides*		
Spot	*Leiostomus xanthurus*		
Rainwater Killifish	*Lucania parva*		
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 saxatalis*		
Atlantic Croaker	*Micropogonias undulatus*		
Planehead Filefish	*Monacanthus hispidus*		
Striped Bass	*Morone saxatilis*		
Striped Mullet	*Mugil cephalus*		
White Mullet	*Mugil curema*		
Speckled Worm Eel	*Myrophis punctatus*		
Leatherjacket	*Oligoplites saurus*		
Thread Herring	*Opisthonema oglinum*		
Gulf Toad Fish	*Opsanus beta*		
Pigfish	*Orthopristis chrysoptera*		
Gulf Flounder	*Paralichthys albigutta*		
Southern Flounder	*Paralichthys lethostigma*		
Black Drum	*Pogonias cromis*		
Bluefish	*Pomatomus saltatrix*		
Leopard Searobin	*Prionotus scitulus*		
Bighead Searobin	*Prionotus tribulus*		
Bluenose Shiner	*Pteronotropis welaka*	SSC	
Cobia	*Rachycentron canadum*		
Cownose Ray	*Rhinoptera bonasus*		
Atlantic Sharpnose Shark	*Rhizoprionodon terraenovae*		
Spanish Sardine	*Sardinella aurita*		
Red Drum	*Scienops ocellatus*		
King Mackeral	*Scomberomorus cavalla*		
Spanish Mackeral	*Scomberomorus maculatus*		
Look-down	*Selene vomer*		
Southern Puffer	*Sphoeroides nephelus*		
Northern Sennet	*Sphyraena borealis*		
Bonnethead	*Sphyrna tiburo*		
Atlantic Needlefish	*Strongylura marina*		
Redfin Needlefish	*Strongylura notada*		
Dusky Pipefish	*Syngnathus floridae*		
Chain Pipefish	*Syngnathus louisianae*		
Gulf Pipefish	*Syngnathus scovelli*		
Inshore Lizardfish	*Synodus foetens*		
Florida Pompano	*Trachinotus carolinus*		
Permit	*Trachinotus falcatus*		

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Invertebrates			
Little Brown Anemone	*Aiptasia pallida*		
Fat Threeridge	*Amblema neislerii*		E
Transverse Arc	*Anadara transversa*		
Rayed Creekshell	*Anodontoides radiatus*		
Common Jingle Shell	*Anomia ephippium*		
Sea Pork	*Aplidium stellatum*		
Sea Hare	*Aplysia brasiliana*		
Spotted Sea Hare	*Aplysia dactylomela*		
Speckled Crab	*Arenaeus cribrarius*		
Lugworm	*Arenicola cristata*		
Bay Scallop	*Argopecten irradians*		
Common Sea Star	*Asterias forbesi*		
Margined Sea Star	*Astropecten articulatus*		
Pen Shell	*Atrina seminuda or rigida*		
Striped Barnacle	*Balanus amphitrite*		
Warty Sea Anemone	*Bunodosoma cavernata*		
Left Handed Whelk	*Busycon contrarium*		
Lightening Whelk	*Busycon perversum pulleyi*		
Blue Crab	*Callinectes sapidus*		
Broad-ribbed Cardita	*Carditamera floridana*		
Common Eastern Chiton	*Chaetopleura apiculata*		
Cross Bar Venus Clam	*Chione cancellata*		
Green Striped Hermit Crab	*Clibanarius vittatus*		
Tiger Lucine	*Codakia orbicularis*		
Atlantic Slipper Snail	*Crepidula fornicata*		
Gulf Oyster	*Crosseastrea virginica*		
Giant Atlantic Cockle	*Dinocardium robustum*		
Colorwheel Tunicate	*Distaplia bermudensis*		
Coquina Clams	*Donax variabilis*		
Disk Dosinia	*Dosinia discus*		
Chipola Slabshell	*Elliptio chipolaensis*		T
Purple Bankclimber	*Elliptoideus sloatianus*		T
Olive Pit Porcelain Crab	*Euceramus praelongus*		
Pink Shrimp	*Farfantepenaeus duorarum*		
Banded Tulip	*Fasciolaria lilium*		
True Tulip	*Fasciolaria tulipa*		
Ribbed Mussel	*Geukensia demissus*		
Round Pearlshell	*Glebula rotundata*		
Shinyrayed pocketbook	*Lampsilis subangulata*		E
Horseshoe Crab	*Limulus polyphemus*		
Marsh Periwinkle	*Littorina irrorata*		
Wharf Roach	*Lygia exoctica*		
Short-spined Urchin	*Lytechinus variegatus*		
Sunray Venus Clam	*Macrocallista nimbosa*		
Gulf Moccasinshell	*Medionidus penicillatus*		E
Washboard	*Megalonaias nervosa*		
Crown Conch	*Melongena corona*		

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Stone Crab	*Menippe mercinaria*		
Quahog Clam	*Mercinaria mercinaria*		
Green Bristle Worm	*Nereis sp*		
Moon Snail	*Nerverita duplicatus*		
Ponderous Ark	*Noetia ponderosa*		
Pygmy Octopus	*Octopus joubini*		
Ivory Bush Coral	*Oculina diffusa*		
Atlantic Ghost Crab	*Ocypode quadrata*		
Lettered Olive	*Oliva sayana*		
Soda Straw Worms	*Onuphis emerita*		
Long-clawed or Dwarf Hermit Crab	*Pagurus longicarpus*		
Flat-clawed Hermit Crab	*Pagurus pollicaris*		
Grass Shrimp	*Palaemonetes pugio*		
Atlantic Geoduck	*Panopea bitruncata*		
Brown Shrimp	*Penaeus aztecus*		
White Shrimp	*Penaeus setiferus*		
Apple Murex	*Phyllonotus pomum*		
Oval Pigtoe	*Pleurobema pyriforme*		E
Horse Conch	*Pleuroploca gigantea*		
Atlantic Kittenspaw	*Plicatula gibbosa*		
Sculptured Pigtoe	*Quincuncina infucata*		
Duck Clam	*Raeta plicatella*		
Incongruous Ark	*Scapharca/ Anadara brasiliana*		
Brown Sea Cucumber	*Sclerodactyla briareus*		
Florida Slender Chiton	*Stenoplax floridana*		
Fighting Conch	*Stombus alatus*		
Southern Creekmussel	*Strophitus subvexus*		
Rough Sea Squirt	*Styela plicata*		
Green Sea Cucumber	*Thyonella gemmata*		
Prickly Cockle	*Trachycardium egmontianum*		
Sand Fiddler Crab	*Uca pugilator*		
Downy Rainbow	*Villosa villosa*		
Mammals			
Southern Short-tailed Shrew	*Blarina carolinenesis*		
Coyote	*Canis latrans*		
American Beaver	*Castor canadensis*		
Big Brown Bat	*Corynorhinus rafinesquii*		
Least Shrew	*Cryptotis parva*		
Nine-banded Armadillo	*Dasypus novemcinctus*		
Virginia Opossum	*Didelphis virginiana*		
Southern Flying Squirrel	*Glaucomys volans*		
Red Bat	*Lasiurus borealis*		
Hoary Bat	*Lasiurus cinereus*		
Northern yellow Bat	*Lasiurus intermedius*		
Seminole Bat	*Lasiurus seminolus*		
Northern River Otter	*Lontra canadensis*		
Bobcat	*Lynx rufus*		
Striped Skunk	*Mephitis mephitis*		

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Long-tailed Weasel	*Mustela frenata*		
American Mink	*Mustela vison*		
Southeastern Myotis	*Myotis austroriparius*		
Gray Bat	*Myotis grisescens*	E	E
Indiana Bat	*Myotis sodalis*	E	E
Eastern Woodrat	*Neotoma floridana*		
Evening Bat	*Nycticeius humeralis*		
Golden Mouse	*Ochrotomys nuttalli*		
White-Tailed Deer	*Odocoileus virginianus*		
Marsh Rice Rat	*Oryzomys palustris*		
Cotton Mouse	*Peromyscus gossypinus*		
Oldfield Mouse	*Peromyscus polionotus*		
St. Andrew Beach Mouse	*Peromyscus polionotus peninsularis*	E	E
Eastern Pipistrelle	*Pipistrellus subflavus*		
Southeastern Big-eared Bat	*Plectotus rafinesquii*		
Northern Raccoon	*Procyon lotor*		
Florida Panther	*Puma concolor coryi*	E	E
Eastern Harvest Mouse	*Reithrodontomys humulis*		
Eastern Mole	*Scalopus aquaticus*		
Eastern Gray Squirrel	*Sciurus carolinensis*		
Eastern Fox Squirrel	*Sciurus niger*		
Hispid Cotton Rat	*Sigmodon hispidus*		
Southeastern Shrew	*Sorex longirostris*		
Eastern Spotted Skunk	*Spilogale putorius*		
Feral pig	*Sus scrofa*		
Eastern Cottontail	*sylvilagus floridanus*		
Marsh Rabbit	*Sylvilagus palustris*		
West Indian Manatee	*Trichechus manatus latirostris*	E	E
Bottlenose Dolphin	*Tursiops truncatus*		
Common Gray Fox	*Urocyon cinereoargenteus*		
Florida Black Bear	*Ursus americanus floridanus*	T	
Red Fox	*Vulpes vulpes*		
Reptiles			
Crocodiles			
American Alligator	*Alligator mississippienisis*	SSC	T(s/a)
Turtles			
Atlantic Loggerhead Turtle	*Caretta caretta*	T	T
Atlantic Green Turtle	*Chelonia mydas mydas*	E	E
Common Snapping Turtle	*Chelydra serpentina*		
Suwannee Cooter	*Chrsemys concinna suwanniensis*		
Florida Cooter	*Chrysemys floridana floridana*		
Florida Red-bellied Turtle	*Chrysemys nelsoni*		
Red-eared Pond Slider	*Chrysemys scripta elegans*		
Yellow-bellied Pond Slider	*Chrysemys scripta scripta*		
Eastern Chicken Turtle	*Deirochelys reticularia reticularia*		
Leatherback Turtle	*Dermochelys coriacea*	E	E
Hawksbill Turtle	*Eretmochelys imbricata imbricata*	E	E
Gopher Tortise	*Gopherus polyphemus*	SSC	

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Barbour's Map Turtle	*Graptemys barbouri*	SSC	
Eastern Mud Turtle	*Kinosternon subrubrum subrubrum*		
Kemp's Ridley Turtle	*Lepidochelys kempii*	E	E
Alligator Snapping Turtle	*Macroclemys temminckii*	SSC	
Ornate Diamondback Terrapin	*Malaclemys terrapin macrospilota*		
Suwannee Cooter	*Pseudemys concinna suwanniensis*	SSC	
Loggerhead Musk Turtle	*Sternotherus minor minor*		
Stinkpot	*Sternotherus odoratus*		
Gulf Coast Box Turtle	*Terrapene carolina major*		
Florida Softshell Turtle	*Trionyx ferox*		
Guadalupe Spiny Softshell Turtle	*Trionyx spiniferus*		
Snakes			
Florida Cottonmouth	*Agkistrodon piscivorus conanti*		
Northern Scarlet Snake	*Cemophora coccinea copei*		
Brownchin Racer	*Coluber constrictor helvigularis*		
Eastern Diamondback Ratttlesnake	*Crotalus adamanteus*		
Canebrake Rattlesnake	*Crotalus horridus atricaudatus*		
Southern Ringneck	*Diadophis punctatus punctatus*		
Eastern Indigo Snake	*Drymarchon corais couperi*	T	T
Corn Snake	*Elaphe guttata guttata*		
Gray Rat Snake	*Elaphe obsoleta spiloides*		
Eastern Mud Snake	*Farancia abacura abacura*		
Rainbow Snake	*Farancia erytrogramma erytrogramma*		
Eastern Hognose	*Heterodon platyrhinos*		
Mole Kingsnake	*Lampropeltis calligaster rhombomaculata*		
Eastern Common Kingsnake	*Lampropeltis getulus getulus*		
Scarlet Kingsnake	*Lampropeltis triangulum elapsoides*		
Eastern Coachwhip	*Masticophis flagellum flagellum*		
Eastern Coral Snake	*Micrurus fulvius fulvius*		
Gulf Salt Marsh Snake	*Nerodia clarkii clarkii*		
Florida Green Water Snake	*Nerodia cyclopion floridana*		
Redbelly Water Snake	*Nerodia erythrogaster erythrogaster*		
Banded Water Snake	*Nerodia fasciata fasciata*		
Brown Water Snake	*Nerodia taxispilota*		
Rough Green Snake	*Opheodrys aestivus*		
Florida Pine Snake	*Pituophis melanoleucus mugitus*	SSC	
Gulf Crayfish Snake	*Regina rigida sinicola*		
Queen Snake	*Regina septemvittata*		
Pine Woods Snake	*Rhadinaa flavilata*		
North Florida Swamp Snake	*Seminatrix pygaea pygaea*		
Dusky Pygmy Rattlesnake	*Sistrurus miliarius barbouri*		
Short Tailed Snake	*Stilosome extenuatum*	T	
Midland Brown Snake	*Storeria dekayi wrightorum*		
Northern Redbelly Snake	*Storeria occipitomaculata occipitomaculata*		
Eastern Ribbon Snake	*Thamnophis sauritus sauritus*		
Eastern Garter Snake	*Thamnophis sirtalis sirtalis*		
Rough Earth Snake	*Virginia striatula*		
Eastern Smooth Earth Snake	*Virginia valeriae valeriae*		

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Lizards			
Green Anole	*Anolis carolinensis*		
Six-lined Racerunner	*Cnemidophorus sexlineatus*		
Southern Coal Skink	*Eumeces anthracinus*		
Northern Mole Skink	*Eumeces egregius similis*		
Five-lined Skink	*Eumeces fasciatus*		
Southeastern Five-lined Skink	*Eumeces inexpectatus*		
Broad-headed Skink	*Eumeces laticeps*		
Eastern Slender Glass Lizard	*Ophisaurus attenuatus*		
Island Glass Lizard	*Ophisaurus compressus*		
Eastern Glass Lizard	*Ophisaurus ventralis*		
Southern Fence Lizard	*Sceloporus undulatus*		
Ground Skink	*Scincella lateralis*		
Plants			
Submerged Aquatic Vegetation			
Mermaid's Wineglass	*Acetabularia crenulata*		
Common Caulerpa	*Caulerpa prolifera*		
Red Algae	*Gracilaria sp.*		
Shoal Grass	*Halodule wrightii*		
Star Grass	*Halophia engelmannii*		
Widgeon Grass	*Ruppia aritime*		
Manatee Grass	*Syringodium filiforme*		
Turtle Grass	*Thallassia testudinum*		
Terrestrial Plants			
Pine False Foxglove	*Agalinis divaricata*		
Jackson False Foxglove	*Agalinis filicaulis*		
Seminole False Foxglove	*Agalinis filifolia*		
Flaxleaf False Foxglove	*Agalinis linifolia*		
Golden Colicroot	*Aletris aurea*		
Yellow Colicroot	*Aletris lutea*		
Clusterspike False Indigobush	*Amorpha herbacea*		
Blue Maidencane	*Amphicarpum muhlenbergianum*		
Eastern Bluestar	*Amsonia rigida (tabernaemontana)*		
Pinewoods Bluestem	*Andropogon arctatus*	T	
Shortspike Bluestem	*Andropogon brachystachyus*		
Purple Bluestem	*Andropogon glomeratus var. glaucopsis*		
Bushy Bluestem	*Andropogon glomeratus var. glomeratus*		
Bushy Bluestem	*Andropogon glomeratus var. hirsutior*		
Bushy Bluestem	*Andropogon glomeratus var. pumilus*		
Elliott's Bluestem	*Andropogon gyrans var. gyrans*		
Elliott's Bluestem	*Andropogon gyrans var. stenophyllus*		
Splitbeard Bluestem	*Andropogon ternarius var. ternarius*		
Broomsedge Bluestem	*Andropogon virginicus var. decipiens*		
Chalky Bluestem	*Andropogon virginicus var. glaucus*		
Broomsedge Bluestem	*Andropogon virginicus var. virginicus*		
Purple Silkyscale	*Anthaenantia rufa*		
Green Silkyscale	*Anthaenantia villosa*		
Wiregrass	*Aristida beyrichiana (stricta)*		

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Big Threeawn, Piedmont Threeawn	*Aristida condensata*		
Corkscrew Threeawn	*Aristida gyrans*		
Longleaf Threeawn	*Aristida palustris*		
Arrowfeather Threeawn	*Aristida purpurascens var. purpurascens*		
Bottlebrush Threeawn	*Aristida spiciformis*		
White Indian Plaintain	*Arnoglossum album*		
Ovateleaf Indian Plantain	*Arnoglossum ovatum*		
Carolina Milkweed	*Asclepias cinerea*		
Largeflower Milkweed	*Asclepias connivens*		
Fewflower Milkweed	*Asclepias lanceolata*		
Longleaf Milkweed	*Asclepias longifolia ssp. longifolia*		
Michaux's Milkweed	*Asclepias michauxii*		
Savannah Milkweed	*Asclepias pedicellata*		
Southern Milkweed, Green Milkweed	*Asclepias viridula*	T	
Slimleaf Pawpaw	*Asimina angustifolia*		
Scaleleaf Aster	*Aster adnatus (Symphyotrichum adnatum)*		
Savannah Aster	*Aster chapmanii (Symphyotrichum chapmanii)*		
Eastern Silver Aster	*Aster concolor (Symphyotrichum concolor)*		
Thistleleaf Aster	*Aster eryngiifolius (Eurybia eryngiifolia)*		
Calico Aster	*Aster lateriflorus (Symphyotrichum lateriflorum)*		
Apalachicola Aster, Pinewoods Aster	*Aster spinulosus (Eurybia spinulosa)*	E	
Whitetop Aster, Dixie Aster	*Aster tortifolius (Sericocarpus tortifolius)*		
Fernleaf Yellow False Foxglove	*Aureolaria pedicularia var. pectinata*		
Big Carpetgrass	*Axonopus furcatus*		
Narrow-leaved Grounsel Bush, Saltwater Falsewillow	*Baccharis angustifolia*		
Grounsel Bush, Sea Myrtle	*Baccharis halimifolia*		
Oneflower Honeycombhead	*Balduina uniflora*		
Gopherweed	*Baptisia lanceolata*		
Pineland Wild Indigo	*Baptisia lecontei*		
White Screwstem	*Bartonia verna*		
Yellow Screwstem	*Bartonia virginica*		
Pineland Rayless Goldenrod	*Bigelowia nudata subsp. nudata*		
Apalachicola Dolls Daisy	*Boltonia apalachicolensis*		
Capillary Hairsedge	*Bulbostylis ciliatifolia*		
Buckthorn	*Bumelia thornei*	E	
Bluethread	*Burmannia biflora*		
Southern Bluethread	*Burmannia capitata*		
American Beautyberry	*Callicarpa americana*		
Pale Grasspink	*Calopogon pallidus*		
Tuberous Grasspink	*Calopogon tuberosus*		
Clustered Sedge	*Carex glaucescens*		
Walter's Sedge	*Carex striata*		
Pinebarren Sedge	*Carex turgescens*		
Warty Sedge	*Carex verrucosa*		
Vanillaleaf	*Carphephorus odoratissimus*		
Bristleleaf Chaffhead	*Carphephorus pseudoliatris*		
Littleleaf Buckbrush	*Ceanothus microphyllus*		
Spadeleaf	*Centella asiatica*		

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Spurred Butterfly Pea	*Centrosema virginianum*		
Common Buttonbush	*Cephalanthus occidentalis*		
Florida Rosemary, Sand Heath	*Ceratiola ericoides*		
Fairywand	*Chamaelirium luteum*		
Woolly Sunbonnets, Pineland Daisy	*Chaptalia tomentosa*		
Longleaf Woodoats	*Chasmanthium sessiliflorum (laxum var. sessiliflorum)*		
Bush Goldenrod, Woody Goldenrod	*Chrysoma pauciflosculosa*		
Godfrey's Goldenaster	*Chrysopsis godfreyi*	E	
Cottony Goldenaster	*Chrysopsis gossypina subsp. hyssopifolia*		
Maryland Goldenaster	*Chrysopsis mariana*		
Coastalplain Goldenaster	*Chrysopsis scabrella*		
Scrubland Goldenaster	*Chrysopsis subulata*		
Leconte's Thistle	*Cirsium lecontei*		
Powder-puff Lichen, Deer Moss	*Cladina evansii*		
Reindeer Lichen	*Cladina subtenuis*		
Jamaica Swamp Sawgrass	*Cladium jamaicense*		
British Soldiers Lichen	*Cladonia leporina*		
Prostrate Cup Lichen, Resurrection Cladonia	*Cladonia prostrata*		
Fernald's Pogonia	*Cleistes bifaria (Pogonia bifaria)*	T	
Coastal Sweetpepperbush	*Clethra alnifolia*		
Black Titi, Buckwheat Tree	*Cliftonia monophylla*		
Wrinkled Jointtailgrass	*Coelorachis rugosa*		
Whitemouth Dayflower	*Commelina erecta*		
False Rosemary	*Conradina canescens*		
Florida Tickseed	*Coreopsis floridana*		
Texas Tickseed	*Coreopsis linifolia*		
Georgia Tickseed	*Coreopsis nudata*		
Rabbitbells	*Crotalaria rotundifolia*		
Toothachegrass	*Ctenium aromaticum*		
Tropical Waxweed	*Cuphea aspera*	E	
Gulf Coast Swallowwort	*Cynanchum angustifolium*		
Leafless Swallowwort	*Cynanchum scoparium*		
Haspan Flatsedge	*Cyperus haspan*		
Pinebarren Flatsedge	*Cyperus retrorsus*		
Fourangle Flatsedge	*Cyperus tetragonus*		
Titi	*Cyrilla parvifolia (racemiflora)*		
Zarzabacoa Comun	*Desmodium incanum*		
Slimleaf Ticktrefoil	*Desmodium tenuifolium*		
Needleleaf Witchgrass	*Dichanthelium aciculare*		
Needleleaf Witchgrass	*Dichanthelium aciculare ssp. angustifolium*		
Tapered Witchgrass	*Dichanthelium acuminatum ssp. spretum*		
Tapered Witchgrass	*Dichanthelium acuminatum var. acuminatum*		
Variable Witchgrass	*Dichanthelium commutatum*		
Cypress Witchgrass	*Dichanthelium ensifolium var. ensifolium*		
Cypress Witchgrass	*Dichanthelium ensifolium var. unciphyllum*		
Erectleaf Witchgrass	*Dichanthelium erectifolium*		
Eggleaf Witchgrass	*Dichanthelium ovale*		
Hemlock Witchgrass	*Dichanthelium portoricense*		

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Woolly Witchgrass	*Dichanthelium scabriusculum*		
Velvet Withchgrass	*Dichanthelium scoparium*		
Roughhair Witchgrass	*Dichanthelium strigosum var. leucoblepharis*		
Roughhair Witchgrass	*Dichanthelium strigosum var. strigosum*		
Cypress Witchgrass	*Dichanthelium tenue (ensilofolium var. unciphyllum)*		
Poor Joe, Rough Buttonweed	*Diodia teres*		
Virginia Buttonweed	*Diodia virginiana*		
Common Persimmon	*Diospyros virginiana*		
Saltgrass	*Distichlis spicata*		
Dwarf Sundew	*Drosera brevifolia*		
Pink Sundew	*Drosera capillaris*		
Spoon-leaved Sundew	*Drosera intermedia*	T	
Tracy's Sundew	*Drosera tracyi*		
Baldwin's Spikerush, Roadgrass	*Eleocharis baldwinii*		
Canada Spikerush	*Eleocharis geniculata*		
Devil's Grandmother	*Elephantopus tomentosus*		
Pan-american Balsamscale	*Elionurus tripsacoides*		
Elliott's Lovegrass	*Eragrostis elliottii*		
Red Lovegrass	*Eragrostis secundiflora*		
Coastal Lovegrass	*Eragrostis virginica*		
Centipedegrass	*Eremochloa ophiuroides*		
Early Whitetop Fleabane	*Erigeron vernus*		
Flattened Pipewort	*Eriocaulon compressum*		
Tenangle Pipewort	*Eriocaulon decangulare*		
Dark-headed Hatpin	*Eriocaulon nigrobracteatum*	E	
Blueflower Eryngo	*Eryngium integrifolium*		
Creeping Eryngo	*Eryngium prostratum*		
Button Rattlesnakemaster, Button Eryngo	*Eryngium yuccifolium*		
Coralbean, Cherokee Bean	*Erythrina herbacea*		
Mohr's Thoroughwort	*Eupatorium mohrii*		
Mohr's Thoroughwort	*Eupatorium recurvans (mohrii)*		
Summer Spurge	*Euphorbia discoidalis*		
Florida Pineland Spurge	*Euphorbia inundata*		
Telephus Spurge	*Euphorbia telephioides*	E	T
Saltmarsh Fingergrass	*Eustachys glauca*		
Flattop Goldenrod	*Euthamia graminifolia var. hirtipes*		
Slender Flattop Goldenrod	*Euthamia tenuifolia (caroliniana)*		
Hairy Fimbry	*Fimbristylis puberula*		
Marsh Fimbry	*Fimbristylis spadicea*		
Carolina Ash, Water Ash, Pop Ash	*Fraxinus caroliniana*		
Saltmarsh Umbrellasedge	*Fuirena breviseta*		
Southern Umbrellasedge	*Fuirena longa (scirpoidea)*		
Southern Umbrellasedge	*Fuirena scirpoidea*		
Eastern Milkpea	*Galactia regularis*		
Hairy Bedstraw	*Galium pilosum*		
Southern Beeblossom	*Gaura angustifolia*		
Dwarf Huckleberry	*Gaylussacia dumosa*		
Woolly Huckleberry	*Gaylussacia mosieri*		

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Blue Huckleberry	*Gaylussacia nana (frondosa var. tomentosa)*		
Yellow Jessamine, Carolina Jessamine	*Gelsemium sempervirens*		
Wiregrass Gentian	*Gentiana pennelliana*	E	
Gladiolus	*Gladiolus x gandavenis*		
Rough Hedgehyssop	*Gratiola hispida*		
Bearded Skeletongrass	*Gymnopogon ambiguus*		
Shortleaf Skeletongrass	*Gymnopogon brevifolius*		
Innocence, Roundleaf Bluet	*Hedyotis procumbens (Houstonia procumbens)*		
Clustered Mille Graines	*Hedyotis uniflora (Oldenlandia uniflora)*		
Savannah Sneezeweed	*Helenium vernale*		
Coastalsand Frostweed	*Helianthemum arenicola*		
Pinebarren Frostweed	*Helianthemum corymbosum*		
Narrowleaf Sunflower, Swamp Sunflower	*Helianthus angustifolius*		
Florida Sunflower	*Helianthus floridanus*		
Variableleaf Sunflower	*Helianthus heterophyllus*		
Stiff Sunflower	*Helianthus radula*		
Comfortroot	*Hibiscus aculeatus*		
Crimsoneyed Rosemallow	*Hibiscus moscheutos*		
Queen-devil	*Hieracium gronovii*		
Henry's Spiderlily, Green Spiderlily	*Hymenocallis henryae*	E	
Coastalplain St. John's-wort	*Hypericum brachyphyllum*		
Apalachicola St. John's-wort	*Hypericum chapmanii*		
Roundpod St. John's-wort	*Hypericum cistifolium*		
St. Peter's-wort	*Hypericum crux-andreae*		
Florida Sands St. John's-wort	*Hypericum exile*		
Sandweed, Peelbark St. John's-wort	*Hypericum fasciculatum*		
Bedstraw St. John's-wort	*Hypericum galioides*		
Pineweeds, Orangegrass	*Hypericum gentianoides*		
St. Andrew's-cross	*Hypericum hypericoides*		
Flatwoods St. John's-wort	*Hypericum microsepalum*		
Myrtleleaf St. John's-wort	*Hypericum myrtifolium*		
Carolina St. John's-wort	*Hypericum nitidum*		
Fourpetal St. John's-wort	*Hypericum tetrapetalum*		
Fringed Yellow Stargrass	*Hypoxis juncea*		
Dahoon	*Ilex cassine var. cassine*		
Myrtle Dahoon	*Ilex cassine var. myrtifolia*		
Large Gallberry, Sweet Gallberry	*Ilex coriacea*		
Gallberry, Inkberry	*Ilex glabra*		
Yaupon	*Ilex vomitoria*		
Cogongrass	*Imperata cylindrica*		
Man-of-the-earth	*Ipomoea pandurata*		
Saltmarsh Morning-glory	*Ipomoea sagittata*		
Savannah Iris	*Iris tridentata*		
Virginia Willow, Virginia Sweetspire	*Itea virginica*		
Bigleaf Sumpweed	*Iva frutescens*		
Annual Rush	*Juncus abortivus (pelocarpus)*		
Forked Rush	*Juncus dichotomus*		
Soft Rush	*Juncus effusus*		

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Bog Rush, Elliott's Rush	*Juncus elliottii*		
Shore Rush, Grassleaf Rush	*Juncus marginatus var. biflorus*		
Bighead Rush	*Juncus megacephalus*		
Needle Rush, Needlegrass Rush, Balck Rush	*Juncus roemerianus*		
Needlepod Rush	*Juncus scirpoides*		
Roundhead Rush	*Juncus validus*		
Red Cedar	*Juniperus silicicola*		
Thickleaf Waterwillow	*Justicia crassifolia*	E	
Wicky, Hairy Laurel	*Kalmia hirsuta*		
Carolina Redroot	*Lachnanthes caroliana*		
Whitehead Bogbutton	*Lachnocaulon anceps*		
Bogbutton	*Lachnocaulon digynum*	T	
Deckert's Pinweed	*Lechea deckertii*		
Hairy Pinweed	*Lechea mucronata*		
Piedmont Pinweed	*Lechea torreyi*		
Corkwood	*Leitneria floridana*	T	
Swamp Doghobble	*Leucothoe racemosa*		
Chapman's Gayfeather	*Liatris chapmanii*		
Slender Gayfeather	*Liatris gracilis*		
Dense Gayfeather	*Liatris spicata*		
Shortleaf Gayfeather	*Liatris tenuifolia var. tenuifolia*		
Gopher Apple	*Licania michauxii*		
Catesby's Lily, Pine Lily	*Lilium catesbaei*	T	
Carolina Sealavender	*Limonium carolinianum*		
Florida Yellow Flax	*Linum floridanum*		
Stiff Yellow Flax	*Linum medium var. texanum*		
Harper's Grooved Yellow Flax	*Linum sulcatum var. harperi*		
West's Flax	*Linum westii*	E	
Shortleaf Lobelia	*Lobelia brevifolia*		
Florida Lobelia	*Lobelia floridana*		
Glade Lobelia	*Lobelia glandulosa*		
White Lobelia	*Lobelia paludosa*		
Golden Crest	*Lophiola aurea*		
Seedbox	*Ludwigia alternifolia*		
Southeastern Primrosewillow	*Ludwigia linifolia*		
Seaside Primrosewillow	*Ludwigia maritima*		
Hairy Primrosewillow	*Ludwigia pilosa*		
Savannah Primrosewillow	*Ludwigia virgata*		
Lady Lupine	*Lupinus villosus*		
Gulf Coast Lupine	*Lupinus westianus*	T	
Foxtail Club-moss	*Lycopodiella alopecuroides*		
Southern Club-moss, Southern Bog Club-moss	*Lycopodiella appressa*		
Slender Club-moss	*Lycopodiella caroliniana*		
Feather-stem Club-moss, Harper's Club-moss	*Lycopodiella prostrata*		
Taperleaf Waterhorehound	*Lycopus rubellus*		
Rusty Staggerbush	*Lyonia ferruginea*		
Coastalplain Staggerbush	*Lyonia fruticosa*		
Fetterbush	*Lyonia lucida*		

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Wand Loosestrife	*Lythrum lineare*		
White Birds-in-a-nest	*Macbridea alba*	E	T
Southern Magnolia	*Magnolia grandiflora*		
Sweetbay	*Magnolia virginiana*		
Grassleaf Barbara's Buttons	*Marshallia tenuifolia (graminifolia)*		
Sensitive Brier	*Mimosa quadrivalvis var. angustata*		
Partridgeberry, Twinberry	*Mitchella repens*		
Swamp Hornpod	*Mitreola sessilifolia*		
Spotted Beebalm	*Monarda punctata*		
Red Mulberry	*Morus rubra*		
Hairawn Muhly	*Muhlenbergia capillaris var. capillaris*		
Cutover Muhly	*Muhlenbergia capillaris var. trichopodes*		
Southern Bayberry, Wax Myrtle	*Myrica cerifera*		
Bayberry	*Myrica heterophylla*		
Odorless Bayberry	*Myrica inodora*		
Ogeechee Tupelo	*Nyssa ogeche*		
Swamp Tupelo	*Nyssa sylvatica var. biflora*		
Swamp Tupelo	*Nyssa ursina (sylvatica var. biflora)*		
Woodgrass, Basketgrass	*Oplismenus hirtellus*		
Cockspur Pricklypear	*Opuntia drummondii (pusilla)*		
Pricklypear	*Opuntia humifusa*		
Wild Olive, American Devilwood	*Osmanthus americanus*		
Cinnamon Fern	*Osmunda cinnamomea*		
Royal Fern	*Osmunda regalis var. spectabilis*		
Water Cowbane	*Oxypolis filiformis*		
Giant Water-dropwort	*Oxypolis filiformis greenmanii*	E	
Piedmont Cowbane	*Oxypolis ternata (denticulata)*		
Beaked Panic Grass	*Panicum anceps*		
Maidencane	*Panicum hemitomon*		
Long-leaved Panic Grass	*Panicum longifolium*		
Naked-stemmed Panic Grass	*Panicum nudicaule*	T	
Redtop Panic Grass	*Panicum rigidulum*		
Bluejoint Panic Grass	*Panicum tenerum*		
Warty Panic Grass	*Panicum verrucosum*		
Swithchgrass	*Panicum virgatum*		
Squareflower	*Paronychia erecta var. corymbosa*		
Virginia Creeper, Woodbine	*Parthenocissus quinquefolia*		
Gulfdune Paspalum	*Paspalum monostachyum*		
Early Paspalum	*Paspalum praecox*		
Thin Paspalum	*Paspalum setaceum*		
Vaseygrass	*Paspalum urvillei*		
Red Bay	*Persea borbonia*		
Swamp Bay	*Persea palustris*		
Pineland False Sunflower	*Phoebanthus tenuifolius*	T	
Godfrey's False Dragonhead, Apalachicola Dragonhead	*Physostegia godfreyi*	T	
Fetterbush	*Pieris phyllyreifolia*		
Violet Butterwort, Panhandle Butterwort	*Pinguicula ionantha*	E	T
Yellow Butterwort, Yellow-flowered Butterwort	*Pinguicula lutea*	T	

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Chapman's Butterwort, Swamp Butterwort	*Pinguicula planifolia*	T	
Sand Pine	*Pinus clausa*		
Slash Pine	*Pinus elliottii var. elliottii*		
Longleaf Pine	*Pinus palustris*		
Pineland Silkgrass	*Pityopsis aspera var. adenolepis*		
Bent Golden Aster	*Pityopsis flexuosa*	E	
Narrowleaf Silkgrass	*Pityopsis graminifolia*		
Grassleaf Goldenaster	*Pityopsis oligantha*		
Yellow Fringed Orchid	*Platanthera ciliaris*	T	
Yellow Fringeless Orchid	*Platanthera integra*	E	
Snowy Orchid	*Platanthera nivea*	T	
Rush Featherling	*Pleea tenuifolia*		
Stinking Camphorweed	*Pluchea foetida*		
Rosy Camphorweed	*Pluchea rosea*		
Rose Pogonia, Snakemouth Orchid	*Pogonia ophioglossoides*	T	
Baldwin's Milkwort	*Polygala balduinii*		
Drumheads	*Polygala cruciata*		
Tall Pinebarren Milkwort	*Polygala cymosa*		
Hooker's Milkwort	*Polygala hookeri*		
Procession Flower	*Polygala incarnata*		
Orange Milkwort	*Polygala lutea*		
Candyroot	*Polygala nana*		
Low Pinebarren Milkwort	*Polygala ramosa*		
Coastalplain Milkwort	*Polygala setacea*		
Tall Jointweed	*Polygonella gracilis*		
October Flower	*Polygonella polygama var. polygama*		
Resurrection Fern	*Polypodium polypodioides var. michauxianum*		
Rustweed, Juniperleaf	*Polypremum procumbens*		
Pickerelweed	*Pontederia cordata*		
Combleaf Mermaidweed	*Proserpinaca pectinata*		
Carolina Laurelcherry	*Prunus caroliniana*		
Tailed Bracken	*Pteridium aquilinum var. pseudocaudatum*		
Blackroot	*Pterocaulon pycnostachyum*		
Red Chokeberry	*Pyrus arbutifolia (Photinia pyrifolia)*		
Chapman's Oak	*Quercus chapmanii*		
Sand Live Oak	*Quercus geminata*		
Laurel Oak	*Quercus hemispherica*		
Bluejack Oak	*Quercus incana*		
Turkey Oak	*Quercus laevis*		
Sand Post Oak	*Quercus margaretta*		
Dwarf Live Oak	*Quercus minima*		
Myrtle Oak	*Quercus myrtifolia*		
Water Oak	*Quercus nigra*		
Bluejack Oak	*Quercus pumila (incana)*		
Live Oak	*Quercus virginiana*		
Savannah Meadowbeauty	*Rhexia alifanus*		
Yellow Meadowbeauty	*Rhexia lutea*		
Pale Meadowbeauty, Maryland Meadowbeauty	*Rhexia mariana*		

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Maid Marian	*Rhexia nashii*		
Nuttall's Meadowbeauty	*Rhexia nuttallii*		
White Meadowbeauty, Apalachicola Meadowbeauty	*Rhexia parviflora*	E	
Fringed Meadowbeauty	*Rhexia petiolata*		
Handsome Harry	*Rhexia virginica*		
Chapman's Rhododendron	*Rhododendron chapmanii (minus var. chapmanii)*	E	E
Swamp Azalea	*Rhododendron viscosum*		
Winged Sumac	*Rhus copallinum*		
Royal Snoutbean	*Rhynchosia cytisoides*		
Baldwin's Beaksedge	*Rhynchospora baldwinii*		
West Indian Beaksedge	*Rhynchospora brachychaeta*		
Shortbristle Beaksedge	*Rhynchospora breviseta*		
Bunched Beaksedge	*Rhynchospora cephalantha*		
Chapman's Beaksedge	*Rhynchospora chapmanii*		
Fringed Beaksedge	*Rhynchospora ciliaris*		
Flatfruit Beaksedge	*Rhynchospora compressa*		
Shortbristle Horned Beaksedge	*Rhynchospora corniculata*		
Hairy-peduncled Beakrush	*Rhynchospora crinipes*	E	
Curtiss' Beaksedge	*Rhynchospora curtissii*		
Elliott's Beaksedge	*Rhynchospora elliottii*		
Fascicled Beaksedge	*Rhynchospora fascicularis var. fascicularis*		
Fernald's Beaksedge	*Rhynchospora fernaldii*		
Threadleaf Beaksedge	*Rhynchospora filifolia*		
Globe Beaksedge	*Rhynchospora globularis*		
Slender Beaksedge	*Rhynchospora gracilenta*		
Gray's Beaksedge	*Rhynchospora grayi*		
Harper's Beaksedge	*Rhynchospora harperi*		
Narrowfruit Horned Beaksedge	*Rhynchospora inundata*		
Giant Whitetop, Sandswamp Whitetop	*Rhynchospora latifolia*		
Sandyfield Beaksedge	*Rhynchospora megalocarpa*		
Mingled Beaksedge	*Rhynchospora mixta*		
Shortbeak Beaksedge, Baldrush	*Rhynchospora nitens*		
Featherbristle Beaksedge	*Rhynchospora oligantha*		
Pinebarren Beaksedge	*Rhynchospora pineticola (intermedia)*		
Plumed Beaksedge	*Rhynchospora plumosa*		
Fairy Beaksedge	*Rhynchospora pusilla*		
Fewflower Beaksedge	*Rhynchospora rariflora*		
Tracy's Beaksedge	*Rhynchospora tracyi*		
Sawtooth Blackberry	*Rubus argutus*		
Sawtooth Blackberry	*Rubus betulifolius (argutus)*		
Southern Dewberry	*Rubus trivialis*		
Grassleaf Coneflower	*Rudbeckia graminifolia*		
St. Johns Black-eyed-Susan	*Rudbeckia nitida*	E	
White-flowered Wild Petunia	*Ruellia noctiflora*	E	
Cabbage Palm	*Sabal palmetto*		
Bartram's Rosegentian	*Sabatia bartramii*		
Shortleaf Rosegentian	*Sabatia brevifolia*		
Largeleaf Rosegentian	*Sabatia macrophylla var. macrophylla*		

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Sugarcane Plumegrass	*Saccharum giganteum*		
Bulltongue Arrowhead	*Sagittaria lancifolia*		
Perennial Glasswort	*Salicornia virginica*		
Soapberry	*Sapindus saponaria*		
Popcorntree, Chinese Tallowtree	*Sapium sebiferum*		
White-top Pitcherplant	*Sarracenia leucophylla*	E	
Hooded Pitcherplant	*Sarracenia minor*	T	
Parrot Pitcherplant	*Sarracenia psittacina*	T	
Decumbant Pitcherplant	*Sarracenia purpurea*	T	
Little Bluestem	*Schizachyrium maritimum (scoparium)*		
Crimson Bluestem	*Schizachyrium sanguineum*		
Little Bluestem	*Schizachyrium stoloniferum (scoparium)*		
Slender Bluestem	*Schizachyrium tenerum*		
White Sunnybell	*Schoenolirion albiflorum*		
Black Bogrush	*Schoenus nigricans*		
Balwin's Nutrush	*Scleria baldwinii*		
Fringed Nutrush	*Scleria ciliata*		
Slenderfruit Nutrush	*Scleria georgiana*		
Fringed Nutrush	*Scleria pauciflora (ciliata)*		
Netted Nutrush	*Scleria reticularis*		
Tall Nutgrass, Whip Nutrush	*Scleria triglomerata*		
Florida Skullcap	*Scutellaria floridana*	E	T
Helmet Skullcap	*Scutellaria integrifolia*		
Saw Palmetto	*Serenoa repens*		
Yellow Bristlegrass, Knotroot Foxtail	*Setaria geniculata (parviflora)*		
Yaupon Blacksenna	*Seymeria cassioides*		
Piedmont Blacksenna	*Seymeria pectinata*		
Gum Bully	*Sideroxylon lanuginosum*		
Thorne's Buckthorn	*Sideroxylon thornei*	E	
Narrowleaf Blue-eyed Grass	*Sisyrinchium angustifolium*		
Narrowleaf Blue-eyed Grass	*Sisyrinchium atlanticum (angustifolium)*		
Earleaf Greenbriar	*Smilax auriculata*		
Saw Greenbrier	*Smilax bona-nox*		
Cat Greenbrier, Wild Sarsaparilla	*Smilax glauca*		
Laurel Greenbrier, Bamboo Vine	*Smilax laurifolia*		
Coral Greenbrier	*Smilax walteri*		
Pinebarren Goldenrod	*Solidago fistulosa*		
Chapman's Goldenrod	*Solidago odora var. chapmanii*		
Seaside Goldenrod	*Solidago sempervirens*		
Wand Goldenrod	*Solidago stricta*		
Apalachicola Indiangrass	*Sorghastrum apalachicolense*		
Smooth Cordgrass	*Spartina alterniflora*		
Marshhay Cordgrass, Saltmeadow Cordgrass	*Spartina patens*		
Largeleaf Sphagnum	*Sphagnum macrophyllum*		
Peat Moss, Sphagnum	*Sphagnum spp.*		
Lacelip Ladiestresses	*Spiranthes laciniata*	T	
Greenvein Ladiestresses	*Spiranthes praecox*		
Little Ladiestresses, Little Pearltwist	*Spiranthes tuberosa*	T	

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Curtiss' Dropseed	*Sporobolus curtissii*		
Florida Dropseed	*Sporobolus floridanus*		
Pineywoods Dropseed	*Sporobolus junceus*		
Mock Pennyroyal	*Stachydeoma graveolens*	E	
Water Toothleaf, Corkwood	*Stillingia aquatica*		
Queensdelight	*Stillingia sylvatica subsp. sylvatica*		
Coastalplain Dawnflower	*Stylisma patens subsp. patens*		
Sidebeak Pencilflower	*Stylosanthes biflora*		
American Snowbell	*Styrax americanus*		
Yellow Hatpins	*Syngonanthus flavidulus*		
Pond Cypress	*Taxodium ascendens*		
Scurf Hoarypea	*Tephrosia chrysophylla*		
Sprawling Hoarypea	*Tephrosia hispidula*		
Spiked Hoarypea	*Tephrosia spicata*		
Spanish Moss	*Tillandsia usneoides*		
Eastern Poison Ivy	*Toxicodendron radicans*		
Hairyflower Spiderwort	*Tradescantia hirsutiflora*		
Small's Noseburn	*Tragia smallii*		
Wavyleaf Noseburn	*Tragia urens*		
Forked Bluecurls	*Trichostema dichotomum*		
Tall Redtop, Purpletop Tridens	*Tridens flavus var. flavus*		
Perennial Sandgrass	*Triplasis americana*		
Seaoats	*Uniola paniculata*		
Southern Bladderwort	*Utricularia juncea*		
Zigzag Bladderwort	*Utricularia subulata*		
Sparkleberry, Farkleberry	*Vaccinium arboreum*		
Highbush Blueberry	*Vaccinium corymbosum*		
Shiny Blueberry	*Vaccinium myrsinites*		
Deerberry	*Vaccinium stamineum*		
Chapman's Crownbeard	*Verbesina chapmanii*	T	
White Crownbeard, Frostweed	*Verbesina virginica*		
Tall Ironweed	*Vernonia angustifolia*		
Giant Ironweed	*Vernonia gigantea*		
Bog White Violet	*Viola lanceolata*		
Early Blue Violet	*Viola septemloba (palmata)*		
Summer Grape	*Vitis aestivalis*		
Muscadine	*Vitis rotundifolia var. rotundifolia*		
Netted Chain Fern	*Woodwardia areolata*		
Virginia Chain Fern	*Woodwardia virginica*		
Coastalplain Yelloweyed Grass	*Xyris ambigua*		
Baldwin's Yelloweyed Grass	*Xyris baldwiniana*		
Shortleaf Yelloweyed Grass	*Xyris brevifolia*		
Carolina Yelloweyed Grass	*Xyris caroliniana*		
Curtiss' Yelloweyed Grass	*Xyris curtissii*		
Bog Yelloweyed Grass	*Xyris difformis var. floridana*		
Drummond's Yelloweyed Grass	*Xyris drummondii*		
Elliot's Yelloweyed Grass	*Xyris elliottii*		
Fringed Yelloweyed Grass	*Xyris fimbriata*		

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Savannah Yelloweyed Grass	*Xyris flabelliformis*		
Quillwort Yelloweyed Grass	*Xyris isoetifolia*	E	
Richard's Yelloweyed Grass	*Xyris jupicai*		
Tall Yelloweyed Grass	*Xyris platylepis*		
Harper's Yelloweyed Grass	*Xyris scabrifolia*	T	
Acidswamp Yelloweyed Grass	*Xyris serotina*		
Pineland Yelloweyed Grass	*Xyris stricta*		
Adam's Needle	*Yucca filamentosa*		
Crowpoison, Osceola's Plume	*Zigadenus densus (Stenanthium densum)*		
Viperina	*Zornia bracteata*		
beach cordgrass			
beach elder			
beach morning glory			
beach rosemary			
deer moss			
dune panic grass			
dune sunflower			
prickley pear			
railroad vine			
sand spur			
sea oxeye			
sea purslane			
sea rocket			
seashore paspalum			

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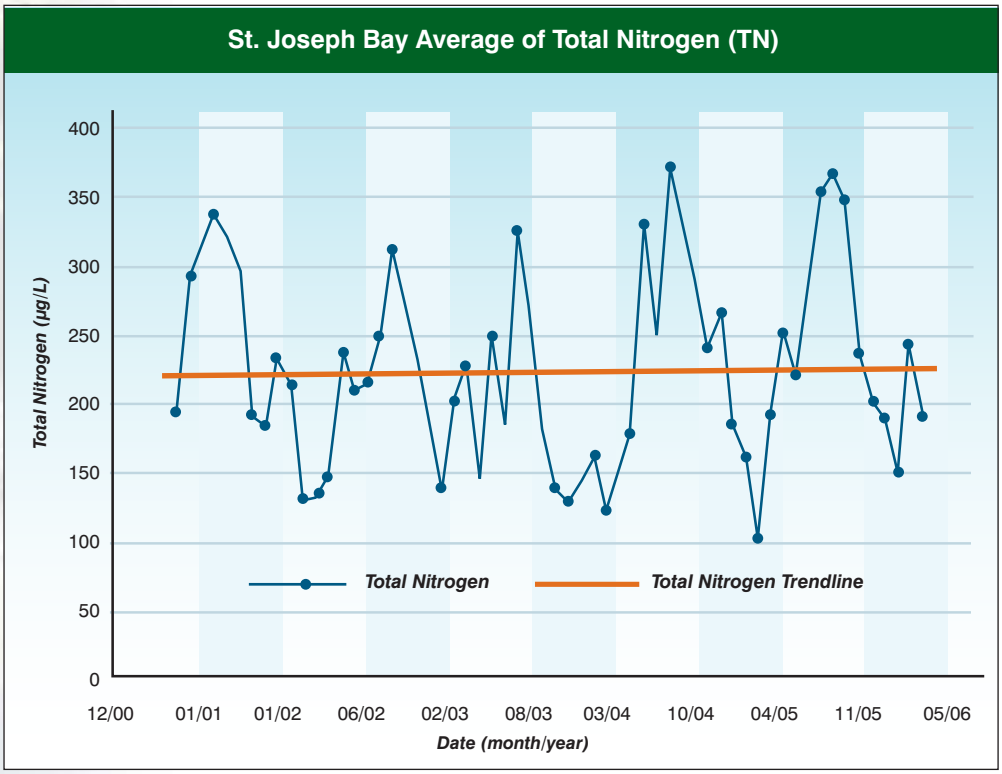
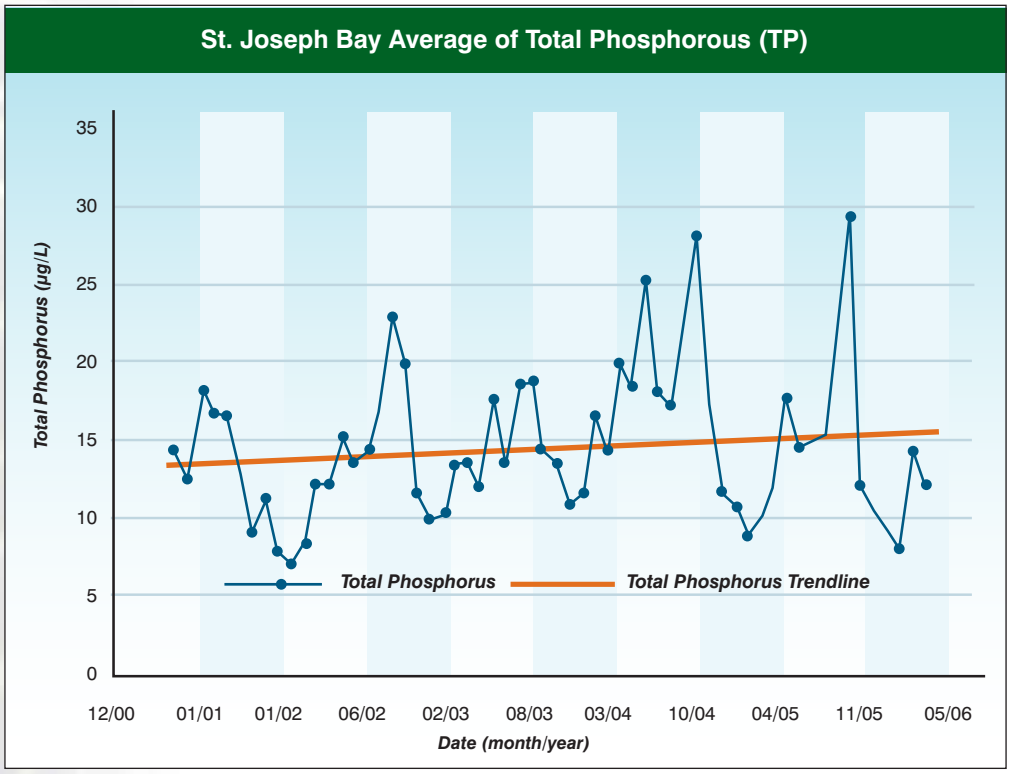
Plants			
Silk tree, Mimosa	*Albizia julibrissin*		
Giant reed	*Arundo donax*		
Wild taro	*Colocasia esculenta*		
Zarzabacoa Comun	*Desmodium incanum*		
Water hyacinth	*Eichhornia crassipes*		
Pan-american Balsamscale	*Elionurus tripsacoides*		
Centipedegrass	*Eremochloa ophiuroides*		
Gladiolus	*Gladiolus x gandavenis*		
Cogongrass	*Imperata cylindrica*		
Japanese climbing fern	*Lygodium japonicum*		
Chinaberry	*Melia azerderach*		
Torpedo grass	*Panicum repens*		
Vaseygrass	*Paspalum urvillei*		
Common reed	*Phragmites australis*		
Chinese tallow	*Sapium sebiferum*		
Richard's Yelloweyed Grass	*Xyris jupicai*		

Water Quality Monitoring / Nutrients

The following graph depicts total nitrogen water quality data associated with the St. Joseph Bay Aquatic Preserve from 2000-2006.

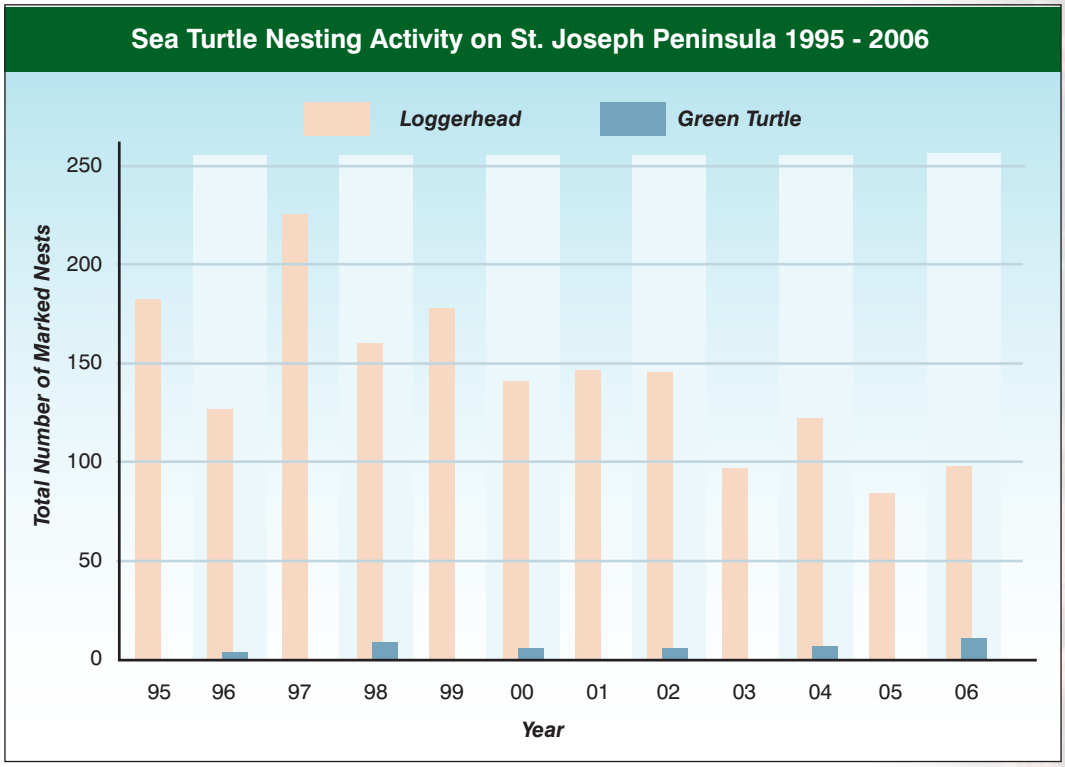


The following graph depicts total phosphorous water quality data associated with the St. Joseph Bay Aquatic Preserve from 2000-2006.

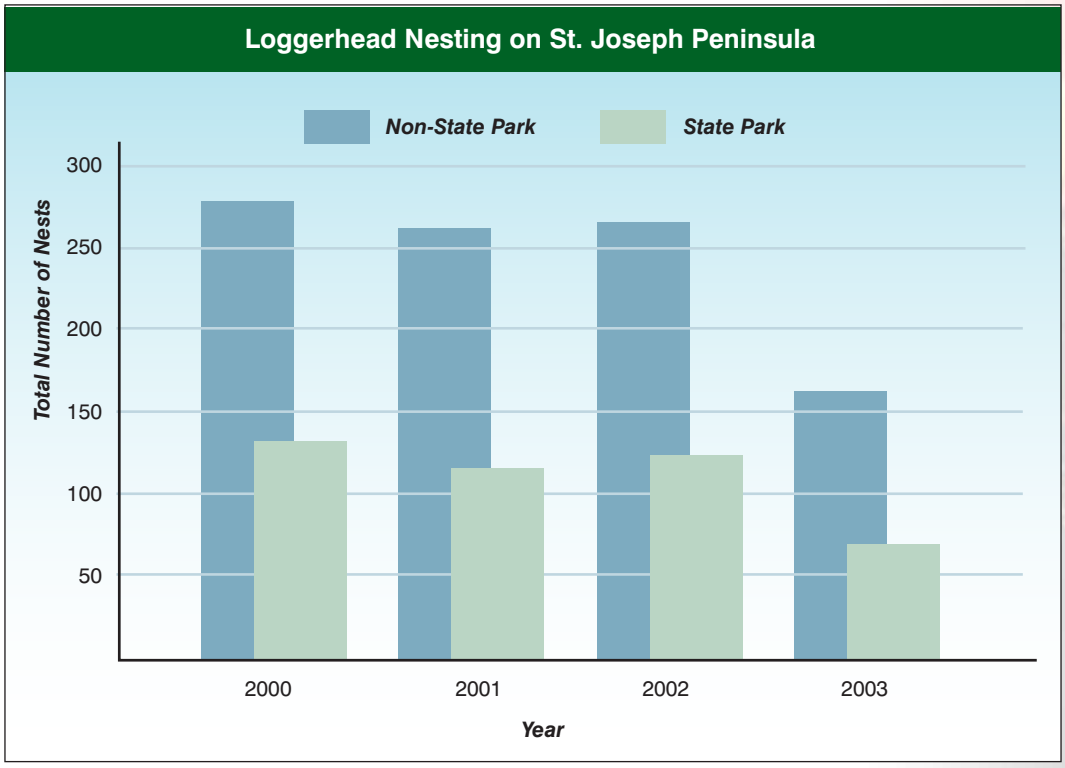


Sea Turtle Nesting on St. Joseph Peninsula from 1995-2006

The following graph depicts sea turtle nesting numbers for the six-mile stretch of beach between the St. Joseph Peninsula State Park boundaries and the Stumphole area from 1995-2006.

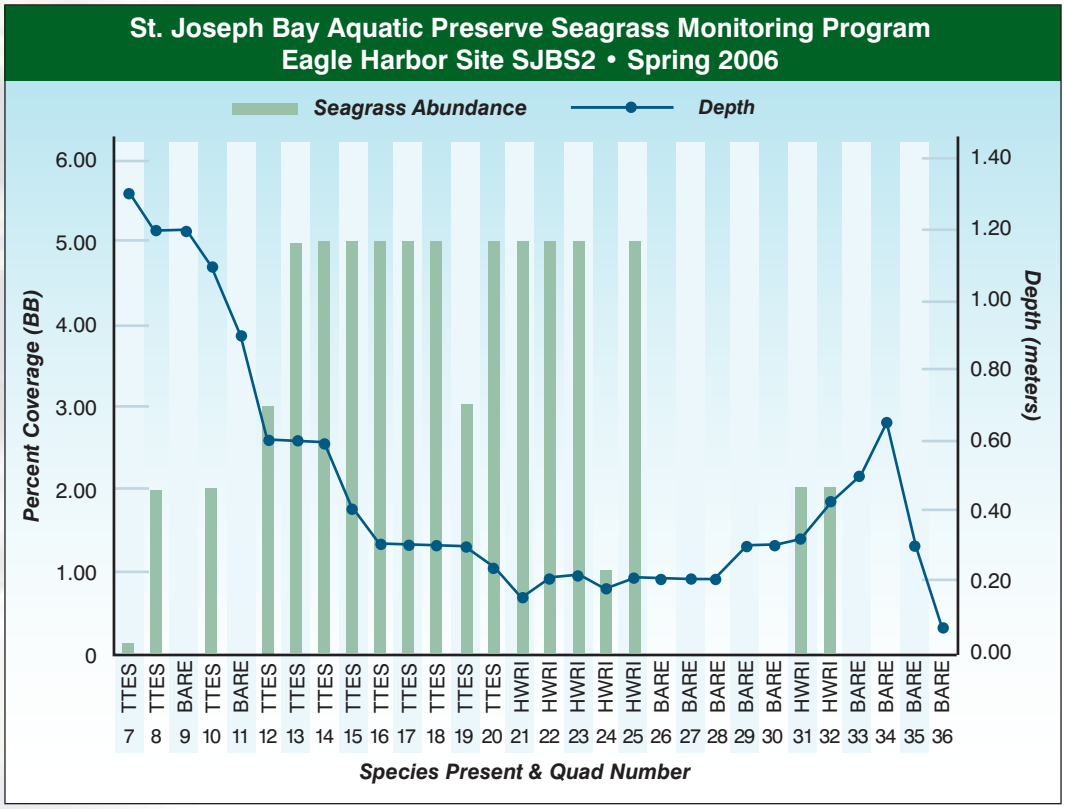


The following graph depicts loggerhead turtle nesting activity on the St. Joseph Peninsula between 2000-2003.



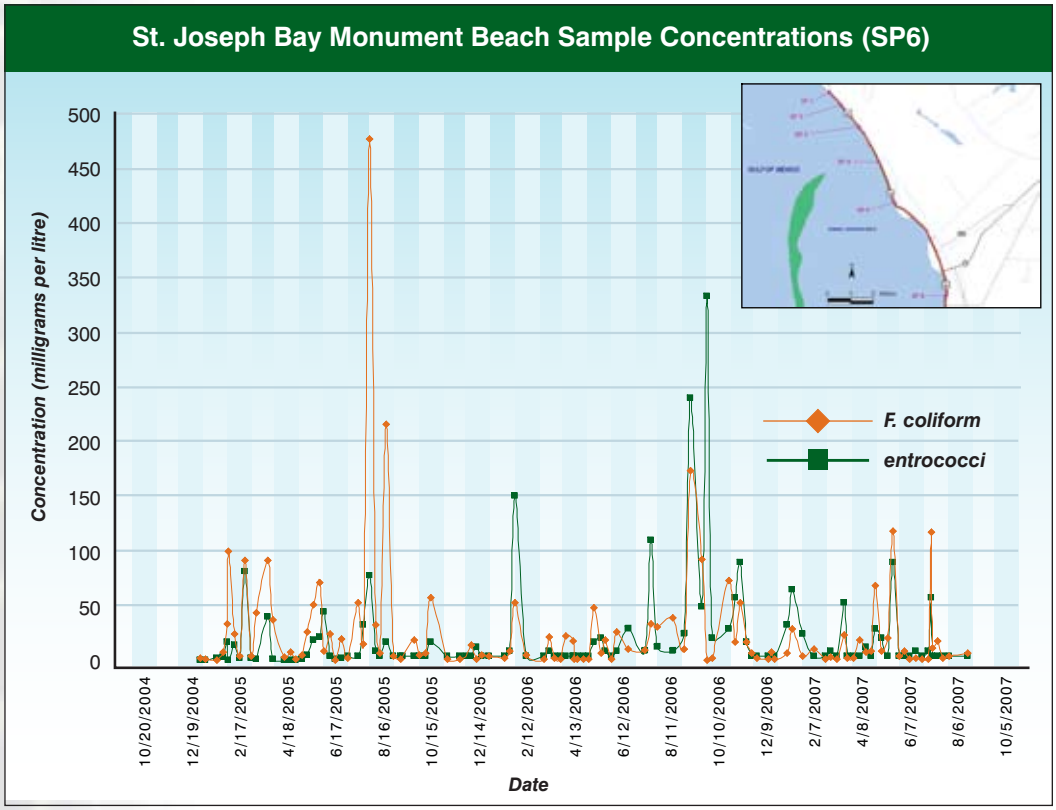
Seagrass Abundance, Depth and Blade Length Comparision 2006

The following graph illustrates the species of seagrass that were found at site SJBS2 in the spring of 2006. This graph is only one example of how seagrass data may be used to assess characteristics of the habitat.



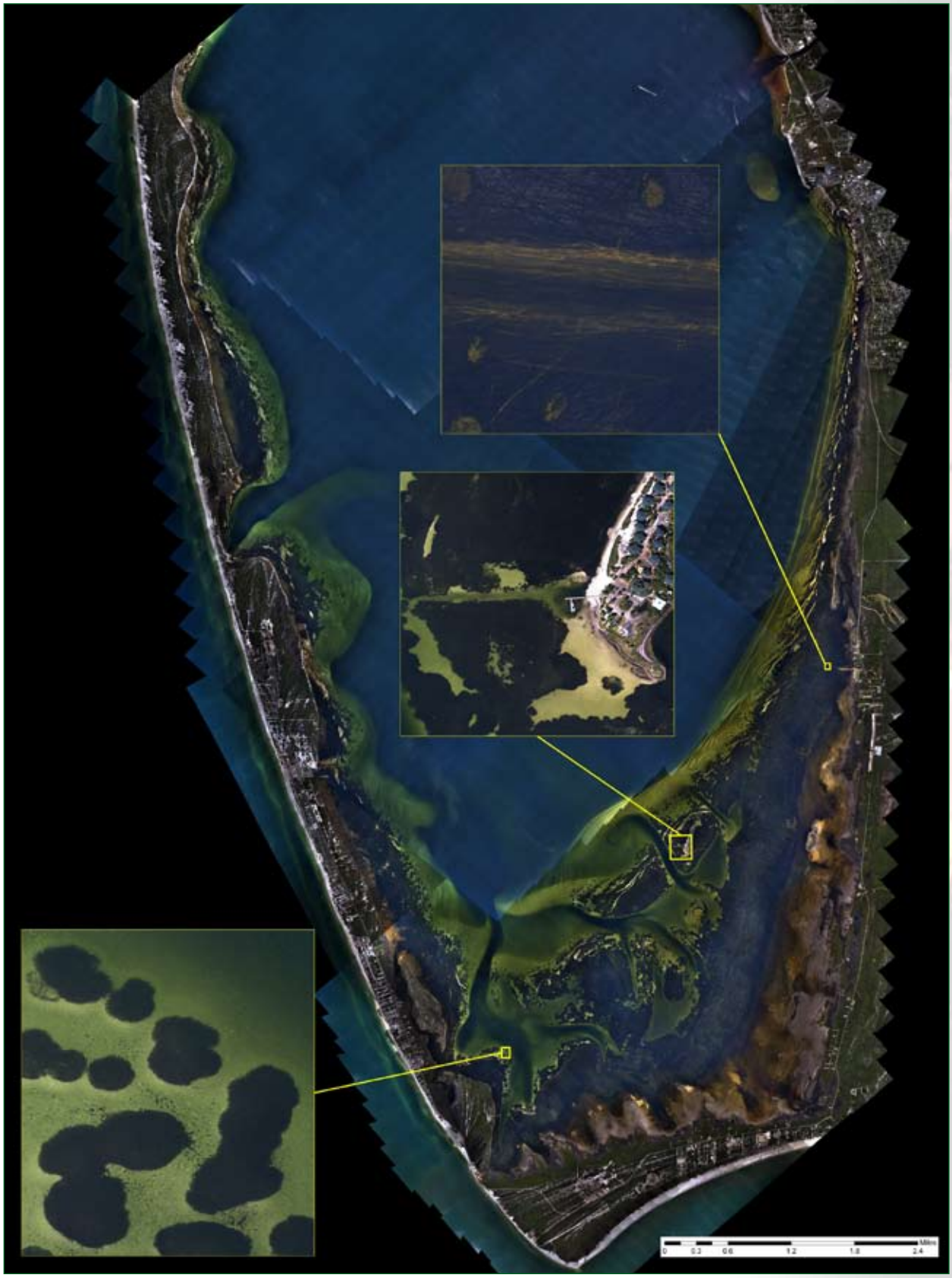
St. Joseph Bay Water Quality – Fecal coliform and *enterococci*

The following graph depicts the fecal coliform and *enterococci* concentrations at the St. Joseph Bay Monument Beach Site (SP6) from 2004 to 2007.



Hyperspectral Imagery of St. Joseph Bay October 2006

These images will be used to assess the extent and distribution of seagrass and saltmarsh habitat as well as provide data on the extent of prop scar damage in the bay. The preserve will seek grant funding to have images done every 3-5 years for comparison.



Eighty-one Natural Communities are classified by the Florida Natural Areas Inventory (FNAI). A Natural Community is defined as a distinct and reoccurring assemblage of populations of plants, animals, fungi and microorganisms naturally associated with each other and their physical environment. The levels of this classification become increasingly more complex and finely subdivided. At all levels, however, there are overlaps between types because of overlapping species distributions and intergrading physical conditions.

At the broadest level, the Natural Communities are grouped into seven Natural Community Categories based on hydrology and vegetation. A second level of the hierarchy splits the Natural Community Categories into Natural Community Groups. The third level of the classification, Natural Community Types, is the level at which Natural Communities are named and described. Natural Communities are characterized and defined by a combination of physiognomy, vegetation structure and composition, topography, land form, substrate, soil moisture condition, climate, and fire. They are named for their most characteristic biological or physical feature.

Levels of Natural Communities

- CATEGORIES – based on hydrology and vegetation
- Groups – defined by landform, substrate, and vegetation
- Types – characterized and defined by a combination of physiognomy, vegetation structure and composition, topography, land form, substrate, soil moisture condition, climate, and fire

Natural Community Categories

1. ***Terrestrial Natural Communities*** - upland habitats dominated by plants which are not adapted to anaerobic soil conditions imposed by saturation or inundation for more than 10% of the growing season.
2. ***Palustrine Natural Communities*** - freshwater wetlands dominated by plants adapted to anaerobic substrate conditions imposed by substrate saturation or inundation during 10% or more of the growing season.
3. ***Lacustrine Natural Communities*** - nonflowing wetlands of natural depressions lacking persistent emergent vegetation except around the perimeter.
4. ***Riverine Natural Communities*** - natural, flowing waters from their source to the downstream limits of tidal influence, and bounded by channel banks.
5. ***Subterranean Natural Communities*** occur below ground surface.
6. ***Estuarine Natural Communities*** - subtidal, intertidal, and supratidal zones of coastal water bodies, usually partially enclosed by land but with a connection to the open sea, within which seawater is significantly diluted with freshwater inflow from the land.
7. ***Marine Natural Communities*** – occur in subtidal, intertidal, and supratidal zones of the sea, landward to the point at which seawater becomes significantly diluted with freshwater inflow from the land.

Descriptions of the Natural Community Types found in St. Joseph Bay Aquatic Preserve

Marine and Estuarine

Mineral Based - communities which occur in subtidal, intertidal and supratidal zones.

Unconsolidated Substrate - 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.

Faunal Based - communities which occur in subtidal zones.

Mollusk Reef - characterized as expansive concentrations of sessile mollusks occurring in intertidal and subtidal zones to a depth of 40 feet. In Florida, the most developed Mollusk Reefs are generally restricted to estuarine areas and are dominated by the American oyster.

Octocoral Bed - characterized as large populations of sessile invertebrates of the Class Anthozoa, Subclass Octocorallia, Orders Gorgonacea and Pennatulacea. This community is confined to the subtidal zone since the sessile organisms are highly susceptible to desiccation.

Sponge Bed - characterized as dense populations of sessile invertebrates of the phylum Porifera, Class Demospongiae. Although concentrations of living sponges can occur in marine and estuarine intertidal zones, Sponge Beds are confined primarily to subtidal zones.

Floral Based - communities which occur in intertidal and supratidal zones.

Algal Bed - characterized as large populations of non-drift macro or micro algae.

Seagrass Bed - 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.

Tidal Marsh - characterized as expanses of grasses, rushes and sedges along coastlines of low wave energy and river mouths. They are most abundant and most extensive in Florida north of the normal freeze line, being largely displaced by and interspersed among Tidal Swamps below this line.

Tidal Swamp - characterized as dense, low forests occurring along relatively flat, intertidal and supratidal shorelines of low wave energy along Southern Florida.

Composite Substrate

Composite Substrate – 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.

Florida Natural Areas Inventory, Natural Communities Rankings

Below are the relative ranks of the Natural Communities. FNAI uses several criteria to determine the relative rarity and threat to each community type; these are translated or summarized into a global and a state rank, the G and S ranks, respectively. Most G ranks for Natural Communities are temporary pending comparison and coordination with other states using this methodology to classify and rank vegetation types (contact FNAI for the most recent Natural Community ranks). A few Natural Communities and several Plant Communities occur only or mostly in Florida and can be considered endemic to Florida (Muller, Hardin, Jackson, Gatewood & Caire, 1989). The only opportunity for protection of these communities is in Florida and they should be given special consideration in Florida's protection efforts.

Marine and Estuarine

Mineral Based

G5 S5 Unconsolidated Substrate

Faunal Based

G3 S3 Mollusk Reef

G2 S1 Octocoral Bed

G2 S2 Sponge Bed

Floral Based

G3 S2 Algal Bed
G2 S2 Seagrass Bed

G4 S4 Tidal Marsh

Composite Substrate

G3 S3 Composite Substrate

Definition of Global (G) element ranks:

G1 - Critically imperiled globally because of extreme rarity (5 or fewer occurrences or very little remaining area, e.g., <2,000 acres) or because of some factor(s) making it especially vulnerable to extinction;

G2 - Imperiled globally because of rarity (6-20 occurrences or very little remaining area, e.g., <10,000 acres) or because of some factor(s) making it very vulnerable to extinction throughout its range;

G3 - Either very rare and local throughout its range or found locally (even abundantly at some of its locations) in a restricted range or because of other factors making it vulnerable to extinction throughout its range, 21 to 100 occurrences;

G4 - Apparently secure globally, though it may be quite rare in parts of its range, especially at the periphery;

G5 - Demonstrably secure globally, though it may be quite rare in parts of its range, especially at the periphery;

G? - uncertain Global rank.

Definition of State (S) element ranks:

S1 - Critically imperiled in state because of extreme rarity (5 or fewer occurrences or very little remaining area) or because of some factor(s) making it especially vulnerable to extinction;

S2 - Imperiled in state because of rarity (6-20 occurrences or little remaining area) or because of some factor(s) making it very vulnerable to extinction throughout it range; S3 = Rare or uncommon in state (on the order of 21 to 100 occurrences);

S4 - Apparently secure in state, although it may be rare in some parts of its state range;

S5 - Demonstrably secure in state and essentially ineradicable under present conditions;

S? - uncertain State rank.

Appendix C

Public Involvement

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

The following appendices contain information about who serves on the Advisory Committee, when meetings were held, copies of the public advertisements for those meetings, and summaries of each meeting.

C.1.1 / List of Advisory Committee Members and Their Affiliations

Name	Affiliation	County
Ann Anderson	Friends of the St. Joseph Bay Preserves	Gulf
Marilyn Blackwell	Save the Apalachicola River	Gulf
Don Butler	Gulf County Administrator	Gulf
Ann Marie Daly	Daly's Dock & Dive Center	Gulf
Barbara Ells	Conservationist/Resident	Gulf
Matt Fleck	St. Joe Company/Representing PSJ Marina	Gulf
Jason Flowers	Gulf County Department of Health	Gulf
Chris Gudeman	Florida Fish & Wildlife Conservation Commission/Resident	Leon
Steven Herrington	The Nature Conservancy	Liberty
Christine Lutz	Resident	Gulf
Artie McMillion	Florida Fish & Wildlife Conservation Commission	Bay
Carl Marchand	St. Joseph Peninsula State Park	Gulf
Martha Maglothin	Gulf Coast Conservation Association	Gulf
Marvin Raulston	Northwest Florida Water Management District	Gadsden
Melody Ray-Culp	United States Fish & Wildlife Service	Bay
Lee Vincent	City of Port St. Joe	Gulf

C.1.2 / Florida Administrative Weekly (F.A.W.) Postings

Meeting: **Thursday, October 12, 2006**

Florida Administrative Weekly Volume 32, Number 38, September 22, 2006, Section VI - Notices of Meetings, Workshops and Public Hearings, page 4490

The **Department of Environmental Protection, Office of Coastal and Aquatic Managed Areas** announces a public meeting to which all persons are invited.

DATE AND TIME: Thursday, October 12, 2006, 1:00 p.m.

PLACE: St. Joseph Bay Buffer Preserve Center, 3915, Highway C-30, Port St. Joe, FL 32456

GENERAL SUBJECT MATTER TO BE CONSIDERED: St. Joseph Bay Aquatic Preserve Advisory Committee meeting. The purpose is to brief members of the Advisory Committee on their role in assisting in the management plan development process.

A copy of the agenda may be obtained by contacting: Aquatic Preserve Manager, Kim Wren, (850)653-8063.

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: Aquatic Preserve Manager, Kim Wren, (850)653-8063. 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).

Meeting: **Thursday, January 18, 2007**

Florida Administrative Weekly Volume 32, Number 51, December 22, 2006, Section VI - Notices of Meetings, Workshops and Public Hearings, page 6063

The **Department of Environmental Protection, Office of Coastal and Aquatic Managed Areas** announces a public meeting to which all persons are invited.

DATE AND TIME: Thursday, January 18, 2007, 1:00 p.m.

PLACE: St. Joseph Bay Buffer Preserve Center, 3915, Highway C-30, Port St. Joe, FL 32456

GENERAL SUBJECT MATTER TO BE CONSIDERED: St. Joseph Bay Aquatic Preserve Advisory Committee meeting. The purpose is for members of the Advisory Committee to review and discuss the draft St. Joseph Bay Aquatic Preserve management plan.

A copy of the agenda may be obtained by contacting Aquatic Preserve Manager, Kim Wren, (850)653-8063.

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 Aquatic Preserve Manager, Kim Wren, (850)653-8063. 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).

Meeting: **Thursday, March 8, 2007**

Florida Administrative Weekly Volume 33, Number 7, February 16, 2007, Section VI - Notices of Meetings, Workshops and Public Hearings, page 771

The **Department of Environmental Protection, Office of Coastal and Aquatic Managed Areas** announces a public meeting to which all persons are invited.

DATE AND TIME: Thursday, March 8, 2007, 1:00 p.m.

PLACE: St. Joseph Bay Buffer Preserve Center, 3915 Highway C-30, Port St. Joe, FL 32456

GENERAL SUBJECT MATTER TO BE CONSIDERED: St. Joseph Bay Aquatic Preserve Advisory Committee meeting. The purpose is for members of the Advisory Committee to discuss the St. Joseph Bay Aquatic Preserve management plan.

A copy of the agenda may be obtained by contacting Aquatic Preserve Manager, Kim Wren, (850)653-8063.

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 Aquatic Preserve Manager, Kim Wren, (850)653-8063. 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).

C.1.3 / Meeting Summaries

Thursday, October 12, 2006 at 1:00 p.m.

St. Joseph Bay Buffer Preserve Center 3915 Highway C-30, Port St. Joe, FL 32456

Attendees

Name	Affiliation
Barbara Ells	Gulf & East Bay Sea Turtle Patrol
Matt Fleck	St. Joe Company
Christine Lutz	Resident
Martha Maglothin	Gulf Coast Conservation Association
Carl Marchand	Department of Environmental Protection, Florida State Parks
Artie McMillion	Florida Fish and Wildlife Conservation Commission, Law Enforcement Division
Marvin Raulston	North West Florida Water Management District
Melody Ray-Culp	US Fish and Wildlife Service
Brian Underwood	St. Joe Company

Summary / Minutes
Purpose of meeting is to advise the St. Joseph Bay Aquatic Preserve Management Plan Advisory Committee (AC) of their roles on serving on this committee and in assisting with the management plan development process. A presentation on St. Joseph Bay Aquatic Preserve was given by Kim Wren, Aquatic Preserve Manager. The group discussed upcoming commitments, deadlines, and meeting dates.

Kelly Samek, DEP's Senior Assistant General Counsel, discussed Florida's Sunshine Law.

Karen Bareford, CAMA's Planning Manager, discussed the management plan process and how AC members would participate at public meetings and member meetings.

Thursday, January 18, 2007 at 1:00 p.m.

St. Joseph Bay Buffer Preserve Center 3915 Highway C-30, Port St. Joe, FL 32456

Attendees

Name	Affiliation
Ann Anderson	Friends of The St. Joseph Bay Preserves
Ann Marie Daly	Daly's Dock and Dive Center
Barbara Ells	Gulf & East Bay Sea Turtle Patrol
Matt Fleck	St. Joe Company
Steve Herrington	The Nature Conservancy
Christine Lutz	Resident
Martha Maglothin	Gulf Coast Conservation Association
Carl Marchand	Department of Environmental Protection, Florida State Parks
Marvin Raulston	Northwest Florida Water Management District
Melody Ray-Culp	U.S. Fish and Wildlife Service

Summary / Minutes
Discussed new calendar/meeting dates with the group and discussed the outcome of the public scoping workshop including attendance, topics and issues discussed, and concerns of the public and input for the plan.

Discussed the changes to the plan outline with the group and received feedback. The ACG was pleased with the new outline and direction the plan was taking. The group also discussed "issued based management" and what this means for the plan and protection of St. Joseph Bay. The new format and table of contents were discussed with the group as well.

The need to prioritize the issues in SJB was discussed and the group was to focus on Chapter 6 and to submit comments on proposed issues.

The date and format for the formal public meeting was discussed as well as who would be in attendance.

Thursday, March 8, 2007 at 1:00 p.m.
St. Joseph Bay Buffer Preserve Center 3915 Highway C-30, Port St. Joe, FL 32456

Attendees

Name	Affiliation
Marilyn Blackwell	Save the Apalachicola River
Ann Marie Daly	Daly's Dock and Dive Center
Steve Herrington	The Nature Conservancy
Christine Lutz	Resident
Martha Maglothin	Gulf Coast Conservation Association
Melody Ray-Culp	US Fish and Wildlife Service
Kent Smith	FWC

Summary / Minutes

Purpose of meeting is to discuss the St. Joseph Bay Aquatic Preserve Management Plan draft. The committee discussed upcoming meeting dates and responsibilities. Hard copies of the plans will be available at the St. Joseph Bay Buffer Preserve for those who would like to pick one up. Plan to be released on-line March 26, 2007.

AC reviewed the draft plan and commented on issues that should be addressed in more detail in the plan. Issues discussed include:

- adding additional information on sea turtle nesting habitat, data, and unique genetic population in area;
- closing the portion of the beach between the state park boundaries and the Stumphole area to driving to protect valuable habitat;
- seagrass buoys;
- creating additional laws to protect seagrass habitat and issue fines for prop scar damage;
- enforcement issues and recommendations;
- update boater's guides with new information;
- educational signage at all local access points;
- strengthen partnership with state park to educate visitors;,
- no enforcement of live shell collecting;
- increase in red tide; permitting issues;
- local development affects on the bay; and
- water quality issues and contaminants.

*C.2 / **Public Scoping Meeting***

The following appendices contain information about the Public Scoping Meeting which was held in order to obtain input from the public as to what they thought the issues in St. Joseph Bay Aquatic Preserve were. There are copies of the public advertisements for this meeting, a list of attendees, a summary of the meeting, and a copy of the written comments received.

C.2.1 / Florida Administrative Weekly Posting

Meeting: **Wednesday, October 25, 2006**

Florida Administrative Weekly Volume 32, Number 38, September 22, 2006, Section VI - Notices of Meetings, Workshops and Public Hearings, page 4490

The **Department of Environmental Protection, Office of Coastal and Aquatic Managed Areas** announces a public meeting to which all persons are invited.

DATE AND TIME: Wednesday, October 25, 2006, 7:00 p.m.

PLACE: St. Joseph Bay Buffer Preserve Center, 3915, Highway C-30, Port St. Joe, FL 32456

GENERAL SUBJECT MATTER TO BE CONSIDERED: St. Joseph Bay Aquatic Preserve Management Plan Public Scoping Meeting. The purpose is to inform the public on the management plan development process and to solicit input on issues they are interested in seeing addressed in the plan.

A copy of the agenda may be obtained by contacting: Aquatic Preserve Manager, Kim Wren, (850)653-8063.

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: Aquatic Preserve Manager, Kim Wren, (850)653-8063. 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).

2006 Statewide Flyer

Florida Department of Environmental Protection
Coastal and Aquatic Managed Areas

Public Meetings

The Florida Department of Environmental Protection's Office of Coastal and Aquatic Managed Areas (CAMA) is responsible for the management of Florida's 41 Aquatic Preserves, 3 National Estuarine Research Reserves (NERR), 1 National Marine Sanctuary, and the Coral Reef Conservation Program. These protected areas comprise more than 4 million acres of the most valuable submerged lands and select coastal uplands in Florida. With public input, CAMA successfully developed a Program Overview that provides the statewide perspective and is now updating site specific management plans. This year three site management plans will be under review. These sites will hold individual public scoping meetings designed to receive public input on site issues.

Meeting Locations

October 25, 2006 at 7:00 p.m.

St. Joseph Bay Aquatic Preserve

St. Joseph Bay Buffer Preserve Center
3915 Highway C-30
Port St. Joe, FL 32456

November 1, 2006 at 6:00 p.m.

Guana Tolomato Matanzas NERR, Guana River Marsh Aquatic Preserve, Pellicer Creek Aquatic Preserve

University of Florida
Whitney Laboratory for Marine Bioscience
Whitney Hall
9505 Ocean Shore Boulevard
St. Augustine, FL 32080

November 2, 2006 at 6:00 p.m.

Guana Tolomato Matanzas NERR, Guana River Marsh Aquatic Preserve, Pellicer Creek Aquatic Preserve

Guana Tolomato Matanzas National Estuarine Research Reserve Environmental Education Center
505 Guana River Road
Ponte Vedra Beach, FL 32082

November 13, 2006 at 6:00 p.m.

Terra Ceia Aquatic Preserve

Manatee Civic Center
Terra Ceia Room
1 Haben Boulevard
Palmetto, FL 34221

These scoping meetings will assist in crafting the content for individual site management plans. The information from each meeting will be recorded, compiled, and presented to CAMA by facilitators. The objectives of the public scoping meetings are to:

- Inform the public about the history, purpose, and scope of management plan development
- Solicit public input regarding issues and opportunities that should be addressed in the management plan

Written comments are welcome and can be submitted to:

Gigi Coulson
Tetra Tech EC, Inc.
759 South Federal Highway, Suite 100
Stuart, FL 34994
or by fax: 772.781.3411

For more information, please contact:
Ellen Stere 850.245.2094 ELLEN.STERE@DEP.STATE.FL.US or visit our website at www.aquaticpreserves.org

Pursuant to the provisions of the Americans with Disabilities Act, any person requiring special accommodations to participate in this hearing is asked to advise the agency at least 48 hours before the hearing by contacting Ellen Stere at 850/245-2094. If you are hearing or speech impaired, please contact the Florida Relay Service by calling (800) 955-8771 (TDD).

Florida Department of Environmental Protection
Coastal and Aquatic Managed Areas

St. Joseph Bay Aquatic Preserve

Public Meeting

The Florida Department of Environmental Protection's Office of Coastal and Aquatic Managed Areas (CAMA) is responsible for the management of Florida's 41 Aquatic Preserves, 3 National Estuarine Research Reserves (NERR), 1 National Marine Sanctuary, and the Coral Reef Conservation Program. These protected areas comprise more than 4 million acres of the most valuable submerged lands and select coastal uplands in Florida. With public input, CAMA successfully developed a Program Overview that provides the statewide perspective and is now updating site specific management plans. This year three site management plans will be under review. These sites will hold individual public scoping meetings designed to receive public input on site issues.

Meeting Location

October 25, 2006 at 7:00 p.m.

St. Joseph Bay Aquatic Preserve

St. Joseph Bay Buffer Preserve Center
3915 Highway C-30
Port St. Joe, FL 32456

These scoping meetings will assist in crafting the content for individual site management plans. The information from each meeting will be recorded, compiled, and presented to CAMA by facilitators. The objectives of the public scoping meetings are to:

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Written comments are welcome and can be submitted to:

Gigi Coulson
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Stuart, FL 34994
or by fax: 772.781.3411

For more information, please contact:
Ellen Stere 850.245.2094 ELLEN.STERE@DEP.STATE.FL.US or visit our website at www.aquaticpreserves.org

Pursuant to the provisions of the Americans with Disabilities Act, any person requiring special accommodations to participate in this hearing is asked to advise the agency at least 48 hours before the hearing by contacting Ellen Stere at 850/245-2094. If you are hearing or speech impaired, please contact the Florida Relay Service by calling (800) 955-8771 (TDD).

Wednesday, October 25, 2006 at 7:00 p.m.

St. Joseph Bay Buffer Preserve Center 3915 Highway C-30, Port St. Joe, FL 32456

Attendees

Name	Affiliation	County
Catherine Aiy	Resident/St. Joseph Bay Buffer Preserve	Gulf
Ann Anderson	Friends of St. Joseph Bay Preserves	
Marilyn Blackwell	Save the Apalachicola River	Gulf
Donald Butler	Gulf County Administrator	Gulf
Ann Marie Daly	Daly's Dock and Dive Center	Gulf
Ed Daly	Daly's Dock and Dive Center	Gulf
Steven Herrington	The Nature Conservancy	Liberty
Corbett Howell	Resident	Gulf
Elizabeth Howell	Resident	Gulf
Jean Huffman	Resident/St. Joseph Bay Buffer Preserve	Gulf
Christine Lutz	Resident	Gulf
Martha Maglothin	Gulf Coast Conservation Association	Gulf
Carl Marchand	St. Joseph Peninsula State Park	Gulf
John Olive	Resident	Gulf
Melody Ray-Culp	United States Fish and Wildlife Service	Bay
Sandra Snow	Resident	Gulf
Marjorie Still	Resident	Gulf
Bill Still	Resident	Gulf

Introduction

Purpose of the Scoping Meeting

The purpose of public involvement is to meaningfully engage all interested individuals, groups, and agencies in the Office of Coastal and Aquatic Managed Areas (CAMA) Aquatic Preserve (AP) management plan development process. The following goals have been set for this round of meetings:

- To meaningfully and efficiently solicit public opinion to be used in developing management plans that are useful, implementable, and widely supported;
- To inform and involve stakeholders in the management plan development process; and
- To gain insight on community and management level issues of concern.

Benefits of an Independent Facilitator (Tetra Tech)

Meetings of large groups of people can be very hard to organize as well as to control when they are in progress. The independent facilitator's job is to lead the group process without bias and help them improve the way they communicate, examine and solve problems, and make decisions. Facilitators, like Tetra Tech (TtEC) can help groups stay on task; and therefore be more creative, efficient, and productive than they would be without facilitation help.

There are a number of additional common benefits to using a facilitator to run public meetings. First, members of the public are often more motivated to support the subsequent decisions made because of their investment in the process. Second, using Tetra Tech makes it more possible for managers and leaders to draw more on their staffs as resources, which contributes to overall organizational success. Participants are encouraged to think and act for the overall benefit of the group, resulting in higher quality decisions. Finally, negative attitudes, low morale, low involvement, and withholding of information are less likely because everyone is involved in a joint process.

CAMA's Planning Program

The Florida Department of Environmental Protection's Office of CAMA is responsible for the management of Florida's 41 Aquatic Preserves, 3 National Estuarine Research Reserves (NERR), 1 National Marine Sanctuary, and the Coral Reef Conservation Program. The state-owned protected areas comprise more than 4 million acres of the most valuable submerged lands and select coastal uplands in Florida. With public input, CAMA successfully developed a Program Overview that provides a statewide perspective of the program and is now updating site specific management plans for the Aquatic Preserves and NERRs. In 2006, three site management plans will be under review. These sites will hold individual public scoping meetings designed to receive public input on site issues.

These scoping meetings will assist in crafting the content for individual site management plans. The information from each meeting will be recorded, compiled, and presented to CAMA by facilitators. The objectives of the public scoping meetings are to:

- Inform the public about the history, purpose, and scope of site specific Aquatic Preserve Management Plan development; and
- Solicit public input regarding issues and opportunities that should be addressed in the site specific Management Plan.

Advisory Committees

One key step that is taken during management plan development is organization of an advisory committee (s. 253.034[5]) comprised of key stakeholders of the Preserve. The advisory committees will be chosen by the Preserve Managers and will work closely with the them to review notices for public meetings, collect and review data on community issues and concerns, and review the plan as it develops into a final draft management plan.

After the initial round of CAMA's Program Overview public workshops in 2005, the preserves that were scheduled to be first to revise their site specific Aquatic Preserve Management Plans began to organize their advisory committees. These committees will be engaged in the beginning steps of the review and development of the draft aquatic Preserve Management Plan. Following the work conducted by the Preserve Managers and their advisory committees, the Preserve will advertise and conduct formal public meetings to introduce the draft plan and to engage a broader group of stakeholders in the development of the draft and final aquatic Preserve Management Plan.

Values, Issues and Opportunities – Workshop Participants

General Summary of the Meeting

The general public and Preserve users and stakeholders were invited to the public scoping meeting located at the St. Joseph Bay Buffer Preserve Center, in Port St. Joe, Florida. The meeting took place on October 25, 2006, at seven o'clock in the evening.

According to the sign-in sheet, 16 members of the public attended the approximately two hour meeting. Following the PowerPoint presentation on the site specific Aquatic Preserve Management Plan planning process, the meeting was opened up to public for their comments. The public input portion of the meeting was recorded and is available for review.

The values, issues, and opportunities for improvement in aquatic preserve management as expressed by public meeting participants are described under the categories listed below. The categories are five operational Management Program Areas under which preserve management will be organized. The management goals, objectives, and strategies identified in the site management plans will be arranged according to these Management Programs. A brief explanation of the Management Program Area is provided preceding the comments.

Resource Management

This Management Program Area oversees all Natural and Cultural Resource Management projects within the state to ensure scientific robustness and consistency in techniques. The Program Area includes listed species, critical habitat management, nuisance species, habitat management, fire management, cultural resources, traditional uses of natural resources, incident response, etc. all pertaining to resource management and protection.

Stakeholders would like to see efforts to protect the bay resources by enforcing permitting regulations that prevent habitat damage, especially as it pertains to development adjacent to the Preserve. The development impacts to the Preserve are an issue of concern for the public, particularly stormwater runoff from nearby construction projects.

During the public scoping meeting, a discussion took place concerning the identification of the proper regulatory offices and enforcement offices to contact if a violation is noticed in the Preserve. The public was informed of several avenues to report permit violations and illegal activity.

The Preserve Manager also offered to work with the stakeholders to share information on "Friends of the St. Joseph Bay Preserve" where they would be able to receive support in their endeavors to protect the pristine nature of St. Joseph Bay.

Ecosystem Science

This Management Program Area oversees all Resource Assessment, Research and Monitoring projects within the state to ensure scientific robustness and consistency in techniques. The Program Area includes mapping, modeling, monitoring, research and support within preserves.

Stakeholders would like to see more water quality and sediment testing in the bay for dioxins and other pollutants and toxins. They also would like to see funding sources and staff allocations in the new plan to address and balance the demand for development and at the same time protect the physical resources. In addition the public would like to see included in the Management Plan specific plans for enacting plan goals, plans for conducting monitoring, and needed research.

Water quality testing is currently being performed within St. Joseph Bay Preserve and is conducted on a regular basis. Sediment testing is done by other local agencies and research labs. The public believes that St. Joseph Bay AP should partner with them to share information on what other chemicals might be found in the Bay.

Education and Outreach

This Management Program Area develops and conducts programs in education, outreach, community engagement, marketing, and volunteers within the preserves, as well as facilitates opportunities for participation in management plan development and implementation.

One stakeholder noted that River Keepers is a good organization, and inquired as to how can the AP could start a similar group to help protect St. Joseph Bay. A discussion of local stewardship groups such as Friends of the St. Joe Bay Preserve, and the Advisory Committee, and their missions ensued. Some stakeholders wondered whether another stewardship group could be started to involve more residents and stakeholders. They would like to be notified of the steps to take to start such a group. A discussion about some of the southern Florida groups began and the Preserve Manager offered to get the interested public more information about those groups.

The suggestion of using a stewardship group that has some enforcement authority to patrol and deter regulation violators was started. The legality of such a group and what kind of authority they could possess is uncertain, but it was suggested that working with FDEP Division of Law Enforcement may be the first step.

Some of the local residents noted that they have lost a lot of dolphin in the past few years due to pollution and habitat loss. It was suggested, perhaps, more outreach and educational programs could help save the pristine Preserve from losing other wildlife and could prevent the ecosystem from deteriorating even more.

A few stakeholders suggested that buoys or signs be put back up to keep motorboats out of shallow areas as a way to prevent the seagrass from getting uprooted by prop scars and groundings. This is a major cause of habitat loss and visitors to the area do not

always know where the shallow areas are located. There used to be signs and buoys, but they are no longer there. The Preserve Manager suggested writing to the local government about this concern, as the solution to the issue, in large part, has to do with the funding that is needed for the signage. The Manager also agreed that this idea should be addressed in the site Management Plan.

Public Use

This Management Program Area would cover the responsibilities for delivery of recreational and tourism opportunities including: user research, public access, boating rules and impacts, consumptive use, non-consumptive use, aquaculture leases, interpretive displays, eco-tourism, volunteer management, enforcement, and private concessions.

The stakeholders would like to see efforts made to protect the bay resources from overuse that ultimately leads to habitat damage. They are also concerned about livelihood on the bay. Many stakeholders have businesses that take them out on the water often; and they are always noticing violations. They don't want the bay to deteriorate as that will affect their business. A Florida Department of Environmental Protection (FDEP) 24-hour Hotline Number to report illegal activity was provided to the audience by the Preserve Manager.

A few stakeholders felt that the Preserve needs enforcement authority, because waiting on the regulatory office or the Florida Fish and Wildlife Conservation Commission (FFWCC) takes too long. The damage by other users or developers is already done by the time the investigators get there. The hotline numbers for the FDEP and the Florida Marine Patrol were mentioned as the fastest way to get enforcement officers on the scene. The Preserve Manager also suggested that if a violation is taking place, the observer could take pictures of what is going on so that law enforcement could use that as evidence once they initiate an investigation. It was also suggested by an audience member that if the mission is to protect the Aquatic Preserve for future generations, then there needs to be "teeth" in the Management Plan that allows for enforcement by the Preserve Managers.

Legal Affairs

It was reiterated that the public would like to see the Preserve given some enforcement authority. It was also suggested that information concerning which regulatory office or hotline to call to report violations should be posted on the website. There was some confusion as to what violations the Florida Marine Patrol, the FFWCC, and the FDEP have jurisdiction over, and that detailed information could also be posted on the Aquatic Preserve website.

Questions about whether or not the boundary will be expanded were asked. Also, the public is concerned about whether CAMA is looking to acquire any more aquatic areas adjacent to St. Joseph Bay to serve as a buffer between the Preserve and new developments.

Specific issues that the public would like to see addressed in the Management Plan are guidelines that limit fertilizers used in landscaping that wash out into the bay and damage the resources. The public would also like to see the existing regulations protect this pristine bay in a proactive rather than reactive manner. One stakeholder wanted to be clear that more regulations aren't necessarily that answer. The consensus at this meeting was that the public would like to see enforcement of current environmental regulations.

Values, issues and opportunities – Preserve Managers and Staff

An interview with Preserve staff was conducted on October 26, 2006, beginning at eleven o'clock in the morning and lasting approximately an hour and a half. The values, issues, and opportunities for improvement in aquatic preserve management as expressed by Preserve Managers and staff are described under the categories listed below.

Resource Management

The St. Joseph Bay AP staff would like to become more involved in a local seagrass salvage program. FDEP staff, located in the Northwest District Ecosystem Restoration Program, have begun a program in which seagrass can be moved or "salvaged" out of the way of dredge and fill activities. AP staff would like to assist this program by identifying damaged seagrass areas within the Preserve that may act as a recipient site for the salvaged grasses. AP staff could also assist with monitoring the success and/or failures of the restoration effort and various transplant techniques.

Funding is needed to replace and install additional signage or buoy systems to protect existing seagrass beds within the Bay. This management request ties directly into the problem of vessel groundings identified in the Public Use Management Program Area.

This funding could also be used to start a buoy campaign where local citizens or businesses are asked to "sponsor a buoy" in exchange for a marketing opportunity on the buoy.

Although there is not a current problem of exotic and invasive flora and fauna within the Aquatic Preserve, staff would like to initiate a survey and possibly a monitoring program to identify any undesirable species early, before they could become a significant threat to the Preserve.

As a tie-in to the salt marsh research and monitoring initiative listed under the Ecosystem Science Management Program, staff would like to identify areas for and take action in saltmarsh restoration projects as some marsh die-off areas have been identified within the Preserve.

Staff would like to continue participation in local cultural resource issues associated with Cape Sand Blass and Richardson Hammock.

Staff would like to continue participation and coordination with the local Beach Advisory Committee in order to have the ability to comment on beach nourishment projects and to ensure beach front activities do not interfere with sea turtle nesting.

A four-wheel drive vehicle, capable of towing the Preserve vessel, is very much needed for staff to adequately perform their jobs.

Ecosystem Science

Aquatic Preserve managers and staff are very satisfied with ongoing efforts in using the Trimble® Geo XT™ for mapping and hyperspectral imaging technology for seagrass mapping and monitoring.

St. Joseph Bay AP staff would like to begin using the Trimble® Geo XT™ and hyperspectral imaging technology in monitoring saltmarsh habitats within the Preserve. They would like to map the existing marshlands, compare the aerial extents to historical maps, and identify possible areas for marsh restoration work to be conducted under the Resource Management Program Area. Once the saltmarsh areas have been restored, the managers would like to conduct long-term monitoring to evaluate the success of the work.

Staff would like to continue the various collaborations and partnerships with other agencies and organizations in Florida. The AP staff's partnership with the Florida Fish and Wildlife Conservation Commission's Fish and Wildlife Research Institute (FWRI) in scallop monitoring has been successful; as well as the partnership with the University of Florida's LAKEWATCH Program in which the water quality monitoring data serves as a baseline for further studies.

Staff would like to expand the water quality monitoring program both in area and the constituents that are evaluated. They would like funding to acquire more sondes/dataloggers in order to include additional monitoring areas within the Bay. Staff would like to be able to collect water samples and have the FDEP laboratories test for some of the additional water quality parameters such as Metals (As, Cd, Cr, Cu, Pb, Zn); Oil and Grease; and Polycyclic Aromatic Hydrocarbons (PAHs) on an as needed basis.

AP staff would like continued participation with the Florida Water Quality Monitoring Council. The Council's goal is to work towards collaboration, communication and cooperation among the water quality monitoring community. Staff feels this is an excellent opportunity to data share with other agencies such as the FFWCC, the United States Fish and Wildlife Service (USFWS), and the Northwest Florida Water Management District (NWFWMD). By participating in Council meetings, AP staff will be able to keep apprised of water quality issues and answers from around the state.

The USFWS, along with the NWFWMD have been doing limited sediment sampling (Dioxin) within the Bay. The AP Manager would like to develop a partnership with these agencies and in which the Aquatic Preserve could perform the sediment collection work while the other agencies could pay for the sediment analysis. The benefit of this relationship would be having the data available to evaluate sediment contamination trends within the Bay.

Education and Outreach

Community turnout to Aquatic Preserve presentations and outreach events has been somewhat disappointing. Staff believes the low turnout is due to the lack of advertising for the events. The Aquatic Preserve Manager would like to distribute newsletters to stakeholders surrounding the Preserve. Staff will be developing newspaper articles, along with posters to distribute at local visitor centers and the State Park.

Funding is needed to cover the costs of mailing, via U.S. Postal Service, Aquatic Preserve information and newsletters. Many local citizens and stakeholders to do not have internet access but are very interested in the activities of the Preserve. Those persons or entities wanting newsletters and notices mailed to them can sign up for such services at the Aquatic Preserve office.

Aquatic Preserve staff would like funding to develop an educational program to take to the local schools. Many of the schools have contacted the Preserve and asked that they come and give presentations to the children on coastal ecosystem science and protection. Monies are needed to develop the presentations, program materials, and field trips.

Staff feels it is important to continue the relationship with and to participate more often in the coastal training activities and outreach events sponsored by the Apalachicola National Estuarine Research Reserve (ANERR). In addition, staff feels it is important to coordinate with and help the Friends of the St. Joe environmental group.

Public Use

The seagrass beds and other benthic resources located in the Southeast section of the Bay are experiencing significant impacts and degradation caused by vessel traffic in the area. Specifically in the areas of Presnells Marina and Black's Island, where the channels are poorly marked or unmarked and vessel operators unfamiliar with the area frequently run aground in the seagrass beds. Aquatic Preserve staff would like to coordinate with the FFWCC to evaluate the feasibility of having some of the Southeast sections of the bay marked as "no motorized vessel zones."

Legal Affairs

Enforcement of existing environmental protection laws is the most significant issue within the Preserve. Staff feels it would be beneficial to develop a contact list of regulatory agencies, including the activities and/or resources in which they have jurisdictional or regulatory authority. This list could be posted on the Aquatic Preserve website; listed in the back of Aquatic Preserve newsletters; distributed to local businesses and residents; and included in the Appendices section of the St. Joseph Bay Aquatic Preserve Management Plan.

Staff is concerned that the local stakeholders have a misunderstanding of the intent of the revised Management Plan. It should be made clear during the process that this Plan is intended as a guidance document for Aquatic Preserve Managers and staff; and that it is not intended to be a regulatory document specifying what can and cannot be done within the Preserve.

Aquatic Preserve staff feels it is very important to continue the relationships developed and permit coordination efforts with the FDEP Northwest District Environmental Resources Program. In addition, the Aquatic Preserve webpage could post the FDEP District's 24-Hour Environmental Hotline Number for citizens to use when reporting environmental crimes.

Conclusion and Findings

Aquatic Preserve staff and the public alike listed the top issues facing the management of the Preserve as the lack of enforcement of current resource protection rules and statutes and the effects of the degrading water quality and dock construction on the resources within St. Joseph Bay. All meeting attendees, stakeholders and staff, value the pristine nature of the St. Joseph Bay Preserve. They enjoy living and working in the area, and want to see the outstanding qualities of the bay preserved for future generations.

The public expressed the most interest in enforcement and regulatory issues, as well as monitoring to have the science needed to make management decisions. Most in attendance were familiar with or members of some stewardship groups and others were interested in joining or forming such a group for patrol and enforcement assistance purposes. This group didn't necessarily want more regulations, just the proper enforcement of the environmental regulations already in place to protect the Preserve.

Similarly, the Preserve Manager sees enforcement, regulatory, and water quality issues as the most pressing on the St. Joseph Bay Aquatic Preserve. Staff felt these issues could be addressed using education and outreach to the public. In addition they want to provide information on hotlines and regulatory departments contacts for enforcement when a violation is noticed. Water quality is already being monitored, but there is an interest in teaming up with the FFWCC and other agencies and organizations to combine efforts and double the information gained from the testing going on in the Preserve.

C.2.4 / Comments from the Public Scoping Meeting

Name: Marilyn Blackwell
Date: 10-30-2006
Address: 4812 County Road 381, Wewahitchka, FL 32465
Email Address: marilynblackwell@wmconnect.com
Telephone: 850-639-2177

1. What do you think are the biggest issues of the St Joseph Bay Aquatic Preserve?

Contamination resulting from development, inadequate wastewater treatment, and other degradation of the bay resulting from commercial and recreational users.

2. How could we best address these issues?

By having more attention directed to the sources of harm caused to the bay, such as stormwater runoff, sewage treatment, lack of wetland protection, illegal development permitting, and more oversite of commercial and recreational users.

3. What opportunities should be considered in the new management plans for this aquatic preserve?

More protection of the bay.

4. Do you have comments that deal with the way the natural or cultural resources are being managed? (RM)

There seems to be to little effort by management in using its position to ensure protection of the bay.

5. Do you have comments that deal with the way the resources are being researched, assessed and monitored? (ES)

The water and sediment in St. Joseph Bay should be seriously tested for dioxin, Pcb's and other contaminantes in order to know just what condition the bay is in. This is needed in order to access the saftey of the public and marine life. The St. Joe Co.. Paper Mill was in operation for 60 years which would indicate the need for testing.

6. Do you have comments that deal with the way the community is educated and engaged? (EO)

The 10-25-06 public meeting was an example of "community engagement and education", as the meeting was not noticed in the only local pper, The Star, and few people was aware that this important meeting was to take place.

7. Do you have comments that deal with the recreation, tourism, and public use or access? (PU)

Public access to the bay has been and continues to be reduced. The emphasize on Tourism has grown to the point of being a detriment to all other considerations concerning the bay.

8. Do you have comments that deal with legal, regulatory, or authority issues? (LR)

It was stated at the 10-25-06 meeting that staff of the S.J.B.A.P. has no enforcement authority. The management plan seems to contradict this, but regardless there is much influence which could and should be exercised relating to issues that involve harm to the bay.

9. Do you have comments that deal with funding or purchasing (Capital Investments)?

I have no knowledge in this area but will request that the 2004-2005 budget and also information on funding sources.

10. Other comments

Issues such as the development of Blacks Island and the present request for permit modification submitted by the Port St. Joe wastewater treatment plant to the FDEP needs to be addressed by the staff at S.J.B.A.P. These are issues that have a direct impact on St. Joseph Bay.

Name: Donald Butler
Date: 10-30-2006
Address: 211 Selma Street, Port St. Joe, FL 32456
Email Address: dbutler@gtcom.net
Telephone: 850-697-5315

1: What do you think are the biggest issues of the St Joseph Bay Aquatic Preserve?

Boating access to the preserve - the only public access directly into the preserve are the kayak laurch and state park launch.

2. How could we best address these issues?

The boating public must either launch a private launch or travel a long distance from a public owned facility to enjoy the bay portion of the aquatic preserve.

3. What opportunities should be considered in the new management plans for this aquatic preserve?

Provide public boating access
Do not put in place more regulations
Encourage enforcement agencies to enforce current regulations

6. Do you have comments that deal with the way the community is educated and engaged? (EO)

The scoping meeting was held on a Wednesday evening (church night) @ 7;00 PM. It makes for a late night to begin an important meeting @7:00 PM.

7. Do you have comments that deal with the recreation, tourism, and public use or access? (PU)

It is hard for the average public to utilize the aquatic preserve the way some do.

8. Do you have comments that deal with legal, regulatory, or authority issues? (LR)

Until a delineation of the grass flats are made by buoys or signs, do not expect the general public to know where that line is @ low tide or high tide.

10. Other comments

It was very clear at the scoping meeting that more regulations was not needed. Even though someone in a state uniform stated that the group wanted more regulations - others in the audience took issue with her statement(s).

Name: Melody Ray-Culp

1: What do you think are the biggest issues of the St Joseph Bay Aquatic Preserve?

Water quality, resource protection (seagrasses, law enforcement)

2. How could we best address these issues?

Require salvage of seagrass from the footprint of all new docks, as per the latest FDEP salvage team protocol.

Work with Coast Guard, FDEP, and other regulatory agencies to install seagrass protection markers around sensitive seagrass areas. Update the boating and angling guide to show them.

Install kiosks at all boat ramps, if not already in place to educate public about seagrasses.

Promote living shoreline restoration on eroding shorelines – bulkheading and other forms of coastal armoring should not be allowed.

Prohibit beach driving.

Require that docks be built in harmony with the latest NOAA small dock and pier management recommendations to minimize impacts and that multi-family use docks be encouraged rather than individual docks.

Beef up law enforcement.

Work with neighboring areas to decrease paved surfaces.

Gradually eliminate sceptic tank installation.

Other Comments Received (categorized by Management Program Area)

Resource Management

What efforts in past re development's impact on preserve, e.g. infrastructure, spray field of Port St. Joe answer: review permit apps (docks, development, spray fields). Report violations they see to regulatory offices.

Seagrass Salvage program is alternative.

Do River Keepers work with CAMA? How do we set up such a program for our Bay?

We do work with Keepers and others, not sure how to set up but suggested to contact others

Where will resources for plan enactment come from in long-term (e.g. monitoring, seagrass signs, etc.)

Current job is focus on mgt plan; later steps will be focus on funding

Ecosystem Science

What are parameters being tested for?

DOT salinity ph. turb. TN TP Chl sediment sample since 2002 (not told what testing for in sediment); sediment being tested by others USFWS & FWRI

Education Outreach

Need efforts to educate people on NPS and point source

Workshops have been and will be provided e.g.; Docks, SW

Public Use

Consider boating exclusion zones

Legal Affairs

How as meeting advertised:

F.A.W., AP website, emails to those who attended last year, local paper and fliers around town

Comment: Put on local TV station for next public meeting

Question on docks:

Allowed subject to rule; AP staff are not regulatory, concerns can most quickly be addressed if regulatory offices called (FDEP & WMD)

SW, development not being addressed

Concern on enforcement:

provided list of violations. Need education and enforcement

*C.3 / **Formal Public Meeting***

The following appendices contain information about the Formal Public Meeting which was held in order to obtain input from the public about the St. Joseph Bay Aquatic Preserve Draft Management Plan. There are copies of the public advertisements for this meeting, a list of attendees, a summary of the meeting, and a copy of the written comments received.

C.3.1 / Florida Administrative Weekly Posting

Meeting: **Wednesday, April 25, 2007**

Florida Administrative Weekly Volume 33, Number 13, March 30, 2007, Section VI - Notices of Meetings, Workshops and Public Hearings, page 1508

The **Department of Environmental Protection, Office of Coastal and Aquatic Managed Areas**, acting as staff to the Board of Trustees of the Internal Improvement Trust Fund announces a public meeting to which all persons are invited.

DATE AND TIME: Wednesday, April 25, 2007, 6:00 p.m.

PLACE: Gulf County Court House, Robert M. Moore Administration Building, Commission Board Room, 1000 Cecil G. Costin Sr. Blvd., Port St. Joe, FL 32456

GENERAL SUBJECT MATTER TO BE CONSIDERED: The St. Joseph Bay Aquatic Preserve Advisory Committee meeting will be held in conjunction with the public meeting advertised in the March 16, 2007, F.A.W. To receive public input regarding the draft St. Joseph Bay Aquatic Preserve Management Plan. A copy of the draft plan will be available for viewing starting March 26, 2007, at www.aquaticpreserves.org

A copy of the agenda may be obtained by contacting Aquatic Preserve Manager, Kim Wren at (850)653-8063.

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 Aquatic Preserve Manager, Kim Wren at (850)653-8063. 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).

St. Joseph Bay Formal Public Scoping Meeting Flyer

Florida Department of Environmental Protection • Office of Coastal & Aquatic Managed Areas

St. Joseph Bay Aquatic Preserve

Public Meeting

Wednesday, April 25, 2007, 6:00 pm

Gulf County Court House
Robert M. Moore Administration Building
Commission Board Room
Cecil G. Costin, Sr. Boulevard
Port St. Joe, FL 32456

The Florida Department of Environmental Protection's Office of Coastal and Aquatic Managed Areas (CAMA) is responsible for the management of Florida's 41 Aquatic Preserves, 3 National Estuarine Research Reserves (NERR), 1 National Marine Sanctuary, and the Coral Reef Conservation Program. These protected areas comprise more than 4 million acres of the most valuable submerged lands and select coastal uplands in Florida. CAMA is updating the site specific management plans, and currently has three plans under review. These sites will be holding formal public meetings to receive input on the new draft plans.

These meetings will assist in editing the content for the individual site management plans. The information from each meeting will be compiled, and presented to CAMA by facilitators. The objective of the public meetings is to solicit public input regarding the draft management plans.

For more information, please contact Kim Wren (850) 653-8063/kim.wren@dep.state.fl.us or visit our website at www.aquaticpreserves.org.

Written comments are welcome and can be submitted via by fax: (850) 245-2110 Attn: St. Joe Bay; or email StJosephBay@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 a agency at least 5 days before the workshop/meeting by contacting Aquatic Preserve Manager, Kim Wren at 1 (850) 653-8063. If you are hearing or speech impaired, please contact the agency using the Florida Relay Service, (800) 955-8771 (TDD) or (800) 955-8770 (Voice).

This publication funded in part through a grant agreement from the Florida Department of Environmental Protection, Florida Coastal Management Program by a grant provided by the Office of Ocean and Coastal Resource Management under the Coastal Zone Management Act of 1972, as amended, National Oceanic and Atmospheric Administration (NOAA) Award No. NA06NOS4190129-CZ709. The views, statements, finding, conclusions, and recommendations expressed herein are those of the author(s) and do not necessarily reflect the views of the State of Florida, NOAA, or any of its subagencies. April 2007.

Wednesday April 25, 2007 at 6:00 p.m.
Gulf County Court House, Robert M. Moore Administration Building, Commission Boardroom
1000 Cecil G. Costin Sr. Blvd., Port St. Joe, FL 32456

Attendees

Name	Affiliation
Brian Addison	FPS
M. Aiken	
Tara Alford	FWC-DLE
Anna Bisig	DOH
Marilyn Blackwell	Save the Apalachicola River
Davey Blaylock	SJNN
Marlane Castellano	DEP
Justin Clark	FWC
Ann Marie Daly	Daly's Dock and Dive Center
Mike Davis	Scallop Cove
Barbara Eells	GEBSTP
Steve Geiger	FWC-FWRI
Matt Hardman	CCA
Brad Hartshorn	DEP
Zach Hodges	Gulf CHD
Mark Howe	Forgotten Coast Fishing
Corbett Howell	
Liz Howell	
Jean Huffman	DEP
Penny Isom	DOF
Doug Kelly	
Bill Koran	
Lisa Logan	Pt. St. Joe Star
Christine Lutz	
Martha Maglothin	GCCA
Bill Mahan	
Bill McGee	
Arnie McMillion	FWC
Joe Mitchell	
Lamar Moore	St. Joe Shrimp Co.
Mark Moore	St. Joe Shrimp Co.
Ken Murphy	SJNN
Aurora Myers	Seahorse Water Safaris
Julie Myers	Seahorse Water Safaris
Jim Norton	
John Parker	
Carlene Pary	
Paula Pickett	TDC
Melody Ray-Culp	USFWS
Elmo Sander	
Shirley Sander	
Rhonda Tull	
Brian Underwood	
Scott Warner	
Kim Wren	DEP/CAMA
Paul Zaticeli	FDACS

Wednesday April 25, 2007 at 6:00 p.m.
Gulf County Court House, Robert M. Moore Administration Building, Commission Boardroom
1000 Cecil G. Costin Sr. Blvd., Port St. Joe, FL 32456

Introduction

On April 25th, 2007 the St. Joseph Bay Aquatic Preserve conducted a public meeting to meet the following objectives:

1. Review purpose of and process for reviewing the site management plan
2. Present the Draft St. Joseph Bay Aquatic Preserve Management Plan, with a focus on the identified issues, goals, objectives and strategies.
3. Receive feedback from stakeholders on the draft management plans

This was the second public meeting related to the review of the site's management plan. The first meeting was held in October 2006 and worked with participants to identify issues that should be included in the management plan.

The April 25th meeting followed the following agenda:

- Official Welcome and introduction to the meeting.
- Overview Presentation: A short presentation was given by the site manger to provide an overview of the planning process, the identified issues and proposed strategies.
- Public Comment and Stakeholder Feedback: An opportunity for the public to provide written and verbal feedback directly to the site staff by visiting "kiosks."
- Kiosk Reports: Staff provided a verbal summary of the comments they received at their kiosk.
- Public Comment: Participants who wanted to make a verbal public statement were asked to sign a posted "speakers list". At the end of the meeting an opportunity was provided for those participants that signed the "speakers list" to make a public statement to the full assembly. Only written comments were included in this summary.

The workshop was designed to encourage deep dialogue between the public and the St. Joseph Bay Aquatic Preserve staff on specific issues as well as providing a forum for general comments and observations.

Coastal and Aquatic Managed Areas

The Florida Department of Environmental Protection's Office of Coastal and Aquatic Managed Areas (CAMA) is responsible for the management of Florida's 41 Aquatic Preserves, 3 National Estuarine Research Reserves (NERR), 1 National Marine Sanctuary, and the Coral Reef Conservation Program. These protected areas comprise more than 4 million acres of the most valuable submerged lands and select coastal uplands in Florida. CAMA is currently in the process of revising its site management plans, including the plan for the St. Joseph Bay Aquatic Preserve. These plans will provide a critical management framework for the sites, setting priorities and guiding implementation for the next ten years.

This document

This document includes both written comments received at the workshops and by email/postal mail during the comment period. It also includes a summary of the reports made by the staff at the end of the kiosk period. This summary is not meant to be a detailed description of the proceedings, but a record of the major themes and comments received. Only written comments are included in this summary.

Summary of the reports made by the staff from the Kiosks

Below is an overall summary of the comments received by St. Joseph Bay Aquatic Preserve staff during the public meeting process:

- Overall, the public endorsed the focus and approach being applied by St. Joseph Bay Aquatic Preserve staff to review their management plan. The public recognized that, generally, the management issues that have been identified accurately reflect the priority issues that the Aquatic Preserve has the authority and capacity to address.
- Comments and reactions where made about the preserves ability and in many cases inability to enforce existing rules and regulations such as storm water regulations. Aquatic Preserves do not have enforcement authority. Instead, the focus on science and application of best management practices through outreach and education.
- Beach driving was noted as an important issue with many different management facets. The team was encouraged to consider all options as it relates to beach driving.
- The health of and impacts on the Preserve's sea grass beds was raised consistently and noted as a critical part of the overall ecosystem.

Written comments received on comment cards at meeting

- What would happen if a hurricane or erosion opened up a stump hole to the Bay? *Comment provided by Anonymous.*
- What water quality monitoring has been done in the Bay? *Comment provided by Anonymous*
- In the fall of 2003 there was a substantial rainfall. Thus, the 2004 scallop season was non-existent. What is to stop the government agencies from going overboard with enforcement….putting the blame on the propeller wash, over fishing, tourists, etc. Who has the "oversight" responsibilities so the "government" doesn't go overboard! The "enforcement" agency needs justification for "causes and concerns" before taking punitive action…will this happen? *Comment provided by Gary Hites*
- Is the water quality data online in a report? *Comment provided by Anonymous*
- Start enforcing the state storm water run off regulate force development to provide storm water relation on site. *Comment provided by Mark Howze*

- Driving on the beach should be continued and regulated for safety. People drive in front of my house everyday. My beach has increased by almost 200 ft in 10 years. If beach driving is your reason for losing sand how did mine increase? Leave this alone. *Comment provided by Patricia R. Hardman*
- Trash that rolls up onto the beach and belongings left behind are a big concern my wife and I have. We see lots of trash from old fishnets, fish hooks, buoys, lawn chairs, clothing items, plastic bottles, and more. We hope that these issues don't be forgotten in the beach impact. *Comment provided by Concerned Sea Turtle Patroller*
- There is no balance- your advisory committee has no one from the areas that would be economically impacted fishermen, realtors, developers and businesses. *Comment provided by Patricia R. Hardman*
- The state should increase the setback from the shoreline in order to minimize runoff from development. Development guidelines on Cape San Blas should be more stringent then existing guidelines along with more stringent permitting. *Comment provided by Anonymous*
- In light of CAMA's interest in monitoring development proposals, permits, etc. How have you factored into the revised plan the St. Joe Company mill site development in Port St. Joe, which includes: a 350,000 foot square foot retail complex, a 150,000 square foot office commercial complex, a 350-unit hotel, plus prerequisite parking, vehicular traffic, storm runoff human and waste? *Comment provided by Marie Logan- reporter The Star Newspaper, Port St. Joe*
- Beach driving central should not be the focus. The Board of County Commissioners supports water quality monitoring of preserve. We appreciate all your efforts. *Comment provided by Billy Traylor- Co. Comm Dist 2*
- Your literature and comments deal only with propeller scaring is the cause of grass decline, is lack of sunlight because of human activities? One is municipal wastewater. *Comment provided by Elmo J. Sauder, 281 N. Canal Drive, Port St. Joe, FL 32456, 850-648-8956*
- On the subject of beach driving- the impact of vehicles on the beach on the fragile dune habitat is substantially devastating on the flora and fauna associated with ecosystem. Beach driving should have been banded years ago. *Comment provided by Anonymous*
- We run a rental boat agency on the St. Joseph's Bay- We feel that the ticket responsibility should be on the operator of the boat. However, the information on the critical areas should be supplied by the rental agency prior rental. Business owners should have a disclosure signed by the customer. *Comment provided by Julie Myers*
- I don't think it takes 8-10 years for sea grass to recover from motor scars, the power lines from Treasure Bay to Blacks Island is 4 years old and about 70% recovered. *Comment provided by Mark R. Moon*
- A seagrass protectionary plan that will still allow access yet protect our resources. This needs to give access to all areas. *Comment provided by Mark Howze*
- Are airboats allowed in SJB? *Comment provided by Anonymous*
- There is no balance. I have enjoyed the bay for over 20 years- perhaps some pruning of the grass has been beneficial. The bay should not be closed by over regulation. *Comment provided by Anonymous*
- The format of the moderator largely discourages public input. *Comment provided by Dewey Blaylock*

Written comments submitted during comment period

These are written comments received within the comment period, which ended on May 2nd.

Florida Department of Agriculture and Consumer Services
Division of Aquaculture

- Page 41 Second Paragraph: Suggest including FL Department of Agriculture and Consumer Services as an enforcement authority.
- Page 54, Objective 2: Suggest adding a new strategy. Integrated Strategies/Partnering: Coordinate with the Dept. of Agriculture and Consumer Services, Division of Agriculture, to assist in maintaining an Approved Shellfish Harvesting area. Assist local government decision-making land use, planning and zoning, or comprehensive planning entities to address pollution, source prevention and rehabilitation. Major pollution sources that affect Shellfish Harvesting Areas include: domestic sewage treatment and collection systems, onsite sewage disposal systems, marinas and docking facilities, domestic animals, wildlife and industrial wastes.
- SHA map located at http://www.floridaaquaculture.com/pdfmaps/14.pdf.

William McGee, Cape San Blas
6062 Anchor Lane, Port St. Joe, FL 32456

Historical Background, p. 11, PP3.1.1: I believe this section should be expanded include the history and changes in the plan since the first plan was agreed upon. Did the plan change from one in which Gulf County share the costs of preserve management personnel expenses, to a plan that leaves the county government out entirely? Gulf County and the city of Port St. Joe should be willing to put forth resources to protect the bay that provides their communities a great deal of economic benefits throughout the year.

All users of the bay should play a role in a financial management of this plan, since it is they who create many of the problems cited in the plan. It is like the concept of impact fee for developing communities. I believe the plan should include a users cost to provide revenue to the plan for protection and maintenance.

General Category of Enforcement: It has been virtually impossible to get a response to call to investigate a potential violation within the preserve. There seems to be no defined enforcement roles for enforcement agencies clearly stated and made public knowledge. I believe there should be a section in the management plan on enforcement and it should include:

- A defined role for each enforcement agency related to the types of Violations. For example: Which agency or agencies should respond to a Seagrass scarring incident? What information is required to call it in? What numbers should be called in? What penalties are prescribed? What judicial court as jurisdiction?

Coastal Development Impact: There needs to be more defined authority and action for DEP and CAMA to play in protecting the bay from development impacts. I still do not understand how DEP and CAMA local development impacts will destroy the bay, whether you have a management plan or not.

Management Agreements: The plan does not specify any remedy for a failure in terms or conditions of a management agreement is to be at all viable or contractually sound.

Response; Marilyn Blackwell

As a member of the Advisory Board for the development of new management plan for the St. Joe Bay aquatic preserve, I would like to submit the following response.

Considering the many local, state and federal agencies and entities involved in the protection of SJBAP and the vast amount of public moines expended, there are some aspects of the program, which need to be addressed.

Enforcement for violations of local, state and federal laws are not enforceable by the arm of Florida Department of Environmental Protection, which is staff of the SJBAP who is daily in the area, and are able to observe violations taking place.

Serious testing for toxins and contaminates in the water, sediment, and the predator fish and long-lived clams should be conducted as advised by USFWS (Mike Brim) when that agency conducted testing in 1991-92-93. The former Paper Mill, in operation for 60 plus years, the Port St. Joe Waste Water Treatment Plant, (which includes a seventy acre “unlined” lagoon, and other industry would seem to indicate a need for extensive testing in order to understand the condition of the bay that is being managed.

New development in the storm surge areas should be an issue that FDEP would have some influence in controlling through communication with state lawmakers. As more loopholes are created to allow developers to increase density in these areas, the degradation of the bay is sure to increase. If a proposal can be considered to restrict the public from using motorized boats in the grass beds, then why not a proposal to restrict further development in storm serge areas?

To make the above proposal to protect the grass beds, (which would protect them, even though it would limit the number of people who are capable of manually reaching the scallop beds), and the proposal to redraw the Coastal Construction Control Line, and at the same time to allow the development of Blacks Island, does not compute.

Black’s Island, having been permitted for twenty-six homes, a restaurant, bar, and public bathrooms on an area of six and three-quarter acre of land, in the midst of the SJBAP, makes the appearance of the preserve having no protection at all. DEP, having denied a permit for another type of sewage system for the island, the Gulf County Health Department approved a system of which sewage is basically filtered to remove some bacteria and the discharge is fed into a drip system of which covers almost half the island. These drip tubes are located six inches under the surface of the ground near the water line, assuring that heavy rains or a storm will not contaminate the bay.

DEP has sent the owner of this island letters stating violations ranging from filling in jurisdiction wetlands without a permit to failing to restore sea grasses damaged when power lines were laid underground to the island, and several more problems occurring. This relates to there being no enforcement even after questionably decisions have been made.

At build out, Black’s Island Development could conceivably have 65 residents (homeowners, or lease and rental folks), 7 employees, 25 guest (at homes or in restaurant or lounge), which would be around 100 people using the sewage system and being shuttled back and forth to the mainland. The cumulative effects to the bay (marine life, grass beds), and the people who enjoy the waters, have the potential to be substantial. Studies in this county and others have shown that even the best of sewage treatment systems do not kill all pathogens, which can cause disease and infections to humans.

These and other issues as well me to believe that the vast amount of resources being expended toward the management and protection of the SJBAP, might well be misdirected in some instances.

I appreciate the opportunity to participate in this subject as I have learned more of the inter workings of the government in relation to the environment, some of which is positive and some negative.

Appendix D

Goals, Objectives, and Strategies

*D.1 / **Current Goals, Objectives and Strategies Table***

The following table is a summary of the issues, goals, objectives and strategies identified in Chapter 5. The "Management Program" column identifies which Management Program each strategy falls within. The "Implementation Date" column identifies the fiscal year when the strategy was, or will be, initiated. The "Project Initiation" column indicates if this is an activity that is already underway, currently under initial development, or will occur in the future. The "Length of Initiative" column indicates how long it is expected to complete the strategy, and the "Estimated Yearly Cost" column identifies the anticipated expenses associated with the strategy.

Goals, Objective & Integrated Strategies	Management Program	Implementation Date (Planned)	Project Initiation	Length of Initiative	Estimated Yearly Cost
Project Initiation Legend: C = Currently Underway D = Under Initial Development F = Future Implementation					
Issue 1: Water Quality					
Goal 1: Continuation of a long-term water quality monitoring project to maintain/improve water quality in the preserve.					
Objective 1: Regularly assess status and trends of water quality throughout St. Joseph Bay to identify threats and provide sound scientific data and recommendations on methods to eliminate impacts to the system for current and future management needs.					
Strategy: Maintain a long-term water quality monitoring program to adequately monitor and assess the status of the bay's water quality through the use of dataloggers.	Ecosystem Science	2005/2006	C	Ongoing	$15,000/yr
Strategy: Monitor nutrients and expand sampling locations as necessary.	Ecosystem Science	2001/2002	C	Ongoing	$4,000/yr
Strategy: Acquire additional dataloggers to expand monitoring efforts.	Ecosystem Science	2010/2011	F	Ongoing	$12,000/yr
Objective 2: 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.					
Strategy: Identify potential point and nonpoint sources of pollution in St. Joseph Bay and develop a monitoring plan to evaluate impacts from this type of pollution using GIS technology to trace possible pollution sources.	Ecosystem Science	2009/2010	D	Ongoing	$3,000/yr
Strategy: Coordinate with the NWFWMD and FWS in efforts to monitor chemical contaminants, including analysis of metals and dioxins, and determine the extent of these contaminants.	Partnering	2007/2008	D	Ongoing	No additional costs
Strategy: Coordinate with Gulf County Department of Health to add additional water quality sites to the already existing Healthy Beaches Program.	Partnering	2007/2008	D	Ongoing	No additional costs
Strategy: Coordinate with Florida Department of Agriculture and Consumer Services, Division of Aquaculture, to assist in maintaining an approved Shellfish Harvesting Area.	Partnering	2007/2008	C	Ongoing	No additional costs
Objective 3: Ensure the sustainability of scallop, fish, benthic invertebrates, seagrass habitat, and concerned species 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 explain causes/sources of any water quality impairment in the bay.					
Strategy: Establish baseline data and broad scale characterizations of benthic communities which are sensible indicators of habitat quality in an aquatic environment.	Ecosystem Science	2006/2007	C	Ongoing	$3,500/yr
Strategy: Monitor specific indicator species such as scallops, fish, and coral to determine the ecological health of the bay.	Ecosystem Science	1995/1996, 2006/2007	C	Ongoing	$11,000/yr
Strategy: Continue participation and assistance with local marine mammal and sea turtle stranding events.	Partnering	1995/1996	C	Ongoing	$3,200/yr
Goal 2: Provide timely and accurate water quality data and information to the public and other entities/agencies.					
Objective 1: Acquire a repository to store water quality data into a centralized database.					
Strategy: Participate in Florida Water Resources Monitoring Council to assist in the development of a centralized storage database and website.	Partnering	2004/2005	C	Ongoing as necessary	$400/yr
Objective 2: Utilize a variety of methods to develop information outlets to the public related to the importance of water quality in the bay.					
Strategy: Utilize educational signage at strategic access points to the aquatic preserve to educate the public on the ecological significance of the bay and how the public can assist in conserving natural resources.	Education and Outreach	2008/2009	D	1 year	$5,000

Goals, Objective & Integrated Strategies	Management Program	Implementation Date (Planned)	Project Initiation	Length of Initiative	Estimated Yearly Cost
Project Initiation Legend: C = Currently Underway D = Under Initial Development F = Future Implementation					
Strategy: Provide a hands-on opportunity for the public to become involved in the protection of the preserve by developing a volunteer network to assist with projects and unique events in the bay.	Education and Outreach	2009/2010	F	Ongoing	$2,000/yr
Issue 2: Protection of Seagrass Habitat					
Goal 1: Manage seagrass communities through sound scientific research and monitoring, resource management, and education and outreach efforts, to effectively protect and maintain this habitat as a valuable, natural resource in St. Joseph Bay.					
Objective 1: Evaluate the status and trends of seagrass habitat distribution and density throughout St. Joseph Bay to determine the health of the system and to document the extent of prop scar damage to determine the best management practices to protect this habitat.					
Strategy: Develop and implement a Seagrass Monitoring Plan for St. Joseph Bay Aquatic Preserve that maintains a strategic, long-term seagrass monitoring project.	Ecosystem Science	2002/2003	C	Ongoing	$15,000/yr
Strategy: Map the spatial extent of seagrass habitat utilizing hyperspectral imagery.	Ecosystem Science	2006/2007	C	Ongoing every three to five years	$150,000
Strategy: Use GIS and aerial photography to identify severely scarred areas for restoration efforts and develop a restoration plan.	Resource Management	2007/2008	D	Ongoing	Costs included in other Strategies
Strategy: Utilize seagrass marker buoys and properly mark channels in the southern portion of St. Joseph Bay.	Partnering	2010/2011	D	1 year	$30,000
Strategy: Coordinate with the Seagrass Salvage Program.	Partnering	2005/2006	C	Ongoing	Costs included in other Strategies
Strategy: Maintain close coordination with all agencies and local government as well as DEP permitting and regulatory offices to review and comment on proposed projects.	Partnering	2000/2001	C	Ongoing	$2,000/yr
Objective 2: Utilize a variety of methods to develop an information outlet to target user groups related to the value of seagrass and the importance of this habitat to the bay system.					
Strategy: Update the current St. Joseph Bay Aquatic Preserve brochure.	Education and Outreach	2006/2007	C	Ongoing as necessary	$2,500
Strategy: Utilize educational signage at local ramps and marinas to inform the public on the importance of the bay's resources as well as identify shallow areas and seagrass buoy locations.	Education and Outreach	2010/2011	F	1 year	$10,000
Strategy: Produce an interactive CD or DVD to educate the public on the value of the natural resources in St. Joseph Bay.	Education and Outreach	2013/2014	F	1 year	Costs included in other Strategies
Strategy: Continue to provide educational and information materials, such as boater's guides and brochures to local businesses, marinas, and Black's Island community center.	Education and Outreach	2000/2001	C	Ongoing	No additional costs
Strategy: Update the St. Joseph Bay Aquatic Preserve Boater's Guide.	Partnering	2011/2012	F	1 year	No additional costs
Issue 3: Coastal Development					
Goal 1: Protect the natural ecological functions of St. Joseph Bay from impacts due to increased adjacent land use and coastal development.					
Objective 1: Retain the natural biological and ecological diversity of the bay system and to evaluate the cumulative impacts of coastal development on adjacent lands. Establish monitoring projects/protocols to evaluate the cumulative impacts of development activities on adjacent lands and support land acquisition opportunities that protect the buffer, in order to retain the diversity and unique visual character of the bay.					
Strategy: Establish effective monitoring projects/protocols to determine potential impacts from adjacent land use activities.	Ecosystem Science	2009/2010	D	Ongoing	Costs included in other Water Quality Strategies
Strategy: Review and provide comments on permits relating to construction and development activities within or adjacent to the aquatic preserve.	Resource Management	1998/1999	C	Ongoing	Costs included in other Protection of Seagrass Habitat Strategies
Strategy: Continue to participate in the NERR's Coastal Training Program workshops which target coastal development issues.	Education and Outreach	2004/2005	C	Ongoing	No additional costs

Goals, Objective & Integrated Strategies	Management Program	Implementation Date (Planned)	Project Initiation	Length of Initiative	Estimated Yearly Cost
Project Initiation Legend: C = Currently Underway D = Under Initial Development F = Future Implementation					
Strategy: Promote compatible, non-impactive recreational opportunities within the preserve's boundaries that balance public use and the need to protect and preserve site resources.	Public Use	1998/1999	C	Ongoing	$1,700/yr
Strategy: Continue close coordination with the St. Joseph Bay State Buffer Preserve.	Partnering	2006/2007	C	Ongoing	$1,000/yr
Strategy: Maintain effective partnerships with local, state and federal regulatory programs, local government, and adjacent land owners to monitor development activities adjacent to St. Joseph Bay.	Partnering	1998/1999	C	Ongoing	Costs included in other Strategies
Strategy: Establish an effective partnership with the Black's Island community to promote non-impactive recreational activities to visitors to protect the bay's valuable resources through educational signage, brochures and presentations.	Partnering	2008/2009	F	Ongoing	No additional costs
Issue 4: Saltmarsh Decline					
Goal 1: Determine the current status of the saltmarsh ecosystem.					
Objective 1: Complete an accurate assessment of the saltmarsh habitat in St. Joseph Bay through mapping and monitoring efforts to identify the status/trends of the ecosystem.					
Strategy: Establish a Saltmarsh Monitoring Plan and provide baseline data.	Ecosystem Science	2007/2008	D	Ongoing	$2,500/yr
Strategy: Develop and implement a Saltmarsh Restoration Plan.	Resource Management	2012/2013	F	1 year	$20,000 (?)
Strategy: Coordinate with FWRI in the implementation of the Saltmarsh Monitoring Plan through planned site inspections and review of historical data.	Partnering	2007/2008	D	1 year	Costs included in other Strategies
Issue 5: Beach Impacts to St. Joseph Peninsula					
Goal 1: Protect and conserve the natural dune vegetation, sea turtle nesting and shorebird habitat as well as other critical species habitat from further impacts due to beach driving, erosion, and artificial lighting on the beaches adjacent to the aquatic preserve.					
Objective 1: Complete an assessment of the affects of beach erosion and recreational impacts to threatened and endangered sea turtle nesting habitat.					
Strategy: Perform biweekly beach surveys to document impacts to resources.	Ecosystem Science	1998/1999	C	Ongoing	$3,000/yr
Strategy: Provide review, comments and necessary data on permits, progress reports and environmental impact studies related to the beach nourishment project and the protection of sea turtle nesting habitat.	Resource Management	2006/2007	C	Ongoing for duration of project	No additional costs
Strategy: Develop an MOA in coordination with Gulf County and FWS to establish techniques for the management of vehicular traffic to reduce adverse impacts to natural resources and essential sea turtle nesting habitat.	Partnering	2007/2008	D	Ongoing during sea turtle nesting season	Costs included in other Coastal Development Strategies
Strategy: Continue close coordination with GCCA in efforts to monitor and protect sea turtle nesting habitat on beaches adjacent to the preserve.	Partnering	2007/2008	C	Ongoing during sea turtle nesting season	No additional costs
Objective 2: Coordinate with Gulf County and the GCCA to assist in actively enforcing beach lighting on new and existing construction on beaches adjacent to the preserve and to ensure that the lighting ordinance is provided to contractors upon submission of building permits.					
Strategy: Establish a volunteer network in coordination with the Friends of the St. Joseph Bay Preserves citizens support group and GCCA to educate residents and renters to the impacts of artificial lighting and the effects to nesting sea turtles and hatchlings.	Education and Outreach	2008/2009	F	Ongoing	$2,000/yr

D.2 / 2008-2009 ***Budget Table***

The following table provides a cost estimate for conducting the priority 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 CAMA and other cooperating entities, and is based on actual costs for management activities, equipment purchases and maintenance, and for development of fixed capital facilities. The budget below exceeds the funds CAMA has been receiving through the state appropriations process, but is consistent with the direction necessary to achieve the goals and objectives identified in the Goals, Objectives and Strategies Table in Appendix D.1. Budget categories identified correlate with the CAMA Management Program Areas.

Issue	Strategy	Project Initiation	Estimated Yearly Cost
Project Initiation Legend: C = Currently Underway D = Under Initial Development			
2008-2009 Cost Estimate			
Ecosystem Science			
Water Quality	Strategy: Maintain a long-term water quality monitoring program to adequately monitor and assess the status of the bay's water quality through the use of dataloggers.	2005/2006	$15,000/yr
Water Quality	Strategy: Monitor nutrients and expand sampling locations as necessary.	2001/2002	$4,000/yr
Water Quality	Strategy: Establish baseline data and broad scale characterizations of benthic communities which are sensible indicators of habitat quality in an aquatic environment.	2006/2007	$3,500/yr
Water Quality	Strategy: Monitor specific indicator species such as scallops, fish, and coral to determine the ecological health of the bay.	1995/1996, 2006/2007	$11,000/yr
Protection of Seagrass Habitat	Strategy: Develop and implement a Seagrass Monitoring Plan for St. Joseph Bay Aquatic Preserve that maintains a strategic, long-term seagrass monitoring project.	2002/2003	$15,000/yr
Saltmarsh Decline	Strategy: Establish a Saltmarsh Monitoring Plan and provide baseline data.	2007/2008	$2,500/yr
Beach Impacts to St. Joseph Peninsula	Strategy: Perform biweekly beach surveys to document impacts to resources.	1998/1999	$3,000/yr
	Ecosystem Science Subtotal		***$54,000***
Resource Management			
Protection of Seagrass Habitat	Strategy: Use GIS and aerial photography to identify severely scarred areas for restoration efforts and develop a restoration plan.	2007/2008	Costs included in other Strategies
Coastal Development	Strategy: Review and provide comments on permits relating to construction and development activities within or adjacent to the aquatic preserve.	1998/1999	Costs included in Protection of Seagrass Habitat Strategies
Beach Impacts to St. Joseph Peninsula	Strategy: Provide review, comments and necessary data on permits, progress reports and environmental impact studies related to the beach nourishment project and the protection of sea turtle nesting habitat.	2006/2007	No additional costs
	Resource Management Subtotal		***$0***
Education & Outreach			
Water Quality	Strategy: Utilize educational signage at strategic access points to the aquatic preserve to educate the public on the ecological significance of the bay and how the public can assist in conserving natural resources.	2008/2009	$5,000
Protection of Seagrass Habitat	Strategy: Continue to provide educational and information materials, such as boater's guides and brochures to local businesses, marinas, and Black's Island community center.	2000/2001	Costs included in other Strategies
Coastal Development	Strategy: Continue to participate in the NERR's Coastal Training Program workshops which target coastal development issues.	2004/2005	No additional costs
Beach Impacts to St. Joseph Peninsula	Strategy: Establish a volunteer network in coordination with the Friends of the St. Joseph Bay Preserves citizens support group and GCCA to educate residents and renters to the impacts of artificial lighting and the effects to nesting sea turtles and hatchlings.	2008/2009	$2,000/yr
	Education & Outreach Subtotal		***$7,000***
Public Use			
Coastal Development	Strategy: Promote compatible, non-impactive recreational opportunities within the preserve's boundaries that balance public use and the need to protect and preserve site resources.	1998/1999	$1,700/yr
	Public Use Subtotal		***$1,700***

Issue	Strategy	Project Initiation	Estimated Yearly Cost
Project Initiation Legend: C = Currently Underway D = Under Initial Development			
Partnering			
Water Quality	Strategy: Coordinate with the NWFWMD and FWS in efforts to monitor chemical contaminants, including analysis of metals and dioxins, and determine the extent of these contaminants.	2007/2008	No additional costs
Water Quality	Strategy: Coordinate with Gulf County Department of Health to add additional water quality sites to the already existing Healthy Beaches Program.	2007/2008	No additional costs
Water Quality	Strategy: Coordinate with Florida Department of Agriculture and Consumer Services, Division of Aquaculture, to assist in maintaining an approved Shellfish Harvesting Area.	2007/2008	No additional costs
Water Quality	Strategy: Continue participation and assistance with local marine mammal and sea turtle stranding events.	1995/1996	$3,200/yr
Water Quality	Strategy: Participate in Florida Water Resources Monitoring Council to assist in the development of a centralized storage database and website.	2004/2005	$400/yr.
Protection of Seagrass Habitat	Strategy: Coordinate with the Seagrass Salvage Program.	2005/2006	Costs included in other Strategies
Protection of Seagrass Habitat	Strategy: Maintain close coordination with all agencies and local government as well as DEP permitting and regulatory offices to review and comment on proposed projects.	2000/2001	$2,000/yr
Coastal Development	Strategy: Continue close coordination with the St. Joseph Bay State Buffer Preserve.	2006/2007	$1,000/yr
Coastal Development	Strategy: Maintain effective partnerships with local, state and federal regulatory programs, local government, and adjacent land owners to monitor development activities adjacent to St. Joseph Bay.	1998/1999	Costs included in other Strategies
Coastal Development	Strategy: Establish an effective partnership with the Black's Island community to promote non-impactive recreational activities to visitors to protect the bay's valuable resources through educational signage, brochures and presentations.	2008/2009	Costs included in other Strategies
Beach Impacts to St. Joseph Peninsula	Strategy: Develop an MOA in coordination with Gulf County and FWS to establish techniques for the management of vehicular traffic to reduce adverse impacts to natural resources and essential sea turtle nesting habitat.	2007/2008	Costs included in Coastal Development Strategies
Beach Impacts to St. Joseph Peninsula	Strategy: Continue close coordination with GCCA in efforts to monitor and protect sea turtle nesting habitat on beaches adjacent to the preserve.	2007/2008	No additional costs
	Partnering Subtotal		***$6,600***
	2008-2009 Total		***$69,300***
2009-2010 Cost Estimate			
Ecosystem Science			
Water Quality	Strategy: Maintain a long-term water quality monitoring program to adequately monitor and assess the status of the bay's water quality through the use of dataloggers.	2005/2006	$15,000/yr
Water Quality	Strategy: Monitor nutrients and expand sampling locations as necessary.	2001/2002	$4,000/yr
Water Quality	Strategy: Identify potential point and nonpoint sources of pollution in St. Joseph Bay and develop a monitoring plan to evaluate impacts from this type of pollution using GIS technology to trace possible pollution sources.	2009/2010	$3,000/yr
Water Quality	Strategy: Establish baseline data and broad scale characterizations of benthic communities which are sensible indicators of habitat quality in an aquatic environment.	2006/2007	$3,500/yr
Water Quality	Strategy: Monitor specific indicator species such as scallops, fish, and coral to determine the ecological health of the bay.	1995/1996, 2006/2007	$11,000/yr
Protection of Seagrass Habitat	Strategy: Develop and implement a Seagrass Monitoring Plan for St. Joseph Bay Aquatic Preserve that maintains a strategic, long-term seagrass monitoring project.	2002/2003	$15,000/yr
Protection of Seagrass Habitat	Strategy: Map the spatial extent of seagrass habitat utilizing hyperspectral imagery.	2006/2007	$150,000
Coastal Development	Strategy: Establish effective monitoring projects/protocols to determine potential impacts from adjacent land use activities.	2009/2010	Costs included Water Quality Strategies
Saltmarsh Decline	Strategy: Establish a Saltmarsh Monitoring Plan and provide baseline data.	2007/2008	$2,500/yr
Beach Impacts to St. Joseph Peninsula	Strategy: Perform biweekly beach surveys to document impacts to resources.	1998/1999	$3,000/yr
	Ecosystem Science Subtotal		***$207,000***

Issue	Strategy	Project Initiation	Estimated Yearly Cost
Project Initiation Legend: C = Currently Underway D = Under Initial Development			
Resource Management			
Protection of Seagrass Habitat	Strategy: Use GIS and aerial photography to identify severely scarred areas for restoration efforts and develop a restoration plan.	2007/2008	Costs included in other Strategies
Coastal Development	Strategy: Review and provide comments on permits relating to construction and development activities within or adjacent to the aquatic preserve.	1998/1999	Costs included in Protection of Seagrass Habitat, Strategies
Beach Impacts to St. Joseph Peninsula	Strategy: Provide review, comments and necessary data on permits, progress reports and environmental impact studies related to the beach nourishment project and the protection of sea turtle nesting habitat.	2006/2007	No additional costs
	Resource Management Subtotal		***$0***
Education & Outreach			
Water Quality	Strategy: Provide a hands-on opportunity for the public to become involved in the protection of the preserve by developing a volunteer network to assist with projects and unique events in the bay.	2009/2010	$2,000/yr
Protection of Seagrass Habitat	Strategy: Continue to provide educational and information materials, such as boater's guides and brochures to local businesses, marinas, and Black's Island community center.	2000/2001	Costs included in other Strategies
Coastal Development	Strategy: Continue to participate in the NERR's Coastal Training Program workshops which target coastal development issues.	2004/2005	No additional costs
Beach Impacts to St. Joseph Peninsula	Strategy: Establish a volunteer network in coordination with the Friends of the St. Joseph Bay Preserves citizens support group and GCCA to educate residents and renters to the impacts of artificial lighting and the effects to nesting sea turtles and hatchlings.	2008/2009	$2,000/yr
	Education & Outreach Subtotal		***$4,000***
Public Use			
Coastal Development	Strategy: Promote compatible, non-impactive recreational opportunities within the preserve's boundaries that balance public use and the need to protect and preserve site resources.	1998/1999	$1,700/yr
	Public Use Subtotal		***$1,700***
Partnering			
Water Quality	Strategy: Coordinate with the NWFWMD and FWS in efforts to monitor chemical contaminants, including analysis of metals and dioxins, and determine the extent of these contaminants.	2007/2008	No additional costs
Water Quality	Strategy: Coordinate with Gulf County Department of Health to add additional water quality sites to the already existing Healthy Beaches Program.	2007/2008	No additional costs
Water Quality	Strategy: Coordinate with Florida Department of Agriculture and Consumer Services, Division of Aquaculture, to assist in maintaining an approved Shellfish Harvesting Area.	2007/2008	No additional costs
Water Quality	Strategy: Continue participation and assistance with local marine mammal and sea turtle stranding events.	1995/1996	$3,200/yr
Water Quality	Strategy: Participate in Florida Water Resources Monitoring Council to assist in the development of a centralized storage database and website.	2004/2005	$400/yr
Protection of Seagrass Habitat	Strategy: Coordinate with the Seagrass Salvage Program.	2005/2006	Costs included in other Strategies
Protection of Seagrass Habitat	Strategy: Maintain close coordination with all agencies and local government as well as DEP permitting and regulatory offices to review and comment on proposed projects.	2000/2001	$2,000/yr
Coastal Development	Strategy: Continue close coordination with the St. Joseph Bay State Buffer Preserve.	2006/2007	$1,000/yr
Coastal Development	Strategy: Maintain effective partnerships with local, state and federal regulatory programs, local government, and adjacent land owners to monitor development activities adjacent to St. Joseph Bay.	1998/1999	Costs included in other Strategies
Coastal Development	Strategy: Establish an effective partnership with the Black's Island community to promote non-impactive recreational activities to visitors to protect the bay's valuable resources through educational signage, brochures and presentations.	2008/2009	Costs included in other Strategies
Beach Impacts to St. Joseph Peninsula	Strategy: Develop an MOA in coordination with Gulf County and FWS to establish techniques for the management of vehicular traffic to reduce adverse impacts to natural resources and essential sea turtle nesting habitat.	2007/2008	Costs included in Coastal Development Strategies

Issue	Strategy	Project Initiation	Estimated Yearly Cost
Project Initiation Legend: C = Currently Underway D = Under Initial Development			
Beach Impacts to St. Joseph Peninsula	Strategy: Continue close coordination with GCCA in efforts to monitor and protect sea turtle nesting habitat on beaches adjacent to the preserve.	2007/2008	No additional costs
	Partnering Subtotal		***$6,600***
	2009-2010 Total		***$219,300***
2010-2011 Cost Estimate			
Ecosystem Science			
Water Quality	Strategy: Maintain a long-term water quality monitoring program to adequately monitor and assess the status of the bay's water quality through the use of dataloggers.	2005/2006	$15,000/yr
Water Quality	Strategy: Monitor nutrients and expand sampling locations as necessary.	2001/2002	$4,000/yr
Water Quality	Strategy: Acquire additional datasondes to expand monitoring efforts.	2010/2011	$12,000/yr
Water Quality	Strategy: Identify potential point and nonpoint sources of pollution in St. Joseph Bay and develop a monitoring plan to evaluate impacts from this type of pollution using GIS technology to trace possible pollution sources.	2009/2010	$3,000/yr
Water Quality	Strategy: Establish baseline data and broad scale characterizations of benthic communities which are sensible indicators of habitat quality in an aquatic environment.	2006/2007	$3,500/yr
Water Quality	Strategy: Monitor specific indicator species such as scallops, fish, and coral to determine the ecological health of the bay.	1995/1996, 2006/2007	$11,000/yr
Protection of Seagrass Habitat	Strategy: Develop and implement a Seagrass Monitoring Plan for St. Joseph Bay Aquatic Preserve that maintains a strategic, long-term seagrass monitoring project.	2002/2003	$15,000/yr
Coastal Development	Strategy: Establish effective monitoring projects/protocols to determine potential impacts from adjacent land use activities.	2009/2010	Costs included in Water Quality Strategies
Saltmarsh Decline	Strategy: Establish a Saltmarsh Monitoring Plan and provide baseline data.	2007/2008	$2,500/yr
Beach Impacts to St. Joseph Peninsula	Strategy: Perform biweekly beach surveys to document impacts to resources.	1998/1999	$3,000/yr
	Ecosystem Science Subtotal		***$69,000***
Resource Management			
Protection of Seagrass Habitat	Strategy: Use GIS and aerial photography to identify severely scarred areas for restoration efforts and develop a restoration plan.	2007/2008	Costs included in other Strategies
Coastal Development	Strategy: Review and provide comments on permits relating to construction and development activities within or adjacent to the aquatic preserve.	1998/1999	Costs included in Protection of Seagrass Habitat Strategies
Beach Impacts to St. Joseph Peninsula	Strategy: Provide review, comments and necessary data on permits, progress reports and environmental impact studies related to the beach nourishment project and the protection of sea turtle nesting habitat.	2006/2007	No additional costs
	Resource Management Subtotal		***$0***
Education & Outreach			
Water Quality	Strategy: Provide a hands-on opportunity for the public to become involved in the protection of the preserve by developing a volunteer network to assist with projects and unique events in the bay.	2009/2010	$2,000/yr
Protection of Seagrass Habitat	Strategy: Continue to provide educational and information materials, such as boater's guides and brochures to local businesses, marinas, and Black's Island community center.	2000/2001	Costs included in other Strategies
Protection of Seagrass Habitat	Strategy: Utilize educational signage at local ramps and marinas to inform the public on the importance of the bay's resources as well as identify shallow areas and seagrass buoy locations.	2010/2011	$10,000
Coastal Development	Strategy: Continue to participate in the NERR's Coastal Training Program workshops which target coastal development issues.	2004/2005	No additional costs
Beach Impacts to St. Joseph Peninsula	Strategy: Establish a volunteer network in coordination with the Friends of the St. Joseph Bay Preserves citizens support group and GCCA to educate residents and renters to the impacts of artificial lighting and the effects to nesting sea turtles and hatchlings.	2008/2009	$2,000/yr
	Education & Outreach Subtotal		***$14,000***

Issue	Strategy	Project Initiation	Estimated Yearly Cost
Project Initiation Legend: C = Currently Underway D = Under Initial Development			
Public Use			
Coastal Development	Strategy: Promote compatible, non-impactive recreational opportunities within the preserve's boundaries that balance public use and the need to protect and preserve site resources.	1998/1999	$1,700/yr
	Public Use Subtotal		***$17,000***
Partnering			
Water Quality	Strategy: Coordinate with the NWFWMD and FWS in efforts to monitor chemical contaminants, including analysis of metals and dioxins, and determine the extent of these contaminants.	2007/2008	No additional costs
Water Quality	Strategy: Coordinate with Gulf County Department of Health to add additional water quality sites to the already existing Healthy Beaches Program.	2007/2008	No additional costs
Water Quality	Strategy: Coordinate with Florida Department of Agriculture and Consumer Services, Division of Aquaculture, to assist in maintaining an approved Shellfish Harvesting Area.	2007/2008	No additional costs
Water Quality	Strategy: Continue participation and assistance with local marine mammal and sea turtle stranding events.	1995/1996	$3,200/yr
Water Quality	Strategy: Participate in Florida Water Resources Monitoring Council to assist in the development of a centralized storage database and website.	2004/2005	$400/yr
Protection of Seagrass Habitat	Strategy: Utilize seagrass marker buoys and properly mark channels in the southern portion of St. Joseph Bay.	2010/2011	$30,000
Protection of Seagrass Habitat	Strategy: Coordinate with the Seagrass Salvage Program.	2005/2006	Costs included in other Strategies
Protection of Seagrass Habitat	Strategy: Maintain close coordination with all agencies and local government as well as DEP permitting and regulatory offices to review and comment on proposed projects.	2000/2001	$2,000/yr
Coastal Development	Strategy: Continue close coordination with the St. Joseph Bay State Buffer Preserve.	2006/2007	$1,000/yr
Coastal Development	Strategy: Maintain effective partnerships with local, state and federal regulatory programs, local government, and adjacent land owners to monitor development activities adjacent to St. Joseph Bay.	1998/1999	Costs included in other Strategies
Coastal Development	Strategy: Establish an effective partnership with the Black's Island community to promote non-impactive recreational activities to visitors to protect the bay's valuable resources through educational signage, brochures and presentations.	2008/2009	Costs included in other Strategies
Beach Impacts to St. Joseph Peninsula	Strategy: Develop an MOA in coordination with Gulf County and FWS to establish techniques for the management of vehicular traffic to reduce adverse impacts to natural resources and essential sea turtle nesting habitat.	2007/2008	Costs included in Coastal Development Strategies
Beach Impacts to St. Joseph Peninsula	Strategy: Continue close coordination with GCCA in efforts to monitor and protect sea turtle nesting habitat on beaches adjacent to the preserve.	2007/2008	No additional costs
	Partnering Subtotal		***$36,600***
	2010-2011 Total		***$136,600***
2011-2012 Cost Estimate			
Ecosystem Science			
Water Quality	Strategy: Maintain a long-term water quality monitoring program to adequately monitor and assess the status of the bay's water quality through the use of dataloggers.	2005/2006	$15,000/yr
Water Quality	Strategy: Monitor nutrients and expand sampling locations as necessary.	2001/2002	$4,000/yr
Water Quality	Strategy: Acquire additional datasondes to expand monitoring efforts.	2010/2011	$12,000/yr
Water Quality	Strategy: Identify potential point and nonpoint sources of pollution in St. Joseph Bay and develop a monitoring plan to evaluate impacts from this type of pollution using GIS technology to trace possible pollution sources.	2009/2010	$3,000/yr
Water Quality	Strategy: Establish baseline data and broad scale characterizations of benthic communities which are sensible indicators of habitat quality in an aquatic environment.	2006/2007	$3,500/yr
Water Quality	Strategy: Monitor specific indicator species such as scallops, fish, and coral to determine the ecological health of the bay.	1995/1996, 2006/2007	$11,000/yr
Protection of Seagrass Habitat	Strategy: Develop and implement a Seagrass Monitoring Plan for St. Joseph Bay Aquatic Preserve that maintains a strategic, long-term seagrass monitoring project.	2002/2003	$15,000/yr

Issue	Strategy	Project Initiation	Estimated Yearly Cost
Project Initiation Legend: C = Currently Underway D = Under Initial Development			
Coastal Development	Strategy: Establish effective monitoring projects/protocols to determine potential impacts from adjacent land use activities.	2009/2010	Costs included in Water Quality Strategies
Saltmarsh Decline	Strategy: Establish a Saltmarsh Monitoring Plan and provide baseline data.	2007/2008	$2,500/yr
Beach Impacts to St. Joseph Peninsula	Strategy: Perform biweekly beach surveys to document impacts to resources.	1998/1999	$3,000/yr
	Ecosystem Science Subtotal		***$69,000***
Resource Management			
Protection of Seagrass Habitat	Strategy: Use GIS and aerial photography to identify severely scarred areas for restoration efforts and develop a restoration plan.	2007/2008	Costs included in other Strategies
Coastal Development	Strategy: Review and provide comments on permits relating to construction and development activities within or adjacent to the aquatic preserve.	1998/1999	Costs included in Protection of Seagrass Habitat Strategies
Beach Impacts to St. Joseph Peninsula	Strategy: Provide review, comments and necessary data on permits, progress reports and environmental impact studies related to the beach nourishment project and the protection of sea turtle nesting habitat.	2006/2007	No additional costs
	Resource Management Subtotal		***$0***
Education & Outreach			
Water Quality	Strategy: Provide a hands-on opportunity for the public to become involved in the protection of the preserve by developing a volunteer network to assist with projects and unique events in the bay.	2009/2010	$2,000/yr
Protection of Seagrass Habitat	Strategy: Continue to provide educational and information materials, such as boater's guides and brochures to local businesses, marinas, and Black's Island community center.	2000/2001	Costs included in other Strategies
Coastal Development	Strategy: Continue to participate in the NERR's Coastal Training Program workshops which target coastal development issues.	2004/2005	No additional costs
Beach Impacts to St. Joseph Peninsula	Strategy: Establish a volunteer network in coordination with the Friends of the St. Joseph Bay Preserves citizens support group and GCCA to educate residents and renters to the impacts of artificial lighting and the effects to nesting sea turtles and hatchlings.	2008/2009	$2,000/yr
	Education & Outreach Subtotal		***$4,000***
Public Use			
Coastal Development	Strategy: Promote compatible, non-impactive recreational opportunities within the preserve's boundaries that balance public use and the need to protect and preserve site resources.	1998/1999	$1,700/yr
	Public Use Subtotal		***$1,700***
Partnering			
Water Quality	Strategy: Coordinate with the NWFWMD and FWS in efforts to monitor chemical contaminants, including analysis of metals and dioxins, and determine the extent of these contaminants.	2007/2008	No additional costs
Water Quality	Strategy: Coordinate with Gulf County Department of Health to add additional water quality sites to the already existing Healthy Beaches Program.	2007/2008	No additional costs
Water Quality	Strategy: Coordinate with Florida Department of Agriculture and Consumer Services, Division of Aquaculture, to assist in maintaining an approved Shellfish Harvesting Area.	2007/2008	No additional costs
Water Quality	Strategy: Continue participation and assistance with local marine mammal and sea turtle stranding events.	1995/1996	$3,200/yr
Water Quality	Strategy: Participate in Florida Water Resources Monitoring Council to assist in the development of a centralized storage database and website.	2004/2005	$400/yr
Protection of Seagrass Habitat	Strategy: Coordinate with the Seagrass Salvage Program.	2005/2006	Costs included in other Strategies
Protection of Seagrass Habitat	Strategy: Maintain close coordination with all agencies and local government as well as DEP permitting and regulatory offices to review and comment on proposed projects.	2000/2001	$2,000/yr
Protection of Seagrass Habitat	Strategy: Update the St. Joseph Bay Aquatic Preserve Boater's Guide.	2011/2012	No additional costs
Coastal Development	Strategy: Continue close coordination with the St. Joseph Bay State Buffer Preserve.	2006/2007	$1,000/yr

Issue	Strategy	Project Initiation	Estimated Yearly Cost
Project Initiation Legend: C = Currently Underway D = Under Initial Development			
Coastal Development	Strategy: Maintain effective partnerships with local, state and federal regulatory programs, local government, and adjacent land owners to monitor development activities adjacent to St. Joseph Bay.	1998/1999	Costs included in other Strategies
Coastal Development	Strategy: Establish an effective partnership with the Black's Island community to promote non-impactive recreational activities to visitors to protect the bay's valuable resources through educational signage, brochures and presentations.	2008/2009	Costs included in other Strategies
Beach Impacts to St. Joseph Peninsula	Strategy: Develop an MOA in coordination with Gulf County and FWS to establish techniques for the management of vehicular traffic to reduce adverse impacts to natural resources and essential sea turtle nesting habitat.	2007/2008	Costs included in Coastal Development Strategies
Beach Impacts to St. Joseph Peninsula	Strategy: Continue close coordination with GCCA in efforts to monitor and protect sea turtle nesting habitat on beaches adjacent to the preserve.	2007/2008	No additional costs
	Partnering Subtotal		***$6,600***
	2011-2012 Total		***$81,300***
2012-2013 Cost Estimate			
Ecosystem Science			
Water Quality	Strategy: Maintain a long-term water quality monitoring program to adequately monitor and assess the status of the bay's water quality through the use of dataloggers.	2005/2006	$15,000/yr
Water Quality	Strategy: Monitor nutrients and expand sampling locations as necessary.	2001/2002	$4,000/yr
Water Quality	Strategy: Acquire additional dataloggers to expand monitoring efforts.	2010/2011	$12,000/yr
Water Quality	Strategy: Identify potential point and nonpoint sources of pollution in St. Joseph Bay and develop a monitoring plan to evaluate impacts from this type of pollution using GIS technology to trace possible pollution sources.	2009/2010	$3,000/yr
Water Quality	Strategy: Establish baseline data and broad scale characterizations of benthic communities which are sensible indicators of habitat quality in an aquatic environment.	2006/2007	$3,500/yr
Water Quality	Strategy: Monitor specific indicator species such as scallops, fish, and coral to determine the ecological health of the bay.	1995/1996, 2006/2007	$11,000/yr
Protection of Seagrass Habitat	Strategy: Develop and implement a Seagrass Monitoring Plan for St. Joseph Bay Aquatic Preserve that maintains a strategic, long-term seagrass monitoring project.	2002/2003	$15,000/yr
Protection of Seagrass Habitat	Strategy: Map the spatial extent of seagrass habitat utilizing hyperspectral imagery.	2006/2007	$150,000
Coastal Development	Strategy: Establish effective monitoring projects/protocols to determine potential impacts from adjacent land use activities.	2009/2010	Costs included in Water Quality Strategies
Saltmarsh Decline	Strategy: Establish a Saltmarsh Monitoring Plan and provide baseline data.	2007/2008	$2,500/yr
Beach Impacts to St. Joseph Peninsula	Strategy: Perform biweekly beach surveys to document impacts to resources.	1998/1999	$3,000/yr
	Ecosystem Science Subtotal		***$219,000***
Resource Management			
Protection of Seagrass Habitat	Strategy: Use GIS and aerial photography to identify severely scarred areas for restoration efforts and develop a restoration plan.	2007/2008	Costs included in other Strategies
Coastal Development	Strategy: Review and provide comments on permits relating to construction and development activities within or adjacent to the aquatic preserve.	1998/1999	Costs included in Protection of Seagrass Habitat Strategies
Saltmarsh Decline	Strategy: Develop and implement a Saltmarsh Restoration Plan.	2012/2013	$20,000
Beach Impacts to St. Joseph Peninsula	Strategy: Provide review, comments and necessary data on permits, progress reports and environmental impact studies related to the beach nourishment project and the protection of sea turtle nesting habitat.	2006/2007	No additional costs
	Resource Management Subtotal		***$20,000***
Education & Outreach			
Water Quality	Strategy: Provide a hands-on opportunity for the public to become involved in the protection of the preserve by developing a volunteer network to assist with projects and unique events in the bay.	2009/2010	$2,000/yr
Protection of Seagrass Habitat	Strategy: Continue to provide educational and information materials, such as boater's guides and brochures to local businesses, marinas, and Black's Island community center.	2000/2001	Costs included in other Strategies

Issue	Strategy	Project Initiation	Estimated Yearly Cost
Project Initiation Legend: C = Currently Underway D = Under Initial Development			
Coastal Development	Strategy: Continue to participate in the NERR's Coastal Training Program workshops which target coastal development issues.	2004/2005	No additional costs
Beach Impacts to St. Joseph Peninsula	Strategy: Establish a volunteer network in coordination with the Friends of the St. Joseph Bay Preserves citizens support group and GCCA to educate residents and renters to the impacts of artificial lighting and the effects to nesting sea turtles and hatchlings.	2008/2009	$2,000/yr
	Education & Outreach Subtotal		***$4,000***
Public Use			
Coastal Development	Strategy: Promote compatible, non-impactive recreational opportunities within the preserve's boundaries that balance public use and the need to protect and preserve site resources.	1998/1999	$1,700/yr
	Public Use Subtotal		***$1,700***
Partnering			
Water Quality	Strategy: Coordinate with the NWFWMD and FWS in efforts to monitor chemical contaminants, including analysis of metals and dioxins, and determine the extent of these contaminants.	2007/2008	No additional costs
Water Quality	Strategy: Coordinate with Gulf County Department of Health to add additional water quality sites to the already existing Healthy Beaches Program.	2007/2008	No additional costs
Water Quality	Strategy: Coordinate with Florida Department of Agriculture and Consumer Services, Division of Aquaculture, to assist in maintaining an approved Shellfish Harvesting Area.	2007/2008	No additional costs
Water Quality	Strategy: Continue participation and assistance with local marine mammal and sea turtle stranding events.	1995/1996	$3,200/yr
Water Quality	Strategy: Participate in Florida Water Resources Monitoring Council to assist in the development of a centralized storage database and website.	2004/2005	$400/yr
Protection of Seagrass Habitat	Strategy: Coordinate with the Seagrass Salvage Program.	2005/2006	Costs included in other Strategies
Protection of Seagrass Habitat	Strategy: Maintain close coordination with all agencies and local government as well as DEP permitting and regulatory offices to review and comment on proposed projects.	2000/2001	$2,000/yr
Coastal Development	Strategy: Continue close coordination with the St. Joseph Bay State Buffer Preserve.	2006/2007	$1,000/yr
Coastal Development	Strategy: Maintain effective partnerships with local, state and federal regulatory programs, local government, and adjacent land owners to monitor development activities adjacent to St. Joseph Bay.	1998/1999	Costs included in other Strategies
Coastal Development	Strategy: Establish an effective partnership with the Black's Island community to promote non-impactive recreational activities to visitors to protect the bay's valuable resources through educational signage, brochures and presentations.	2008/2009	Costs included in other Strategies
Beach Impacts to St. Joseph Peninsula	Strategy: Develop an MOA in coordination with Gulf County and FWS to establish techniques for the management of vehicular traffic to reduce adverse impacts to natural resources and essential sea turtle nesting habitat.	2007/2008	Costs included in Coastal Development Strategies
Beach Impacts to St. Joseph Peninsula	Strategy: Continue close coordination with GCCA in efforts to monitor and protect sea turtle nesting habitat on beaches adjacent to the preserve.	2007/2008	No additional costs
	Partnering Subtotal		***$6,600***
	2012-2013 Total		***$251,300***
2013-2014 Cost Estimate			
Ecosystem Science			
Water Quality	Strategy: Maintain a long-term water quality monitoring program to adequately monitor and assess the status of the bay's water quality through the use of dataloggers.	2005/2006	$15,000/yr
Water Quality	Strategy: Monitor nutrients and expand sampling locations as necessary.	2001/2002	$4,000/yr
Water Quality	Strategy: Acquire additional dataloggers to expand monitoring efforts.	2010/2011	$12,000/yr
Water Quality	Strategy: Identify potential point and nonpoint sources of pollution in St. Joseph Bay and develop a monitoring plan to evaluate impacts from this type of pollution using GIS technology to trace possible pollution sources.	2009/2010	$3,000/yr

Issue	Strategy	Project Initiation	Estimated Yearly Cost
Project Initiation Legend: C = Currently Underway D = Under Initial Development			
Water Quality	Strategy: Establish baseline data and broad scale characterizations of benthic communities which are sensible indicators of habitat quality in an aquatic environment.	2006/2007	$3,500/yr
Water Quality	Strategy: Monitor specific indicator species such as scallops, fish, and coral to determine the ecological health of the bay.	1995/1996, 2006/2007	$11,000/yr
Protection of Seagrass Habitat	Strategy: Develop and implement a Seagrass Monitoring Plan for St. Joseph Bay Aquatic Preserve that maintains a strategic, long-term seagrass monitoring project.	2002/2003	$15,000/yr
Coastal Development	Strategy: Establish effective monitoring projects/protocols to determine potential impacts from adjacent land use activities.	2009/2010	Costs included in Water Quality Strategies
Saltmarsh Decline	Strategy: Establish a Saltmarsh Monitoring Plan and provide baseline data.	2007/2008	$2,500/yr
Beach Impacts to St. Joseph Peninsula	Strategy: Perform biweekly beach surveys to document impacts to resources.	1998/1999	$3,000/yr
	Ecosystem Science Subtotal		***$69,000***
Resource Management			
Protection of Seagrass Habitat	Strategy: Use GIS and aerial photography to identify severely scarred areas for restoration efforts and develop a restoration plan.	2007/2008	Costs included in other Strategies
Coastal Development	Strategy: Review and provide comments on permits relating to construction and development activities within or adjacent to the aquatic preserve.	1998/1999	Costs included in Protection of Seagrass Habitat Strategies
Beach Impacts to St. Joseph Peninsula	Strategy: Provide review, comments and necessary data on permits, progress reports and environmental impact studies related to the beach nourishment project and the protection of sea turtle nesting habitat.	2006/2007	No additional costs
	Resource Management Subtotal		***$0***
Education & Outreach			
Water Quality	Strategy: Provide a hands-on opportunity for the public to become involved in the protection of the preserve by developing a volunteer network to assist with projects and unique events in the bay.	2009/2010	$2,000/yr
Protection of Seagrass Habitat	Strategy: Continue to provide educational and information materials, such as boater's guides and brochures to local businesses, marinas, and Black's Island community center.	2000/2001	Costs included in other Strategies
Protection of Seagrass Habitat	Strategy: Produce an interactive CD or DVD to educate the public on the value of the natural resources in St. Joseph Bay.	2013/2014	Costs included in other Strategies
Coastal Development	Strategy: Continue to participate in the NERR's Coastal Training Program workshops which target coastal development issues.	2004/2005	No additional costs
Beach Impacts to St. Joseph Peninsula	Strategy: Establish a volunteer network in coordination with the Friends of the St. Joseph Bay Preserves citizens support group and GCCA to educate residents and renters to the impacts of artificial lighting and the effects to nesting sea turtles and hatchlings.	2008/2009	$2,000/yr
	Education & Outreach Subtotal		***$4,000***
Public Use			
Coastal Development	Strategy: Promote compatible, non-impactive recreational opportunities within the preserve's boundaries that balance public use and the need to protect and preserve site resources.	1998/1999	$1,700/yr
	Public Use Subtotal		***$1,700***
Partnering			
Water Quality	Strategy: Coordinate with the NWFWMD and FWS in efforts to monitor chemical contaminants, including analysis of metals and dioxins, and determine the extent of these contaminants.	2007/2008	No additional costs
Water Quality	Strategy: Coordinate with Gulf County Department of Health to add additional water quality sites to the already existing Healthy Beaches Program.	2007/2008	No additional costs
Water Quality	Strategy: Coordinate with Florida Department of Agriculture and Consumer Services, Division of Aquaculture, to assist in maintaining an approved Shellfish Harvesting Area.	2007/2008	No additional costs

Issue	Strategy	Project Initiation	Estimated Yearly Cost
Project Initiation Legend: C = Currently Underway D = Under Initial Development			
Water Quality	Strategy: Continue participation and assistance with local marine mammal and sea turtle stranding events.	1995/1996	$3,200/yr
Water Quality	Strategy: Participate in Florida Water Resources Monitoring Council to assist in the development of a centralized storage database and website.	2004/2005	$400/yr
Protection of Seagrass Habitat	Strategy: Coordinate with the Seagrass Salvage Program.	2005/2006	Costs included in other Strategies
Protection of Seagrass Habitat	Strategy: Maintain close coordination with all agencies and local government as well as DEP permitting and regulatory offices to review and comment on proposed projects.	2000/2001	$2,000/yr
Coastal Development	Strategy: Continue close coordination with the St. Joseph Bay State Buffer Preserve.	2006/2007	$1,000/yr
Coastal Development	Strategy: Maintain effective partnerships with local, state and federal regulatory programs, local government, and adjacent land owners to monitor development activities adjacent to St. Joseph Bay.	1998/1999	Costs included in other Strategies
Coastal Development	Strategy: Establish an effective partnership with the Black's Island community to promote non-impactive recreational activities to visitors to protect the bay's valuable resources through educational signage, brochures and presentations.	2008/2009	Costs included in other Strategies
Beach Impacts to St. Joseph Peninsula	Strategy: Develop an MOA in coordination with Gulf County and FWS to establish techniques for the management of vehicular traffic to reduce adverse impacts to natural resources and essential sea turtle nesting habitat.	2007/2008	Costs included in Coastal Development Strategies
Beach Impacts to St. Joseph Peninsula	Strategy: Continue close coordination with GCCA in efforts to monitor and protect sea turtle nesting habitat on beaches adjacent to the preserve.	2007/2008	No additional costs
	Partnering Subtotal		***$6,600***
	2013-2014 Total		***$81,300***
2014-2015 Cost Estimate			
Ecosystem Science			
Water Quality	Strategy: Maintain a long-term water quality monitoring program to adequately monitor and assess the status of the bay's water quality through the use of dataloggers.	2005/2006	$15,000/yr
Water Quality	Strategy: Monitor nutrients and expand sampling locations as necessary.	2001/2002	$4,000/yr
Water Quality	Strategy: Acquire additional dataloggers to expand monitoring efforts.	2010/2011	$12,000/yr
Water Quality	Strategy: Identify potential point and nonpoint sources of pollution in St. Joseph Bay and develop a monitoring plan to evaluate impacts from this type of pollution using GIS technology to trace possible pollution sources.	2009/2010	$3,000/yr
Water Quality	Strategy: Establish baseline data and broad scale characterizations of benthic communities which are sensible indicators of habitat quality in an aquatic environment.	2006/2007	$3,500/yr
Water Quality	Strategy: Monitor specific indicator species such as scallops, fish, and coral to determine the ecological health of the bay.	1995/1996, 2006/2007	$11,000/yr
Protection of Seagrass Habitat	Strategy: Develop and implement a Seagrass Monitoring Plan for St. Joseph Bay Aquatic Preserve that maintains a strategic, long-term seagrass monitoring project.	2002/2003	$15,000/yr
Coastal Development	Strategy: Establish effective monitoring projects/protocols to determine potential impacts from adjacent land use activities.	2009/2010	Costs included in Water Quality Strategies
Saltmarsh Decline	Strategy: Establish a Saltmarsh Monitoring Plan and provide baseline data.	2007/2008	$2,500/yr
Beach Impacts to St. Joseph Peninsula	Strategy: Perform biweekly beach surveys to document impacts to resources.	1998/1999	$3,000/yr
	Ecosystem Science Subtotal		***$69,000***
Resource Management			
Protection of Seagrass Habitat	Strategy: Use GIS and aerial photography to identify severely scarred areas for restoration efforts and develop a restoration plan.	2007/2008	Costs included in other Strategies
Coastal Development	Strategy: Review and provide comments on permits relating to construction and development activities within or adjacent to the aquatic preserve.	1998/1999	Costs included in Protection of Seagrass Habitat Strategies
Beach Impacts to St. Joseph Peninsula	Strategy: Provide review, comments and necessary data on permits, progress reports and environmental impact studies related to the beach nourishment project and the protection of sea turtle nesting habitat.	2006/2007	No additional costs
	Resource Management Subtotal		***$0***

Issue	Strategy	Project Initiation	Estimated Yearly Cost
Project Initiation Legend: C = Currently Underway D = Under Initial Development			
Education & Outreach			
Water Quality	Strategy: Provide a hands-on opportunity for the public to become involved in the protection of the preserve by developing a volunteer network to assist with projects and unique events in the bay.	2009/2010	$2,000/yr
Protection of Seagrass Habitat	Strategy: Continue to provide educational and information materials, such as boater's guides and brochures to local businesses, marinas, and Black's Island community center.	2000/2001	Costs included in other Strategies
Coastal Development	Strategy: Continue to participate in the NERR's Coastal Training Program workshops which target coastal development issues.	2004/2005	No additional costs
Beach Impacts to St. Joseph Peninsula	Strategy: Establish a volunteer network in coordination with the Friends of the St. Joseph Bay Preserves citizens support group and GCCA to educate residents and renters to the impacts of artificial lighting and the effects to nesting sea turtles and hatchlings.	2008/2009	$2,000/yr
	Education & Outreach Subtotal		***$4,000***
Public Use			
Coastal Development	Strategy: Promote compatible, non-impactive recreational opportunities within the preserve's boundaries that balance public use and the need to protect and preserve site resources.	1998/1999	$1,700/yr
	Public Use Subtotal		***$1,700***
Partnering			
Water Quality	Strategy: Coordinate with the NWFWMD and FWS in efforts to monitor chemical contaminants, including analysis of metals and dioxins, and determine the extent of these contaminants.	2007/2008	No additional costs
Water Quality	Strategy: Coordinate with Gulf County Department of Health to add additional water quality sites to the already existing Healthy Beaches Program.	2007/2008	No additional costs
Water Quality	Strategy: Coordinate with Florida Department of Agriculture and Consumer Services, Division of Aquaculture, to assist in maintaining an approved Shellfish Harvesting Area.	2007/2008	No additional costs
Water Quality	Strategy: Continue participation and assistance with local marine mammal and sea turtle stranding events.	1995/1996	$3,200/yr
Water Quality	Strategy: Participate in Florida Water Resources Monitoring Council to assist in the development of a centralized storage database and website.	2004/2005	$400/yr
Protection of Seagrass Habitat	Strategy: Coordinate with the Seagrass Salvage Program.	2005/2006	Costs included in other Strategies
Protection of Seagrass Habitat	Strategy: Maintain close coordination with all agencies and local government as well as DEP permitting and regulatory offices to review and comment on proposed projects.	2000/2001	$2,000/yr
Coastal Development	Strategy: Continue close coordination with the St. Joseph Bay State Buffer Preserve.	2006/2007	$1,000/yr
Coastal Development	Strategy: Maintain effective partnerships with local, state and federal regulatory programs, local government, and adjacent land owners to monitor development activities adjacent to St. Joseph Bay.	1998/1999	Costs included in other Strategies
Coastal Development	Strategy: Establish an effective partnership with the Black's Island community to promote non-impactive recreational activities to visitors to protect the bay's valuable resources through educational signage, brochures and presentations.	2008/2009	Costs included in other Strategies
Beach Impacts to St. Joseph Peninsula	Strategy: Develop an MOA in coordination with Gulf County and FWS to establish techniques for the management of vehicular traffic to reduce adverse impacts to natural resources and essential sea turtle nesting habitat.	2007/2008	Costs included in Coastal Development Strategies
Beach Impacts to St. Joseph Peninsula	Strategy: Continue close coordination with GCCA in efforts to monitor and protect sea turtle nesting habitat on beaches adjacent to the preserve.	2007/2008	No additional costs
	Partnering Subtotal		***$6,600***
	2014-2015 Total		***$81,300***
2015-2016 Cost Estimate			
Ecosystem Science			
Water Quality	Strategy: Maintain a long-term water quality monitoring program to adequately monitor and assess the status of the bay's water quality through the use of dataloggers.	2005/2006	$15,000/yr
Water Quality	Strategy: Monitor nutrients and expand sampling locations as necessary.	2001/2002	$4,000/yr
Water Quality	Strategy: Acquire additional dataloggers to expand monitoring efforts.	2010/2011	$12,000/yr

Issue	Strategy	Project Initiation	Estimated Yearly Cost
Project Initiation Legend: C = Currently Underway D = Under Initial Development			
Water Quality	Strategy: Identify potential point and nonpoint sources of pollution in St. Joseph Bay and develop a monitoring plan to evaluate impacts from this type of pollution using GIS technology to trace possible pollution sources.	2009/2010	$3,000/yr
Water Quality	Strategy: Establish baseline data and broad scale characterizations of benthic communities which are sensible indicators of habitat quality in an aquatic environment.	2006/2007	$3,500/yr
Water Quality	Strategy: Monitor specific indicator species such as scallops, fish, and coral to determine the ecological health of the bay.	1995/1996, 2006/2007	$11,000/yr
Protection of Seagrass Habitat	Strategy: Develop and implement a Seagrass Monitoring Plan for St. Joseph Bay Aquatic Preserve that maintains a strategic, long-term seagrass monitoring project.	2002/2003	$15,000/yr
Protection of Seagrass Habitat	Strategy: Map the spatial extent of seagrass habitat utilizing hyperspectral imagery.	2006/2007	$150,000
Coastal Development	Strategy: Establish effective monitoring projects/protocols to determine potential impacts from adjacent land use activities.	2009/2010	Costs included in Water Quality Strategies
Saltmarsh Decline	Strategy: Establish a Saltmarsh Monitoring Plan and provide baseline data.	2007/2008	$2,500/yr
Beach Impacts to St. Joseph Peninsula	Strategy: Perform biweekly beach surveys to document impacts to resources.	1998/1999	$3,000/yr
	Ecosystem Science Subtotal		***$219,000***
Resource Management			
Protection of Seagrass Habitat	Strategy: Use GIS and aerial photography to identify severely scarred areas for restoration efforts and develop a restoration plan.	2007/2008	Costs included in other Strategies
Coastal Development	Strategy: Review and provide comments on permits relating to construction and development activities within or adjacent to the aquatic preserve.	1998/1999	Costs included in Protection of Seagrass Habitat Strategies
Beach Impacts to St. Joseph Peninsula	Strategy: Provide review, comments and necessary data on permits, progress reports and environmental impact studies related to the beach nourishment project and the protection of sea turtle nesting habitat.	2006/2007	No additional costs
	Resource Management Subtotal		***$0***
Education & Outreach			
Water Quality	Strategy: Provide a hands-on opportunity for the public to become involved in the protection of the preserve by developing a volunteer network to assist with projects and unique events in the bay.	2009/2010	$2,000/yr
Protection of Seagrass Habitat	Strategy: Continue to provide educational and information materials, such as boater's guides and brochures to local businesses, marinas, and Black's Island community center.	2000-2001	Costs included in other Strategies
Coastal Development	Strategy: Continue to participate in the NERR's Coastal Training Program workshops which target coastal development issues.	2004/2005	No additional costs
Beach Impacts to St. Joseph Peninsula	Strategy: Establish a volunteer network in coordination with the Friends of the St. Joseph Bay Preserves citizens support group and GCCA to educate residents and renters to the impacts of artificial lighting and the effects to nesting sea turtles and hatchlings.	2008/2009	$2,000/yr
	Education & Outreach Subtotal		***$4,000***
Public Use			
Coastal Development	Strategy: Promote compatible, non-impactive recreational opportunities within the preserve's boundaries that balance public use and the need to protect and preserve site resources.	1998/1999	$1,700/yr
	Public Use Subtotal		***$1,700***
Partnering			
Water Quality	Strategy: Coordinate with the NWFWMD and FWS in efforts to monitor chemical contaminants, including analysis of metals and dioxins, and determine the extent of these contaminants.	2007/2008	No additional costs
Water Quality	Strategy: Coordinate with Gulf County Department of Health to add additional water quality sites to the already existing Healthy Beaches Program.	2007/2008	No additional costs
Water Quality	Strategy: Coordinate with Florida Department of Agriculture and Consumer Services, Division of Aquaculture, to assist in maintaining an approved Shellfish Harvesting Area.	2007/2008	No additional costs

Issue	Strategy	Project Initiation	Estimated Yearly Cost
Project Initiation Legend: C = Currently Underway D = Under Initial Development			
Water Quality	Strategy: Continue participation and assistance with local marine mammal and sea turtle stranding events.	1995/1996	$3,200/yr
Water Quality	Strategy: Participate in Florida Water Resources Monitoring Council to assist in the development of a centralized storage database and website.	2004/2005	$400/yr
Protection of Seagrass Habitat	Strategy: Coordinate with the Seagrass Salvage Program.	2005/2006	Costs included in other Strategies
Protection of Seagrass Habitat	Strategy: Maintain close coordination with all agencies and local government as well as DEP permitting and regulatory offices to review and comment on proposed projects.	2000/2001	$2,000/yr
Coastal Development	Strategy: Continue close coordination with the St. Joseph Bay State Buffer Preserve.	2006/2007	$1,000/yr
Coastal Development	Strategy: Maintain effective partnerships with local, state and federal regulatory programs, local government, and adjacent land owners to monitor development activities adjacent to St. Joseph Bay.	1998/1999	Costs included in other Strategies
Coastal Development	Strategy: Establish an effective partnership with the Black's Island community to promote non-impactive recreational activities to visitors to protect the bay's valuable resources through educational signage, brochures and presentations.	2008/2009	Costs included in other Strategies
Beach Impacts to St. Joseph Peninsula	Strategy: Develop an MOA in coordination with Gulf County and FWS to establish techniques for the management of vehicular traffic to reduce adverse impacts to natural resources and essential sea turtle nesting habitat.	2007/2008	Costs included in Coastal Development Strategies
Beach Impacts to St. Joseph Peninsula	Strategy: Continue close coordination with GCCA in efforts to monitor and protect sea turtle nesting habitat on beaches adjacent to the preserve.	2007/2008	No additional costs
	Partnering Subtotal		***$6,600***
	2015-2016 Total		***$231,300***
2016-2017 Cost Estimate			
Ecosystem Science			
Water Quality	Strategy: Maintain a long-term water quality monitoring program to adequately monitor and assess the status of the bay's water quality through the use of dataloggers.	2005/2006	$15,000/yr
Water Quality	Strategy: Monitor nutrients and expand sampling locations as necessary.	2001/2002	$4,000/yr
Water Quality	Strategy: Acquire additional dataloggers to expand monitoring efforts.	2010/2011	$12,000/yr
Water Quality	Strategy: Identify potential point and nonpoint sources of pollution in St. Joseph Bay and develop a monitoring plan to evaluate impacts from this type of pollution using GIS technology to trace possible pollution sources.	2009/2010	$3,000/yr
Water Quality	Strategy: Establish baseline data and broad scale characterizations of benthic communities which are sensible indicators of habitat quality in an aquatic environment.	2006/2007	$3,500/yr
Water Quality	Strategy: Monitor specific indicator species such as scallops, fish, and coral to determine the ecological health of the bay.	1995/1996, 2006/2007	$11,000/yr
Protection of Seagrass Habitat	Strategy: Develop and implement a Seagrass Monitoring Plan for St. Joseph Bay Aquatic Preserve that maintains a strategic, long-term seagrass monitoring project.	2002/2003	$15,000/yr
Coastal Development	Strategy: Establish effective monitoring projects/protocols to determine potential impacts from adjacent land use activities.	2009/2010	Costs included in Water Quality Strategies
Saltmarsh Decline	Strategy: Establish a Saltmarsh Monitoring Plan and provide baseline data.	2007/2008	$2,500/yr
Beach Impacts to St. Joseph Peninsula	Strategy: Perform biweekly beach surveys to document impacts to resources.	1998/1999	$3,000/yr
	Ecosystem Science Subtotal		***$69,000***
Resource Management			
Protection of Seagrass Habitat	Strategy: Use GIS and aerial photography to identify severely scarred areas for restoration efforts and develop a restoration plan.	2007/2008	Costs included in other Strategies
Coastal Development	Strategy: Review and provide comments on permits relating to construction and development activities within or adjacent to the aquatic preserve.	1998/1999	Costs included in Protection of Seagrass Habitat, Strategies

Issue	Strategy	Project Initiation	Estimated Yearly Cost
Project Initiation Legend: C = Currently Underway D = Under Initial Development			
Beach Impacts to St. Joseph Peninsula	Strategy: Provide review, comments and necessary data on permits, progress reports and environmental impact studies related to the beach nourishment project and the protection of sea turtle nesting habitat.	2006/2007	No additional costs
	Resource Management Subtotal		***$0***
Education & Outreach			
Water Quality	Strategy: Provide a hands-on opportunity for the public to become involved in the protection of the preserve by developing a volunteer network to assist with projects and unique events in the bay.	2009/2010	$2,000/yr
Protection of Seagrass Habitat	Strategy: Continue to provide educational and information materials, such as boater's guides and brochures to local businesses, marinas, and Black's Island community center.	2000/2001	Costs included in other Strategies
Coastal Development	Strategy: Continue to participate in the NERR's Coastal Training Program workshops which target coastal development issues.	2004/2005	No additional costs
Beach Impacts to St. Joseph Peninsula	Strategy: Establish a volunteer network in coordination with the Friends of the St. Joseph Bay Preserves citizens support group and GCCA to educate residents and renters to the impacts of artificial lighting and the effects to nesting sea turtles and hatchlings.	2008/2009	$2,000/yr
	Education & Outreach Subtotal		***$4,000***
Public Use			
Coastal Development	Strategy: Promote compatible, non-impactive recreational opportunities within the preserve's boundaries that balance public use and the need to protect and preserve site resources.	1998/1999	$1,700/yr
	Public Use Subtotal		***$1,700***
Partnering			
Water Quality	Strategy: Coordinate with the NWFWMD and FWS in efforts to monitor chemical contaminants, including analysis of metals and dioxins, and determine the extent of these contaminants.	2007/2008	No additional costs
Water Quality	Strategy: Coordinate with Gulf County Department of Health to add additional water quality sites to the already existing Healthy Beaches Program.	2007/2008	No additional costs
Water Quality	Strategy: Coordinate with Florida Department of Agriculture and Consumer Services, Division of Aquaculture, to assist in maintaining an approved Shellfish Harvesting Area.	2007/2008	No additional costs
Water Quality	Strategy: Continue participation and assistance with local marine mammal and sea turtle stranding events.	1995/1996	$3,200/yr
Water Quality	Strategy: Participate in Florida Water Resources Monitoring Council to assist in the development of a centralized storage database and website.	2004/2005	$400/yr.
Protection of Seagrass Habitat	Strategy: Coordinate with the Seagrass Salvage Program.	2005/2006	Costs included in other Strategies
Protection of Seagrass Habitat	Strategy: Maintain close coordination with all agencies and local government as well as DEP permitting and regulatory offices to review and comment on proposed projects.	2000/2001	$2,000/yr
Coastal Development	Strategy: Continue close coordination with the St. Joseph Bay State Buffer Preserve.	2006/2007	$1,000/yr
Coastal Development	Strategy: Maintain effective partnerships with local, state and federal regulatory programs, local government, and adjacent land owners to monitor development activities adjacent to St. Joseph Bay.	1998/1999	Costs included in other Strategies
Coastal Development	Strategy: Establish an effective partnership with the Black's Island community to promote non-impactive recreational activities to visitors to protect the bay's valuable resources through educational signage, brochures and presentations.	2008/2009	Costs included in other Strategies
Beach Impacts to St. Joseph Peninsula	Strategy: Develop an MOA in coordination with Gulf County and FWS to establish techniques for the management of vehicular traffic to reduce adverse impacts to natural resources and essential sea turtle nesting habitat.	2007/2008	Costs included in Coastal Development Strategies
Beach Impacts to St. Joseph Peninsula	Strategy: Continue close coordination with GCCA in efforts to monitor and protect sea turtle nesting habitat on beaches adjacent to the preserve.	2007/2008	No additional costs
	Partnering Subtotal		***$6,600***
	2016-2017 Total		***$81,300***

Issue	Strategy	Project Initiation	Estimated Yearly Cost
Project Initiation Legend: C = Currently Underway D = Under Initial Development			
2017-2018 Cost Estimate			
Ecosystem Science			
Water Quality	Strategy: Maintain a long-term water quality monitoring program to adequately monitor and assess the status of the bay's water quality through the use of dataloggers.	2005/2006	$15,000/yr
Water Quality	Strategy: Monitor nutrients and expand sampling locations as necessary.	2001/2002	$4,000/yr
Water Quality	Strategy: Acquire additional dataloggers to expand monitoring efforts.	2010/2011	$12,000/yr
Water Quality	Strategy: Identify potential point and nonpoint sources of pollution in St. Joseph Bay and develop a monitoring plan to evaluate impacts from this type of pollution using GIS technology to trace possible pollution sources.	2009/2010	$3,000/yr
Water Quality	Strategy: Establish baseline data and broad scale characterizations of benthic communities which are sensible indicators of habitat quality in an aquatic environment.	2006/2007	$3,500/yr
Water Quality	Strategy: Monitor specific indicator species such as scallops, fish, and coral to determine the ecological health of the bay.	1995/1996, 2006/2007	$11,000/yr
Protection of Seagrass Habitat	Strategy: Develop and implement a Seagrass Monitoring Plan for St. Joseph Bay Aquatic Preserve that maintains a strategic, long-term seagrass monitoring project.	2002/2003	$15,000/yr
Coastal Development	Strategy: Establish effective monitoring projects/protocols to determine potential impacts from adjacent land use activities.	2009/2010	Costs included in Water Quality Strategies
Saltmarsh Decline	Strategy: Establish a Saltmarsh Monitoring Plan and provide baseline data.	2007/2008	$2,500/yr
Beach Impacts to St. Joseph Peninsula	Strategy: Perform biweekly beach surveys to document impacts to resources.	1998/1999	$3,000/yr
	Ecosystem Science Subtotal		***$69,000***
Resource Management			
Protection of Seagrass Habitat	Strategy: Use GIS and aerial photography to identify severely scarred areas for restoration efforts and develop a restoration plan.	2007/2008	Costs included in other Strategies
Coastal Development	Strategy: Review and provide comments on permits relating to construction and development activities within or adjacent to the aquatic preserve.	1998/1999	Costs included in Protection of Seagrass Habitat, Strategies
Beach Impacts to St. Joseph Peninsula	Strategy: Provide review, comments and necessary data on permits, progress reports and environmental impact studies related to the beach nourishment project and the protection of sea turtle nesting habitat.	2006/2007	No additional costs
	Resource Management Subtotal		***$0***
Education & Outreach			
Water Quality	Strategy: Provide a hands-on opportunity for the public to become involved in the protection of the preserve by developing a volunteer network to assist with projects and unique events in the bay.	2009/2010	$2,000/yr
Protection of Seagrass Habitat	Strategy: Continue to provide educational and information materials, such as boater's guides and brochures to local businesses, marinas, and Black's Island community center.	2000/2001	Costs included in other Strategies
Coastal Development	Strategy: Continue to participate in the NERR's Coastal Training Program workshops which target coastal development issues.	2004/2005	No additional costs
Beach Impacts to St. Joseph Peninsula	Strategy: Establish a volunteer network in coordination with the Friends of the St. Joseph Bay Preserves citizens support group and GCCA to educate residents and renters to the impacts of artificial lighting and the effects to nesting sea turtles and hatchlings.	2008/2009	$2,000/yr
	Education & Outreach Subtotal		***$4,000***
Public Use			
Coastal Development	Strategy: Promote compatible, non-impactive recreational opportunities within the preserve's boundaries that balance public use and the need to protect and preserve site resources.	1998/1999	$1,700/yr
	Public Use Subtotal		***$1,700***

Issue	Strategy	Project Initiation	Estimated Yearly Cost
Project Initiation Legend: C = Currently Underway D = Under Initial Development			
Partnering			
Water Quality	Strategy: Coordinate with the NWFWMD and FWS in efforts to monitor chemical contaminants, including analysis of metals and dioxins, and determine the extent of these contaminants.	2007/2008	No additional costs
Water Quality	Strategy: Coordinate with Gulf County Department of Health to add additional water quality sites to the already existing Healthy Beaches Program.	2007/2008	No additional costs
Water Quality	Strategy: Coordinate with Florida Department of Agriculture and Consumer Services, Division of Aquaculture, to assist in maintaining an approved Shellfish Harvesting Area.	2007/2008	No additional costs
Water Quality	Strategy: Continue participation and assistance with local marine mammal and sea turtle stranding events.	1995/1996	$3,200/yr
Water Quality	**Strategy:** Participate in Florida Water Resources Monitoring Council to assist in the development of a centralized storage database and website.	2004/2005	$400/yr
Protection of Seagrass Habitat	**Strategy:** Coordinate with the Seagrass Salvage Program.	2005/2006	Costs included in other Strategies
Protection of Seagrass Habitat	**Strategy:** Maintain close coordination with all agencies and local government as well as DEP permitting and regulatory offices to review and comment on proposed projects.	2000/2001	$2,000/yr
Coastal Development	**Strategy:** Continue close coordination with the St. Joseph Bay State Buffer Preserve.	2006/2007	$1,000/yr
Coastal Development	**Strategy:** Maintain effective partnerships with local, state and federal regulatory programs, local government, and adjacent land owners to monitor development activities adjacent to St. Joseph Bay.	1998/1999	Costs included in other Strategies
Coastal Development	**Strategy:** Establish an effective partnership with the Black's Island community to promote non-impactive recreational activities to visitors to protect the bay's valuable resources through educational signage, brochures and presentations.	2008/2009	Costs included in other Strategies
Beach Impacts to St. Joseph Peninsula	**Strategy:** Develop an MOA in coordination with Gulf County and FWS to establish techniques for the management of vehicular traffic to reduce adverse impacts to natural resources and essential sea turtle nesting habitat.	2007/2008	Costs included in Coastal Development Strategies
Beach Impacts to St. Joseph Peninsula	**Strategy:** Continue close coordination with GCCA in efforts to monitor and protect sea turtle nesting habitat on beaches adjacent to the preserve.	2007/2008	No additional costs
	Partnering Subtotal		***$6,600***
	2017-2018 Total		***$81,300***

2008-2009 Cost Estimate	
Ecosystem Science Subtotal	$54,000
Resource Management Subtotal	$0
Education and Outreach Subtotal	$7,000
Public Use Subtotal	$1,700
Partnering Subtotal	$6,600
2008-2009 Total	***$69,300***

2009-2010 Cost Estimate	
Ecosystem Science Subtotal	$207,000
Resource Management Subtotal	$0
Education and Outreach Subtotal	$4,000
Public Use Subtotal	$1,700
Partnering Subtotal	$6,600
2009-2010 Total	***$219,300***

2010-2011 Cost Estimate	
Ecosystem Science Subtotal	$69,000
Resource Management Subtotal	$0
Education and Outreach Subtotal	$14,000
Public Use Subtotal	$17,000
Partnering Subtotal	$36,600
2010-2011 Total	***$136,600***

2011-2012 Cost Estimate	
Ecosystem Science Subtotal	$69,000
Resource Management Subtotal	$0
Education and Outreach Subtotal	$4,000
Public Use Subtotal	$1,700
Partnering Subtotal	$6,600
2011-2012 Total	***$81,300***

2012-2013 Cost Estimate	
Ecosystem Science Subtotal	$219,000
Resource Management Subtotal	$20,000
Education and Outreach Subtotal	$4,000
Public Use Subtotal	$1,700
Partnering Subtotal	$6,600
2012-2013 Total	***$251,300***

2013-2014 Cost Estimate	
Ecosystem Science Subtotal	$69,000
Resource Management Subtotal	$0
Education and Outreach Subtotal	$4,000
Public Use Subtotal	$1,700
Partnering Subtotal	$6,600
20013-2014 Total	***$81,300***

2014-2015 Cost Estimate	
Ecosystem Science Subtotal	$69,000
Resource Management Subtotal	$0
Education and Outreach Subtotal	$4,000
Public Use Subtotal	$1,700
Partnering Subtotal	$6,600
2014-2015 Total	***$81,300***

2015-2016 Cost Estimate	
Ecosystem Science Subtotal	$219,000
Resource Management Subtotal	$0
Education and Outreach Subtotal	$4,000
Public Use Subtotal	$1,700
Partnering Subtotal	$6,600
2015-2016 Total	***$231,300***

2016-2017 Cost Estimate	
Ecosystem Science Subtotal	$69,000
Resource Management Subtotal	$0
Education and Outreach Subtotal	$4,000
Public Use Subtotal	$1,700
Partnering Subtotal	$6,600
20016-2017 Total	***$81,300***

2017-2018 Cost Estimate	
Ecosystem Science Subtotal	$69,000
Resource Management Subtotal	$0
Education and Outreach Subtotal	$4,000
Public Use Subtotal	$1,700
Partnering Subtotal	$6,600
2017-2018 Total	***$81,300***

Local County Ordinances that pertain to this management plan

Ordinance 2001-09

ORDINANCE NO. 2001-09

AN ORDINANCE OF GULF COUNTY, FLORIDA, CREATING REGULATIONS FOR THE PROTECTION OF SEA TURTLES AND OTHER ENUMERATED SPECIES WITHIN CERTAIN BEACHES OF GULF COUNTY; PROVIDING FOR THE PURPOSE AND INTENT OF SUCH ORDINANCE; PROVIDING FOR DEFINITIONS, PROHIBITED ACTIVITIES, LIGHTING STANDARDS FOR NEW CONSTRUCTION, LIGHTING STANDARDS FOR EXISTING LIGHTING, PROVIDING FOR PUBLIC AWARENESS, PROVIDING FOR ENFORCEMENT AND PENALTIES, PROVIDING AN INTERPRETATION, PROVIDING A SEVERABILITY CLAUSE AND PROVIDING AN EFFECTIVE DATE.

WHEREAS, it has been determined that artificial lighting upon certain beaches of Gulf County adversely effects the nesting habits of the endangered and threatened marine turtle population and other enumerated species of Gulf County, and

WHEREAS, it is the policy of the Board of County Commissioners of Gulf County, Florida, that no enumerated artificial light source improperly illuminate the beaches of unincorporated Gulf County,

NOW, THEREFORE, be it ordained by the Board of County Commissioners of Gulf County, Florida, as follows:

I PURPOSE AND INTENT

This Ordinance is intended to protect state and federally listed species from the adverse effects of artificial lighting and from injury or harassment caused by such lighting and its effects. These species include all animals categorized by the United States Fish and Wildlife Service (50 CFR 17) or the Florida Fish & Wildlife Conservation Commission or the Marine Turtle Protection Act (Florida Statute 370.12, Florida Administrative Code, Rules 62-01, 62-B33, 62-B55) as either endangered, threatened, or species of special concern which utilize the beach habitat of Gulf County, Florida, specifically nesting female and hatchling marine turtles, beach mice, and shorebirds.

II DEFINITIONS

(1) "Artificial light" or "artificial lighting" means the light emanating from any device other than natural celestial light sources.

(2) "Beach" means the zone of unconsolidated material that extends landward from the mean low water line to the place where there is a marked change in material or physiographic form, or to the line of permanent vegetation, usually the effective limit of storm waves.

(3) "Bug" type bulb means any yellow colored light bulb that is marketed as being specifically treated in such a way so as to reduce the attraction of bugs to the light.

(4) "Coastal construction activities" means any work or development that is likely to have a material physical effect on existing coastal conditions or natural shore and inlet processes.

(5) "Coastal Construction Control Line (CCCL)" means the portion of the Coastal Construction Control Line established pursuant to the provisions of Section 161.053 Florida Statutes that lies within Gulf County.

(6) "Cumulatively illuminated" means illuminated by numerous artificial light sources that as a group illuminate any portion of the beach.

(7) "Department" means the Florida Department of Environmental Protection.

(8) "Directly illuminated" means the source of artificial light, i.e. lamps or reflectors, is visible to an observer located beyond the frontal dune.

(9) "Dune" means a mound or ridge of loose sediments, usually sand-sized, lying landward of the beach and deposited by any natural or artificial mechanism.

(10) "Frontal dune" means the first natural or man-made mound or bluff of sand which is located landward of the beach and which has sufficient vegetation, height, continuity, and configuration to offer protective value.

(11) "Ground-level barrier" means any vegetation, natural feature or artificial structure rising from the ground which prevents beachfront lighting from shining directly onto the beach-dune system.

(12) "Gulf County Beaches" includes all beaches within Gulf County located seaward of SR30A and County Road C30B and C30E commencing at the Indian Pass public boat ramp and extending to the southern boundary of the St. Joseph Peninsula State Park and also including those boundaries lying south of Highway 98 commencing at the western boundary of the Gulf County Canal and extending to the Gulf/Bay County boundary line.

(13) "Hatchling" means any species of marine turtle, within or outside of a nest, that has recently hatched from an egg.

(14) "Indirectly illuminated" is the term used when the source element of an artificial light source is not visible by an observer located beyond the frontal dune, but the lumen output is.

(15) "Listed species" includes all animals categorized by the United States Fish and Wildlife Service (50 CFR 17) or the Florida Fish & Wildlife Conservation Commission or the Marine Turtle Protection Act (Florida Statute 370-12, Florida Administrative Code, Rules 62-01, 62-B33, 62-B55) as either endangered, threatened, or species of special concern.

(16) "Low pressure sodium luminaries (LPS)" means an electric discharge lamp containing sodium, neon, and argon, that when illuminated appears orange in color, and under which colors are indiscernible.

(17) "Marine turtle" means any marine-dwelling reptile of the families Cheloniidae or Dermochelyidae found in Florida waters or using the beach as nesting habitat, including the species: *Caretta caretta* (loggerhead), *Chelonia mydas* (green), *Dermochelys coriacea* (leatherback), *Eretmochelys imbricata* (hawksbill), and *Lepidochelys kempi* (Kemp's ridley). For purposes of this rule, marine turtle is synonymous with sea turtle.

(18) "Nest" means an area where marine turtle eggs have been naturally deposited or subsequently relocated.

(19) "Nesting season" means the period from May 1 through October 31 of each years, as defined by F.A.C. 62B 55.002(17) for all counties.

(20) "Nighttime" means the locally effective time period between sunset and sunrise.

(21) "Person" means individuals, firms, associations, joint ventures, partnerships, estates, trusts, syndicates, fiduciaries, corporations, and all other groups or combinations.

(22) "Pole lighting" means a light fixture set on a base or pole which raises the source of the light higher than twenty four inches (24") off the ground.

(23) "Shield" means a covering, canopy, or other such device fitted over and extended below an artificial light source.

(24) "Tinted glass" means any glass treated to achieve an industry-approved, inside-to-outside light transmittance value of 45% or less. Such transmittance is limited to the visible spectrum (400 to 700 nanometers) and is measured as the percentage of light that is transmitted through the glass.

III PROHIBITION OF ACTIVITIES DISRUPTIVE TO MARINE TURTLES AND OTHER LISTED SPECIES

The following activities involving direct illumination of the beach shall be prohibited at nighttime on Gulf County Beaches, as defined in Sec. II.12 above, from May 1 through October 31 of each year for the protection of listed species, specifically marine turtle nesting females, hatchlings, and nests:

(1) The use of artificial lighting, including flashlights, to directly observe marine turtle nesting and hatching activities.

(2) Any transient lighting which purposely or flagrantly illuminates nesting sea

turtles or hatchlings such that it disrupts their behavior patterns.

IV STANDARDS FOR UTILITY LEASED LIGHTING

A. New Construction

Utility lighting will be constructed within the following guidelines:

(1) Distances Greater Than 300 ft. From The Mean High Water Mark: Cut-off HPS Luminaries, 150 watts or less; mounting height of 25ft or less. Where direct light source is visible by observer from beyond the frontal dune, a shield will also be installed.

(2) Distances Up to 300 ft From the Mean High Water Mark: Cut-off HPS Luminaries; 150 watts or less with amber filtered lens, mounting height of 25 ft or less. Where direct light source is visible by observer from beyond the frontal dune, a shield will also be installed.

B. Existing Lighting

Upon failure of existing fixtures, the utility will install replacement fixtures utilizing the following guidelines:

(1) Distances Greater Than 300 ft From The Mean High Tide Mark: Cut-off HPS Luminaries; 150 watts or less, mounting height of 25 ft or less. Where direct light source is visible by observer from beyond the frontal dune a shield will also be installed.

(2) Distance 100 ft -300 ft From The Mean High Tide Mark: Cut-off HPS Luminaries; 150 watts or less with amber filtered lens; mounting height of 25 ft or less. Where direct light source is visible by observer from beyond the frontal dune a shield will also be installed.

Upon an agreement between the FDEP, Fish & Wildlife, local county government and the utility, that an existing fixture is posing a significant threat, replacement will occur prior to failure.

V STANDARDS FOR NEW CONSTRUCTION ACTIVITIES (EXCLUDING UTILITY LEASED LIGHTING)

In order to provide the highest level of protection for nesting marine turtles, hatchlings, and other listed species, the following standards for artificial light sources on all new coastal construction within the Beaches of Gulf County as defined in Section II.12, above:

(1) Exterior artificial light fixtures shall be designed and positioned so that:

(a) The point source of light or any reflective surface of the light fixture is not directly visible from the beach.

(b) Areas seaward of the frontal dune are not directly or indirectly illuminated; and

(c) Areas seaward of the frontal dune are not cumulatively illuminated.

(2) Exterior artificial light fixtures within direct line-of-sight of the beach will be permitted only if designed and installed as follows:

(a) Completely shielded down light only fixtures or recessed fixtures having low wattage type bulbs and non-reflective interior surfaces are used. Other fixtures that have appropriate shields, louvers, or cutoff features may also be used if they are in compliance with subsection (1)(a), (b), and (c) above; 25 watts or less bug lights and

(b) All fixtures are mounted as low in elevation as possible through use of low-mounted wall fixtures, low bollards, and ground-level fixtures.

(3) Floodlights, up lights or spotlights for decorative and accent purposes that are directly visible from the beach, or which indirectly or cumulatively illuminate the beach, shall not be used.

(4) Exterior lights used expressly for safety or security purposes must comply with subsections 2(a) and (b) and shall be limited to the minimum number and configuration required to achieve their functional role(s). The use of motion detector switches that keep lights off except when approached and that switch lights on for the minimum duration possible are required.

(5) Only low intensity lighting shall be used in parking areas within line-of-sight of the beach. Such lighting shall be:

(a) Set on a base which raises the source of light no higher than 45 inches off the ground; and

(b) Positioned or shielded so that the light is cast downward and the source of light or any reflective surface of the light fixture is not visible from the beach and does not directly or indirectly illuminate the beach.

(6) Parking area lighting, and roadway lighting shall be shielded from the beach through the use of ground-level barriers. Ground-level barriers must not interfere with marine turtle nesting or hatchling emergence, or cause short or long term damage to the beach/dune system.

(7) Tinted glass shall be installed on all windows and glass doors of single or multi-story structures within line-of-sight of the beach.

(8) Use of appropriately shielded low-pressure sodium-vapor lamps and fixtures

shall be required for high-intensity lighting applications such as lighting parking areas and roadways, providing security, and similar applications.

(9) Lights on dune walkovers are prohibited seaward of the CCCL. Lights on the walkovers landward of the CCCL shall utilize low profile shielded luminaries directed and positioned so that the point source of light or any reflective surface of the light fixture is not directly visible to a person on the beach.

(10) Temporary lighting of construction sites during the marine turtle nesting season shall be required to abide by the standards of this section.

VI STANDARDS FOR EXISTING LIGHTING (EXCLUDING UTILITY LEASED LIGHTING)

In order to provide the highest level of protection for nesting marine turtles, hatchlings, and other listed species, the following standards for all existing artificial light sources, with the Gulf County Beaches as defined within Section II.12 above shall be brought into compliance by April 1, 2002.

(1) Existing artificial light fixtures shall be repositioned, modified, disconnected, or removed so that:

(a) The point source of light or any reflective surface of the light fixture is not directly visible from the beach.

(b) Areas seaward of the frontal dune are not directly or indirectly illuminated; and

(c) Areas seaward of the frontal dune are not cumulatively illuminated.

(2) Existing artificial light fixtures that are replaced for any reason shall comply with Section IV, Standards for New Construction Activities and the following measures taken:

(a) Reposition fixtures so that the point source of light or any reflective surface of the light fixture is no longer visible from the beach;

(b) Replace fixtures having an exposed light source with fixtures containing recessed light sources or shields;

(c) Replace non-directional fixtures with directional fixtures that point down and away from the beach;

(d) Replace pole lamps with low-profile, low-level luminaries so that the light source or any reflective surface of the light fixture is not visible from the beach;

(e) Replace incandescent, flourescent, and high intensity lighting with the lowest wattage low-pressure sodium-vapor lighting possible for the specific application;

(f) Plant or improve vegetation buffers between the light source and the beach to screen light from the beach;

(3) The following measures shall be taken as applicable to reduce or eliminate the negative effects of interior light emanating from doors and windows within line-of-sight of the beach:

(a) Apply window tint or film that meets the standards for tinted glass;

(b) Rearrange lamps and other moveable fixtures away from windows;

(c) Use window treatments (e.g., blinds, curtains) to shield interior lights from the beach; and

(d) Turn off unnecessary lights.

(4) Any and all lighting which fails to meet the requirements of Section VI as to standard for existing lighting shall be subject to termination of lighting pending full compliance.

VII PUBLIC AWARENESS

Any person submitting an application for coastal construction activities within the jurisdictional boundaries of Gulf County shall be informed of the existence of and the requirements concerning artificial lighting and marine turtle protection by the Gulf County Planning and Building Department.

VIII ENFORCEMENT AND PENALTIES

Upon notification, the Gulf County Code Enforcement Officer shall give notice to any person who violates this Ordinance by a certified letter/return receipt requested to the property owner's address listed at the Gulf County Tax Collector's Office for the location of the offending light. Such notice shall be provided within twenty-four (24) hours of the report of the disorientation event, or within forty-eight (48) hours of the report of the disorientation event if reported on the weekend. Additionally, in the event that the Code Enforcement Officer ascertains that the offending property is under the care of a rental (realty) agency or property manager, then and in that event, the Code Enforcement Officer shall provide to such rental agency a Notice of Violation letter within forty-eight (48) hours of the disorientation event. Further, in the event that the Code Enforcement Officer ascertains that the offending property is occupied, then and in that event, a copy of the Notice of Violation shall be provided to an occupant at the location of the offending light within twenty-four (24) hours of the report of the disorientation event, or within forty-eight (48) hours of the report of the disorientation event if reported on the weekend. Such letters shall describe the violation and shall enclose a brochure provided by the Department of Environmental Protection and a copy of this

Ordinance. Failure to correct any noticed violation within seven (7) days of the date of notice of such violation shall be punishable in the same manner as a misdemeanor punishable as provided by Section 125.69, Florida Statutes (2001). Each day of any such violation shall constitute a separate and distinct offense. The Florida Department of Environmental Protection, Gulf County Sheriff's Department, Florida Fish & Wildlife Conservation Commission, and Gulf County Code Enforcement officers shall have authority to enforce the Ordinance. Any person may exercise their right to report any and all violations of this Ordinance to the proper enforcement authorities. In addition to any other remedy herein set forth or otherwise provided by law, the County may restrain any violation of this Ordinance by suit in a court or administrative body of competent jurisdiction.

IX INTERPRETATION

The provisions of this Ordinance shall be liberally construed in order to effectively carry out its purpose. Where any provision of this Ordinance refers to or incorporates another provision, ordinance, statue, rule, regulation, policy, official publication, or other authority, it refers to the most current version, incorporating any amendments thereto or re-designation thereof

X SEVERABILITY

If any section, subsection, sentence, clause or provision of this Ordinance is held invalid by a court of competent jurisdiction, the remainder of this Ordinance shall not be affected.

XI EFFECTIVE DATE

This Ordinance shall take effect immediately upon its adoption.

Duly adopted by the Board of County Commissioners of Gulf County, Florida, this 11th day of September, 2001.

BOARD OF COUNTY COMMISSIONERS
GULF COUNTY, FLORIDA

By: Nathan Peters, Jr.
Nathan Peters, Jr. Chairman

ATTEST:

By: Douglas Birmingham, Clerk

CERTIFIED TRUE COPY
DOUGLAS C. BIRMINGHAM
CLERK OF COUNTY COURT
GULF COUNTY, FLORIDA
BY D.C.
DATE 9/24/01

ORDINANCE NO. 97-02

AN ORDINANCE OF GULF COUNTY, FLORIDA, ALLOWING FOR VEHICULAR TRAFFIC ON CERTAIN COASTAL BEACHES WITHIN GULF COUNTY, FLORIDA, REGULATING VEHICULAR TRAFFIC ALONG PUBLIC BEACHES OF GULF COUNTY, FLORIDA; PROVIDING FOR A PERMIT AND REQUIREMENTS TO OBTAIN THE SAME; PROVIDING FOR A PERMIT FEE; ESTABLISHING A SYSTEM FOR MONITORING THE ISSUANCE OF DECALS; ESTABLISHING THE FORMAT FOR DECALS; LIMITING AND DESIGNATING BEACH ACCESS POINTS; PROVIDING FOR A SPEED LIMIT; PROVIDING FOR RULES FOR OPERATION OF VEHICLES ON THE BEACHES; PROVIDING FOR A PENALTY FOR VIOLATION; PROVIDING A SEVERABILITY CLAUSE; REPEALING ALL ORDINANCES OR PARTS OF ORDINANCES GOVERNING, CONTROLLING OR RELATING TO THE SUBJECT MATTER ADDRESSED HEREIN; PROVIDING AN EFFECTIVE DATE.

WHEREAS, Gulf County, Florida contains many miles of beaches which are inaccessible to the public without the availability of vehicular traffic along those beaches; and

WHEREAS, The Gulf County Board of County Commissioners has found it necessary to regulate traffic along the beaches described in Section I of this Ordinance in order to protect and promote the health and safety of the citizens of this County and to protect the environment;

NOW, THEREFORE BE IT ORDAINED BY THE BOARD OF COUNTY COMMISSIONERS OF GULF COUNTY, FLORIDA:

SECTION 1:

It shall be unlawful for any person, firm, corporation, or other entity, to drive, or cause to be driven any vehicle on the following described beaches of Gulf County, in the State of Florida:

Those beaches fronting on the Gulf of Mexico, running from Indian Pass to the East to the T. H. Stone Park in the North. Said beaches lying and being in the following Sections: Section 25 and 36, Township 8 South, Range 12 West; Sections 1 & 12, Township 9 South, Range 12 West; Section 6, 7, 18, 19, 20, 21, 22, 23, 24, 28, 29 and 33, Township 9 South, Range 11 West; and Section 19, 20, 21, and 22, Township 9 South, Range 11 West.

unless said vehicle and driver have complied with the requirements of this Ordinance. Upon compliance with the registration requirements of this Ordinance, driving on the above described beaches shall be allowed subject to the restrictions of this Ordinance.

SECTION 2:

a. A vehicle is defined as any mode of transportation with two, three, four or any other number of wheels if propelled by power other than human muscular power. For the purposes of this Ordinance, the following vehicles as defined in Florida Statutes 320.01, are specifically prohibited

from driving on the beach; recreational vehicles, travel trailers, camping trailers, campers, motor homes, private motor coaches, conversion vans, tractor-trailers or semi-trailer, vehicles primarily designed as temporary living quarters for recreational, camping or travel use, either with motor power or mounted on or drawn by another vehicle.

b. Before any vehicle shall be allowed to operate on the beaches of Gulf County, Florida, in the above described area, a beach driving permit must be obtained for said vehicle.

c. Beach driving permits shall not be issued to any prohibited vehicle.

SECTION 3:

a. Beach driving permits shall be issued by the Tax Collector of Gulf County, Florida, at the Courthouse in Port St. Joe, Florida, during regular business hours.

b. Beach driving permits shall be issued for a period of one (1) year and shall thereafter expire unless expressly provided otherwise herein.

c. The beach driving permit shall cost the sum of $15.00 per year for Gulf County residents and or Gulf County property tax payers.

d. The beach driving permit shall cost the sum of $150.00 per year for Non-Gulf County residents, who own no real property in Gulf County.

e. A one time fee of $3.00 shall be charged individuals who are Gulf County Residents and either 65 years of age or older, or are handicapped citizens, resulting in issuance of a permit which shall not be required to be renewed.

SECTION 4:

A decal shall be provided with each Beach Driving Permit sold.

a. The decal system for vehicles permitted to drive on the beaches shall include the following:

(a) One decal shall be issued for each vehicle.
(b) The decal shall be of different colors based on the expiration date.
(c) The decal shall be numbered to provide for monitoring and accounting.
(d) The Gulf County Sheriff's office shall be notified of the number and name of lost or stolen decals.
(e) A replacement fee of $3.00 shall be charged for lost or stolen decals.
(f) The decal shall be affixed to the permitted vehicle on the vehicle's rear window on the driver's side. If no such space is available, the decal shall be otherwise conspicuously displayed on the vehicle.

SECTION 5:

Any individual applying for a permit must provide the following information:

a. Name.
b. Address.
c. Type of vehicle.
d. Tag number.
e. Valid drivers license.
f. Proof of Ownership of Vehicle

Each applicant shall sign the application and an accompanying statement of responsibility acknowledging the rules and regulations governing the operation of vehicles on the beaches of Gulf County, Florida, and agreeing to be bound by the terms and conditions thereof.

SECTION 6:

A pamphlet and copy of this Ordinance shall be provided with each permit sold stating the following rules which, by this Ordinance, are adopted by Gulf County, Florida:

a. Maximum speed allowed on the described beaches is to be 15 mph or such lesser speed as posted;

b. Pedestrians and pets shall have the right of way.

c. Driving in, on or over sand dunes is strictly prohibited.

d. Obtaining access to the above described beaches by a route other than a county designated beach access point is strictly prohibited.

e. Driving in, on or over vegetation is strictly prohibited.

f. No litter is to be left on the beaches; litter shall include, but not be limited to, fish bait, discarded fish or any other form of waste, whether taken from the gulf or removed from the vehicle.

g. The person to whom the permit is issued is responsible under this ordinance for the conduct of the occupants of his or her vehicle.

h. Reckless driving along the public beach as designated in this Ordinance is prohibited.

i. Any person driving or operating a vehicle on the public beaches as designated in this Ordinance must possess a valid drivers license.

j. Vehicles are prohibited from entering, driving or parking landward of the vehicular buffer zone on the beaches adjacent to the St. Joseph Bay Aquatic Preserve. This zone is designated

by signage which is physically located on the beach in the affected areas.

k. The public beaches adjacent to the Aquatic Preserve shall be closed to vehicular traffic on those days when extremely high tides make that beach impassable without travel over dunes or vegetation.

l. Vehicular driving is prohibited on the beaches adjacent to the Aquatic Preserve from May 1 until October 31 of each year during the time after Sunset and before Sunrise.

The Gulf County Tax Collector shall provide each purchaser of a permit with a map showing the beaches designated for permitted driving and the legal access points to the beaches described above.

SECTION 7:

Violation of this Ordinance shall be punishable as follows:

a. Driving on the beach without first having obtained a valid permit shall result in a fine of $250.00 for a first time offense. For a second offense, the fine shall be $350.00.

b. Racing vehicles on the beach or pulling skiers from any moving vehicle on land shall result in a $250.00 fine.

c. Production of any excess noise from any vehicle which shall disturb the peace shall result in a $250.00 fine. Failure of any vehicle to have proper mufflers, or having a muffler for which bafflers have been removed shall be prima facie evidence of violation of this Section.

d. Gaining access to the beaches by a route other than a designated legal access point shall result in a fine of $500.00 in addition to any other fines or penalties imposed pursuant to state law.

e. Any other violations of this Ordinance shall result in a $150.00 file for a first offense and a $250.00 fine for a subsequent offense.

f. Any permit holder accumulating three of more violations of this ordinance shall have his or her beach driving permit revoked and shall be thereafter ineligible to apply for or obtain any other Gulf County beach driving permit. An applicant whose rights have been affected by such a revocation may petition the Gulf County Commission for reinstatement.

SECTION 8:

If any provision of this Ordinance is held to be invalid or unconstitutional by any court of competent jurisdiction, the remainder of this Ordinance and the applications of the provisions to other persons not similarly situate shall not be affected thereby and shall remain in full force and effect.

SECTION 9:

All ordinances or parts of ordinances governing, controlling or relating to the subjects addressed herein are repealed upon the effective date of this ordinance, including, but not limited to, Gulf County Ordinance numbers 84-3, 87-3, 88-5, 89-5, 90-10, 90-14, 92-07, 94-11.

SECTION 10:

This Ordinance shall become effective as provided by law.

ADOPTED BY THE BOARD OF COUNTY COMMISSIONERS THIS 23rd DAY OF JUNE, 1997.

ATTEST:

Benny C. Lister

BENNY C. LISTER
Clerk

BOARD OF COUNTY COMMISSIONERS
GULF COUNTY, FLORIDA

BY: Nathan Peters, Jr.

NATHAN PETERS, JR.
Chairman

CERTIFIED TRUE COPY
DOUGLAS C. BIRMINGHAM
CLERK OF COUNTY COURT
GULF COUNTY, FLORIDA
BY Donna Kopensky D.C.
DATE 1/15/04

Appendix F

Management Coordination Network

Many federal, state, regional and local agencies have priority interest, land and wildlife management programs, research activities, construction activities, and regulatory programs existing within and adjacent to the St. Joseph Bay Aquatic Preserve. Listed below are some of these agencies/groups and their program involvement along with their contact information.

FEDERAL AGENCIES

National Oceanic and Atmospheric Administration

The National Oceanic and Atmospheric Administration (NOAA) is focused on the condition of the oceans and the atmosphere. It plays several distinct roles within the Department of Commerce with a broad mission.

Website http://www.noaa.gov/

To report wildlife harassment events call NOAA's Office of Law Enforcement 24-hour hotline: (800) 853-1964

NOAA National Marine Fisheries Service

The National Marine Fisheries Service is responsible for the management, conservation and protection of living marine resources within waters 3 to 200 miles offshore. Contact National Marine Fisheries Service to report marine mammal strandings.

Website http://www.nmfs.noaa.gov/
Panama City Field Office (850) 234-5061

U.S. Army Corps of Engineers

The U.S. Army Corps of Engineers regulates activities in waters and wetlands under four separate, but related laws and their subsequent amendments: Rivers and Harbors Act of 1899, federal Water Pollution Act of 1972, Clean Water Act of 1977, and Marine Protection, Research, and Sanctuaries Act of 1972.

Website http://www.usace.army.mil/
General Questions (202) 761-0011
Emergency Response (202) 761-1001

U.S. Coast Guard

The U.S. Coast Guard is charged with the protection of the nation's coastline. In the aquatic preserve, the Coast Guard is involved in the regulation of boating safety, search and rescue, the surveillance of narcotics contraband, and plays a primary role in spill control in coastal areas. Additionally, the Coast Guard regulates the construction of structures, such as bridges, causeways, and aerial utilities, which may pose navigation hazards, and oversees safety issues associated with commercial navigation.

Website http://www.uscg.mil/
Telephone (251) 471-5966

U.S. Environmental Protection Agency

The U.S. Environmental Protection Agency is responsible for the control and abatement of six types of pollution: air, water, noise, solid waste, toxic waste, and radiation. The Florida Department of Environmental Protection (DEP) is the state agency responsible for pollution control in Florida in conjunction with the federal program.

Website http://www.epa.gov/
Telephone (800) 241-1754

U.S. Fish and Wildlife Service

The U.S. Fish and Wildlife Service has responsibility for the protection and conservation of federally listed, endangered and threatened species.

Website http://www.fws.gov/
Telephone (800) 344-WILD

STATE AGENCIES

Florida Department of Environmental Protection

DEP has the authority to regulate air, water, noise, wastewater, stormwater, and hazardous waste pollution through a permitting and certification process. DEP aquatic preserve staff review and provide comments on proposed projects that may have potential environmental impacts to the preserve habitat, but do not have enforcement authority.

DEP's six regulatory district offices ensure statewide compliance with department rules. Most department permits are issued from the district offices. District staff is available to answer environmental questions and assist the public and local governments. Each district office is under the charge of a director of district management, who reports directly to the Deputy Secretary for Regulatory Programs.

The **Northwest District Office** includes Gulf County.

160 Governmental Center
Pensacola, Florida 32502-5794
(850) 595-8300 / SC 695-8300
Fax (850) 595-8417 / SC Fax 695-8417
http://www.dep.state.fl.us/northwest/

Branch Offices

Northwest District Branch Office
2815 Remington Green Circle, Suite A
Tallahassee, Florida 32308-1513
(850) 488-3704 / SC 278-3704
Fax (850) 922-3620 / SC Fax 22-3620

Northwest District Branch Office
2353 Jenks Avenue
Panama City, Florida 32405
(850) 872-4375 / SC 777-4375
Fax (850) 872-7790 / SC Fax 777-7790

- ***DEP Bureau of Beaches and Coastal Systems***
  The Bureau of Beaches and Coastal Systems is responsible for managing erosion control, hurricane protection, coastal flood control, shoreline and offshore rehabilitation, and the regulation of work and activities likely to affect the physical condition of the beach and shore.

  Website http://www.dep.state.fl.us/
  Telephone (850) 245-2118

- ***DEP Division of Law Enforcement***
  To report environmental crimes, call 1-877-272-8335 (1-877-2 SAVE FL) Wireless customers can dial #DEP

  Website http://www.dep.state.fl.us/law/Environmental_crimes.htm

Florida Fish and Wildlife Conservation Commission

The Florida Fish and Wildlife Conservation Commission (FWC) is responsible for reviewing projects which may affect local fish and wildlife habitat. FWC is the state coordinator of the Non-Game Wildlife and Endangered Species Program in Florida. The Marine Patrol regulates and enforces safe boating laws and enforces all commercial and recreational fishing laws.

Website http://myfwc.com/

To report live/dead marine mammals or turtles on the beach, fish kills, red tide events, or any other wildlife related activity please call FWC's 24-hour Wildlife Alert Number at (888) 404-FWCC (3922) or the Central Panhandle Aquatic Preserve Office at (850) 670-4783 x 104.

Florida Department of Community Affairs

The Florida Department of Community Affairs (DCA) is responsible for coordinating Developments of Regional Impact, designating Areas of Critical State Concern, and overseeing the local planning process. The DCA also oversees the development of local government comprehensive plans for counties and municipalities. Local governments are required to adopt land development regulations which are consistent with the adopted local comprehensive plan within one year after submission of their plan for review and approval by the DCA.

Website http://www.dca.state.fl.us/
Telephone (800) 226-4329

Florida Department of Agriculture and Consumer Services

The Florida Department of Agriculture and Consumer Services (DACS) is responsible for the classification and management of shellfish harvesting areas. DACS performs four primary tasks: conducting shoreline surveys to locate and evaluate potential pollution sources; establishing and monitoring water quality monitoring stations; red tide monitoring, and; managing shellfish harvesting areas for the purpose of protecting public health. DACS plays a key role in the regulation of aquaculture facilities and

shellfish processing plants, is responsible for opening/closing of shellfish harvesting waters to protect human health, ensures the continued productivity of oyster reefs through a restoration program and issues leases of submerged state lands for aquaculture.

Website http://www.doacs.state.fl.us/
Telephone (850) 488-3022

Florida Department of State

The Florida Department of State, Division of Historical Resources has responsibility for protecting archaeological and historical sites. This includes cultural resources located on state-owned sovereignty submerged lands.

Website http://www.dos.state.fl.us/
Telephone (850) 245-6500

Florida Department of Transportation

The Florida Department of Transportation (DOT) is responsible for the planning and construction of state roads in Gulf County.

Website http://www.dot.state.fl.us/
Telephone (866) 374-FDOT

Gulf County Health Department

The mission of the Gulf County Health Department (DOH) shall be to promote and protect the health and safety of all the people in Gulf County Florida through the establishment and maintenance of high quality standards for the public health environment and the delivery of public health services

Website http://www.doh.state.fl.us/chdGulf/EH/service1new.htm

Telephone (850) 227-1726

Healthy Beaches Program

Website http://esetappsdoh.doh.state.fl.us/irm00beachwater/default.aspx
Telephone (850) 245-4240

Toll-free Aquatic Toxins Hotline at (888) 232-8635.

The DOH, DEP, and FWC operate jointly to determine if environmental chemicals are present in fish from Florida waters. In most instances FWC determines what fish species should be sampled and collects those samples. DEP measures the levels of chemicals in the fish tissue. DOH determines the potential for adverse human health effects from consuming the fish and issues fish consumption advisories when needed.

http://www.doh.state.fl.us/environment/community/fishconsumptionadvisories/Fish_consumption_guide.pdf

REGIONAL AGENCIES

Northwest Florida Water Management District

The Northwest Florida Water Management District (NWFWMD) stretches from the St. Marks River Basin in Jefferson County to the Perdido River in Escambia County. The district is one of five water management districts in Florida created by the Water Resources Act of 1972. The district has worked for decades to protect and manage water resources in a sustainable manner for the continued welfare of people and natural systems across its 16-county region. The NWFWMD serves Bay, Calhoun, Escambia, Franklin, Gadsden, Gulf, Holmes, Jackson, Leon, Liberty, Okaloosa, Santa Rosa, Wakulla, Walton, Washington and western Jefferson counties. The goals of the district are to ensure an adequate supply of water for all reasonable and beneficial purposes through the promotion of conservation, resource protection and development of alternative supplies; to provide for the protection and enhancement of natural systems through integrated land and water resource management programs; to minimize harm from flooding and otherwise protect the health, safety and welfare of the residents of the region; to protect, maintain and improve the quality of the water resource; to enhance public awareness, understanding and participation in comprehensive water resource management; and to develop the district's overall water management capabilities, expertise and abilities to provide technical assistance for local needs.

Website http://www.nwfwmd.state.fl.us/

LOCAL GOVERNMENT

City of Port St. Joe

Website http://www.cityofportstjoe.com/

Gulf County

Website http://www.gulfcountygovernment.com/

CITIZEN SUPPORT ORGANIZATIONS/NONPROFITS

Apalachicola Riverkeeper

The Riverkeeper monitors the Apalachicola River from the upper reaches at the Florida/Georgia line downstream 108 miles, through the middle reaches around Wewahitchka, to the estuary and bay on the Gulf.

Website http://www.apalachicolariverkeeper.org/

Friends of the St. Joseph Bay Preserves

See Section 3.1.5

Website http://www.stjosephbaypreserves.org

Gulf County Conservation Association

Gulf Coast Conservation Association, Inc. (GCCA) is a Florida nonprofit corporation operated exclusively for public charitable, conservation, and educational purposes. The objective of GCCA is to heighten public awareness and knowledge of the natural resources of the Florida Panhandle Gulf coast, the beaches and St. Joseph Bay, and to encourage conservation of these valuable natural resources.

Website http://www.gccaturtles.org

The Nature Conservancy

The Nature Conservancy's (TNC) mission is to preserve the plants, animals and natural communities that represent the diversity of life on Earth by protecting the lands and waters they need to survive. TNC has developed a strategic, science-based planning process, called Conservation by Design, which helps to identify the highest-priority places—landscapes and seascapes that, if conserved, promise to ensure biodiversity over the long term.

Website http://www.nature.org/wherewework/northamerica/states/florida/

St. Joseph Bay Aquatic Preserve

Management Plan • September, 2008 - August, 2018

St. Joseph Bay Aquatic Preserve
350 Carroll Street • East Point, FL 32328
850-670-4783

Florida Department of Environmental Protection
Coastal and Aquatic Managed Areas
3900 Commonwealth Blvd., MS #235
Tallahassee, FL 32399 • aquaticpreserves.org