Terra Ceia Aquatic Preserve

Management Plan • April, 2007

Florida Department of Environmental Protection
Coastal and Aquatic Managed Areas

Draft 070330

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Florida Department of Environmental Protection
Coastal and Aquatic Managed Areas
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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, three 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.

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Executive Summary

Terra Ceia Aquatic Preserve Management Plan	
Lead Agency	Florida Department of Environmental Protection Office of Coastal and Aquatic Managed Areas
Common Name of Property	Terra Ceia Aquatic Preserve
Location	Manatee County, Florida
Acreage Total	Approximately 21.736
Acreage Breakdown	
Natural Communities	Acreage according to GIS
Beach Dune	
Coastal Berm	
Seagrass Bed	
Tidal Marsh	
Tidal Swamp	
Mollusk Reef	
Total acreage	Unknown, resource inventories still pending
Management Agency	DEP/CAMA
Designation	Aquatic Preserve
Unique Features	Terra Ceia has some of the most diverse hardbottom habitat in Tampa Bay. Regionally-significant bird nesting sites are located in Terra Ceia Bay.
Archeological/Historical	The adjacent uplands are rich on pre-Columbian archaeological sites. Submerged sites are likely.
Management Needs	Emphasis is placed on protection of relatively pristine submerged habitats. Restoration needs are in small areas.
Ecosystem Science	Building on the research begun in the five year USGS Tampa Bay study is planned.
Resource Management	Balancing increasing access and development with resource protection will be challenging.
Education & Outreach	Efforts will be concentrated at access points, unless an interpretive facility is available.
Public Use	Boat access is a major issue at Terra Ceia, as well as in southeast Tampa Bay.
Public Involvement	Information not available

Coastal Zone Management Issues - Historically, Terra Ceia has remained pristine by virtue of its remote location and limited access. Shoreline development and demand for increased access will raise issues seen in more urban areas of Tampa Bay. Baseline information on resources and water quality, as well as ongoing monitoring, will be key to identifying and addressing issues.

Goals - Using scientifically-derived information, preserves staff will address resource protection issues through partnerships and public engagement/education. Trends in water quality improvement will be maintained, disturbances to habitats and wildlife will be minimized, and environmentally-sound access will be accommodated

CAMA / BTITIF Approval			
CAMA approval date:	Insert date	**BTIITF approval date:**	Insert date
Comments:			

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Butterfly orchids bloom on overhanging branches.

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 (FDEP) Office of Coastal and Aquatic Managed Areas (CAMA) as part of a network that includes forty-one Aquatic Preserves, three National Estuarine Research Reserves (NERR), a National Marine Sanctuary (NMS), the Coral Reef Conservation Program (CRCP), and the Florida Oceans and Research 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.

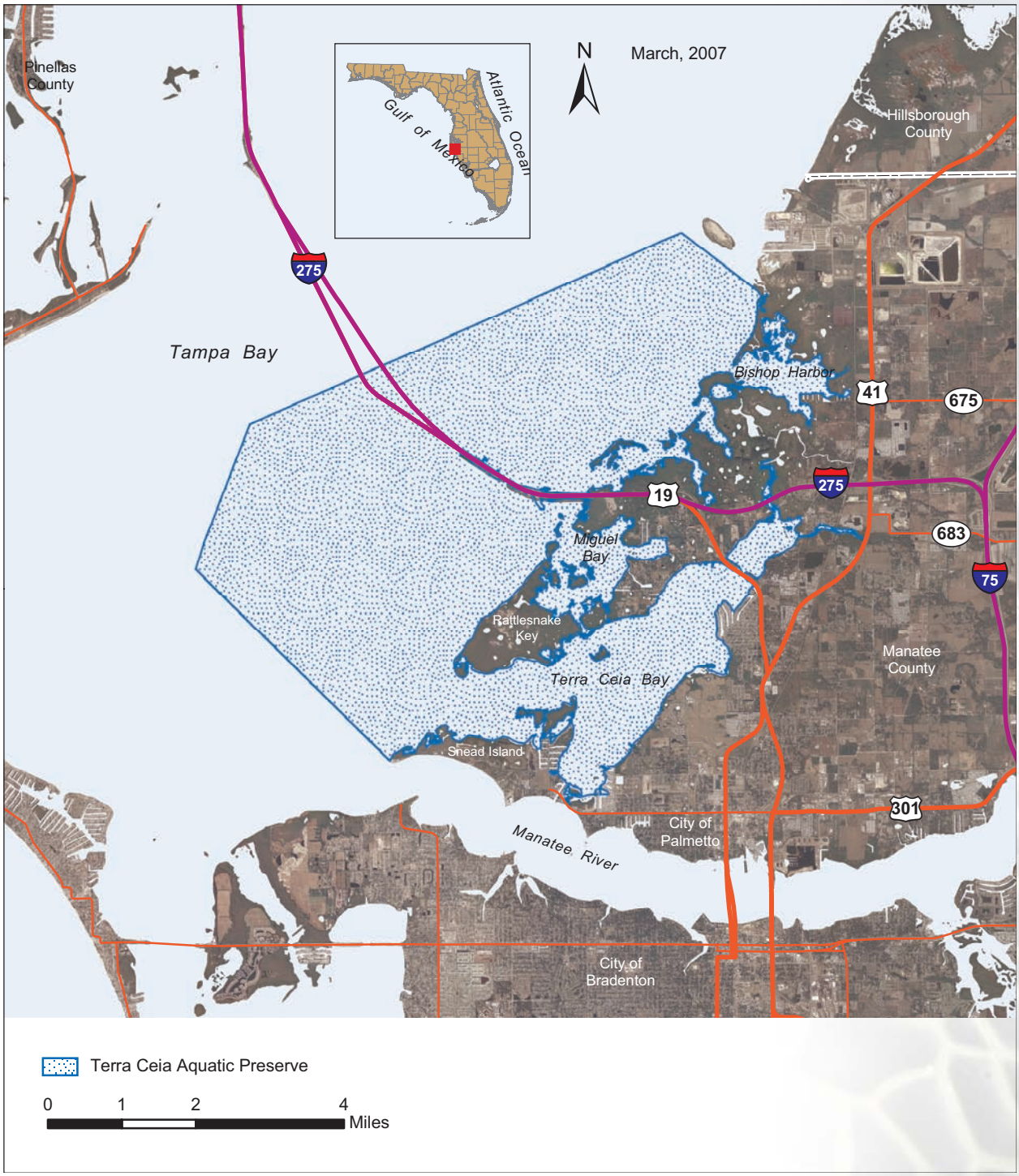
Title to submerged lands not previously conveyed to private landowners is held by the Board of Trustees of the Internal Improvement Trust Fund (the Trustees). The Governor and Cabinet, sitting as the Trustees, act as guardians for the people of the State of Florida (§253.03, Florida Statutes [F.S.]) and regulate the use of these public lands. Through statute, the Trustees have the authority to adopt rules related to the management of sovereignty (Florida Aquatic Preserve Act of 1975). 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 Resources Council was created 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.

Map 1 / CAMA System Map

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.



Map 2 / Terra Ceia Aquatic Preserve

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 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 utilized 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 in the site and the management strategies developed to respond to those conditions. To aide 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

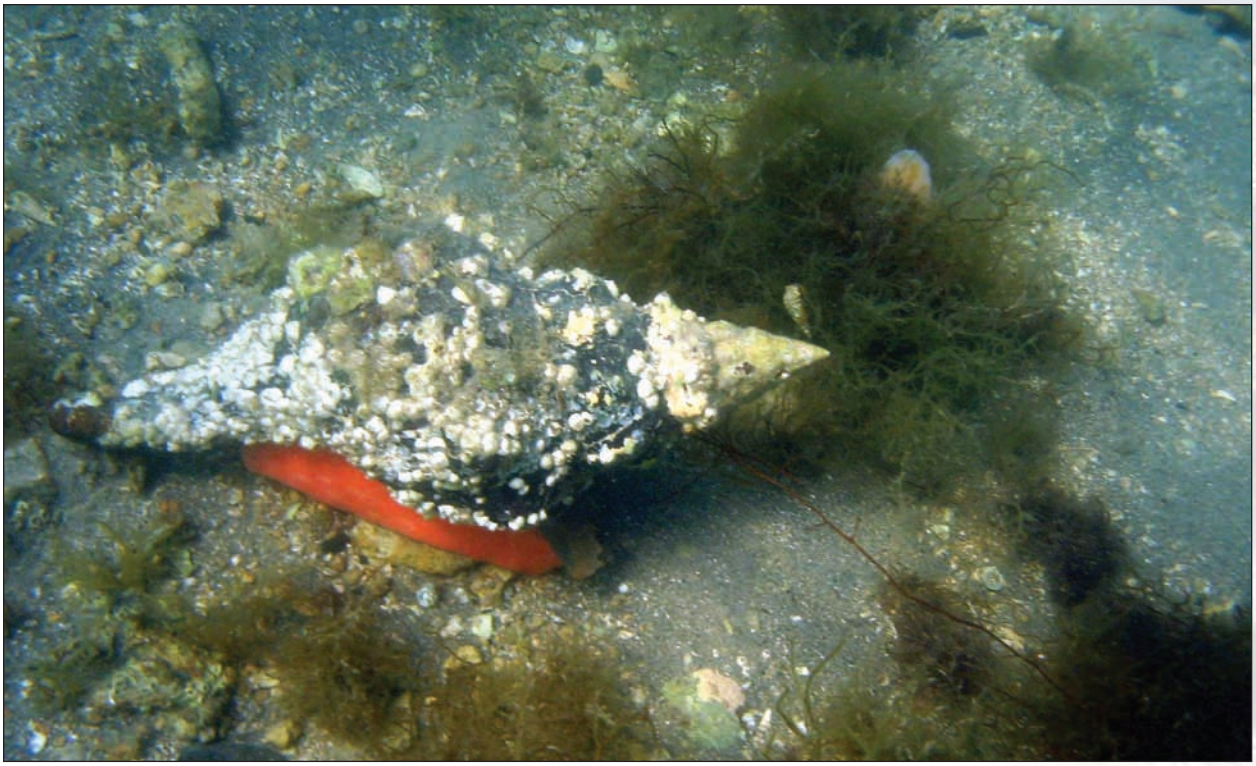
In addition, unique local and regional issues are identified, and goals, objectives, and strategies are established to address these issues. Finally, the program and facility needs to meet these goals are identified. These components are all key elements in an effective coastal management program and 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 organize an advisory committee comprised of key stakeholders. Next, staff advertise and conduct a public meeting(s) to receive input from stakeholders on the concerns and perceived issues affecting each of the sites. This input is utilized in the development of a draft management plan that is reviewed by CAMA staff and the advisory committee. After the initial reviews, the staff advertise and conduct, in conjunction with the advisory committee, a second public meeting(s) 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 Florida horse conch is one of several large snails commonly found in the preserve and its shells are often found in pre-Columbian archaeological sites.

Chapter Two

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

2.1 / ***Introduction***

The FDEP protects, conserves, and manages Florida's natural resources and enforces the State's environmental laws. The FDEP 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 FDEP 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.

CAMA is the unit within the FDEP that manages more than four million acres of submerged lands and select coastal uplands. This includes forty-one Aquatic Preserves, three NERRS, the Florida Keys National Marine Sanctuary (FKNMS) and the CRCP. The three NERRs, the FKNMS, 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 rampant dredge and fill activities that occurred in the late 1960s spawned this widespread public concern. In 1966, 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, 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 (IAC) 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 IAC issued a report recommending the establishment of twenty-six Aquatic Preserves.

The Trustees acted on this recommendation in 1969 by establishing sixteen 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, 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.

Originally adopted by the Trustees in 1981, 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. CAMA's management plans must be consistent with the Conceptual State Lands Management Plan.

Through delegation of authority from the Trustees, the FDEP 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 holds 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, FDEP law enforcement, and local law enforcement agencies. Enforcement of administrative remedies rests with CAMA, the FDEP Districts, and Water Management Districts (WMD).

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 FDEP 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 FDEP Districts (in addition to the WMDs and the Division of Aquaculture in the Florida Department of Agriculture and Consumer Services (FDACS)), which grant regulatory permits and--through delegated authority from the Trustees--proprietary authorizations for certain public and private uses within the Aquatic Preserves. 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.

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 will require a letter of consent, a lease, an easement, or other approval from the Trustees.

Preserves staff use accurate GPS technology to map resources.

Many provisions of the Florida Statutes that empower non-CAMA programs within FDEP or other agencies may be important to the management of CAMA sites. For example, Chapter 403, F.S., authorizes FDEP to create rules concerning the designation of "Outstanding Florida Waters" (OFW), a designation program that provides Aquatic Preserves with additional regulatory protection. Chapter 370, F.S., regulates saltwater fisheries, including the use of submerged lands for aquaculture, and provides enforcement authority and powers for law enforcement officers within the Florida Fish and Wildlife Conservation Commission (FWC). 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.

*2.5 / **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.

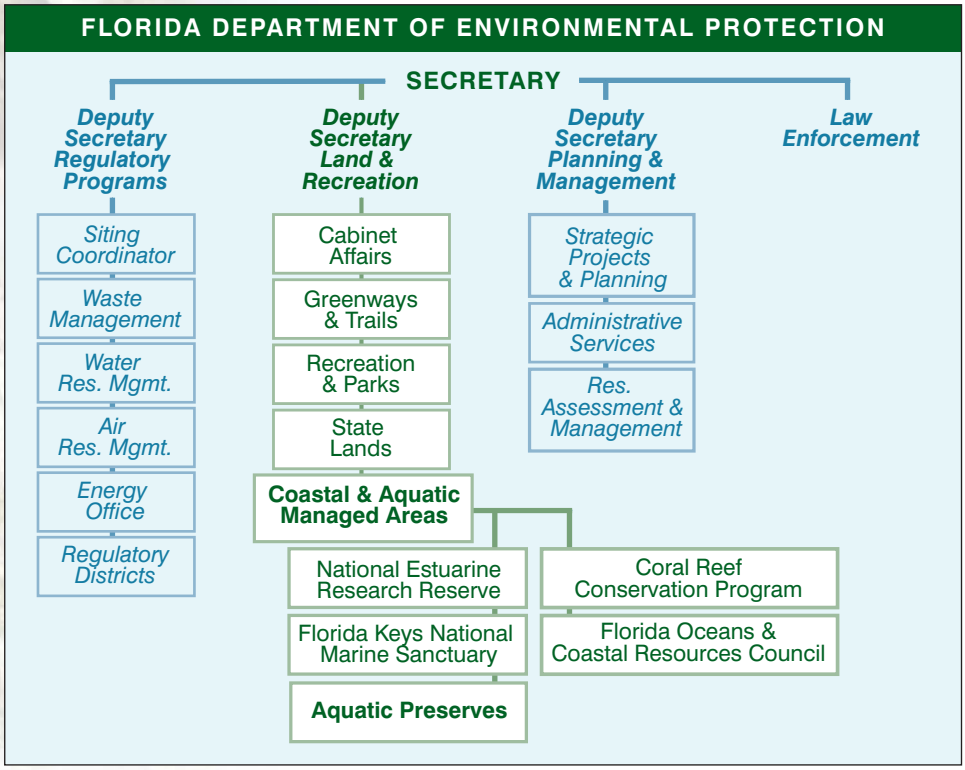


Figure 1 / State Structure for Managing Aquatic Preserves

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, board walks, 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, 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 FDEP 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.

Conservation of adjacent upland areas is important to the health of the aquatic preserve.

Chapter Three

The Terra Ceia Aquatic Preserve

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

3.1.1 / Historical Background

The earliest archaeological evidence of human use of the Terra Ceia Aquatic Presrve area dates to about 8,000 BC and was recovered from spoil dredged from Terra Ceia Bay. Subsequent aboriginal occupations produced shell middens and mounds dating from 500 BC to the late 1400's. Sixteenth century explorers, including Narvaez and Desoto, found the Tampa Bay region settled by the Tocobaga, Pooy, Uzita, Yagua and Neguarete Indians.

After the virtual extinction of the Florida natives by the mid-1700's, Creek Indians from Georgia and Alabama, who later became known as Seminoles, moved south into the state, and the Tampa Bay area saw limited use as their hunting territory. Even though most of their operations centered on Charlotte Harbor, Cuban fishermen also established seasonal, shoreline camps around Tampa Bay. Under the Armed Occupation Act of 1842, homesteaders began to claim the land in the area south of the Fort Brooke (Tampa). Arriving on April 12, 1843, by way of Tampa, Joseph and Julia (Madam Joe) Atzeroth, along with their daughter Eliza, established a claim on Terra Ceia Island, not far from the camp of Miguel Guerero, a Cuban fisherman after whom Miguel Bay is named. They were the first permanent settlers on Terra Ceia Island. By the 1880's farming was well established in the area. The majority of the uplands surrounding the TCAP were historically farmed for vegetable and citrus crops, and were later the birthplace of the Florida gladiolus industry

In the late 1880's, pebble phosphate deposits were discovered in the Peace River, then later in Polk County. Much of the acreage surrounding the TCAP was purchased by phosphate speculators, who found no significant deposits. Phosphate extraction elsewhere and its shipment became a major economic focus and an incentive for construction of both railroad and port facilities. In 1966, Borden Chemical Company constructed the now defunct Piney Point phosphate plant. In 1969, a 40 ft deep channel was extended from the Tampa Bay shipping channel to Port Manatee. This channel separates the Terra Ceia and Cockroach Bay Aquatic Preserves. (Burger, BW, 1982; Terra Ceia Aquatic Preserve Management Plan, 1987; http://www.baysoundings.com/sum02/pineypt.html)

3.1.2 / General Description

The Terra Ceia Aquatic Preserve is located in northwest Manatee County near the mouth of Tampa Bay. Situated on either side of the Sunshine Skyway, the preserve is central to the Bradenton – St. Petersburg – Tampa area. The preserve is comprised of an area of state-owned submerged lands totaling 21,736 acres of predominately pristine submerged and wetland areas within Tampa Bay, Terra Ceia Bay, Miguel Bay, Joe Bay, Bishop Harbor and tidal waters of all tributaries including Frog Creek/Terra Ceia River and McMullen Creek. It has open water, several inlet bays, and tidally influenced creeks and rivers and contains a diverse variety of natural communities, including seagrass, mangroves, saltmarsh, tidal flats, hard bottom, oyster bars and clam beds.

International/National/State/Regional Significance - The Terra Ceia Aquatic Preserve is in close proximity to other publicly owned sites, including the Terra Ceia State Buffer Preserve Park, Emerson Point Nature Park, the Madira Bickel Mound State Archaeological Site, Port Manatee. The National Audubon Society's Washburn Sanctuary, a colonial rookery, on Bird Key is within the preserve. The TCAP is also adjacent to and within a Strategic Habitat Conservation Class 3 Area as designated by the Florida Game and Freshwater Fish Commission. [Land Management Plan for the Terra Ceia State Buffer Preserve, 2001]

Location/Boundaries - The Terra Ceia Aquatic Preserve is located entirely within Manatee County. The preserve boundary begins just south of the mouth of Little Redfish Creek and ends at Emerson Point on Snead Island. The boundary extends northwesterly from these points out to the Manatee-Hillsborough County line and the Intracoastal Waterway, respectively, which then cross and form the outer most corner of the preserve. With the exception of the City of Palmetto and the Palmetto Point sub-division, most of the adjacent uplands are within the Terra Ceia Florida Forever Project. Bishop Harbor, Clambar and Williams Bayou and the Terra Ceia River are bordered by state-owned uplands. Palmetto is the only incorporated city bordering the preserve.

3.1.3 / Resource Description

Surrounding Population Data and Future Projected Changes - The majority of the Terra Ceia Aquatic Preserve is adjacent to uplands in unincorporated Manatee County. As of 2000, the population for the county was 264,002. The U.S. Census Bureau 2005 estimate for the county was 306,779. This was an increase of 16.2% from the 2000 census. A portion of the preserve is adjacent to the City of Palmetto. As of 2000, the population for the city was 12,571. The estimated population in July 2005 was 13,510. This was an increase of 7.5%. The population change in the 1990's for Palmetto was an increase of 2,837 people or 29.1%.

The following are the demographics for the city of Palmetto, which reasonably reflect those affecting the aquatic preserve. As of the census of 2000, the population density was 2,912.9 / mi^2 (1,123.5/ km^2). The racial makeup of the city was 59.3% White Non-Hispanic, 26.7% Hispanic, 12.8% African American, 8.8% from other races, 2.2% from two or more races, and 1% from Native American. The number of males was 6,292 (50.1%), femailes 6,279 (49.0%). There were 4,448 households out of which 28.1% had children under the age of 18 living with them. The average household size was 2.57 and the average family size was 3.07. The population was spread out with 26.3% under the age of 18, 8.9% from 18 to 24, 24.7% from 25 to 44, 20.2% from 45 to 64, and 19.9% who were 65 years of age or older. The median age was 37 years. [Source: http://www.city-data.com/city/Palmetto-Florida.html]

Topography and Geomorphology - The Terra Ceia Aquatic Preserve has open water, several inlet bays, and tidally influenced creeks and rivers. Inlet bays include Bishop Harbor, Miguel Bay and Terra Ceia Bay. Within Bishop Harbor, two additional inlets can be found: Williams and Clambar Bayous. Miguel Bay is formed from the mainland and Rattlesnake Key. The largest inlet, Terra Ceia Bay is bisected by the US 19 bridge. The open water of the preserve is also bisected by the Sunshine Skyway and its southern causeway approach. The Terra Ceia River / Frog Creek and McMullen Creek provide freshwater to the system. The tidally influenced portions of these waterbodies are part of the preserve.

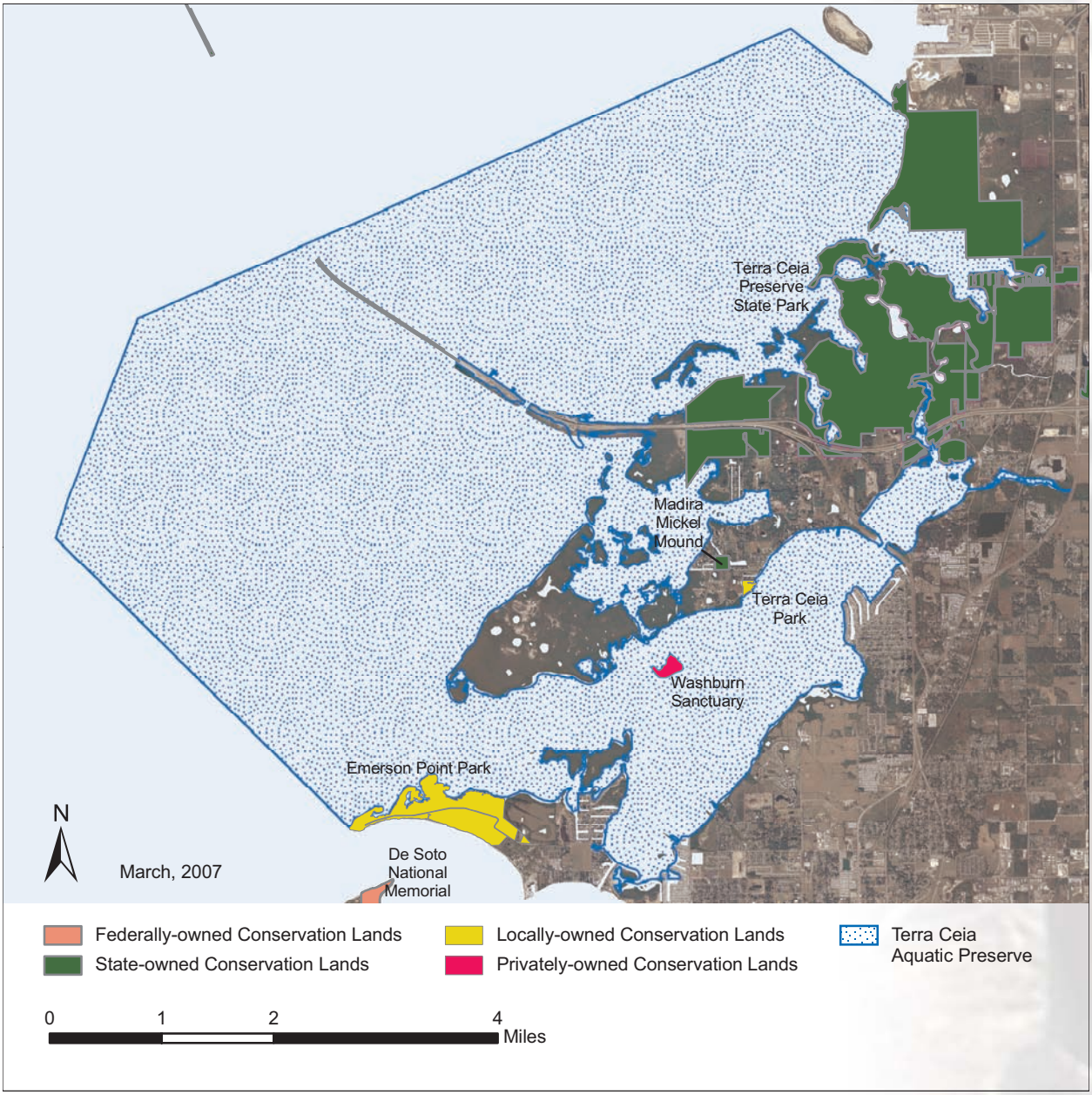
Bishop Harbor is located in the north portion of the preserve and is a large,1½ + miles long, bay-like waterbody with depths of -1 to -5 ft NGVD. The substrate is sandy / organic. Hell's Half Acre is a shallower waterbody with a prevalence of small mangrove islands formed off Bishop Harbor to the north.

Williams Bayou and Clambar Bay are finger-like lagoons, approximately one to one-half miles long. They are located between Joe's Island and Mariposa Key on the west coast of the preserve. Depths

range from -3 feet NGVD in Williams Bayou to -5 feet NGVD in Clambar Bay. Both have sand/silt substrates, but Clambar has an additional organic component.

With the exception of the open water of Tampa Bay, Terra Ceia Bay is the largest waterbody in the aquatic preserve boundary. It spans approximately 6 miles long and one mile at its widest point. Bay channel depths are -5+ feet NGVD, with surrounding depths of -1 to -3 NGVD. Silty sands with some organics comprise the substrate.

With its mouth located at the northern terminus of Terra Ceia Bay, the Terra Ceia River / Frog Creek extends in a north/northeast direction for approximately two miles, then continues east approximately five miles. The tidally influenced portion of the river is part of the aquatic preserve. The headwaters appear to be a wetland complex located north of Moccasin Wallow Rd. Cabbage Slough, Buffalo Canal, and Cedar Drain are channelized systems which drain into Frog Creek. These systems efficiently drain large agricultural areas. The creek banks are incised and lack a developed floodplain. Depths range from -1 to-3 feet NGVD in the lagoons, to -2- to -6 feet NGVD in the creek proper. A few lagoons branch off from the creek in estuarine waters, and are characterized by shallow depths, mangrove perimeters, and hammock ridges. Looking at aerial photographs, the lagoons appear to be karst formations which have been connected to the main waterway. [Land Management Plan for the Terra Ceia State Buffer Preserve, 2001]



Map 3 / Conservation Lands near Terra Ceia Aquatic Preserve

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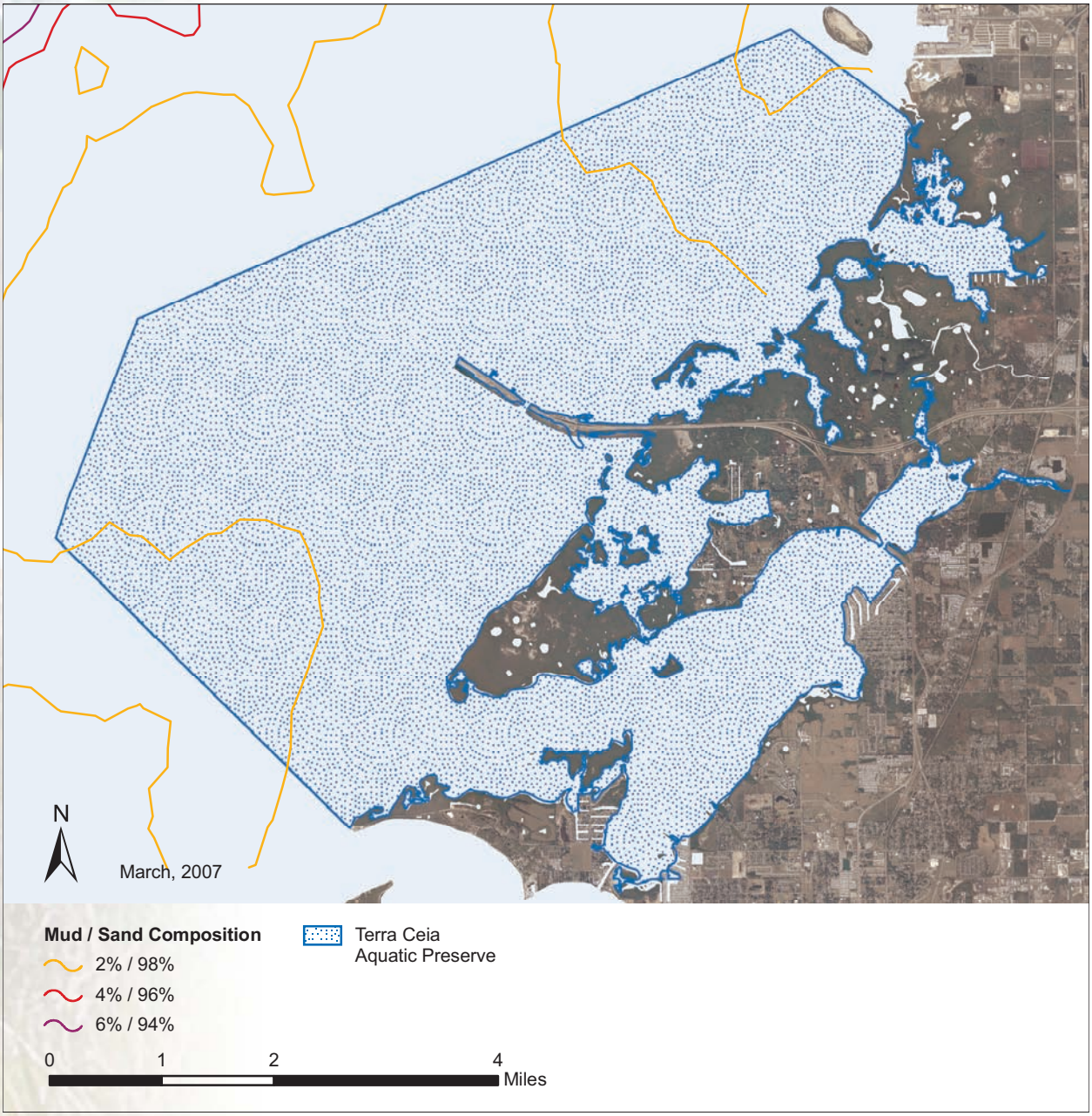
Geology - Like most estuaries, Tampa Bay is a product of the fluctuations in sea level caused by glaciation. During times of lowered sea level, the river valley of Tampa Bay was cut into underlying limestones by its tributary rivers. As sea level rose during glacial retreat, the area was flooded and became Tampa Bay. Underlying Tampa Bay are limestones and dolomites. The Hawthorn formation, a gray-greenish clay layer, is present at the surface throughout two-thirds of Tampa Bay, including the TCAP. The Hawthorn formation is apparently only moderately thick to thin in some portions of the preserve which is evident by the occurrence of hard bottom communities off Rattlesnake Key and by the approximately 50 karst depressions located in the buffer preserve.

Surface sediments are composed of fine to very fine quartz sand with varying amounts of organic muds and coarse carbonates, mostly in the form of mollusk shells. A band of phosphate-bearing runs parallel to the shore of the TCAP. The sand side sediments in Tampa Bay were probably derived from the major river tributaries during the last rise in sea level. At the present time, essentially no sand size material is being added to the system from the rivers but input from the Gulf of Mexico may occur in the Terra Ceia area. Streams carry only small loads of fine sediments but it may be that considerable amounts of fine materials are added through surface runoff. As development in the area increases, the contribution of fine silt materials into the TCAP will also increase. (Terra Ceia Aquatic Preserve Management Plan, 1987)



Map 4 / Sediments of Terra Ceia Aquatic Preserve

Hydrology and Watershed

Outstanding Florida Waters (OFW) Designation - Outstanding Florida Waters are defined as waters designated by the Environmental Protection as worthy of special protection because of their natural attributes. FDEP affords the highest protection to these waters. No degradation of water quality, other than that allowed by rule, is to be permitted. Terra Ceia Aquatic Preserve was designated as an Outstanding Florida Water on May 22,1986.

Shellfish Harvesting: Class II waterbody - Water quality in Class II waters is protected to provide for shellfish propagation or harvesting in addition to recreation, and propagation and maintenance of fish and wildlife. The areas under Class II designation have been classified as conditionally approved, except for those waters in Bishop Harbor, Miguel Bay and Terra Ceia Bay which have been classified as prohibited.

Climate - The following information is for the City of Palmetto, which reasonably reflect those affecting the aquatic preserve. The average low temperature is 61° and generally occurs in January; the average high is 82° and occurs in July/August. The average low precipitation is 2" in April; the average high is 9" in August. The average low wind speed is 6.9 mph and occurs in July; the average high is approx. 9.5 mph in March. The Gulf of Mexico significantly affects the climate of the area. Summer thunderstorms are frequent. The Palmetto-area historical tornado activity is slightly above Florida state average. It is 87% greater than the overall U.S. average. [Source: http://www.city-data.com/city/Palmetto-Florida.html]

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 Environmental Protection. 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 and FDEP, 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.5 provides a full explanation of the FNAI Community Types and the ranking system.

FNAI Natural Community Type	# Acres	%of Area	Federal Rank	State Rank	Comments
Tidal Swamp	Unknown	Unknown	G3	S3	
Seagrass Bed	3417		G4	S4	
Algal Bed	Unknown	Unknown	G2	S2	
Composite Substrate	Unknown	Unknown	G3	S3	
Consolidated Substrate	Unknown	Unknown	G3	S5	
Unconsolidated Substrate	Unknown	Unknown	G3	S3	
Mollusk Reef	Unknown	Unknown	G2	S1	
Octocoral Bed	Unknown	Unknown	G2	S2	
Sponge Bed	Unknown	Unknown	G3	S2	
Tidal Marsh	Unknown	Unknown	G3	S3	

Table 1 | Summary of Natual Communities on Terra Ceia Aquatic Preserve

The marine and estuarine communities in the Terra Ceia Aquatic Preserve are ecologically important as wildlife habitat, storm protection and land stabilization. Mangrove communities are abundant, hosting all four species of mangroves (red, black, white, and buttonwood). Worth noting are the historic mangroves on the coastlines surrounding Williams Bayou and Clambar Bay which display extensive prop roots and heights up to 25 feet. Seagrass and algal beds are also found throughout the preserve. Salt marsh communities are few in the preserve, but are productive in terms of biomass and providing a transition zone between terrestrial and aquatic habitats. Common vegetative species include black needlerush (Juncus roemerianus), saltmarsh hay (Spartina patens), and saltgrass (Distichlis spicata). A 1994 hard bottom mapping study performed for the Tampa Bay National Estuary Program indicated extensive hardbottom habitat within the Terra Ceia Aquatic Preserve. The known hard bottom area is located in front of Rattlesnake Key, Joe Island and Bird Key. Native limestone

outcroppings support a diverse assemblage of sponges, compound ascidians, soft corals and hard corals. These hard bottom areas also support a variety of fishes and motile invertebrates not found on nearby unconsolidated sediments. While a few sketchy hard bottom studies have been published for Tampa Bay, the areal extent and faunal assemblages of these areas is still largely unknown.

The following are the community types found within the preserve. Descriptions were taken from the 1990 FNAI Guide to the Natural Communities of Florida.

Tidal Swamps - (synonyms: mangrove forest, mangrove swamp, mangrove islands). Marine and Estuarine Tidal Swamps are floral based natural communities characterized as dense, low forests occurring along relatively flat, intertidal and supratidal shorelines of low wave energy along southern Florida. The dominant plants of Tidal Swamp Natural Communities are red mangrove, black mangrove, white mangrove and buttonwood. These four species occasionally occur in zones which are defined by varying water levels, with red mangrove occupying the lowest zone, black mangrove the intermediate zone, and white mangrove and buttonbush the highest zone. Other vascular plants associated with Tidal Swamps include salt grass, black needlerush, spike rush, glasswort, Gulf cordgrass, sea purslane, saltwort and sea oxeye. Typical animals of the Tidal Swamp include mangrove water snake, brown pelican, white ibis, osprey, bald eagle, and a variety of shorebirds, herons, egrets, and raccoon. Also included are sponges, oysters, marine worms, barnacles, mangrove tree crabs, fiddler crabs, mosquitoes, and numerous other invertebrates. Fishes are likewise diverse in this community. Those most frequently occurring include black-tipped shark, lemon shark, nurse shark, bonnethead shark, rays, tarpon, ladyfish, bonefish, menhaden, sardines, lookdown, permit, snapper, sheepshead, porgies, pinfish, and mullet.

The prop roots of red mangroves, the extensive pneumatophores (aerial roots) of black mangroves and the dense root mats of the white mangrove serve to entrap sediments and recycle nutrients from upland areas and from tidal import. This process serves in “island formation” and is a part of the successional process involved in land formation in south Florida. These root structures also provide substrate for the attachment of and shelter for numerous marine and estuarine organisms.

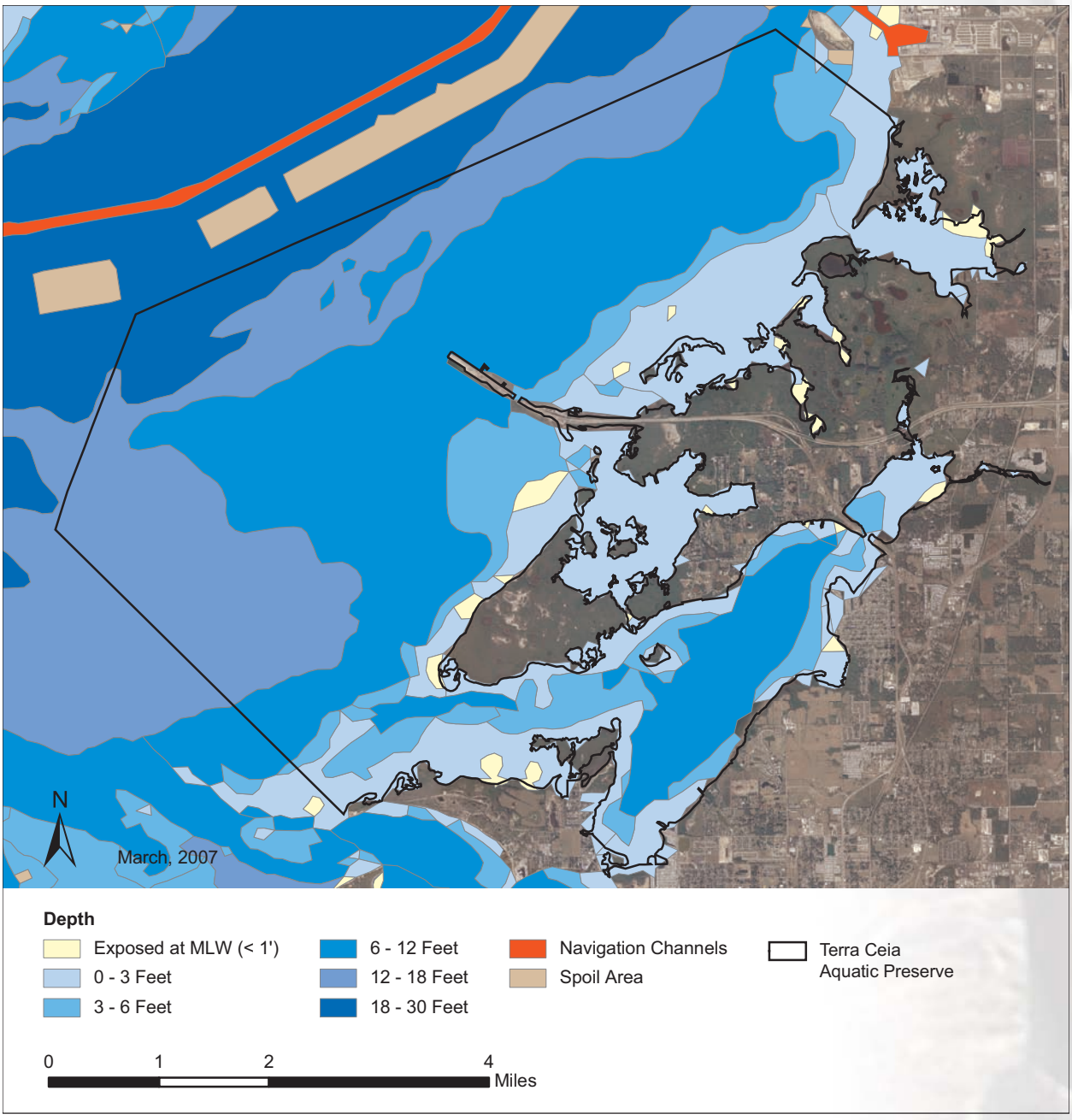
Temperature, salinity, tidal fluctuation, substrate and wave energy are five physical factors influencing the size and extent of Tidal Swamps. Mangroves require an annual average water temperature above 19°C (66°F) to survive. They do not tolerate temperatures below freezing or temperatures which fluctuate widely over the course of a year. Salt water is a key element in reducing competition from other plants and allowing mangroves to flourish. In addition, mangroves have adapted to the salt water environment by either excluding or excreting salt from plant tissues. Mangroves can survive in freshwater but are usually not found in large stands under such conditions in nature because they succumb to competition. Tidal Swamps are closely associated with and often grade into Seagrass Beds, Unconsolidated Substrates, Tidal Marshes, Shell Mounds, Coastal Berms, Maritime Hammocks, and other coastal communities. Seagrass Beds and Unconsolidated Substrates are usually found in the subtidal regions surrounding Tidal Swamps.

The Marine and Estuarine Tidal Swamp communities are significant because they function as nursery grounds for most of the state’s commercially and recreationally important fish and shellfish. These Natural Communities are also the breeding grounds for substantial populations of wading birds, shorebirds, and other animals. The continuous shedding of mangrove leaves and other plant components produce as much as 80% of the total organic material available in the aquatic food web. Additionally, Tidal Swamps help protect other inland communities by absorbing the brunt of tropical storms and hurricanes. Tidal Swamps have been and continue to be areas of environmental concern because many acres were destroyed through diking and flooding, ditching for mosquito control, and dredging and filling activities.

Seagrass Beds (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 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 20° and 30°C (68°-86°F). 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,



Map 5 / Bathymetry of Terra Ceia Aquatic Preserve

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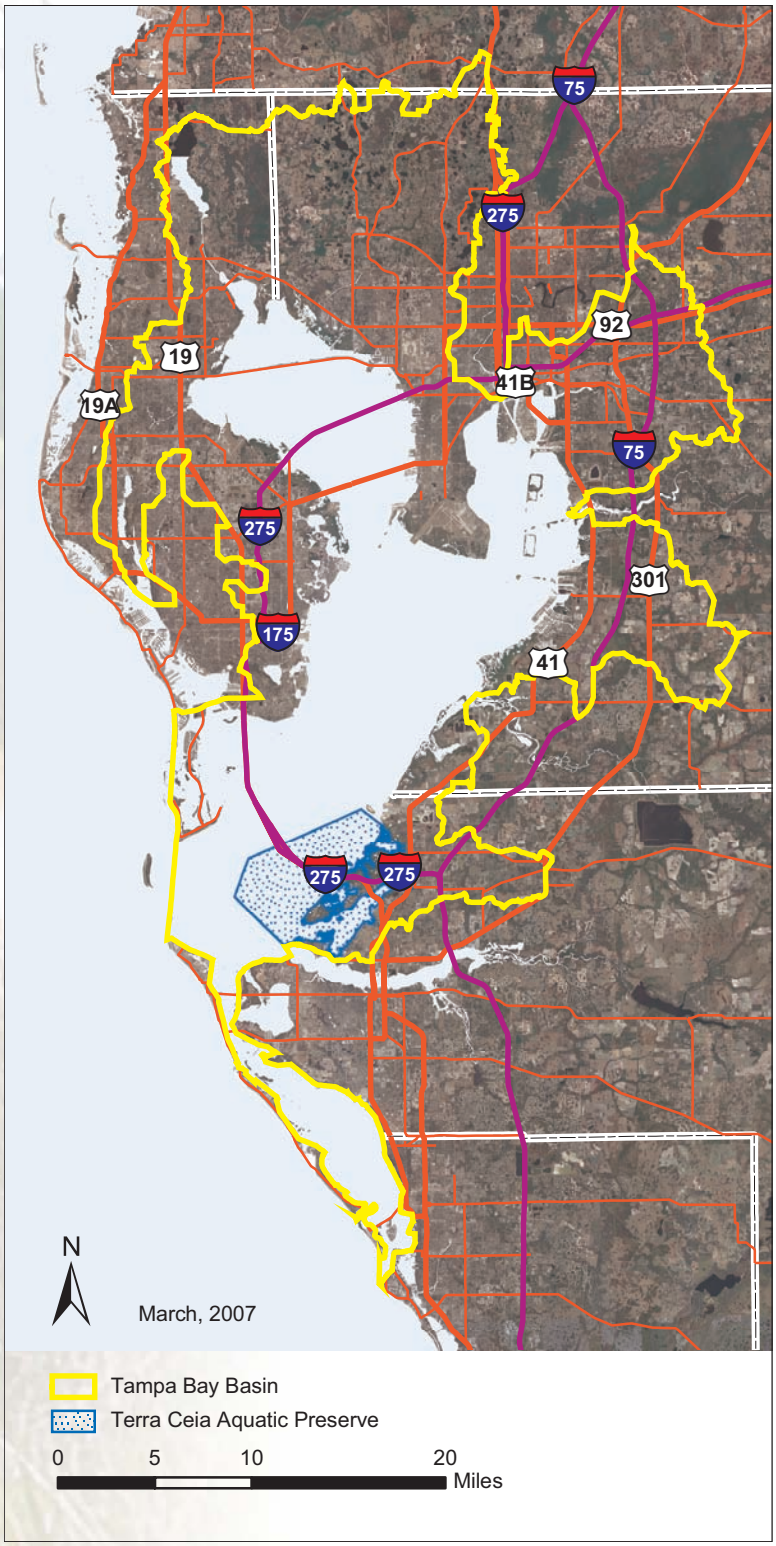
the water must be fairly clear because turbidity blocks essential light necessary for photosynthesis. The rapid growth rate of seagrass under optimum conditions rivals that of most intensive agricultural practices, without energy input from man.

Marine and Estuarine Seagrass Beds are 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 35°C (95°F), 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.



Map 6 / Drainage of Terra Ceia Aquatic Preserve

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

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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.

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. 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.

Consolidated Substrate - (synonyms: hard bottom, rock bottom, limerock bottom, coquina bottom, relic reef). Marine and estuarine consolidated substrates are mineral based natural communities generally characterized as expansive, relatively open areas of subtidal, intertidal, and supratidal zones which lack dense populations of sessile plant and animal species. Consolidated substrates are solidified rock or shell conglomerates and include coquina, limerock or relic reef materials. These communities may be sparsely inhabited by sessile, planktonic epifaunal, and pelagic plants and animals but house few infaunal organisms (i.e., animals living within the substrate). Consolidated substrates are important in that they form the foundation for the development of other marine and estuarine natural communities when conditions become appropriate. Consolidated Substrate Communities are easily destroyed through siltation or placement of fill, and deliberate removal by actions such as blasting or nondeliberate destruction by forces such as vehicular traffic. Another type of disturbance involves the accumulation of toxic levels of heavy metals, oils, and pesticides in consolidated substrates. A film of pollutants engulfing consolidated substrates can render these areas unsuitable for colonization by marine and estuarine flora and fauna. 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.

Unconsolidated Substrate - (synonyms: beach, shore, sand bottom, shell bottom, sand bar, mud flat, tidal flat, soft bottom, coralgal substrate, marl, gravel, pebble, calcareous clay). Marine and estuarine unconsolidated substrates are mineral based natural communities generally characterized as expansive, relatively open areas of subtidal, intertidal, and supratidal zones which lack dense populations of sessile plant and animal species. Unconsolidated substrates are unsolidified material and include coralgal, marl, mud, mud/sand, sand or shell. This community may support a large population of infaunal organisms as well as a variety of transient planktonic and pelagic organisms (e.g., tube worms, sand dollars, mollusks, isopods, amphipods, burrowing shrimp, and an assortment of crabs). 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.

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. 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.

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 then 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.

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. 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.

Sponge Bed - (synonyms: branching candle sponge, Florida loggerhead sponge, sheepswool sponge). Marine and Estuarine Sponge Beds are soft faunal fased 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.

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 area, with elevation as the primary determining factor. 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.

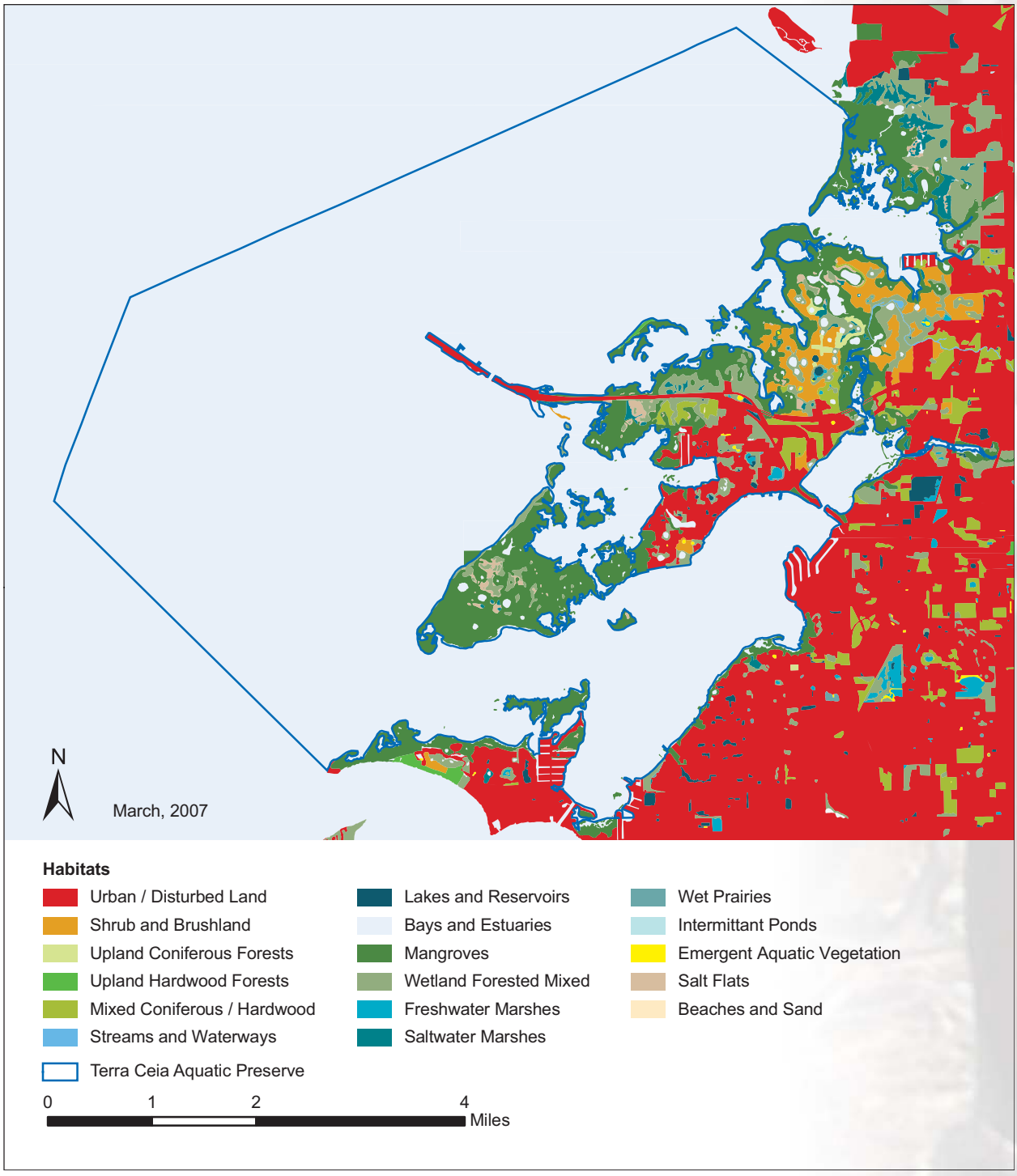
Tidal Marsh soils are generally very poorly drained muck or sandy clay loams with substantial organic components and often a high sulfur content. The elevation of Tidal Marshes range from just below sea level to slightly above sea level with vegetation occupying the intertidal and supratidal zones. The 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. 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.

Listed Species - Listed species include the West Indian manatee, which may be seen foraging along the grass flats. A bald eagle pairs that nests in the adjacent uplands has been spotted sitting atop



Map 7 / Habitats Surrounding Terra Ceia Aquatic Preserve

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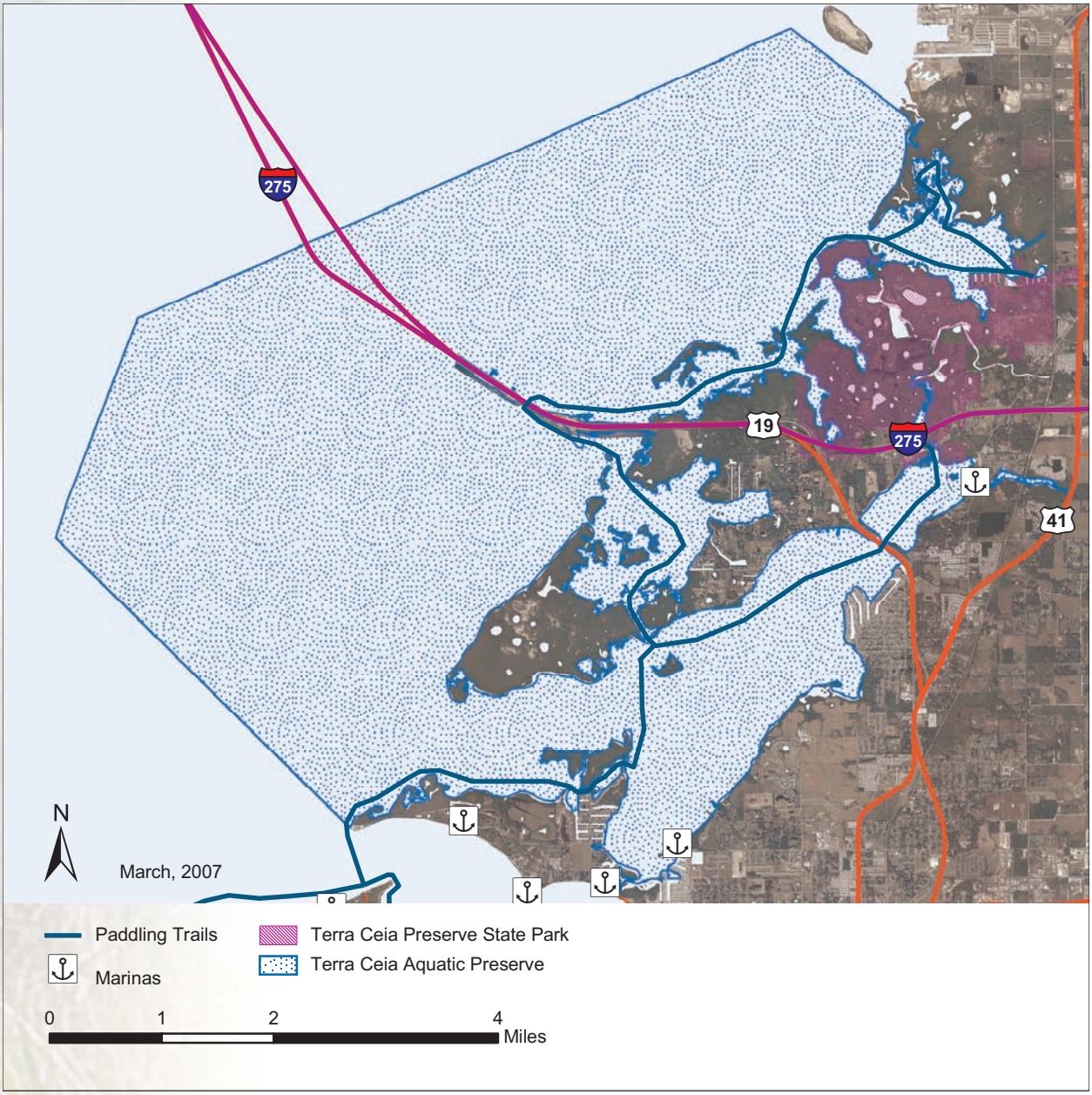
mangrove trees overhanging the preserve. At least a dozen state or federally listed bird species frequent the preserve.

Invasive Non-native Species - In low-salinity areas of the preserve, water hyacinth has been the most disruptive invasive exotic species. Hyacinth can clog channels ro the point that they become unnavigable. Other invasive aquatic plants are found in Appendizx B.3. Several upland and transitional species displace native species, and, in addition to facilitating erosion, they reduce the complexity of submerged habitat for fisheries use. The most problematic of these are Brazilian pepper and Australian Pine.

Invasive non-native marine life includes the Asian green mussel, *Perna viridis*. This species, while pervasive in parts of upper Tampa Bay, still appears to be spreading at Terra Ceia. The ultimate level of infestation within the preserve remains uncertain.

Problem Species - Two native species are especially problematic in parts of the preserve. Cattail *(Typha dominguensis)* forms large monospecific stands, to the exclusion of other native species, in disturbed low-salinity areas. Occasional increases in salinity leave large amounts of decaying biomass from the cattails killed by the salt.

Raccoons (*Procyon lotor*) are a likely cause of nesting failure in some island bird colonies. Control measures are conducted by the National Audubon Society's Coastal Islands and Sanctuaries program.



Map 8 / Public Access Points in Terra Ceia Aquatic Preserve

Archaeological and Historical Resources - Approximately 90 prehistoric archaeological sites have been identified within the Terra Ceia Florida Forever project boundary, and approximately 60 of these are presently under State ownership. [Land Management Plan for the Terra Ceia State Buffer Preserve 2001]. While these sites are not within the aquatic preserve, they may shed light on its importance to prehistoric man. Developed sites adjacent to the aquatic preserve include Madira Bickel Mound State Archaeological Site on Terra Ceia Island and the Portevant Indian Mound at Emerson Point Park.

3.1.4 / Values

Natural Values - The geomorphological landscape of Terra Ceia is a classic Karst coastal terrain. Submerged lands and uplands are punctuated by relict sinkholes from past times when lower groundwater levels encouraged active Karst processes. These deeper areas may serve as warm-water refugia for overwintering fishes. Within the preserve, large areas of exposed limestone from the Arcadia Formation provide attachment areas for a large number of hard substrate species. Clastic unconsolidated sediments form productive open bottom, and where depths and light penetration are appropriate, they support vast seagrass and algal beds. Unfortunately, the unimpeded, undeveloped nature of Frog Creek that supports such a great diversity of wildlife and fisheries species has become very uncommon in the Tampa Bay watershed.

While small amounts of needlerush *(Juncus romerianus)* are present in some low-salinity areas, and small amounts of cordgrass *(Spartina alterniflora)* recruit into open shorelines, these typically are rapidly overgrown by mangroves. Tampa Bay represents a climatic transition zone where occasional freezing temperatures rarely reach areas as far south as Terra Ceia. As a result, the area represents transition from temperate salt marshes to subtropical mangrove forests. Even within the timeframe of aerial photography, there has been a transition from salt marsh to mangrove fringe with changing climate. The Terra Ceia area is one of Florida's most likely locations to experience profound floral and faunal changes with anticipated changes in climate and sea level.

The Terra Ceia area is one of the best locations for a cross section of local submerged habitat types. All local species of marine and estuarine seagrasses may be found within the preserve. Hard corals, soft corals, sponges and other hardbottom species, are found in close proximity to seagrass beds, algal beds and open sand bottom, The patchiness of these habitats provides valuable transitional habitat, or ecotones, where an increased diversity of organisms may be found.

Foraging within the habitats of the Terra Ceia Bay Aquatic Preserve and its Buffer Preserve upland wetland habitats is critical to sustaining the populations of colonial waterbirds that nest on islands within the bay or on the nearby colony islands. Three colonial waterbird nesting colony islands occur within the boundaries of the Terra Ceia Aquatic Preserve. Several others colonies are within foraging distance. The estuary open-water foragers, Brown Pelicans and Double-crested Cormorants, rely on high water clarity to find fish prey, and the importance of water quality and quantity of freshwater inflows to protect the fishery resource prey base is easily understood, and cannot be underemphasized in developing management plans for the bay. Also, Reddish Egrets, the rarest heron in North America, has a small population in Florida of only about 400 nesting pairs. Reddish Egrets forage only in estuaries, on open mudflats and exposed sand and grass flats. Therefore, the value of the nesting islands within Terra Ceia Bay, the islands within foraging distance of Terra Ceia Bay, and the habitat availability for Reddish Egret foraging activity is significant.

The habitats of the Terra Ceia Bay system are also very important to other bird species. During the winter, the bay is extensively used by winter migrant bird populations and other duck species. Nesting Prairie Warblers rely on the mangrove forest habitats. Mangrove Cuckoos have also been observed in the mangrove forests during the nesting season, and are suspected of nesting. Shorelines of islands, especially along the west side of Miguel Bay and Rattlesnake Key, are important to wintering and migratory shorebirds. Wilson's Plovers use these shorelines and salt barrens for nesting in the spring and summer and are residents here all year long. In the spring and fall, neotropical migrants and other songbirds use the mangroves and coastal hammock habitats of Terra Ceia Bay and its watershed extensively.

American Oystercatchers, a state-listed "Species of Special Concern, forage on the exposed oysterbars and mudflats in Terra Ceia Bay as year-long residents. Mottled Ducks also rely on habitats within Terra Ceia Bay. Terns and gulls also forage in the waters of Terra Ceia Bay. (Hodgson, A.and A. Paul, 2006)

Cultural Values - Terra Ceia includes sites dating back to 8,000 B.C., mostly small hunting and camping sites. Larger shell middens have been found dating to around 1200 B.C. Most of these

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middens are now underwater, reflecting sea-level rise. More permanent settlements - including temple and burial mounds still present on site - were established by Indians between 800 and 1200 A.D., long before Europeans landed on our shores. By the 17th century, Cuban fishermen were harvesting redfish, sea trout and pompano from the estuary, and shipping catches back to their homeland.

But it wasn't until the 1840s, when the Atzeroth family settled land on the west end of Terra Ceia, that the first European settlement was documented. Julia Atzeroth - or "Madame Joe" as she was known - ran a riverfront boarding house and store in Palmetto where she sold vegetables grown on Terra Ceia Island. The industrious matriarch later purchased a coastal sloop and hired one Samuel Bishop, after whom Bishop Harbor is thought to be named, to captain the vessel. During the Civil War, Madame Joe's sloop was used for blockade running, ferrying mail from Fort Brooke in Tampa to Bradenton. As legend has it, on one particular trip, with Union officers in hot pursuit, Bishop ran the sloop aground but managed to make it ashore and deliver the mail.

The tiny farming community grew in the late 1880s, with vegetables and citrus transported by steamship from wharfs on Terra Ceia Bay to Tampa. With the extension of a railroad line to the island in the early 1900s, the community flourished. During Prohibition, whisky runners shuttled liquid contraband through Terra Ceia Bay. Critical Creek, which bisects Rattlesnake Key, got its name from smugglers who used the tiny shortcut to Miguel Bay to escape the Coast Guard.

"The death knell of Terra Ceia's booming economy," says Bill Burger, a local archaeologist, was a massive storm old-timers called "the tidal wave," which flooded the island in the early 1930s. The railroad line was discontinued, and while farming continued, the area has become increasingly residential " (Hoppe, 2002).

Scientific Values - The Tampa Bay area is in a climatic transition zone in which some plant and animal species have reached the limit of their geographic distribution. This provides a unique opportunity to study the effects of climate change in regards to genetic adaptation, diversity, interaction, and dominance shifts due to parasite/disease interaction, and change in reproduction trends.

The location of the preserve within a short distance from several major colleges, universities and research iinstitutions makes it especially suitable for the development of an interdisciplinary research program.

Social Values - Southeast Tampa Bay represents much of the remaining undeveloped shoreline of one of Florida's most densely populated watersheds. With increasing urbanization, it is becoming increasingly important that residents and visitors be able to drive a short distance down I-75 or I-275 and experience Tampa Bay in its natural state. For many, visiting the Terra Ceia area is like "stepping back in time" to experience the natural beauty that attracted early settlers to the Tampa Bay area. Such experiences create a public appreciation for the natural functions of ecosystems that do so much to provide clean water, clean air and abundant seafood for people.

Increasingly, society is regaining an appreciation for the ties between humans and these natural environments. In educational theory, this has been articulated as natuarist intelligence, the ninth of Gardner's "Multiple intelligences" (Gardner, 1999). Studies at the Cornell University have indicated that exposure to "green space" may reduce the need to medicate children for attention deficit disorders (Wells, et al., 2002).

Economic Values - The total annual economic contribution of coastal fish and wildlife activities to Florida's economy in 2006 was $27.6 billion and 311,674 jobs. Specifically boating contributed $18.4 billion and 220,000 jobs; saltwater fishing $6 billion and 59,418 jobs; wildlife viewing $2 billion and 19,361 jobs; commercial fishing $576 million and 9,787 jobs; and seafood processing $629 million and 3,108 jobs. (IFAS, 2007). This does not include the many restaurants, hotels and other businesses that benefit from related tourism. Tampa Bay alone contributes more than $5 billion annually from trade, tourism, development and fishing, and boasts three major seaports. More than 100,000 boats are registered to anglers and sailing enthusiasts in Pinellas, Hillsborough and Manatee counties. (Tampa Bay Coastal Corridor Plan, ABM). The emergent and submerged habitats of the preserve are critical to many commercial and recreational fish species as well as many bird species.

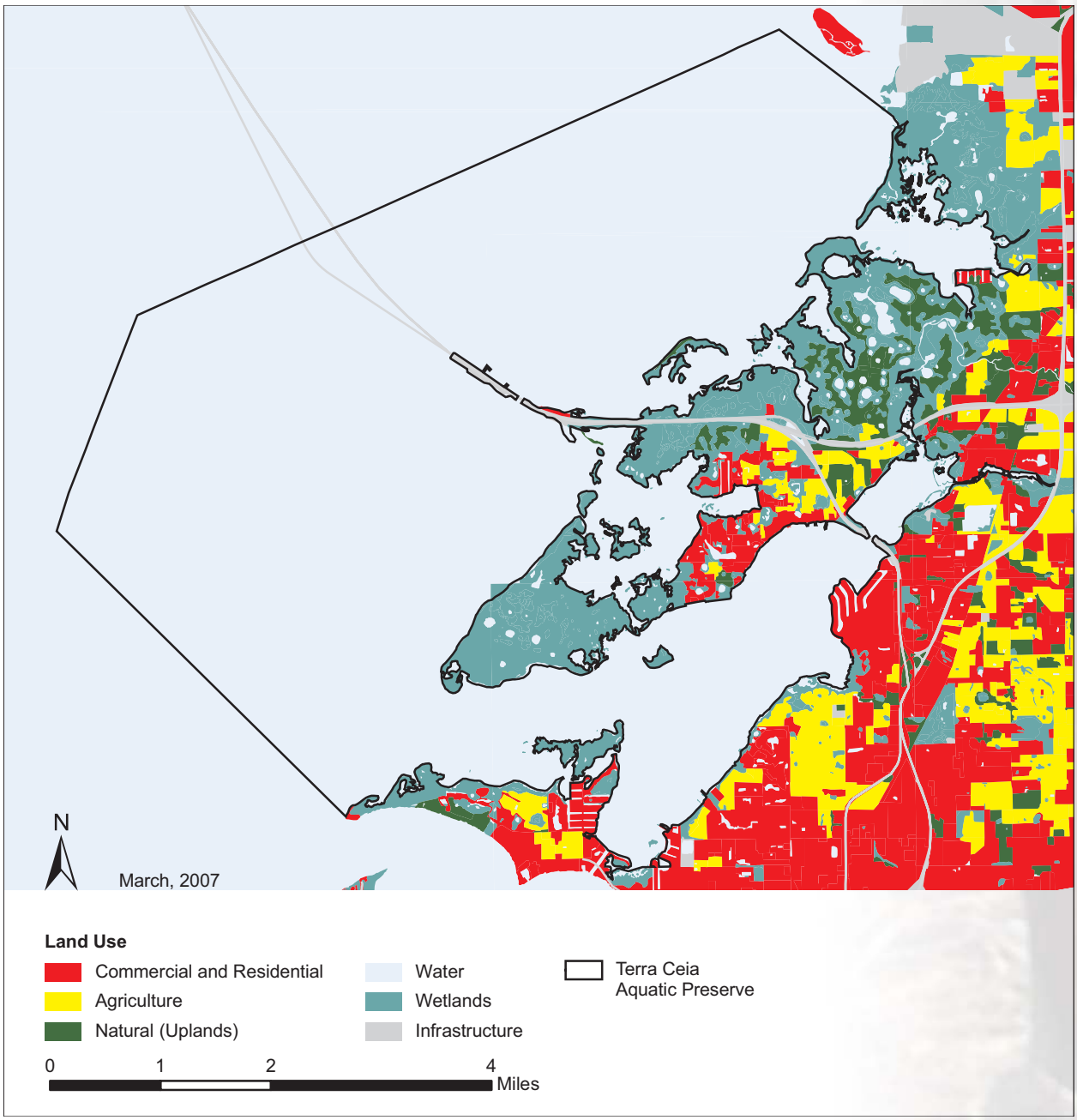
3.1.5 / Citizen Support Organization (CSO)

A citizen support organization (CSO) can be a valuable enhancement to agency efforts. However, careful consideration is necessary to weigh the costs and benefits of a CSO for any particular program. The Tampa Bay Aquatic Preserves program continues to consider CSO viability with regard to the following considerations.

Geographic Scale - A CSO must cover a geographic scale that matches local constituency and issues. While a CSO for an area like Terra Ceia may be of an appropriate geographic scale, a CSO for all four Tampa Bay aquatic preserves in three counties, likely would not be sustainable. The mix of urban and non-urban areas, different drainage basins and other conditions would result in a lack of focus in a program-wide CSO.

Adequate Outstanding Needs - A CSO should not reinvent the wheel. If management support needs largely can be covered by existing nongovernmental organizations, then the investment of staff time and energy in a CSO may not be warranted. While a few aspects of management of the TCAP would benefit from a CSO, most can be covered by the variety of nonprofit organizations and other entities with which the program presently collaborates. A common misconception is that a CSO is needed to accept donations. While a CSO has more flexibility in the use of donations, state agencies are legitimate charitable organizations.

Advocacy - CSOs are prohibited, by statute, from playing an advocacy role, and a shift toward advocacy has been the downfall of several. Citizen interest should be purely in assisting the program, rather than advocating for issues. In past "feelers" regarding a possible CSO at Terra Ceia, much of the interest has been in an advocacy role.



Map 9 / Land Use Surrounding Terra Ceia Aquatic Preserve

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Adequate Staff Resources - Building and sustaining enthusiasm in a CSO requires a great deal of staff time and commitment. Because the Tampa Bay Aquatic Preserves program has approximately 2% of CAMA's staff to manage nearly 20% of Florida's aquatic preserve acreage and nearly 10% of CAMA – managed acreage, a much greater benefit for the investment would have to be anticipated to justify moving forward.

3.1.6 / Adjacent Public Lands and Designated Resources

The Terra Ceia Preserve State Park was established in 1998 as a buffer preserve for the protection of the aquatic preserve. Its acreage totals over 1,900 acres and it is part of the larger Terra Ceia Florida Forever Project, which is a joint acquisition project between the State of Florida and the Southwest Florida Water Management District.

Washburn National Audubon Sanctuary is located in Terra Ceia Bay and has been protected by Audubon wardens since 1939. Now owned by the Society, this beautiful natural mangrove key supports a large breeding colony of up to 4000 pairs of pelicans, cormorants, anhingas, herons, egrets, ibis, and spoonbills. With 16 nesting species, this colony is ranked the second most important in Florida by the Wildlife Commission. [http://www.audubon.org/states/fl/fl/conservation/coastal.htm]

Emerson Point Park is a 195 acre site acquired as public conservation lands by the State of Florida and Manatee County and managed by Manatee County for public use as a passive recreation, conservation, and education park. It is located at the tip of Snead Island and its northern shoreline borders the aquatic preserve. The site has a combination of cultural and natural resources with six Native American Indian mounds and middens, a nineteenth century plantation settlement), hardwood hammocks, extensive mangroves, and saltwater marsh areas. [http://www.tbrpc.org/waterfront/emerson.htm]

Madira Bickel Mound State Archeological Site was the first site in Florida to be designated a State Archaeological Site. Karl and Madira Bickel donated the mound and surrounding property to the state in 1948. The flat-topped ceremonial mound-composed of sand, shell, and village debris-measures 100 by 170 feet at the base and is 20 feet in height. Archaeological excavations have disclosed at least three periods of Native American cultures, the earliest dating back 2,000 years. [http://www.floridastateparks.org/madirabickelmound/default.cfm]

Port Manatee is located along the northern border of the preserve and separates the Terra Ceia Aquatic Preserve from the Cockroach Bay Aquatic Preserve. The channel into the port is 2.9 miles in length with a width of 400 ft and a depth of 40'+ 2' MLW.

The Sunshine Skyway Bridge and **Skyway State Fishing Pier** bisect the preserve. Traveling south on the Skyway, the TCAP is the first thing one sees after the high point of the bridge. The undeveloped beauty of the aquatic preserve and the buffer preserve is further highlighted by its urban counterpart in Pinellas County. Common catches from the fishing pier include snook, tarpon, grouper, black sea bass, Spanish mackerel, king mackerel, cobia, sheepshead, red snapper and pompano.

3.1.7 / Surrounding Land Use

Much of the land adjacent to the Terra Ceia Aquatic Preserve is state-owned conservation land acquired to act as a buffer from coastal development. Several commercial nurseries are near the preserve and a number of shoreline homes and housing developments are clustered in various locations adjacent to or near the preserve shoreline. Port Manatee lies immediately adjacent to the northern boundary of the preserve.

Tidal creeks in the preserve are both picturesque and ecologically important.

Part Two

Management Programs

Chapter Four

CAMA's Management Programs

The work performed by 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 utilized 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 scientifically characterizing 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 Terra Ceia Aquatic Preserve

Ecosystem Science is relatively young in the Terra Ceia Aquatic Preserve, but recent years have seen the groundwork for a very robust program in which science and resource management goals are tied together. Until relatively recently, most of the shoreline at Terra Ceia was in private ownership, and a combination of poor access and little on-site support for field activities was a deterrent to field research. Over the past decade, the purchase of thousands of acres of shoreline conservation land and the

relocation of the Tampa Bay Aquatic Preserves program office from Tampa to Terra Ceia has provided a much-improved "jumping off" point, as well as other logistical support and experimental design assistance for researchers.

In 2002, USGS established the Tampa Bay Pilot Study as a collaborative effort with Tampa Bay Aquatic Preserves. This three-month interdisciplinary study was largely focused on Terra Ceia, and it was intended to establish and evaluate equipment and techniques for coastal studies. The study was extended to one year, and, eventually, it evolved into the five-year Tampa Bay Study. Visits from USGS' central office staff and congressional aides highlighted the importance of the project. The project has expanded to include comparative studies between Terra Ceia and other sites like Weedon Island and Mobbly Bayou.

The Tampa Bay Study has been a truly interdisciplinary effort, and it has been used as a model of integrated and collaborative science within USGS. Topics either directly or indirectly tied to this effort include…

- Coastal historical geology has been studied to better understand the formation and evolution of Terra Ceia and of Tampa Bay as a whole.
- Archaeology of paleo shorelines at Terra Ceia has been studied to reconstruct pre-Columbian human interactions with sea level
- Topobathymetric mapping has been done using soundings, LIDAR and a variety of methods to provide more accurate three-dimensional representations of the shoreline.
- Multispectral image analysis has been ground-truthed to study its accuracy in habitat characterization under a variety of conditions.
- Georeferenced 150 year-old descriptions of witness trees and other historical analytical tools have been used in detecting coastal habitat changes.
- Comparisons of LIDAR, EARL LIDAR and conventional survey accuracies have been conducted to gain insights on the relative accuracies of these techniques for different Terra Ceia habitat types.
- Groundwater movement studies through wells and surface resistivity have yielded new insights into groundwater salinities and fluxes through the Terra Ceia coastline.
- Studies of wetland wildlife use, including fish use of disturbed and natural areas, already have yielded preliminary data of use in prioritizing wetland habitat restoration and land acquisition.
- Submerged habitat *in situ* respirometry, using a device called the SHARQ, has indicated higher levels of productivity in Terra Ceia seagrass beds than in similar deployments of the system in Florida Bay and Hawaii.
- Studies of genetics of mangrove populations….in particular albinism mutations in red mangroves… have revealed unusually high mutation rates in Bishop Harbor of the preserve.
- Analysis of sediment cores for pollen, chemical contaminants, etc. has given valuable insights into the lasting effects of deforestation, industrial development, etc. at Terra Ceia and in Tampa Bay.
- Sediment pore water characterization has given insights into often-ignored hydrological effects of habitat alteration and restoration projects.
- Groundwater fluxes, measured through such tracers as radon, have revealed a great deal of exchange between ground water and surface water.
- Hydrological modeling of tidal creek function will support decisionmaking in the environmental tradoffs of habitat creation projects.
- Supercomputer modeling of submerged resource changes with changing shoreline ground cover has shown strong correlations in such parameters as seagrass and impermeable surface.

As experimental designs were developed for individual research projects, preserves staff were engaged in defining informational needs, locating appropriate study sites, discussing methods and results and pulling stuck researchers out of the mud. Collaboration truly has been on all levels. At the time this management plan is being drafted, data from these and other components of the Tampa Bay Study are being processed and analyzed. Preserves staff are working with USGS and collaborating scientists to determine how best to make the information available to future researchers, resource managers and to the public. While still tentative, much of the information from the Tampa Bay Study can be found on the USGS Tampa Bay Study web site. As the full extent of this information is processed, Tampa Bay Aquatic Preserves staff will look to the incorporation of it into decisionmaking for adaptive management and for the next management plan revision of the Terra Ceia Aquatic Preserve.

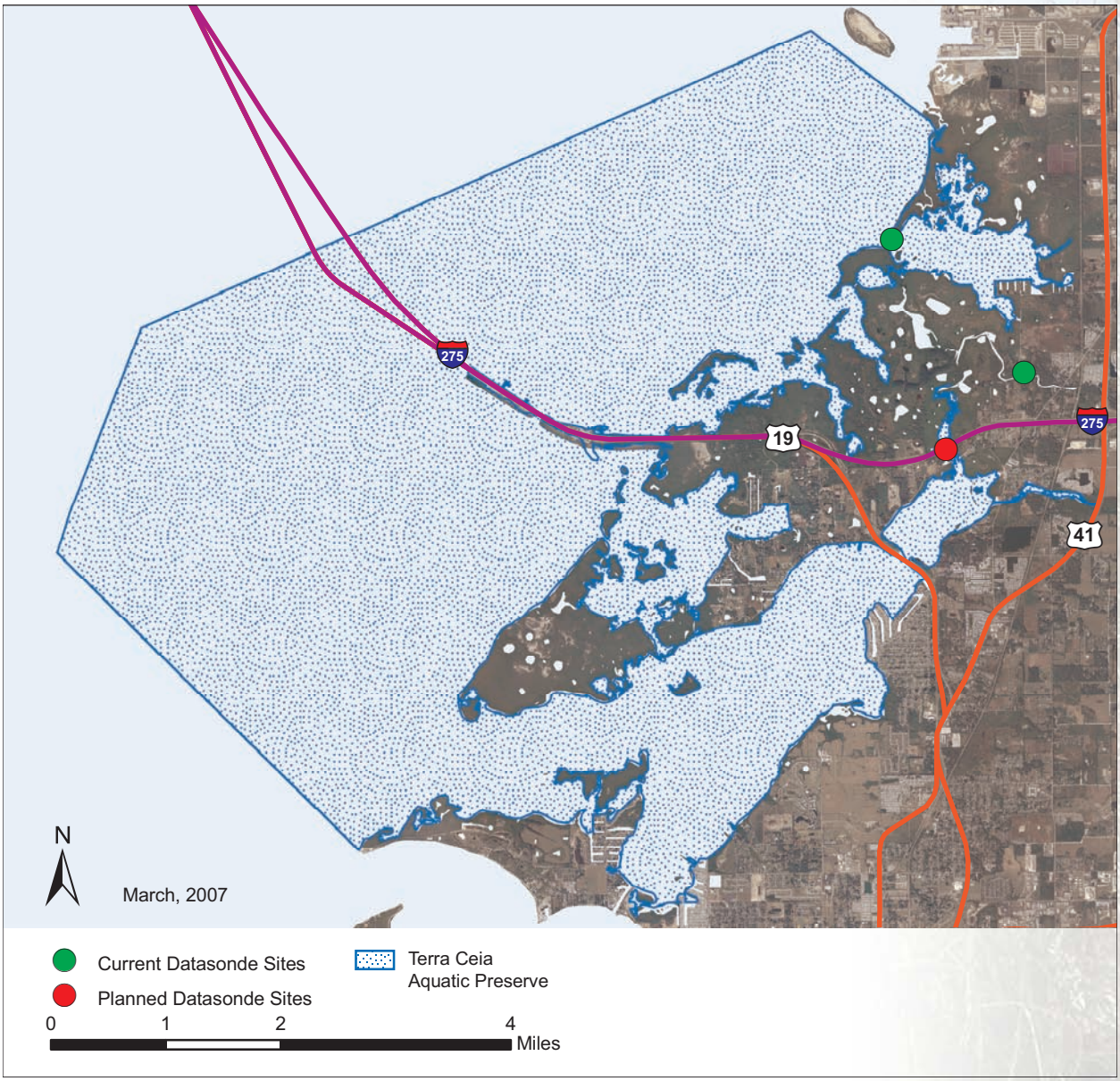
4.1.2 / Current Status of Ecosystem Science at Terra Ceia Aquatic Preserve

The Tampa Bay Study is in its fifth and final year. Present work is directed toward two goals, (1) to tie together the data into useful "tools" for resource managers and (2) to create a context within which future research will continue and flourish. .

The Tampa Bay Aquatic Preserves program is moving ahead with several ecosystem science initiatives above and beyond the Tampa Bay Study. These are intended to make existing information related to resource management readily available and to identify and pursue additional informational needs.

Mining existing data is becoming more practical with digital technology. In the past, preserves managers and staff were content with knowing where information could be found if warranted by the development of issues. The program kept a modest library of documents for which there was a recurring need. Storage space and the difficulty in locating individual documents limited enthusiasm for a more extensive literature collection. Reference management software, digital data files and digital full-text journal articles have led the program to begin developing a more comprehensive in-house collection that includes historical, legal, administrative and scientific documents.

Resource inventories always have been a need for all of Tampa Bay's aquatic preserves. This need also has been identified for the statewide program as well (Auditor General's report, 1982). Historically, resource inventories have been done for the footprints of individual impact areas as warranted by events and requests for regulatory input. This approach ignored the need for a "big picture" perspective of the



Map 9 / Land Use Surrounding Terra Ceia Aquatic Preserve

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status and trends in preserve resources. Boat based, georeferenced underwater video capability already is making it possible to do resource surveys of larger areas, like proposed aquaculture leases. Other remote sensing techniques, like high-resolution sidescan sonar and airborne hyperspectral imaging show promise for larger-scale, more cost-effective surveys. Tampa Bay Aquatic Preserves is actively engaged in forging partnerships with other agencies and private industry to evaluate and apply these and other technologies. It must be kept in mind that resource inventories are expensive, and data collection efforts must be carefully spatially and temporally scaled, as to provide only the level of detail useful in developing big-picture views of the status and trends of resource distributions. There always will be a need for staff to visit sites to evaluate impacts within specific footprints of events.

Water quality has long been of interest to the Tampa Bay environmental community. A big-picture perspective has resulted in wholesale reductions in nutrients and other pollutants that had seriously impaired Tampa Bay several decades ago. Past pollutant sources of concern specific to Terra Ceia have included sewage and septic effluent into Terra Ceia Bay and phosphate process water discharges into Bishop Harbor. While there is a trend toward a decrease in these impacts, new threats to water quality at Terra Ceia are increasing in the form of a development boom in the local watershed. Additionally, increased cargo traffic resulting through the expansion of Port Manatee may raise new issues.

Manatee County has an ongoing water quality monitoring program, and they have responded promptly and effectively to degradation events identified to preserves staff. County data has been adequate, and there is no need for the preserve to duplicate the county program. While anecdotal information, like increased occurrence of octopus and other species sensitive to water quality is encouraging, there has been no long-term, continuous, in-situ monitoring. As Terra Ceia moves into a crossroads where water quality may continue to improve or may become degraded by regional growth, strategically-placed permanent stations will give valuable insights into the status and trends of such parameters as water level, salinity, dissolved oxygen, pH, temperature, turbidity, etc. For several years, the Tampa Bay Aquatic Preserves program has been experimenting with technology and partnerships aimed at developing sustainable, reliable continual monitoring stations at key locations in the preserve. A permanent station in the low salinity region of Frog Creek had been fitted with cell phone telemetry, and data from this station was available, in nearly real-time, to preserves staff and the public. This strategy proved to be prohibitively expensive beyond the pilot project. Present emphasis has shifted to the development of low-cost radio telemetry in partnership

Development still threatens some shoreline along the preserve.

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with USF. The first radio telemetry station soon should be operational at the existing upstream Frog Creek site. A station that has operated intermittently at the mouth of Bishop Harbor will be made permanent, and a third station will be added at the mouth of the Terra Ceia River. Tampa Bay Aquatic Preserves is working with the appropriate entities to ultimately incorporate these stations into the GCOOS system and to disseminate information on constructing the stations through the Alliance for Coastal Technologies.

Contingent upon the success of the fixed monitoring and data telemetry stations, Tampa Bay Aquatic Preserves may proceed to develop a buoy-based station that can be temporarily located near dredging projects and other events. By supplying nearly real-time information to preserves staff, this station might prevent some of the ongoing degradation of past projects.

There has been considerable discussion among CAMA's managed sites of the utility of creating a benthic habitat suitability index based upon empirical monitoring data. For a number of years, Hillsborough County's environmental Protection Commission has refined and implemented such a system baywide. The Tampa Bay Aquatic Preserves Program is investigating the suitability of the present index as a basis for management decisions within the preserves. Given the relatively small number of stations within the Terra Ceia Aquuatic Preserve, the preserves program may find it useful to enhance the efforts at Terra Ceia within Hillsborough County's existing framework.

Science from the Tampa Bay Study has been tied to habitat restoration projects in the preserve. Information on fish use of mosquito ditches, ponds and other habitats has been used in determining when restoration of disturbed areas is likely to result in ecologically valuable habitat changes. Tampa Bay Aquatic Preserves staff have been working with USGS and SWFWMD to establish and maintain five datasonde and stage monitoring stations in the Frog Creek system to provide empirical data for a hydrodynamic model of the creek. This model will be used to determine whether proposed wetland creation along the creek will result in unacceptable alteration of an exiting salinity gradient.

A strong science component now exists at Terra Ceia outside and beyond the Tampa Bay Study. Monitoring of birds, bats fishes, algae, seagrasses and other ecosystem components by outside organizations allows the Tampa Bay Aquatic Preserves program to concentrate on the ecosystem-level perspectives that are directly tied to their legislative mandate. As digital information management becomes more cost effective, more research and monitoring data will be available in-house, but preserves staff presently have ready access to most information as needed. Local colleges and universities are applying for grants for ongoing research in the preserve. Planned studies include expanding work on the unusually high frequency mutation rates in Bishop Harbor mangroves to include seagrass and oyster mutations. Other work will address recovery of mangroves from storm events. Preserves staff is engaged in the design of these studies, and, in some cases, is collaborating as associate investigators.

*4.2 / **Resource Management Program***

The Resource Management Program addresses how CAMA manages the Terra Ceia Aquatic Preserve and its resources. The primary concept of Terra Ceia Aquatic Preserve Resource Management projects and activities are guided by CAMA's mission statement: "To protect Florida's Coastal and Aquatic Resources." CAMA NERRs accomplish resource management by physically conducting management activities on the resources for which it has direct management responsibility, and by influencing the activities of others within and adjacent to it's managed areas and within it's watershed. Watershed and adjacent area management activities, and the resultant changes in environmental conditions, affect the condition and management of the resources within our 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 utilized 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 Terra Ceia 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 Terra Ceia 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 Terra Ceia Aquatic Preserve

Effective resource management is especially challenging for the Tampa Bay Aquatic Preserves program. Tampa Bay Aquatic Preserves manages nearly 20% of CAMA's aquatic preserve acreage (nearly 10% of CAMA's total acreage) with less than 3% of CAMA's staff. Issues and unforeseen events in one of Florida's most densely urbanized watersheds necessitate the continual review and adjustment of priorities to ensure maximum resource protection from available program resources. Nevertheless, the actions of TBAP have resulted in protection of numerous acres of submerged resources from pending impacts.

CAMA's resource management priorities at Terra Ceia have undergone dramatic changes over the past decade. Until the early to mid 1990s, the program had only one FTE position and occasional OPS staff to manage Tampa Bay's four aquatic preserves. As a result, only the most basic and pressing issues could be addressed at Terra Ceia, and preserves with more impacts often took priority.

In 1998, the the Terra Ceia State Buffer Preserve was established under the management responsibility of CAMA as a Conservation and Recreational Lands (CARL) project. Five FTE positions were added to the expanded "Tampa Bay Aquatic and Buffer Preserves" program staff. However, the statutory obligations of the buffer preserve meant that most of the program's resources were committed to prioritization, acquisition and startup activities associated with the uplands. Several years of creating positions, acquiring land management equipment like tractors, fencing and other startup activities placed most of the program's emphasis on upland habitats.

In 2004, management responsibilities for all the state's buffer preserves, including the Terra Ceia State Buffer Preserve, were transferred to DEP's Division of Recreation and Parks. The local CAMA program reverted to "Tampa Bay Aquatic Preserves," and three FTE positions were transferred out of the program. In the past few years, the program has been retooling to reemphasize submerged resource management.

4.2.2 / Current Status of Resource Management at Terra Ceia Aquatic Preserve

Staffing and Management Strategic Approach - At present, the Tampa Bay Aquatic Preserves Program has one SES position as the manager, one FTE position as field staff, one OPS field staff position and one FTE administrative position. The resource management strategy of the Tampa Bay Aquatic Preserves program is to develop a systemic understanding of Tampa Bay's four areas that have been legislatively designated for special protection as aquatic preserves. Based on this perspective, the program serves as a catalyst to define priority issues, identify resources to address these issues and facilitate the resolution of the issues. Because of the large geographic area of Tampa Bay's aquatic preserves, local manpower and other resources are used to identify and resolve issues. For example, with the widespread islands of the Pinellas County Aquatic Preserve, citizen groups help with debris cleanup, exotic species removal and native species planting. A network of city, county and state facilities serve as points for TBAP staff to stage equipment and to coordinate these efforts. This wide-ranging, opportunistic approach is especially successful in maximizing the effectiveness of limited programmatic resources. A key element of this strategy is the abundance of manpower, information and other resources in the Tampa Bay area.

While the strategy in urban areas like Pinellas County is oriented mostly toward addressing regulatory and enforcement issues as they arise, the strategy in relatively pristine areas like Terra Ceia leans more toward proactive, preventative actions. Understanding the functional aspects of resource dynamics at Terra Ceia provides guidance for resource restoration and management in more disturbed areas. Little restoration of submerged habitat is necessary at Terra Ceia. Emphasis is to be placed on preventing damage expected from increased use and development.

Indirect Impacts to Submerged Resources - Sewage and animal waste may have considerable impacts in poorly flushed areas of the Terra Ceia Aquatic Preserve. The wastewater treatment plant at the City of Palmetto historically has discharged poorly-treated sewage into Terra Ceia Bay, but recent attention from the USEPA likely will lead to that issue being address. Despite expected development at Terra Ceia, not all areas provide seqer connections. As a result some new construction, as well as many existing homes must rely on septic systems. Preserves staff will work with county officials to look into the extent to which setbacks or other measures are needed to protect habitats and human health.

Pet waste has not been identified as a major issue at the preserve, but DNA tests of coliform contaminants in the waters of other remote areas have indicated that failure to pick up after pets can contribute unacceptable levels of coliforms to coastal waters. Tampa Bay Aquatic Preserves should encourage pet waste pick-up stations at preserves access points like boat launches and waterfront parks.

In addition to water quality, water quantity is a likely future concern. Increased attention to possible freshwater sources around Tampa Bay is especially intense in areas, like Terra Ceia, where increasing development also will increase the demand for water. Sound baseline data on freshwater inflows and their ecological significance will enable preserves staff to provide accurate, compelling information on the impacts of freshwater withdrawal from local tributaries.

Direct Impacts to Submerged Resources - A number of sediment discharge events into the preserve have been detected in recent years. In addition to direct burial of organisms, suspended sediment can interfere with filter feeders and can shade seagrasses, algae and invertebrates like corals with algal symbionts. Tampa Bay Aquatic Preserves can help reduce anthropogenic sediment influx through encouraging design elements that minimize erosion in boat ramps, trails and other shoreline features. By encouraging homowners to rid shorelines of exotics like Brazilian pepper and Australian pine, and by encouraging them to plant native plants like mangroves and cordgrass, TBAP can restore eroding shorelines to those that actually trap and sequester sediment.

Prop dredging and vessel groundings degrade the extensive shallow areas at Terra Ceia by mechanically damaging seagrass, hardbottom and other submerged resources and by resuspending sediment. Much of this degradation is concentrated in areas where shortcuts are taken and where water depth changes rapidly. Preserves staff must identify areas of chronic degradation and must address these problems through marking channels, shoals, etc. when the resource protection benefits of such actions make them cost-effective. Occasional, but substantial impacts occur in the Terra Ceia River/Frog Creek system as a result of infrequent incursions by inappropriately large boats. In addition, kayakers have been in danger from occasional large boats in small, shallow areas of the creek. A restriction on horsepower within the creek system likely would solve these problems, and this should be considered by preserves staff.

Invasive Exotic Species - A University of Florida study, sponsored by the Tampa Bay Estuary Program, found dozens of non-native species that either have invaded or potentially could invade the waters of Tampa Bay. Effective dispersal and difficult removal make most invasive marine species difficult, if not impossible, to eradicate. Therefore, it is important that preserves staff work to minimize and restore habitat alterations that facilitate the recruitment of exotic species. For example, the green mussel, Perna viridis appears to establish more readily on manmade structures like buoys, and this establishes more larval sources. By removing unnecessary manmade substratesm, the probability of successful recruitment of mussels onto native hardbottom may be reduced. A thorough understanding of the life

By comparing fishes in disturbed areas (such as ditches) with those in undisturbed areas, the need for restoration can be assessed. Photo courtesy of USGS.

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history of potential exotic invaders is important, and TBAP is building a library of existing information. The program also will identify information gaps and will encourage research that addresses these gaps.

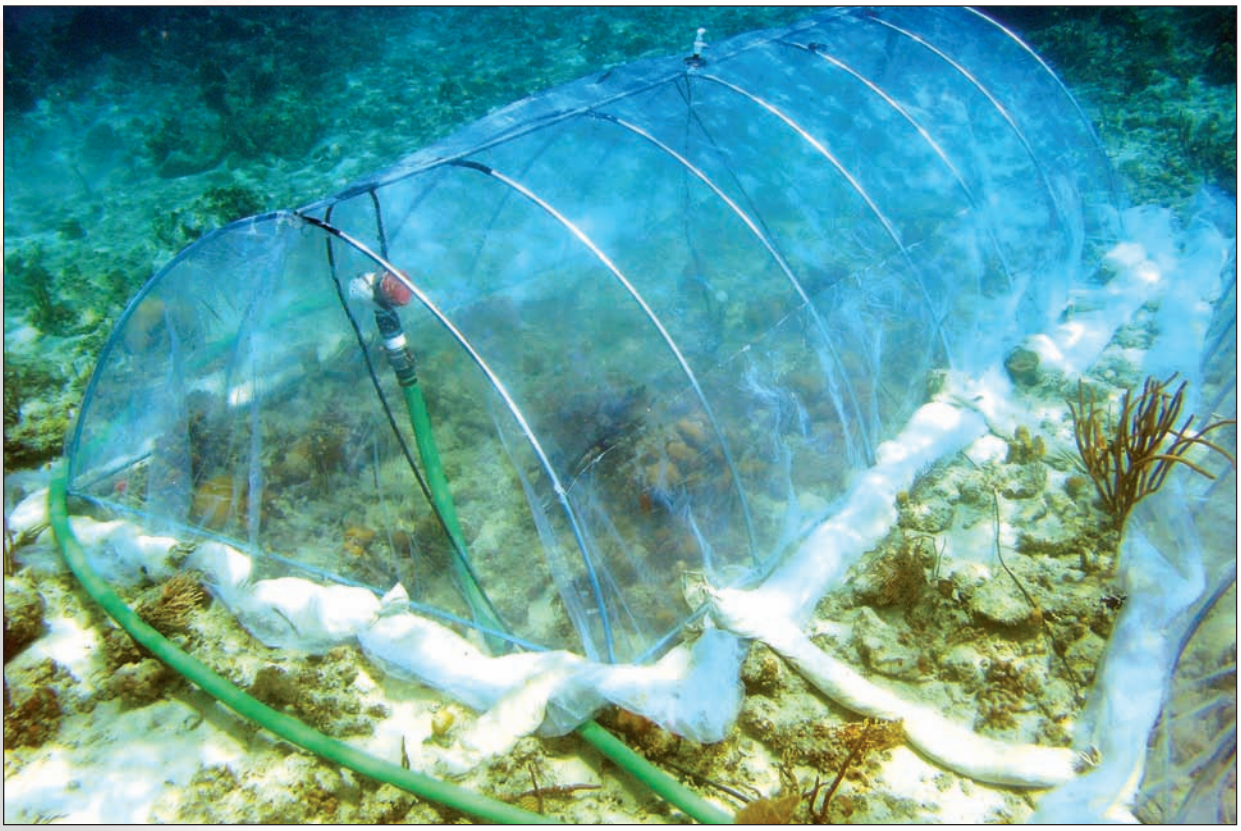
Heavy Industry - Port Manatee is the predominant heavy industry on the southeastern shoreline of Tampa Bay. Observed and likely impacts to the preserve from port operations include wayward dunnage, truck tires cargo bags and other debris washed ashore, exotic species brought in on ship hulls and in bilgewater, airborne pollutants and noise. Several dredge buoys have washed ashore in storms, and their removal had to be planned as to minimize submerged resource impacts. Preserves staff must continue to work with the port to ensure that present and future operations are planned and conducted with the environmenta sensitivity of the Cockroach Bay Aquatic Preserve and the Terra Ceia Aquatic Preserve in mind.

Linear features have posed a particular set of issues for the preserve. As onshore development requires increasing infrastructure development, there may be new proposals for pipelines, fiber optic cables, and other linear features. The environmental issues related planning linear features are beyond the scope of this plan, but the TBAP program has extensive experience in this area.

Historical & Cultural Resource Management - Terra Ceia is rich in histiorical and cultural resources. More than 80 archaeological sites have been identified on the upland areas bordering the aquatic preserve. Much less is known about submerged historical and cultural resources of the preserve. TBAP can help protect these submerged resources by encouraging the application of new technologies and protocols to their identification and by ensuring that any resource inventories required of construction impacts are done in a thorough manner. For example, TBAP staff were directly involved in planning and overseeing cultural resource inventories done in conjunction with the Peanut Lake Road removal and tidal creek excavation.

Florida's Division of Historical Resources has sought site-specific advice from TBAP staff on a number of occasions. It is important that preserves staff be trained in historical and cultural resource protection and that the program maintain a good working relationship with DHR.

Regulatory Assistance - Preserves staff routinely provide technical assistance to a variety of regulatory agencies that operate within the Terra Ceia Aquatic Preserve. These agencies include DEP's Southwest Regulatory District, the regulatory section of the Southwest Florida Water Management District, DEP's Office of Beaches and Coastal Systems, the Florida Fish and Wildlife Commission The U.S. Environmental Protection Agency and the Federal Energy Regulatory Commission.



This underwater respirometry device (photo not taken in the preserve) is one of the innovative approaches to studying ecosystem function in the USGS Tampa Bay Study. Photo courtesy of USGS.

TBAP's assistance typically is in the form of permit application review, mitigation planning and suggestions for public interest and net ecosystem benefit projects related to regulatory actions that affect aquatic preserves. With increasing turnover in most regulatory programs, aquatic preserves staff is increasingly seen as a source of basic information on submerged resources and ecosystem function. Tampa Bay Aquatic Preserves has put together training materials and programs in regulatory aspects of aquatic preserves, and it is important that this training get to regulatory staff. CAMA staff should work closely with regulatory agencies to develop and refine effective protocols for collaboration on aquatic preserve regulatory matters.

Enforcement Actions - Effective enforcement of laws and regulations involves the availability of law enforcement officers and their ability to operate effectively in a given area. The Tampa Bay Aquatic Preserves program seeks to improve both of these aspects of enforcement at Terra Ceia. TBAP has met with numerous officers and programs to highlight the need for enforcement in remote areas like Terra Ceia. Enforcement actions in which TBAP has participated have included illegal vegetation clearing, illegal dredge-and-fill, illegal narcotics farming and illegal gill netting.

By making areas accessible, the program hopes to encourage more frequent visits by officers. To this end, TBAP has provided access to remote launch sites, provided off-road transportation, and has transported officers in a variety of boats, kayaks and other conveyances.

In addition to facilitating access, TBAP staff routinely enhance the effectiveness of law enforcement efforts by providing state-of-the-art GIS mapping, free aerial photography, unmarked boats for surveillance and expert testimony under oath. Preserves staff also have offered to let officers access internet, phones, etc. at Terra Ceia. When there are questions regarding the legality and/or enforcibility of an activity, TBAP staff often serve as a lliason between officers and environmental legal counsel.

Restoration of Degraded Habitats - The Tampa Bay Aquatic Preserves program is charged with maintaining the Terra Ceia Aquatic Preserve in "essentially natural conditions" (18-20, FAC). There is not widespread need for restoration of submerged lands at Terra Ceia. Increased vitality of seagrass beds, hardbottom communities and other submerged resources more likely will result from maintaining and improving water quality in the preserve.

Restoration at Terra Ceia is done for any of three reasons (1) to recover the ecological function of degraded habitats (2) to meet larger baywide goals for restoring acreage of habitats largely lost elsewhere and (3) to mitigate for impacts defined by regulatory entities. Projects identified as "restoration" do not always provide net ecosystem benefit. Substitution of one habitat for another and attempts to engineer habit function often are not appropriate in relatively intact areas like Terra Ceia. Preserves staff increasingly are applying general and site-specific scientifically-derived information in evaluating the propriety of proposed restoration projects to the Terra Ceia ecosystem.

Impacts for which restoration may be needed include llegal dredge-and-fill activities. These often bring fine sediments to the surface in an area where sorting normally has produced a coarse substrate. Preserves staff must either oversee these projects, or, at the very least, they must ensure that the bulk properties of sediments are appropriately matched. Illegal clearing of native shoreline vegetation and colonization by invasive exotic plants often results in eroding shorelines with diminished fisheries habitat value. TBAP staff provides guidance in ther restoration of these shorelines. Boat grounding sites and prop scars often heal by themselves in areas wher coarse sediments rapidly refill the scars, but similar scars in low-energy areas may fill with muck and may take years fo recover. TBAP staff can weigh the cost and benefit of restoring specific degraded areas.

The Surface Water Improvement and Management (SWIM) program at SWFWMD is beginning over $7 million in upland restoration and habitat creation work that will take place over the lifetime of this plan. A major emphasis of the TBAP program at Terra Ceia will be to ensure that restoration activities do not adversely affect key hydrological processes, do not produce turbidity and sedimentation issues and, overall, are a positive development for the function of the entire coastal ecosystem at Terra Ceia. In an ongoing collaborative effort, TBAP, USGS and SWFWMD are collecting hydrological data at stations in the Frog Creek system to create a model of creek hydrology. This model will be used to determine whether proposed creation of pocket wetlands along the creek will alter existing creek function.

Disaster/Contingency Planning - TBAP participates in a variety of disaster/contingency planning exercises. Terra Ceia is especially vulnerable to events like oil spills, because preventative and remedial measures (e.g., containment booms) can be difficult to stage and deploy in the more remote areas with little boat access. It is important that TBAP, in collaboration with DEP's Bureau of Emergency Responese and the US Coast Guard, Port Manate and Florida Power, develop discrete map-based guidelines for priorities, boom lengths and other information needed in the event of a spill.

TBAP has put considerable thought and preparation into hurricane response in the Terra Ceia Aquatic Preserve. Large boats with small tenders, powerful binoculars and advanced GPS technology will allow preserves staff to do a rapid post-storm assessment of grounded vessels, wayward storage tanks, grounded dredge floats and other expected issues. In the past three years, TBAP has sought to develop a variety of communications avenues including ship-to-shore (MMS) radio telephone capability and cell phones with radio features that can operate independently of the cell phone network for a few miles range.

*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 dissemination 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 relationships and convey knowledge to the community; invaluable components to successful management

4.3.1 / Background of Education and Outreach at Terra Ceia Aquatic Preserve

Originally, the Tampa Bay Aquatic Preserves program put more program resources into school visits and other events that were of limited significance in the big picture of the program's geographic range. In order to get more "bang for the buck," emphasis was shifted to major events, satellite broadcasts to classrooms and other mass marketing strategies. Particularly effective events included an episode of the satellite television show Project Oceanography that was broadcast, via satellite, to numerous schools in the Tampa Bay area and beyond. Displays at the St. Petersburg Boat show and MarineQuest have given the program regional exposure. Kiosks at preserve access points have been effective in getting information to persons entering the preserves.

4.3.2 / Current Status of Education and Outreach at Terra Ceia Aquatic Preserve

Demographics of the Education/Outreach Audience - By virtue of its remote location, Terra Ceia has the advantage of a higher level of awareness among its users than some of the more urban preserves. Visitors to Terra Ceia typically know something about boating and the resources, and they are attracted to Terra Ceia by that knowledge. Ephemeral users, like the one-time boat rental customers of Pinellas County are relatively uncommon, but, as development and tourism bring in an increasing number and variety of users, a need for more basic information on the preserve's resources and their protection is likely.

Of course, areas like Terra Ceia also attract a few visitors whose "frontier ethic" leads them to exploit remote areas. These include those who employ illegal fishing techniques and those who illegally disturb submerged lands and shoreline habitats. While education and outreach efforts may have some direct effect on these people, their activities are more likely altered by the knowledge that other visitors have been educated to recognize illegal activities.

An important, and often overlooked, target audience for preserve education/outreach efforts is the group of law enforcement officers from various agencies. Conventional law enforcement training often ignores the statutory basis of environmental law enforcement. Preserves staff, often in consultation with attorneys from DEP's Office of General Counsel, have and will continue to educate law enforcement officers on enforcible laws that protect the natural, cultural and historical resources of Terra Ceia. Additionally, preserves staff have been helpful in conveying site-specific information to law enforcement officers that facilitates their access to remote areas of the preserve.

The Big Picture - Special attention must be given to the basic nature of the outreach message. TBAP must avoid the pitfall of redefining the message to portray the preserves as parks. While recreational opportunities are important, the primary rationale for protecting aquatic preserves must continue to be the natural functions that these areas provide for the health of the bay and, in turn for the quality of life of residents and visitors. Rather than base public understanding of our mission on the more tangible results like recreational opportunities, we should be raising awareness of less tangible "ecosystem services" provided by the healthy submerged lands we work to restore and preserve. In the past two years, the formation of the Gulf of Mexico Alliance as a consortium of Gulf states has demonstrated that resource

managers must view coastal systems as components of a much larger Gulf of Mexico ecosystem. The health of areas like Terra Ceia should be inextricably tied to the health and fate of the Gulf as a whole.

Messages for Visitors - While visitors to Terra Ceia likely have some level of awareness of the submerged resources of the preserve, several types of information are important. Even for the majority of visitors who want to "do the right thing," some specifics must be available on-site or at access points.

In areas where boat impacts to seagrasses, hardbottom and other resources are frequent, information on the importance, location and avoidance of these resources must be provided at access points. Aerial photographs of seagrass scarring are particularly effective on kiosks.

Fisheries management information, while scientifically-derived, often is not intuitive. It is important to make information on size and catch limits, as well as open and closed seasons for fish species, available at access points. These can be posted and distributed to boaters launching into the preserve.

TBAP was one of, if not the, first CAMA sites to promote the Clean Boating Partnership. This coalition of public and private entities educates boaters and marina operators in best practices for keeping their waterways clean. TBAP is active in this partnership by distributing materials on-site, advising marinas on BMPs and distributing information at events and water-based businesses. TBAP is committed to continuing and enhancing this worthwhile collaboration.

In addition to helping those who want to operate legally, information on laws and regulations can also help visitors serve as "eyes and ears" to preserve management and law enforcement. Along with resource protection information, contact information should be posted to enable those who witness unauthorized activities to report them.

Messages for Homeowners - Most homowners adjacent to the preserve wish to maintain the relatively pristine state that initially drew them to Terra Ceia. Numerous homeowners have sought out information on appropriate mangrove trimming, seagrass-friendly dock designs, native shoreline vegetation and other means by which they can help keep Terra Ceia natural. TBAP has and should continue to, make this information readily-available, regardless of its source from within or outside the agency. Homeowners can be reached through local homeowner associations, civic groups and local events. One of the most effective ways to inform homowners and to raise awareness among them is to include them in volunteer events. Local residents should be targeted for recruitment into the TBAP volunteer database.

Visitors from the Seminole Nation of Oklahoma learn about natural history aspects of their heritage.

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Getting the Message Out - Despite some regional successes, there is still a need for more place-based education and outreach efforts specific to Terra Ceia. High-quality kiosk and signage at more access points likely will be effective in reaching more preserve visitors. Participation in more local events like Rubonia Mardi Gras and the Terra Ceia Mullet Smoke-off could reach more local citizens who not only use the preserve but can serve as the program's eyes and ears. Increased talks to civic groups like Rotary Clubs and homowners' associations likely would be a worthwhile commitment of resources. However, since the Terra Ceia Aquatic Preserve is a relatively small portion of the program's management responsibilities, there are severe limitations on the staff that may be committed to local outreach efforts.

The biggest hurdle in outreach/education has been the uncertain availability of the previously planned research interpretation facility. As the Tampa Bay Study comes to a close, the facility was to have showcased the fascinating results of the work in a format that would be interesting to the public. They would be able to see a timeline of Man's changing relationship with Terra Ceia and Tampa Bay from pre-Columbian times to supercomputer simulations of the future. Because a facility is no longer dedicated to this vision, it will be much more difficult for the TBAP program and collaborators to keep the Terra Ceia story from being relegated to the appreciation of scientists only. In the event that a facility becomes available, the program will pursue the original goals. At present, the most effective strategy is to provide information at access points, through kiosks and signs, and to provide information at events and invited presentations. Information specific to the Tampa Bay Study may be accessed over the internet, and, hopefully, at some other outreach facilities in the Tampa Bay Area. TCAP will support the development of these exhibits regardless of the venues.

*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 a degree that is consistent with our goals for natural and cultural resource protection, we will 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, wetland and submerged habitats. This would include the coordination of visitor program planning with social science research. One of CAMA's critical management challenges during the next ten 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 Terra Ceia Aquatic Preserve

Historically, public use of Terra Ceia has primarily been consumptive uses by local residents. Activities include line and net fishing, crabbing oystering, and scalloping. Associated activities have included cast netting and digging fidder crabs for bait. The scallop population declined decades ago, and has not recovered, but fishing activities are increasing with increasing population size and increasing awareness of, and access to, the water. While local residents have engaged in some nonconsumptive activities like waterskiing and swimming, these are relatively infrequent. Kayaking likely is the most prevalent nonconsumptive use of the preserve. The preserve also is a great place for snorkeling and watching birds and other wildlife.

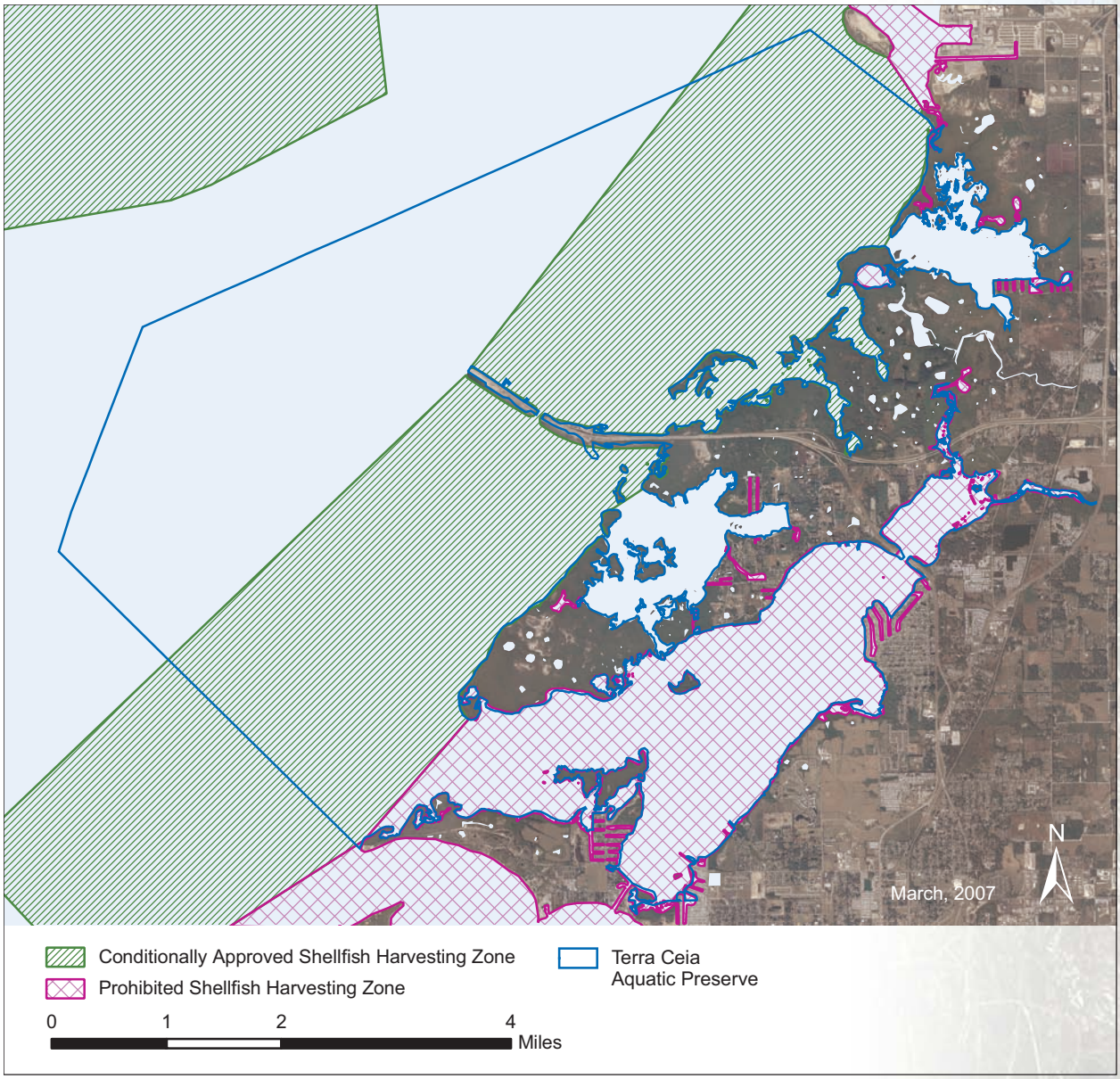
4.4.2 / Current Status of Public Use at Terra Ceia Aquatic Preserve

Poor access to the water continues to be a major issue. Overall, the submerged resources of the TCAP have benefited from the preserve's remote location, but there are some disadvantages as well. Illegal gill netting is common in secluded areas of the preserve. Unauthorized shoreline development, artifact hunting and other deleterious activities often go undetected, because there aren't as many "eyes on the water." In the event of an oil spill, poor access to some areas may cause unacceptable delays in the deployment of containment booms.

Over the lifetime of this plan, decisions vital to the balance between resource protection and public access will have to be made. Boating access in southeast Tampa Bay will have to be addressed with a "big picture" perspective. Intense access at a few improvised launch facilities like the Bishop Harbor (TCAP) and Cockroach Bay (Cockroach Bay Aquatic Preserve) ramps must be addressed. To take pressure off these small local-use launches, consideration may have to be given to enhancing boat access at existing facilities like E.G. Simmons Park. Some new facilities, like a ramp at the Skyway Bridge, have been proposed, and these will require careful consideration because of their potential to cause widespread impacts to submerged resources. The Tampa Bay Aquatic Preserves program must stay actively engaged with this process, because the program's site knowledge will be important to understanding and protecting local resources in the face of increasing use.

It will be essential that the TBAP program work closely with the Division of Recreation and Parks in the planning and development of land-based and water-based public access opportunities. Launch areas and other access points are all portals to the aquatic preserve, and as such, aquatic preserve impacts must be considered in developing carrying capacities, vessel draft restrictions, etc for these facilities.

Boating and Fishing - Boating is an important means of accessing much of the preserve. Small, shallow-draft boats necessary to access much of the nearshore area cannot come from long distances in uncertain weather conditions. It is important to accommodate historic use of the area by small boats, but access should be spread among several access points to avoid intense impacts at any one point. Bishop



Map 11 / Shellfish Harvesting Zones in Terra Ceia Aquatic Preserve

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Harbor, Piney Point and the Manatee River presently provide some access, but launch facilities often are improvised. While additional access point possibilities are limited, there is considerable potential for making existing facitilities more functional and environmentally-sound.

Intense direct impacts to submerged resources often are concentrated in specific areas where shortcuts and/or sudden changes in depth cause prop-scarring and groundings. Marking of areas like the Bishop Harbor Swash Channel can help lead boats through the deeper areas. However, depth at Terra Ceia is relative, and additional information like posted controlling depths, tidal staffs and posted tide tables must be provided to complement any waterway marking efforts in a comprehensive package.

Legal fishing activities are one of the most important public use access of the preserve. By providing fisheries regulations at access points, and by facilitating law enforcement activities, preserves staff can help ensure the sustainability of fisheries resources at Terra Ceia.

Illegal fishing by gill netters and ghost fishing by abandoned crab traps are pervasive forms of fisheries degradation at Terra Ceia. Preserves staff have, and should continue to, support law enforcement efforts. Derelict trap removal has specific legal requirements, but preserves staff can, and should, play a bigger role in addressing this growing problem.

Bait collecting efforts at Terra Ceia have some negative impacts on preserves resources, but the degree and trends in these are uncertain. Cast netting often results in unwanted fish bycatch and oysters being left on shorelines and bridges. Digging for fiddler crabs appears to be causing increasing disturbance of intertidal sediments. TBAP should look in to whether these problems are substantial and whether education and/or enforcement actions are warranted.

Canoeing and Kayaking - Paddling is one of the lowest-impact means of experiencing the Terra Ceia Aquatic Preserve. Kayaks and canoes are the conveyances of choice for increasing numbers of fishermen, sightseers and wildlife watchers. Several paddling trails have been marked within the preserve as part of the Manatee County Blueways Network. Unfortunately, while a great deal of planning went into these trails, a number of markers were not installed in the intended locations. Additionally, many trail signs are missing from their posts. To avoid confusion among paddlers, TBAP should ensure that markers either are maintained or removed.

Aviation - Aviation impacts are in the form of flushing birds and direct imacts of aircraft. An ultralight has been observed to swoop down at shoals in apparent attempts to flush loafing birds. However these instances are not common, and, in general, the popularity of ultrailghts appears to have diminished. Overall, ultralight user groups appear to be effective in addressing abuses by their peers. Kite surfing is popular at the Skyway Bridge, but any impacts are not apparent at this time. In 2006, a small plane conducted an emergency landing in shallow waters outside Bishop Harbor, but the landing and subsequent removal did not appear to be very destructive. Hovercraft have been an issue in other parts of Tampa Bay, but there is no indication that they are likely to visit the Terra Ceia area.

Aquaculture - Aquaculture is relatively new to Terra Ceia, but the issues related to this activity fit within existing areas of program emphasis. Potential impacts from aquaculture activities include wastewater discharge, preemption of submerged habitats and introduction of nonnative species. Wastewater discharge is limited to zero degradation within the OFW, and it is regulated. Preserves staff have provided input as to how imacts to sensitive resources can be minimized during the process of defining individual lease areas. Nonnative species continue to be a concern. For example, recent research (Arnold, et al., 2003) indicate that hybridization of the local hard clam, Mercenaria campechiensis with the Northeastern hard clam, Mercenaria mercenaria, results in hybrids with increased rates of gonadal tumors. M, mercenaria is used in local aquaculture, because it has a longer shelf life. Preserves staff will continue to work with local and state aquaculture entities to look for the most environmentally-sound practices. TBAP staff will periodically check aquaculture lease areas to ensure that operations follow defined guidelines and are contained within lease boundaries.

Mooring Fields and liveabords pose little problem at present, but conditions warrant monitoring their status in areas like Terra Ceia. In addition to decreasing availability of wet slips, the insurance necessary to keep boats in marinas is increasingly unavailable. As a result, the movement of boats into open water mooring fields is anticipated. This trend could be especially problematic in areas like Terra Ceia where pumpout facilities are scarce. Preserves staff should take notice of increases in mooring activties and associated impacts within the preserve.

Shoreline development along Terra Ceia Bay.

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 Preserve's 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, possibly, the Aquatic Preserve may not normally address.

This section will explore issues that impact the management of Terra Ceia Aquatic Preserve directly, or are of significant local or regional importance that the Aquatic Preserve's participation in them may prove beneficial. While an issue may be the same from preserve to preserve, the goals, objectives and strategies employed to address the issue will likely vary depending on the ecological and socioeconomic conditions present within and around a particular Aquatic Preserve's boundary. In this management plan Terra Ceia 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.

Issues are listed in priority order and each issue will have goals, objectives and strategies associated with it. Goals are a broad statement 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 / *Issue One: Marine Debris*

Marine debris presents a real and chronic threat to wildlife and public safety. Entanglement, ingestion and toxins are issues related to debris of various materials. Additionally, the presence of debris detracts from the aesthetic value of natural landscapes.

Goal One

Reduce the Amount of Debris In the Preserve. Unlike more populated, more accessible areas of Tampa Bay, the shorelines of Terra Ceia rarely, and, for some, never are cleaned of debris. The logistics of getting volunteers to remote shorelines and islands within the timeframes of events like Coastal Cleanup leave little time for actual removal of debris. The importance of removing debris from sensitive wildlife habitat necessitates special cleanup events. The archaeological sensitivity of many areas of Terra Ceia demands special attention to the selection and initial orientation of volunteer groups.

Objective One

Reduce debris at the sources. While much debris is generated by sources outside the preserve, some of the most detrimental material is from local, definable and preventable sources. The popularity of Terra Ceia among fishermen increases the likelihood that monofilament line, lead weights and other fishing-related debris will accumulate in preserve waters. Increasing use of the adjacent Terra Ceia Preserve State Park and the Skyway Fishing Pier increases that likelihood that plastic bags, bottles and other debris will enter the aquatic preserve from adjacent upland areas.

Integrated Strategies / **Ecosystem Science** - TBAP should attempt to determine the relative importance of debris sources. This could be done as a student research project that would categorize debris found in cleanup efforts according to material, likely source and environmental threat. Information from such a study could be used in adaptive strategies under this plan as well as in the formulation of a more comprehensive and informed approach in future plan revisions. By regularly repeating this study methodology, changes in proportions of debris may yield valuable insights into changes in public use, changes correlated with educational programs (monofilament stations) and emerging hazards tied to new packaging, etc.

Integrated Strategies / **Resource Management** - TBAP will take steps to ensure that access points to the preserve (boat launches, fishing piers, etc.) have monofilament line depositories. TBAP will encourage local parks, marinas and other facilities to equip trash receptacles with lids.

Integrated Strategies / **Education and Outreach** - TBAP must ensure that, whenever possible, public access points in the preserve include signage on the threats and prevention of debris.

Integrated Strategies / **Public Use** - TBAP will seek sources of boat litter receptacles. This may be done through the Florida Clean Boater Program or another relevant entity.

Integrated Strategies / **Partnering** - TBAP will partner with local academic institutions to better understand the sources and potential threats of various types of debris. The program will seek to strengthen collaborative efforts with local state and county park management to implement debris reduction strategies at access points.

Objective Two

Coordinate Debris Removal Programs. One of the most effective approaches to debris removal is to collect debris trapped on shorelines. Native vegetation is effective in trapping debris among prop roots, pneumatophores and coastal grasses.

Integrated Strategies / **Ecosystem Science** - The debris study prescribed above would yield valuable insights into the need for prioritization of debris removal areas and strategies.

Integrated Strategies / **Resource Management** - Experience has shown that, after an initial cleanup of a shoreline, the shoreline should be cleaned at least once a year and preferably twice. Preserves staff should work with park staff and volunteers to achieve initial cleanups of all accessible shorelines and to establish a maintenance schedule. The non-public boat launch area has proven to be a useful location for staging and unloading debris from these cleanups.

Integrated Strategies / **Education and Outreach** - TBAP must ensure that, whenever possible, public access points to the preserve include signage on the threats and prevention of debris.

Integrated Strategies / **Public Use** - Public access points should be provided with obvious, convenient, covered debris receptacles.

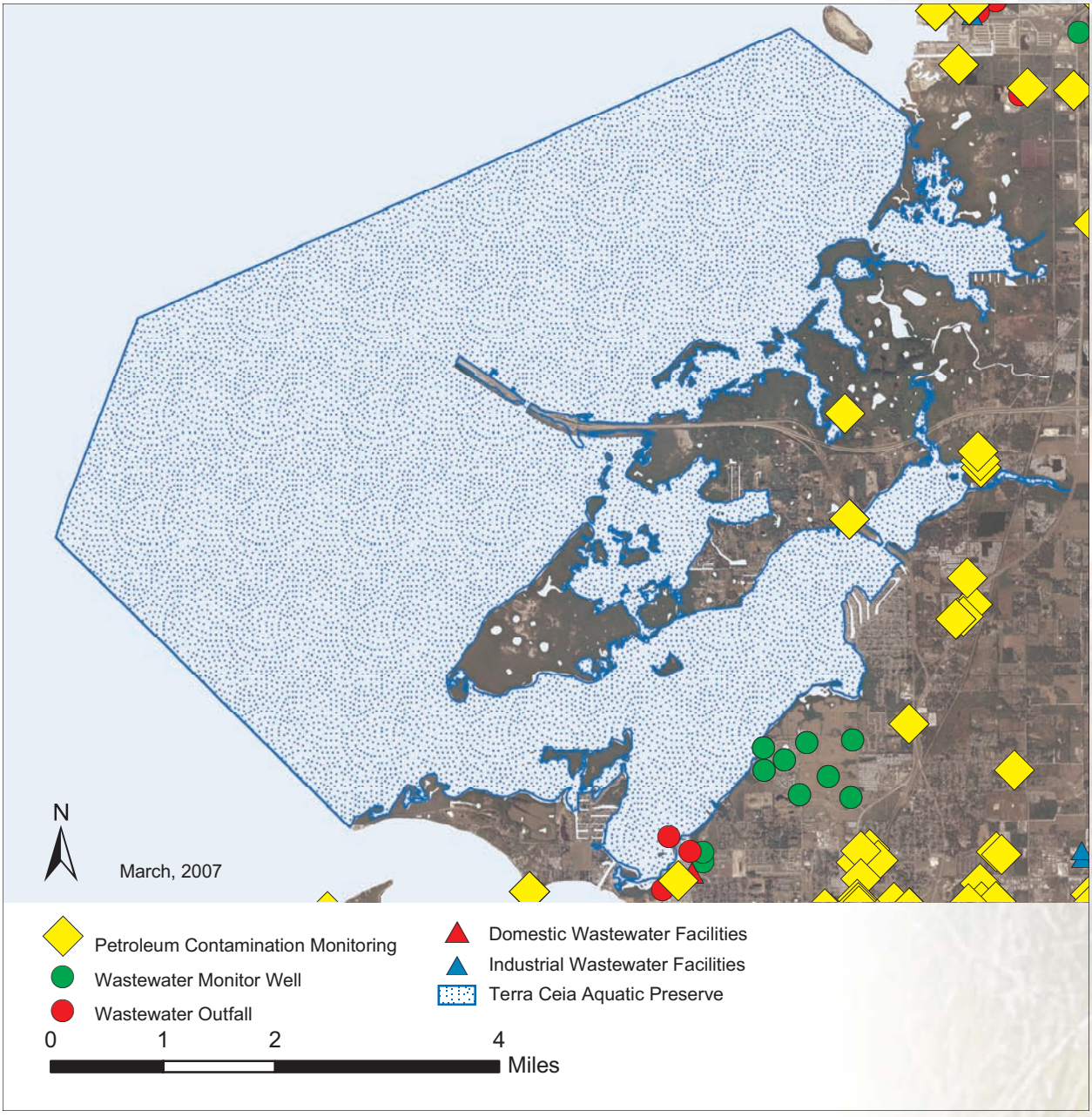
Integrated Strategies / **Partnering** - TBAP will seek to strengthen collaborative efforts with local state and county park management and homowners' associations to implement debris reduction strategies at access points.

5.3 / ***Issue Two: Water Quality***

In addition to debris, sediment and chemical pollution pose an increasing threat to water quality in the preserve. Unlike more urbanized preserves, pollutant sources of the Terra Ceia Aquatic Preserve often are easily detected and addressed. Those sources that historically have been important likely will continue to increase as development and public use increase in the watershed.

Goal One

Develop a baseline and trends perspective on preserves water quality through continual, permanent monitoring stations at key locations in the preserve. While Manatee County's routine monitoring program is very useful, continual, synoptic monitoring in a few key stations will help the program to set baselines, understand diurnal fluctuations and spot trends in water quality parameters.



Map 12 / Point Source Polution Monitoring in Terra Ceia Aquatic Preserve

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Objective One

Upgrade, and/or install permanent datasonde stations with telemetry capability at key locations in the preserve. Key sites include Frog Creek, because of upstream development, and the Terra Ceia River, because of development likely upstream in Frog Creek and downstream in Terra Ceia Bay. A permanent station in Bishop Harbor also is a high priority, because of a number of management and restoration actions described in the previous chapter are expected to result in long-term trends in water quality improvement

Integrated Strategies / **Ecosystem Science** - Use existing water quality data to define parameters and protocols of permanent monitoring.

Integrated Strategies / **Resource Management** - Upgrade the Frog Creek station to include telemetry capability, make theBishop Harbor station permanent and add a station at the mouth of the Terra Ceia River.

Integrated Strategies / **Education and Outreach** - Add component on datasonde stations and accessing the data via web portal to outreach exhibits.

Integrated Strategies / **Public Use** - Linking stage data to paddling trail applications like trail web sites will help paddlers plan their trips to avoid flood conditions.

Integrated Strategies / **Partnering** - USGS and SWFWMD have partnered with TBAP to establish stations for the Frog Creek Modeling study, and have indicated interest in supporting some continued data collection

Goal One

Reduce untreated Human and animal waste into the preserve – Organic waste poses threats from nutrients as well as from pathogens that may enter the waters of the preserve. By virtue of its remoteness, much of Terra Ceia cannot be connected to existing sewer systems. Inquiries into local health offices have indicated that new innovative technology may be difficult to permit.

Objective One

Encourage effective wastewater treatment systems in the preserve watershed. TBAP staff should collaborate with Manatee County staff to minimize the effect of septic systems, grease traps and other domestic discharges within the watershed. The adequacy of setbacks and other requirements for these systems should be reviewed for land adjacent to the preserve. Whenever possible, connection to city sewer systems or advanced wastewater treatment on-site should be encouraged.

Integrated Strategies / **Ecosystem Science** - Seek out information on state-of-the-art wastewater treatment approaches for homes without available sewer connections.

Integrated Strategies / **Resource Management** - Seek information (preferably GIS-based maps) on the abundance and distribution of septic systems in the TCAP watershed.

Integrated Strategies / **Education and Outreach** - Encourage local health agencies to be open to new state-of-the-art wastewater treatment ideas.

Integrated Strategies / **Partnering** - TBAP will work with Manatee County's environmental and planning departments to assess the scope of the problem and to identify possible solutions.

Objective Two

Encourage the use of pumpouts. Marinas servicing the TCAP should be reviewed for the presence of pumpout facilities. Marinas lacking pumpout facilities should be encouraged to develop these facilities. The Florida Clean Boating Partnership offers grants to assist marinas in providing pumpout facilities.

Integrated Strategies / **Ecosystem Science** - Seek out coliform monitoring data in and near the TCAP.

Integrated Strategies / **Resource Management** - TBAP can assist marinas in getting grants for pumpouts through the Clean Boating Partnership.

Integrated Strategies / **Education and Outreach** - The location of pumpout facilities should be advertised in CAMA and other outreach materials.

Integrated Strategies / **Partnering** - Addressing this issue will require the participation of local marinas.

Objective Three

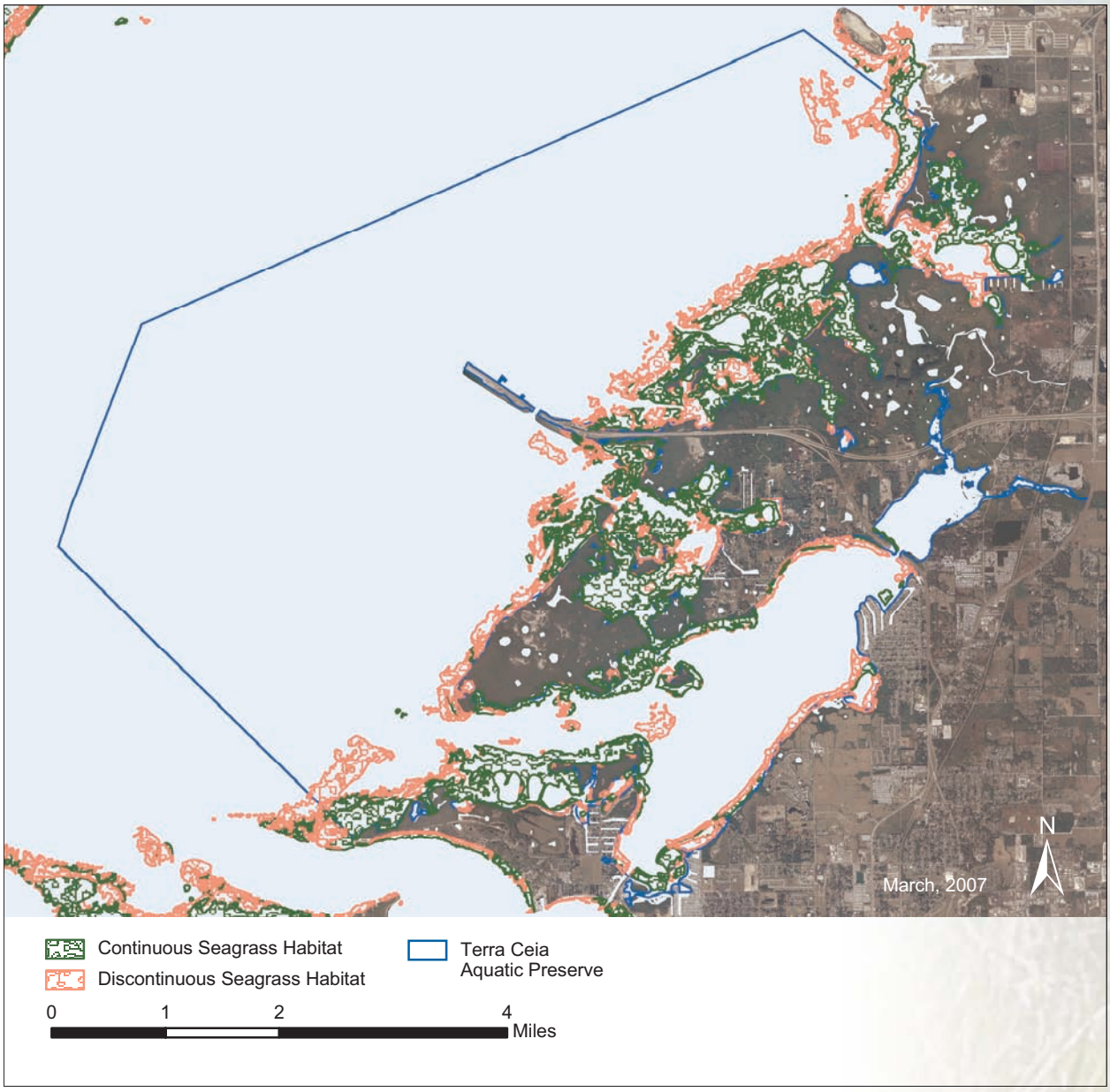
Encourage proper pet sanitation on waterfront areas. Pets like dogs and horses can contribute significant levels of nutrients and coliform bacteria to coastal areas. Managers of preserve access points (launches, waterfront parks, etc.) should be encouraged to provide waste pickup stations for dog owners. Should equestrian activities become popular adjacent to the preserve, riders should be encouraged to keep wastes out of the aquatic environment.

Integrated Strategies / **Ecosystem Science** - Add literature addressing pet sanitation in coastal areas to TBAP literature database.

Integrated Strategies / **Resource Management** - Preserves staff should take notice of the presence and condition of pet cleanup bag stations and should encourage the maintenance of them by their respective management entities.

Integrated Strategies / **Education and Outreach** - Include informational signs on the hazards of pet waste at access points.

Integrated Strategies / **Public Use** - Possibly provide individual dog cleanup bag dispensers that can



Map 13 / Seagrass Beds of Terra Ceia Aquatic Preserve

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Good water quality is necessary for seagrass beds to thrive.

be attached to boat console, leash, etc.

*5.4 / **Issue Three: Direct Impacts to Submerged Resources***

Shallow nearshore areas comprise the most diverse and productive habitat acreage of the TCAP. They also are the most susceptible to prop dredging, vessel grounding and other direct impacts. Bishop Harbor is a good example, within the preserve, of an area where mechanisms of habitat degradation are understood and may be addressed through collaborative efforts. Efforts to reduce degradation in Bishop Harbor and the protocols to be established in monitoring them, likely will serve in the development of future similar efforts in Miguel Bay and Terra Ceia Bay.

Goal One

Minimize ongoing degradation of submerged resources in Bishop Harbor. For several decades, several processes have been at work to diminish the water quality of Bishop Harbor. Within the next few years, TBAP and others will complete several actions that should result in measurable improvements in turbidity and other parameters. For several years, TBAP has given input into the process of permanently closing the defunct Piney Point Phosphate facility which was a major source of degradation. FDEP has collaborated with SWFWMD to plan a stabilization of the eroding dredge-and-fill are in the southeast quadrant of the harbor. TBAP also laid the groundwork to clean up the improvised boat launch "facility." The remaining need to be addressed by TBAP is the direct impacts of boats to the shallow resources in the harbor. Collectively, these actions should improve water quality to the point that measurable increases in seagrass acreage will follow.

Objective One

Reduce the frequency of prop scarring on Bishop Harbor shoals. Bishop Harbor has a swash channel that is deeper than the surrounding shoals and seagrass beds. To reduce the frequency of commonly-observed prop scarring, the channel should be marked and indications of controlling depths and related conditions should be made available to boaters.

Integrated Strategies / **Ecosystem Science** - Produce a baseline GIS map of Bishop Harbor's shoals,

swash channel and prop scarring. And resurvey prop scars on an annual basis to track changes.

Integrated Strategies / **Resource Management** - Mark the Bishop Harbor swash channel to direct boats away from shoals

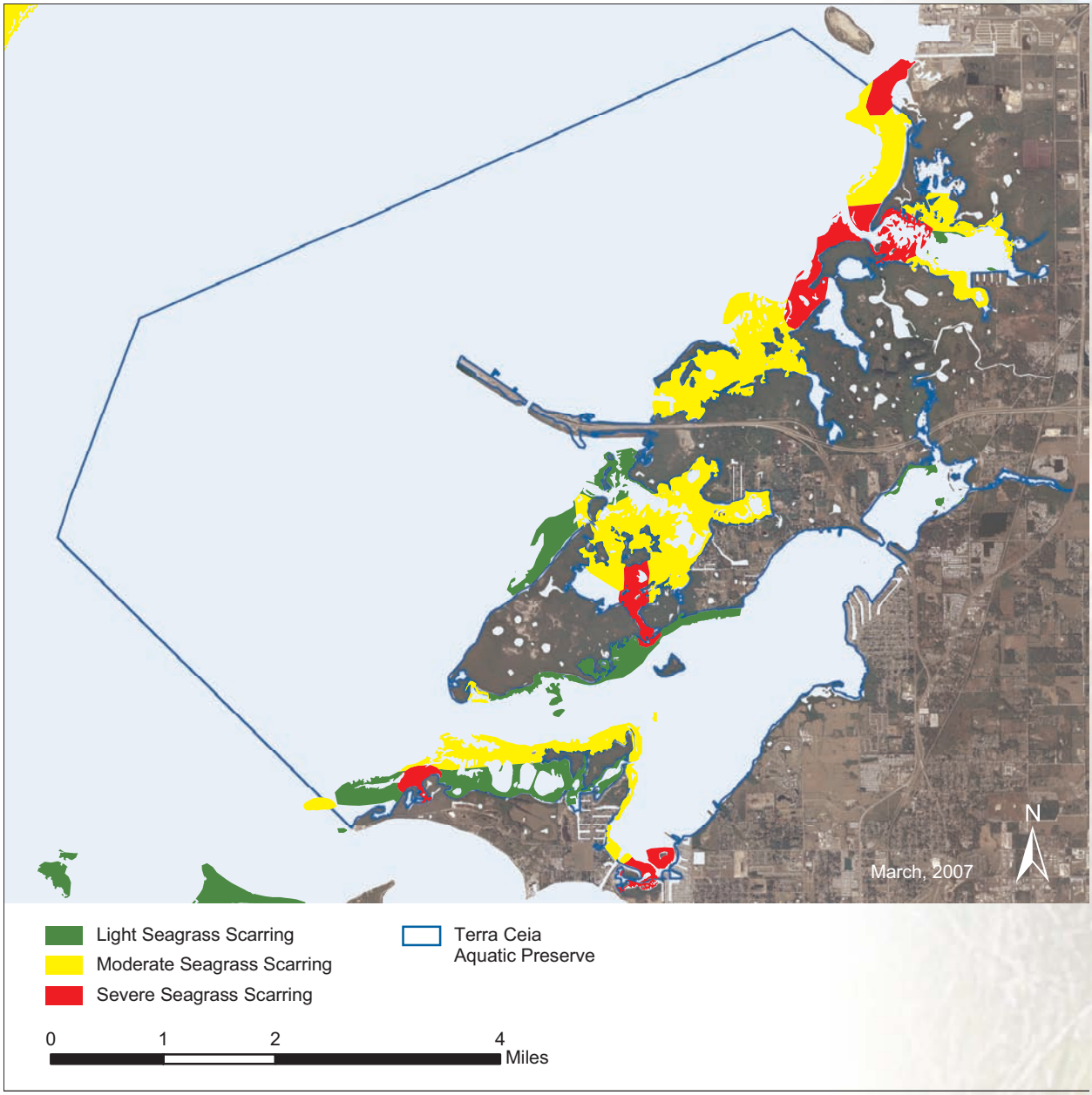
Integrated Strategies / **Education and Outreach** - Add information on the importance of seagrass and seagrass-friendly boating to access points

Integrated Strategies / **Public Use** - Give technical assistance in the design of the Bishop Harbor Boat Launch facility to accommodate only appropriate numbers and sizes of boats in Bishop Harbor. Priovide on-site indicators of controlling depths and tides.

Integrated Strategies / **Partnering** - DEP Division of Recreation and Parks, Port Manatee

Objective Two

Continue to facilitate/enhance improvements in water quality conditions that enhance seagrass expansion in Bishop Harbor. Depths in the eastern end of Bishop Harbor appear to be suitable for shoal grass and turtlegrass, but most seagrass is concentrated in the western end. An obvious turbidity gradient is present across the harbor. Sediments eroding from the old dredge-and-fill site in the eastern end are resuspended by wind-driven waves and prop dredging. By stabilizing sediments at the source and by informing boaters about environmentally-sound boating practices, conditions may be improved



Map 14 / Seagrass Scarring of Terra Ceia Aquatic Preserve

Draft 070330

to result in considerable additional seagrass acreage.

Integrated Strategies / **Ecosystem Science** - Assist with ongoing seagrass monitoring efforts. Monitor water quality parameters with the Bishop Harbor datasonde station.

Integrated Strategies / **Resource Management** - Participate in planning shoreline stabilization efforts, and improvements to the Bishop Harbor Boat Launch.

Integrated Strategies / **Education and Outreach** - Make information from the Clean Boating Partnership available at the boat launch.

Integrated Strategies / **Partnering** - DEP's Division of Recreation and Parks, DEP's Water Resources Division, SWFWMD-SWIM, USGS, USF

5.5 / Issue Four - Disaster/Contingency Planning

The location of the preserve near the main Tampa Ship Channel, Port Manatee and intense recreational boating all make it likely that events requiring emergency actions will occur. Contingency planning and robust communications mechanisms will reduce the need for decisions to be made in haste as an event unfolds.

Goal One

Prepare for rapid response and interagency communication in the event of spills.

Objective One

Maintain partnerships and communications channels necessary for effective spill response.

Integrated Strategies / **Education and Outreach** - Distribute program identity and contact information.

Integrated Strategies / **Partnering** - DEP-Bureau of Emergency Response, USCG, Port Manatee, Florida Power.

Objective Two

Produce spill contingencies document – A document is needed to serve as a guide for various agencies and groups responding to spills, groundings, etc. This document would be a general guide to A.P. resources, points of protection (e.g. channels to be boomed) and any other information that experience has shown to be valuable to resource protection "on the fly."

Integrated Strategies / **Ecosystem Science** - Use existing and targeted on-site resource inventories and current circulation models from the P.O.R.T.S. System.

Integrated Strategies / Resource Management - Ground-truth locations of tidal passes that would be boomed for maximum protection of resources in embayments.

Integrated Strategies / **Education and Outreach** - Produce a map-based laminated document reflecting resources to be protected and strategies to be used in the field by responders.

Integrated Strategies / **Partnering** - DEP-Bureau of Emergency Response, USCG, Port Manatee, Florida Power.

Objective Three

If prudent, encourage the permanent staging of spill control equipment. Because of the difficulty of launching boats and gear like spill booms near remote areas of the preserve, it may be prudent to work with other agencies to stage materials in containers in remote areas. If so, provisions must be made for the maintenance and deployment responsibilities.

Integrated Strategies / **Ecosystem Science** - Analyze response time for various spill scenarios.

Integrated Strategies / **Resource Management** - Evaluate any adverse impacts of possible boom staging sites.

Integrated Strategies / **Education and Outreach** - dentifying signs/markings should be placed on any staged equipment containers.

Integrated Strategies / **Partnering** - DEP-Bureau of Emergency Response, USCG, Port Manatee, Florida Power.

Terra Ceia Aquatic Preserve is a popular resource for kayakers of all ages.

Part Six

Additional Plans

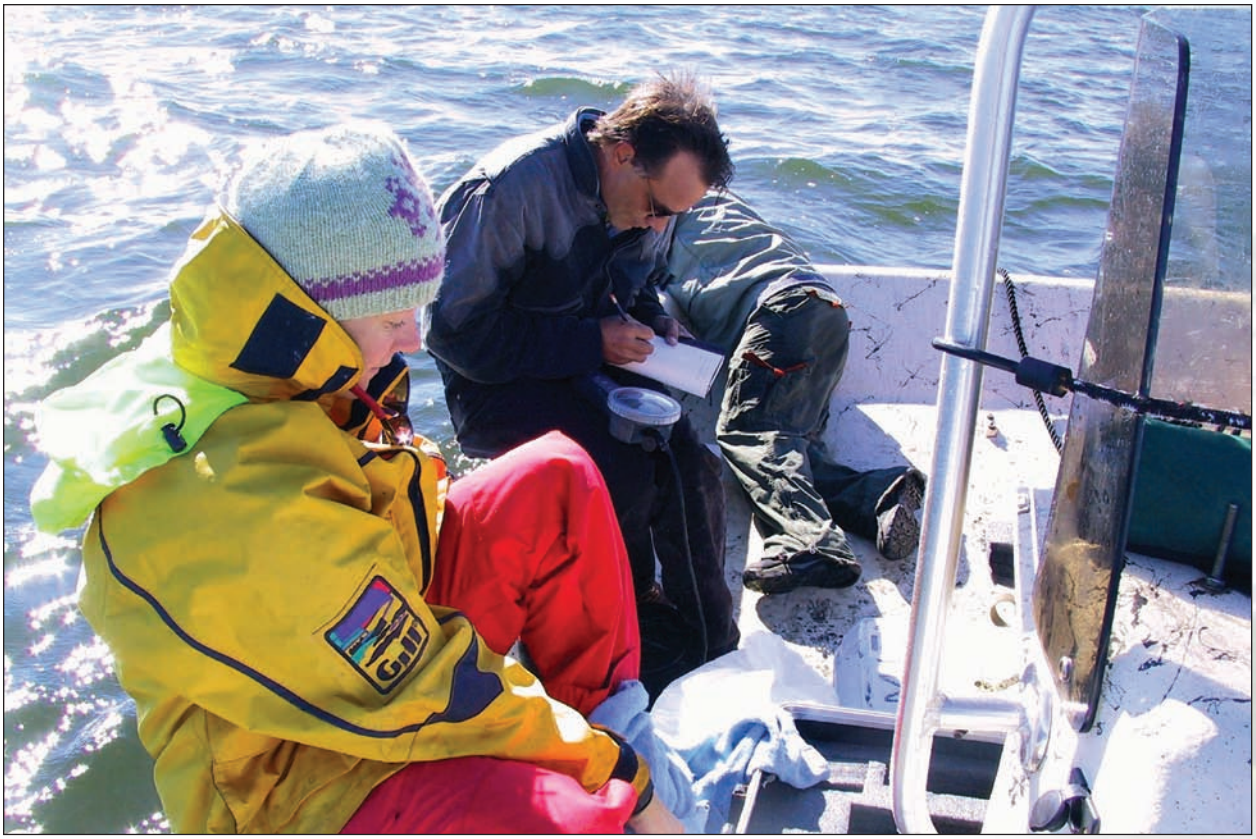
Chapter Six

Administrative Plans

The Tampa Bay Aquatic Preserves program has a staff of three FTE positions (two field and one administrative) and one OPS position to manage four aquatic preserves, totaling nearly 400,000 acres, in three counties. The management goals for the Terra Ceia Aquatic Preserve must be balanced with the program's other responsibilities, and it must be done with new issues emerging frequently. To this end, an effective and efficient planning cycle has evolved. The TBAP program maintains a program-wide strategic plan with a planning horizon of 5-10 years. This timeframe accommodates anticipation of vehicle replacements, facilities needs and changing staffing needs. The plan also lists "big picture" goals for the direction of the program.

The strategic plan is revisited early each calendar year. By checking to determine whether the goals of the strategic plan are still valid, the staff sets the stage for developing individual staff action plans for the next fiscal year. Individual staff action plans include a summary of workload duties, descriptions of projects for the upcoming fiscal year, training and equipment needs and project timelines. The preserves manager looks at these individual plans and their timelines together to detect likely equipment and staffing bottlenecks for the upcoming fiscal year. This annual planning cycle is timed to generate realistic budgetary needs before the annual budget request is submitted.

To carry out planned activities, limited staff resources are supplemented by active intern and volunteer programs. A computer-based volunteer coordination system is being refined. Colleges, grade schools, nonprofit organizations, corporate groups and other agencies all have been valuable sources of volunteer staffing supplements



Terra Ceia staff conducting monitoring studies on Terra Ceia Bay.

Chapter Seven

Facilities Plans

Vehicles and Vessels – All major vehicles and vessels deemed necessary in the strategic plan have been acquired. As part of the program's strategic planning cycle, the suitability and condition of all vehicles and vessels in the program are reevaluated annually.

Vessels and the functional "niches" they fill include the following:

- **Kayaks** – for navigating the many narrow channels, creeks and shallow areas
- **14' johnboat** – for transporting equipment in narrow channels
- **16' vee-hull runabout** – for open water and convenient trailering
- **19' shallow-draft skiff** – for transporting equipment into shallow areas
- **25' Mako** – for transporting more equipment and people and for open, choppy water in the open bay and offshore areas
- **Zodiac** – as a tender for the Mako in shallow areas

Vehicles and their functional "niches" include the following:

- **F-350** for towing the Mako
- **F-250 4x4** for towing the smaller boats and accessing off-road sites
- **Ford Taurus sedan** for economical travel to meetings and errands

The program had a definite facilities development plan until the agency reorganized in 2004. This plan included the following components to be developed at the present site occupied by the program:

- **office space**
- **small indoor and outdoor interpretive facility** for interpretation of the results of the Tampa Bay Study and ongoing research

- **small research lab** for microscope work, aquariums, etc.
- **small shop** area for assembling, repairing and calibrating field equipment
- **quarters** for visiting scientists to stay overnight and work.

Buildings and Grounds - At present, there is uncertainty as to the facilities available for the program at Terra Ceia. While the location of the present facilities is especially suitable for the program's resource management, research and education/outreach activities, the future availability of those facilities for these needs has not been set. The program is working to determine the fate and availability of these facilities and the availability of alternative facilities, should the present facilities not be available.

Lists of Appendices

Appendix A

Legal Documents

A.1 / Aquatic Preserve Resolution

A.2 / Florida Statutes (F.S.)

A.3 / Florida Administrative Code (F.A.C.)

A.4 / Management Agreements

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

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

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

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

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

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

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

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

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

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

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

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

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

(6) Neither the establishment nor the management of an aquatic preserve shall infringe upon the lawful and traditional riparian rights o private property owners adjacent to a preserve. In furtherance of these rights, reasonable improvement for ingress and egress, mosquito control, shore protection and similar purposes may be permitted by the State of Florida Board of Trustees of the Internal Improvement Trust Fund and other jurisdictional agencies, after review and formal concurrence by any specifically designated managing agency for the preserve in question.

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

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

CLAUDE R. KIRK, JR, Governor
TOM ADAMS, Secretary of State
EARL FAIRCLOTH, Attorney General
FRED O. DICKINSON, JR., Comptroller
BROWARD WILLIAMS, Treasurer
FLOYD T. CHRISTIAN, Commissioner of Education
DOYLE CONNER, Commissioner of Agriculture

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

- ***Florida Statutes, Chapter 253: State Lands***

  www.leg.state.fl.us/Statutes/index.cfm?App_mode=Display_Statute&URL=Ch0253/titl0253.htm

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

  www.leg.state.fl.us/Statutes/index.cfm?App_mode=Display_Statute&URL=Ch0258/ch0258.htm

  Part II (Aquatic Preserves):

  http://www.leg.state.fl.us/Statutes/index.cfm?App_mode=Display_Statute&URL=Ch0258/part02.htm

- ***Florida Statutes, Chapter 370: Saltwater Fisheries***

  www.leg.state.fl.us/Statutes/index.cfm?App_mode=Display_Statute&URL=Ch0370/titl0370.htm

- ***Florida Statutes, Chapter 372: Wildlife***

  www.leg.state.fl.us/Statutes/index.cfm?App_mode=Display_Statute&URL=Ch0372/titl0372.htm

- ***Florida Statutes, Chapter 403: Environmental Control***

  (Statute authorizing FDEP to create Outstanding Florida Waters is at 403.061(27))

  www.leg.state.fl.us/Statutes/index.cfm?App_mode=Display_Statute&URL=Ch0403/ch0403.htm

A.3 / Florida Administrative Codes (F.A.C.)

- ***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

A.4 / Management Agreements

A.4.1 / Memorandums of Understanding (MOU) and Memorandums of Agreement (MOA)

A.4.2 / Other Agreements

Appendix B

Resource Data

Acronym	Definition
ANERR	Apalachicola National Estuarine Research Reserve
AP	Aquatic Preserve
ARC	Acquisition and Restoration Council
BTIITF	Board of Trustees of the Internal Improvement Trust Fund
CAMA	Coastal and Aquatic Managed Areas
CARL	Conservation and Recreational Lands
CBRA	Coastal Barrier Resources Act
CDMO	Centralized Data Management Office
CFR	Code of Federal Regulations
CICEET	Coastal and Estuarine Environmental Technology
CRCP	Coral Reef Conservation Program
CSO	Citizen Support Organization
CTP	Coastal Training Program
CZM	Coastal Zone Management
CZMA	Coastal Zone Management Act
DNR	Department of Natural Resources (now DEP)
DSL	Division of State Lands
EEL	Environmentally Endangered Lands
ERD	Estuarine Reserves Division
F.A.C.	Florida Administrative Code
F.A.W.	Florida Administrative Weekly
FCMP	Florida Coastal Management Program
FDACS	Florida Department of Agricultural and Consumer Services
FDEP	Florida Department of Environmental Protection
FDOF	Florida Department of Agricultural and Consumer Services, Division of Forestry
FEPPC	Florida Exotic Pest Plant Council
FKNMS	Florida Keys National Marine Sanctuary
FLUCCS	Florida Land Use Cover and Forms Classification System
FNAI	Florida Natural Area Inventory
F.S.	Florida Statutes
FWC	Florida Wildlife Commission
GEMS	Gulf Ecological Management Sites
GRF	Graduate Research Fellowship
GTMNERR	Guana Tolomato Matanzas National Estuarine Research Reserve
IAC	Interagency Advisory Committee
ICW	Intracoastal Waterway
LATF	Land Acquisition Trust Fund
LBR	Legislative Budget Request
MAG	Management Advisory Group
MOA	Memorandum of Agreement
MOU	Memorandum of Understanding
NC	Natural Communities
NERR	National Estuarine Research Reserve
NMS	National Marine Sanctuary
NOAA	National Oceanic and Atmospheric Administration
NOS	National Ocean Service
OCRM	Office of Ocean and Coastal Resource Management
OFW	Outstanding Florida Water
RBNERR	Rookery Bay National Estuarine Research Reserve
SFA	Stewardship Focus Area
SHCA	Strategic Habitat Conservation Area
SWMP	System-wide Monitoring Program
UNH	University of New Hampshire
U.S.C.	United States Code
U.S.D.A.	United States Department of Agriculture
WMD	Water Management District

B.4.1 / Native Species Within and Adjacent to the Terra Ceia Aquatic Preserve

Common Name	Species Name	State Status	Federal Status
Plants			
Phylum Pterophyta (Ferns)			
leather fern	*Acrosticum sp.*		
Pinophyta (Cone-bearing plants)			
Australian pine	*Casuarina equisetifolia*	X	
Magnoliophyta (Flowering plants)			
Class Liliopsida (Grass-like flowering plants)			
turtle grass	*Thalassia testudinum*		
manatee grass	*Syringodium filiforme*		
shoal grass	*Halodule wrightii*		
star grass	*Halophila englemannii*		
widgeongrass	*Ruppia maritima*		
needlerush	*Juncus romerianus*		
swamp lilly	*Crinum americanum*		
butterfly orchid	*Encyclia tampensis*		
alligator weed	*Alternanthera philoxeroides*	X	
smooth cordgrass	*Spartina* alterniflora		
taro	*Colocasia esculenta*	X	
torpedo grass	*Panicum repens*	X	
water hyacinth	*Eichhornia crassipes*	X	
Class Magnoliopsida (Woody flowering plants)			
red mangrove	*Rhizophora mangle*		
black mangrove	*Avicennia germinans*		
white mangrove	*Laguncularia racemosa*		
buttonwood	*Conocarpus erectus*		
live oak	*Quercus virginiana*		
red cedar	*Juniperus virginiana*		
Brazilian pepper	*Schinus terebinthifolius*	X	
Green Algae			
sea down	*Bryopsis plumosa*		
algae	*Caulerpa mexicana*		
algae	*Caulerpa racemosa*		
algae	*Caulerpa sertularioides*		
algae	*Cladophora sp.*		
algae	*Cladophoropsis sp.*		
sea lettuce	*Ulva fasciata*		
sea lettuce	*Ulva lactuca*		
algae	*Halimeda sp.*		
deadman's fingers	*Codium spp.*		
algae	*Enteromorpha flexuosa*		
gut weed	*Enteromorpha intestinalis*		
Red Algae			
algae	*Agardhiella subulata*		
algae	*Acanthophora spicifera*		

Legend: T = Threatened • E = Endangered • SSC = Species of Special Concern (please select in **Fed. & State Status** columns above)

Draft 070330

Common Name	Species Name	State Status	Federal Status
algae	*Centroceras clavulatum*		
algae	*Ceramium avalone*		
algae	*Dasya baillouviana*		
algae	*Halymenia sp.*		
algae	*Heterosiphonia gibbesii*		
algae	*Hypnea cervicornis*		
algae	*Hypnea cornuta*		
algae	*Hypnea musciformis*		
hooked redweed	*Hypnea spinella*		
algae	*Hypnea valentiae*		
algae	*Gracilaria armata*		
algae	*Gracilaria blodgeettii*		
algae	*Gracilaria cervicornis*		
algae	*Gracilaria mammilaris*		
algae	*Gracilaria damaecornis*		
algae	*Gracilaria verrucosa*		
algae	*Laurencia sp.*		
algae	*Meristiella acanthocladum*		
algae	*Solieria tenera*		
algae	*Spyridia sp.*		
algae			
algae	*Dictyota sp.*		
Brown Algae			
sargassum	*Sargassum filipendula*		
sargassum	*Sargassum vulgare*		
algae	*Padina sp.*		
Phytoplankton			
diatoms	*Amphiprora sp.*		
diatoms	*Amphora sp.*		
diatoms	*Biddulphia sp.*		
diatoms	*Coscinodiscus sp.*		
diatoms	*Grammatophora marina*		
diatoms	*Gyrosigma sp.*		
diatoms	*Navicula clavata*		
diatoms	*Navicula ssp.*		
diatoms	*Nitzschia closterium*		
diatoms	*Pleurosigma sp.*		
diatoms	*Striatella unipunctata*		
diatoms	*Thalassiothrix sp.*		
diatoms	*Anacystis sp.*		
diatoms	*Lyngbya sp.*		
diatoms	*Microcystis sp.*		
diatoms	*Oscillatoria sp.*		
dinoflagellates	*Exuvialla sp.*		
dinoflagellates	*Goniaulax sp.*		

Legend: T = Threatened • E = Endangered • SSC = Species of Special Concern (please select in **Fed. & State Status** columns above)

Common Name	Species Name	State Status	Federal Status
Animals			
Phylum Cnidaria (Jellyfish and Anemones)			
Hydrozoan	*Hydrozoa sp.*		
anemone	*Actinaria sp.*		
anemone	*Actinaria sp.b*		
anemone	*Athenaria sp.*		
Burrowing anemone	*Haloclava Cf. Producta*		
Anemone	*Thenaria sp.*		
Anemone	*Thenaria Sp. A Of EPC*		
Phylum Platyhelminthes (Flatworms)			
flat worm	*Turbellaria sp.*		
flat worm	*Eustylochus meridianalis*		
Phylum Nemertea (Ribbon worms)			
ribbon worm	*Nemertea sp.*		
ribbon worm	*Archinemertea Sp. A Of Epc*		
ribbon worm	*Tubulanus pellucidus*		
ribbon worm	*Tubulanus sp. A of EPC*		
ribbon worm	*Tubulanus sp. B of EPC*		
ribbon worm	*Micrura leidyi*		
ribbon worm	*Amphiporus bioculatus*		
ribbon worm	*Amphiporus sp. A of EPC*		
ribbon worm	*Zygonemertes virescens*		
	Tetrastemma candidum		
Phylum Annelida (Segmented worms)			
polychaete worm	*Polynoidae*		
polychaete worm	*Malmgreniella maccraryae*		
polychaete worm	*Malmgreniella taylori*		
polychaete worm	*Polynoidae genus D*		
polychaete worm	*Sthenelais sp. A* of Wolf,1984		
polychaete worm	*Bhawania heteroseta*		
polychaete worm	*Phyllodocidae sp.*		
polychaete worm	*Phyllodoce groenlandica*		
polychaete worm	*Eteone heteropoda*		
polychaete worm	*Nereiphylla castanea*		
polychaete worm	*Paranaitis gardineri*		
polychaete worm	*Nereiphylla fragilis*		
polychaete worm	*Eumida sp. A*		
polychaete worm	*Phyllodoce arenae*		
polychaete worm	*Hesionidae sp.*		
polychaete worm	*Gyptis crypta*		
polychaete worm	*Parahesione luteola*		
polychaete worm	*Ophiodromus obscura*		
polychaete worm	*Podarkeopsis levifuscina*		
polychaete worm	*Ancistrosyllis jonesi*		
polychaete worm	*Sigambra tentaculata*		
polychaete worm	*Synelmis ewingi*		
polychaete worm	*Procerae sp. A*		
polychaete worm	*Pionosyllis sp. D* of Uebelacker, 1984		
polychaete worm	*Pionosyllis nr. ehlersiaeformis*		
polychaete worm	*Syllis cornuta*		

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Common Name	Species Name	State Status	Federal Status
polychaete worm	*Exogone dispar*		
polychaete worm	*Exogone lourei*		
polychaete worm	*Exogone atlantica*		
polychaete worm	*Exogone breviantennata*		
polychaete worm	*Sphaerosyllis aciculate*		
polychaete worm	*Sphaerosyllis taylori*		
polychaete worm	*Sphaerosyllis longicauda*		
polychaete worm	*Sphaerosyllis labyrinthophila*		
polychaete worm	*Grubeosyllis clavata*		
polychaete worm	*Brania wellfleetensis*		
polychaete worm	*Brania sp. A*		
polychaete worm	*Syllides floridanus*		
polychaete worm	*Streptosyllis pettiboneae*		
clam worm	*Nereididae sp.*		
clam worm	*Nereis sp.*		
clam worm	*Ceratonereis irritabilis*		
clam worm	*Nereis acuminate*		
clam worm	*Nereis succinea*		
clam worm	*Nereis falsa*		
clam worm	*Nereis lamellose*		
clam worm	*Platynereis dumerilii*		
clam worm	*Laeonereis culveri*		
polychaete worm	*Nephtys cryptomma*		
polychaete worm	*Aglaophamus verrilli*		
blood worm	*Glyceridae sp.*		
blood worm	*Glycera Americana*		
polychaete worm	*Glycinde solitaria*		
polychaete worm	*Goniadides carolinae*		
polychaete worm	*Onuphidae sp.*		
polychaete worm	*Mooreonuphis sp.*		
tube worm	*Diopatra cuprea*		
polychaete worm	*Mooreonuphis cf. nebulosa*		
polychaete worm	*Kinbergonuphis simoni*		
clam worm	*Lumbrineris latreilli*		
clam worm	*Lumbrineris verrilli*		
clam worm	*Lumbrineris sp. D* of Uebelacker, 1984		
polychaete worm	*Arabella multidentata*		
polychaete worm	*Arabella mutans*		
polychaete worm	*Dorvillea cf. rudolphi*		
polychaete worm	*Pettiboneia sp.*		
polychaete worm	*Scoloplos rubra*		
polychaete worm	*Leitoscoloplos sp.*		
polychaete worm	*Leitoscoloplos fragilis*		
polychaete worm	*Leitoscoloplos robustus*		
polychaete worm	*Aricidea suecica*		
polychaete worm	*Aricidea fragilis*		
polychaete worm	*Aricidea lopezi*		
polychaete worm	*Aricidea philbinae*		
polychaete worm	*Aricidea taylori*		
polychaete worm	*Aricidea allisdari*		
polychaete worm	*Paraonis fulgens*		

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Common Name	Species Name	State Status	Federal Status
polychaete worm	*Paraonella sp.*		
polychaete worm	*Cirrophorus sp.*		
polychaete worm	*Cirrophorus americanus*		
polychaete worm	*Paradoneis cf. lyra*		
polychaete worm	*Laonice cirrata*		
polychaete worm	*Dipolydora socialis*		
polychaete worm	*Polydora cornuta*		
polychaete worm	*Apoprionospio pygmaea*		
polychaete worm	*Prionospio sp.*		
polychaete worm	*Prionospio multibranchiata*		
polychaete worm	*Prionospio heterobranchia*		
polychaete worm	*Prionospio steenstrupi*		
polychaete worm	*Prionospio cristata*		
polychaete worm	*Prionospio perkinsi*		
polychaete worm	*Spio pettiboneae*		
polychaete worm	*Spiophanes bombyx*		
polychaete worm	*Paraprionospio pinnata*		
polychaete worm	*Streblospio sp.*		
polychaete worm	*Scolelepis texana*		
polychaete worm	*Carazziella hobsonae*		
polychaete worm	*Magelona pettiboneae*		
polychaete worm	*Spiochaetopterus costarum*		
polychaete worm	*Cirratulidae sp.*		
polychaete worm	*Caulleriella sp.*		
polychaete worm	*Caulleriella cf. alata*		
polychaete worm	*Caulleriella cf. zetlandica*		
polychaete worm	*Caulleriella sp. D* of Wolf, 1984		
polychaete worm	*Aphelochaeta sp.*		
polychaete worm	*Tharyx sp.*		
polychaete worm	*Tharyx acutus*		
polychaete worm	*Monticellina dorsobranchialis*		
polychaete worm	*Chaetozone sp.*		
polychaete worm	*Cirriformia sp.*		
polychaete worm	*Cirriformia cf. sp. B* of Wolf,1984		
polychaete worm	*Cirriformia sp. A* of Wolf, 1984		
polychaete worm	*Ophelina cf. acuminate*		
polychaete worm	*Armandia maculate*		
polychaete worm	*Travisia hobsonae*		
polychaete worm	*Capitella capitata complex*		
polychaete worm	*Capitella jonesi*		
polychaete worm	*Heteromastus filiformis*		
polychaete worm	*Notomastus hemipodus*		
polychaete worm	*Notomastus americanus*		
polychaete worm	*Notomastus n. sp.*		
polychaete worm	*Mediomastus sp.*		
polychaete worm	*Mediomastus ambiseta*		
polychaete worm	*Mediomastus californiensis*		
polychaete worm	*Leiochrides sp. A*		
polychaete worm	*Maldanidae*		
polychaete worm	*Sabaco americanus*		
polychaete worm	*Asychis elongates*		

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Common Name	Species Name	State Status	Federal Status
polychaete worm	*Axiothella mucosa*		
polychaete worm	*Owenia fusiformis*		
polychaete worm	*Galathowenia oculata*		
polychaete worm	*Sabellaria sp. C of*		
polychaete worm	*Sabellaria sp. A* of Uebelacker, 1984		
polychaete worm	*Augeneriella hummelincki*		
ice cream cone worm	*Pectinaria gouldii*		
polychaete worm	*Ampharetidae*		
polychaete worm	*Hobsonia florida*		
polychaete worm	*Melinna cristata*		
polychaete worm	*Melinna maculate*		
	Isolda pulchella		
	Polycirrus cf. denticulatus		
	Loimia medusa		
	Streblosoma hartmanae		
	Chone sp.		
	Chone cf. Americana		
	Megalomma sp.		
	Branchiomma sp.		
	Megalomma pigmentum		
	Pseudopotamilla cf. reniformis		
	Fabricinuda trilobata		
	Serpulidae sp.		
	Spirorbis spirillum		
	Janua (Dexiospira) steueri		
	Janua (Dexiospira) cf. corrugata		
	Pomatoceros americanus		
	Boguea enigmatica		
	Spirorbidae sp.		
	Enchytraeidae sp.		
	Grania sp.		
	Tubificidae sp.		
	Tubificoides motei		
	Tubificoides brownie		
	Tubificoides wasselli		
	Thalassodrilides sp.		
	Thalassodrilides ineri		
	Tectidrilus squalidus		
Phylum Mollusca (Clams, Snails, Squid)			
Class Gastropoda (Snails)			
	Schwartziella catesbyana		
	Vitrinellidae sp.		
	Cyclostremiscus pentagonus		
	Teinostoma sp.		
	Teinostoma biscaynense		
	Caecum sp.		
beautiful little caecum	*Caecum pulchellum*		
little horn caecum	*Meioceras nitidum*		
	Caecum cf. bipartitum		
	Caecum strigosum		
	Caecum ustulatulina		

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Common Name	Species Name	State Status	Federal Status
	Bittiolum varium		
cerith	*Cerithium muscarum*		
	Melanella sp.		
	Melanella jamaicensis		
	Microeulima hemphilli		
	Calyptraea centralis		
slipper shell	*Crepidula sp.*		
common Atlantic slipper shell	*Crepidula fornicata*		
flat slipper shell	*Crepidula plana*		
spotte slipper shell	*Crepidula maculosa*		
	Tectonatica pusilla		
	Favartia cellulose		
	Astyris lunata		
	Parvanachis obesa		
	Costoanachis semiplicata		
common eastern nassa	*Nassarius vibex*		
	Fasciolaria lilium hunteria		
dwarf olive	*Olivella sp.*		
very small dwarf olive	*Olivella pusilla*		
	Jaspidella blanesi		
	Granulina hadria		
	Dentimargo aureocinctus		
	Gibberula lavalleenana		
	Prunum apicinum		
	Kurtziella atrostyla		
	Pyrgocythara plicosa		
	Stellatoma stellata		
odostome	*Odostominae sp.*		
odostome	*Sayella laevigata*		
odostome	*Odostomia producta*		
odostome	*Odostomia virginica*		
odostome	*Odostomia sp. C (of EPC)*		
impressed odostome	*Boonea impressa*		
odostome	*Eulimastoma sp.*		
odostome	*Eulimastoma weberi*		
odostome	*Eulimastoma teres*		
	Houbricka cf. incise		
turbonilla	*Turbonilla sp.*		
turbonilla	*Turbonilla interrupta*		
turbonilla	*Turbonilla cf conradi*		
Dall's turbonilla	*Turbonilla cf. dalli*		
turbonilla	*Turbonilla textilis*		
turbonilla	*Turbonilla (Pyrigiscus) sp.*		
	Lephalapsidea sp.		
Adams' baby-bubble	*Rictaxis punctostriatus*		
barrel bubble	*Acteocina sp.*		
barrel bubble	*Acteocina canaliculata*		
Orbigny's barrel bubble	*Acteocina bidentata*		
common Atlantic bubble	*Bulla striata*		
paper bubble	*Haminoea sp.*		
paper bubble	*Haminoea succinea*		

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Common Name	Species Name	State Status	Federal Status
paper bubble	*Haminoea elegans*		
paper bubble	*Haminoea antillarum*		
obscure corambe	*Corambe obscura*		
sooty sea hare	*Aplysia brasiliana*		
ragged sea hare	*Bursatella leachii pleii*		
Class Polyplacophora (Chitons)			
fuzzy chiton	*Acanthopleura granulata*		
Class Bivalvia (Clams and Mussels)			
Atlantic nut clam	*Nucula proxima*		
nut clam	*Nuculana acuta*		
transverse ark	*Anadara transversa*		
lateral musculs	*Musculus lateralis*		
scorched mussel	*Brachidontes exustus*		
paper mussel	*Amygdalum papyrium*		
Conrad's false mussel	*Mytilopsis leucophaeta*		
common jingle shell	*Anomia simplex*		
lucina	*Lucinidae sp.*		
many-lined lucina	*Parvilucina multilineata*		
woven lucina	*Lucinisca nassula*		
costate lucina	*Parvilucina costata*		
American oyster	*Crassostrea virginica*		
	Diplodonta semiaspera		
	Orobitella floridana		
	Mysella planulata		
	Erycina floridana		
	Carditamera floridana		
	Laevicardium mortoni		
	Trachycardium egmontianum		
	Mulinia lateralis		
minor jackknife clam	*Ensis minor*		
	Tellinidae sp.		
	Macoma tenta		
	Macoma constricta		
tellin	*Tellina sp.*		
iris telling	*Tellina iris*		
DeKay's dwarf tellin	*Tellina cf. versicolor*		
alternate tellin	*Tellina alternata*		
razor clam	*Tagelus sp.*		
stout razor clam	*Tagelus plebeius*		
purplish razor clam	*Tagelus divisus*		
common Atlantic abra	*Abra aequalis*		
telling-like cumingia	*Cumingia tellinoides*		
	Veneridae sp.		
	Transennella sp.		
	Transennella conradina		
	Transenella stimpsoni		
disk dosinia	*Dosinia discus*		
	Cyclinella tenuis		
venus	*Chione elevate*		
	Anomalocardia auberiana		
	Parastarte triquetra		

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Common Name	Species Name	State Status	Federal Status
	Sphenia antillensis		
	Corbula sp.		
	Corbula contracta		
	Corbula swiftiana		
	Lyonsia floridana		
	Thraciidae sp.		
	Asthenothaerus hemphilli		
Class Scaphopoda (Tusk shells)			
tusk shell	*Antalis pilsbryi*		
Phylum Arthropoda			
Sub-phylum Chelicerata (Spiders, Scorpions)			
horseshoe crab	*Limulus polyphemus*		
orb weaver	*Argiope sp.*		
crab spider	*Gastrocanthus cancriformis*		
Class Crustacea (Crabs, Shrimp, Lobsters)			
	Cephalocardida sp.		
barnacle	*Cirripedia sp.*		
barnacle	*Balanus sp.*		
barnacle	*Balanus improvisus*		
	Nebalia sp.		
myside shrimp	*Mysidopsis spp.*		
myside shrimp	*Americamysis bigelowi*		
myside shrimp	*Mysidopsis furca*		
myside shrimp	*Bowmaniella sp.*		
myside shrimp	*Bowmaniella brasiliensis*		
myside shrimp	*Bowmaniella floridana*		
myside shrimp	*Americamysis stucki*		
cumacean	*Leucon americanus*		
cumacean	*Oxyurostylis spp.*		
cumacean	*Oxyurostylis smithi*		
cumacean	*Oxyurostylis lecroyae*		
cumacean	*Cumella cf. garrityi*		
cumacean	*Almyracuma proximoculi*		
cumacean	*Cyclaspis spp.*		
cumacean	*Cyclaspis cf. varians*		
tanaid	*Kalliapseudes macsweenyi*		
tanaid	*Leptochelia sp.*		
isopod	*Xenanthura brevitelson*		
isopod	*Amakusanthura magnifica*		
isopod	*Paracerceis caudate*		
isopod	*Erichsonella attenuate*		
isopod	*Edotia triloba*		
isopod	*Tropedotea lyonsi*		
amphipod	*Gammaridea sp.*		
amphipod	*Ampelisca sp.*		
amphipod	*Ampelisca abdita*		
amphipod	*Ampelisca vadorum*		
amphipod	*Ampelisca agassizi*		
amphipod	*Ampelisca holmesi*		
amphipod	*Ampelisca sp. C* of LeCroy, 2002		
amphipod	*Amphilochus sp. B*		

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amphipod	*Hourstonius laguna*		
amphipod	*Ampithoe sp.*		
amphipod	*Ampithoe cf. longimana*		
amphipod	*Cymadusa compta*		
amphipod	*Aoridae sp.*		
amphipod	*Lembos unifasciatus*		
amphipod	*Bemlos spinicarpus*		
amphipod	*Bemlos cf. longicornis*		
amphipod	*Paramicrodeutopus cf. myersi*		
amphipod	*Rudilemboides naglei*		
amphipod	*Bemlos rectangulatus*		
amphipod	*Grandidierella bonnieroides*		
amphipod	*Batea catharinensis*		
amphipod	*Cerapus sp.*		
amphipod	*Cerapus sp. C (="tubularis")*		
amphipod	*Monocorophium acherusicum*		
amphipod	*Laticorophium cf. baconi*		
amphipod	*Erichthonius brasiliensis*		
amphipod	*Eusiridae sp.*		
amphipod	*Elasmopus levis*		
amphipod	*Dulichiella appendiculata*		
amphipod	*Acanthohaustorius uncinus*		
amphipod	*Microprotopus raneyi*		
amphipod	*Listriella barnardi*		
amphipod	*Shoemakerella cubensis*		
amphipod	*Hartmanodes nyei*		
amphipod	*Metharpinia floridana*		
amphipod	*Eudevenopus honduranus*		
amphipod	*Stenothoe gallensis*		
amphipod	*Stenothoe cf. Georgiana*		
amphipod	*Metatiron tropakis*		
skeleton shrimp	*Caprellidae-unid.*		
skeleton shrimp	*Deutella incerta*		
skeleton shrimp	*Paracaprella sp.*		
shrimp	*Rimapenaeus constrictus*		
grass shrimp	*Palaemonidae sp.*		
grass shrimp*	*Palaemonetes spp.**		
caridean shrimp	*Periclimenes americanus*		
caridean shrimp	*Periclimenes longicaudatus*		
green snapping shrimp	*Alpheus normanni*		
snapping shrimp	*Alpheus angulatus*		
	Hippolyte pleuracantha		
	Hippolyte zostericola		
	Latreutes parvulus		
arrow shrimp	*Tozeuma carolinense*		
	Ambidexter symmetricus		
pink shrimp	*Farfantepenaeus duorarum*		
hermit crab	*Paguroidea sp.*		
hermit crab	*Paguristes hummi*		
hermit crab	*Paguristes nr. Tortugae*		

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hermit crab	*Pagurus sp.*		
hermit crab	*Pagurus longicarpus*		
hermit crab	*Pagurus stimpsoni*		
hermit crab	*Pagurus gymnodactylus*		
hermit crab	*Pagurus maclaughlinae*		
	Euceramus praelongus		
	Upogebia sp.		
	Upogebia affinis		
	Brachyura sp.		
	Majidae sp.		
decorator crab	*Libinia dubia*		
	Pelia mutica		
	Pitho laevigata		
	Heterocrypta granulate		
	Panopeidae sp.		
	Hexapanopeus angustifrons		
mud crab	*Panopeus sp.*		
	Dyspanopeus texanus		
	Pinnotheridae sp.		
sand dollar crab	*Dissodactylus mellitae*		
	Pinnixa sp.		
	Pinnixa cf. pearsii		
	Pinnixa cf. floridana		
	Pinnixa sp. A (of LeCroy)		
Phylum Sipunculida (Peanut worms)			
peanut worm	*Phascolion sp.*		
peanut worm	*Phascolion cryptum*		
peanut worm	*Phascolion cf. caupo*		
Phylum Phoronida (Horseshoe worms)			
	Phoronis sp.		
	Phoronis architecta		
Phylum Bryozoa (Moss animals)			
moss animal	*Bugula neritina*		
moss animal	*Glottidia pyramidata*		
Phylum Echinodermata (Sea stars, Urchins, Sea Cucumbers)			
brittle star	*Ophiuroidea sp.*		
brittle star	*Hemipholis elongate*		
brittle star	*Amphiuridae sp.*		
brittle star	*Amphipholis squamata*		
brittle star	*Amphipholis gracillima*		
brittle star	*Ophiophragmus sp.*		
brittle star	*Ophiophragmus filograneus*		
brittle star	*Ophiphragmus brachyactus*		
	Amphioplus thrombodes		
	Amphioplus sepultus		
	Micropholis sp.		
	Amphipholis atra		
	Amphipholis sp. A		
sea biscuit	*Echinoidea sp.*		
sand dollar	*Mellita tenuis*		

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sea cucumber	*Holothuroidea sp.*		
burrowing sea cucumber	*Synaptidae sp. A*		
Phylum Enterpneusta (Acorn worms)			
	Enteropneusta sp.		
	Stereobalanus canadensis		
Phylum Chaetognatha (Arrow worms)			
arrow worm	*Chaetognatha sp.*		
Phylum Chordata			
Sub-phylum Cephalochordata (Lancelets)			
Lancelet	*Branchiostoma floridae*		
Sub-phylum Vertebrata (Vertebrates)			
Class Osteichthyes (Bony fishes)			
lined sole	*Achirus lineatus*		
diamond killifish	*Adinia xenica*		
striped anchovy	*Anchoa hepsetus*		
bay anchovy	*Anchoa mitchilli*		
anchovy	*Anchoa spp.*		
sheepshead	*Archosargus probatocephalus*		
hardhead catfish	*Arius felis*		
silver perch	*Bairdiella chrysoura*		
frillfin goby	*Bathygobius soporator*		
menhaden	*Brevoortia spp.*		
blue crab	*Callinectes sapidus*		
snook	*Centropomus undecimalis*		
florida blenny	*Chasmodes saburrae*		
cichlid	*Cichlidae sp.*		
herring	*Clupeidae sp.*		
sand seatrout	*Cynoscion arenarius*		
spotted seatrout	*Cynoscion nebulosus*		
sheepshead minnow	*Cyprinodon variegates*		
atlantic stingray	*Dasyatis Sabina*		
striped mojarra	*Diapterus plumieri*		
threadfin shad	*Dorosoma petenense*		
ladyfish	*Elops saurus*		
silver jenny	*Eucinostomus gula*		
tidewater mojarra	*Eucinostomus harengulus*		
mojarra	*Eucinostomus spp.*		
goldspotted killifish	*Floridichthys carpio*		
marsh killifish	*Fundulus confluentus*		
gulf killifish	*Fundulus grandis*		
striped killifish	*Fundulus majalis*		
killifish	*Fundulus spp.*		
eastern mosquito fish	*Gambusia holbrooki*		
highfin goby	*Gobionellus oceanicus*		
emerald goby	*Gobionellus smaragdus*		
naked goby	*Gobiosoma bosc*		
code goby	*Gobiosoma robustum*		
goby	*Gobiosoma spp.*		
scaled sardine	*Harengula jaguana*		
least killifish	*Heterandria Formosa*		

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dwarf seahorse	*Hippocampus zosterae*		
brown hoplo	*Hoplosternum littorale*		
halfbeak	*Hyporhamphus meeki*		
brook silverside	*Labidesthes sicculus*		
pinfish	*Lagodon rhomboids*		
spot	*Leiostomus xanthurus*		
bluegill	*Lepomis macrochirus*		
spotted sunfish	*Lepomis punctatus*		
sunfish	*Lepomis spp.*		
bluefin killifish	*Lucania goodei*		
rainwater killifish	*Lucania parva*		
highfin blenny	*Lupinoblennius nicholsi*		
gray snapper	*Lutjanus griseus*		
tarpon	*Megalops atlanticus*		
rough silverside	*Membras martinica*		
silverside	*Menidia spp.*		
southern kingfish	*Menticirrhus americanus*		
clown goby	*Microgobius gulosus*		
atlantic croaker	*Micropogonias undulatus*		
largemouth bass	*Micropterus salmoides*		
striped mullet	*Mugil cephalus*		
white mullet	*Mugil curema*		
fantail mullet	*Mugil gyrans*		
mullet	*Mugil spp.*		
leatherjacket	*Oligoplites saurus*		
gulf toadfish	*Opsanus beta*		
blue tilapia	*Oreochromis aureus*		
pigfish	*Orthopristis chrysoptera*		
gulf flounder	*Paralichthys albigutta*		
sailfin molly	*Poecilia latipinna*		
black drum	*Pogonias cromis*		
cownose stingray	*Rhinoptera bonasus*		
drum	*Sciaenidae sp.*		
red drum	*Sciaenops ocellatus*		
sole	*Soleidae sp.*		
southern puffer	*Sphoeroides nephelus*		
redfin needlefish	*Strongylura notata*		
timucu	*Strongylura timucu*		
blackcheek tonguefish	*Symphurus plagiusa*		
chain pipefish	*Syngnathus louisianae*		
gulf pipefish	*Syngnathus scovelli*		
inshore lizardfish	*Synodus foetens*		
tilapia	*Tilapia spp.*		
hogchoker	*Trinectes maculates*		
Class Amphibia (Frogs and Salamanders)			
cuban tree frog	*Osteopilus septentrionalis*		
leopard frog	*Rana pipiens*		
southeastern five-lined skink	*Eumeces inexpectatus*		
Class Reptilia (Reptiles)			
american alligator	*Alligator mississippiensis*		

Legend: T = Threatened • E = Endangered • SSC = Species of Special Concern (please select in **Fed. & State Status** columns above)

Common Name	Species Name	State Status	Federal Status
diamondback terrapin	*Malaclemys terrapin*		
water snake	*Nerodia sp.*		
yellow rat snake	*Elaphe obsoleta quadrivittata*		
red rat snake	*Elaphe obsoleta*		
eastern diamondback rattlesnake	*Crotalus adamanteus*		
cottonmouth	*Agkistrodon piscivorus*		
Eastern indigo snake	*Drymarchon corais couperi*		
leatherback sea turtle	*Dermochelys coriacea*		
green sea turtle	*Chelonia mydas*		
Class Aves (Birds)			
red tail hawk	*Buteo jamaicensis*		
turkey vulture	*Cathartes aura*		
bald eagle	*Haliaeetus leucocephalus*		
red-shouldered hawk	*Buteo lineatus*		
sharp-shinned hawk	*Accipiter striatus*		
osprey	*Pandion haliaetus*		
American kestrel	*Falco sparverius*		
burrowing owl	*Athene cunicularia*		
peregrine falcon	*Falco peregrinus*		
great horned owl	*Bubo virginianus*		
eastern screech-owl	*Otus asio*		
swallow-tailed kite	*Elanoides forficatus*		
laughing gull	*Larus atricilla*		
herring gull	*Larus argentatus*		
ring-billed gull	*Larus delawarensis*		
American avocet	*Recurvirostra Americana*		
sandwich tern	*Sterna sandvicensis*		
royal tern	*Sterna maxima*		
least tern	*Sterna antillarum*	T	T
piping plover	*Charadrius melodus*	T	T
black-bellied plover	*Pluvialis squatarola*		
Wilson's plover	*Charadrius wilsonia*		
semipalmated plover	*Charadrius semipalmatus*		
killdeer	*Charadrius vociferous*		
long-billed curlew	*Numenius americanus*		
black skimmer	*Rynchops niger*		
brown pelican	*Pelecanus occidentails*	SSC	
white pelican	*Pelecanus erythrorhynchos*		
sanderling	*Calidris alba*		
western sandpiper	*Calidris mauri*		
least sandpiper	*Calidris minutilla*		
dunlin	*Calidris alpine*		
marbled godwit	*Limosa fedoa*		
spotted sandpiper	*Actitis macularaia*		
common snipe	*Gallinago gallinago*		
willet	*Catoptrophorus semipalmatus*		
ruddy turnstone	*Arenaria interpres*		
greater yellowlegs	*Tringa melanoleuca*		
lesser yellowlegs	*Tringa flavipes*		
American bittern	*Botaurus lentiginosus*		

Legend: T = Threatened • E = Endangered • SSC = Species of Special Concern (please select in **Fed. & State Status** columns above)

Common Name	Species Name	State Status	Federal Status
American oystercatcher	*Haematopus palliates*	SSC	
black-necked stilt	*Himantopus mexicanus*		
roseate spoonbill	*Ajaia ajaja*	SSC	
anhinga	*Anhinga anhinga*		
great blue heron	*Ardea Herodias*		
little blue heron	*Egretta caerulea*	SSC	
tricolored heron	*Egretta tricolor*	SSC	
snowy egret	*Egretta thula*	SSC	
reddish egret	*Egretta rufescens*	SSC	
black-crowned night-heron	*Nycticorax nycticorax*		
yellow-crowned night-heron	*Nyctanassa violacea*		
green heron	*Butorides virescens*		
wood stork	*Mycteria Americana*	E	
great egret	*Casmerodius albus*		
cattle egret	*Bubulcus ibis*		
double-crested cormorant	*Phalacrocorax auritus*		
magnificent fridatebird	*Fregata magnificens*		
white ibis	*Eudocimus albus*	SSC	
sandhill crane	*Grus Canadensis*	T	
limpkin	*Aramus guarauna*		
mottled duck	*Anas fulvigula*		
mallard	*Anas platyrhynchos*		
blue-winged teal	*Anas discors*		
green-winged teal	*Anas carolinensis*		
northern shoveler	*Anas clypeata*		
wood thrush	*Hylocichla mustelina*		
prothonotary warbler	*Protonotaria citrea*		
worm-eating warbler	*Helmitheros vermivorus*		
American robin	*Turdus migratorius*		
mangrove cuckoo	*Coccyzus minor*		
lesser scaup	*Aythya affinis*		
red-breasted merganser	*Mergus serrator*		
Class Mammalia (Mammals)			
West Indian manatee	*Trichechus manatus*		
Atlantic bottlenose dolphin	*Stenella frontails*		
humans	*Homo sapiens*		
raccoon	*Procyon lotor*		
river otter	*Lutra Canadensis*		
freetail bat	*Tadarida brasiliensis*		
Seminole bat	*Lasiurus seminolus*		
evening bat	*Nycticeius humeralis*		
yellow bat	*Lasiurus intermedius*		
big brown bat	*Eptesicus fuscus*		
marsh rabbit	*Sylvilagus palustris*		
opossum	*Didelphis marsupialus*		
nine-banded armadillo	*Dasypus novemcinctus*		
cotton rat	*Signodon hispidus*		
black rat	*Rattus rattus*		

Legend: T = Threatened • E = Endangered • SSC = Species of Special Concern (please select in **Fed. & State Status** columns above)

Draft 070330

B.4.2 / Invasive Non-native Species List

Common Name	Species Name	State Status	Federal Status
Plants			
Brazilian pepper	Schinus terebinthifolius		
melaleuca	Melaleuca quinquenervia		
Australian pine	Cassurina equisitifolia		
alligator weed	Alternanthera philoxeroides		
taro	Colocasia esculenta		
torpedo grass	Panicum repens		
water hyacinth	Eichhornia crassipes		
Mollusks & Crustaceans			
Asian green mussel	Perna viridis		

B.4.3 / Problem Species List

Common Name	Species Name	State Status	Federal Status
Plants			
southern cattail	*Typha domingensis*		
Mammals			
raccoon	*Procyon lotor*		

81 Natural Communities are classified by the Florida Natural Areas Inventory (FNAI). A Natural Community (NC) 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.

3 Levels of Natural Communities

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

7 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 Terra Ceia Aquatic Preserve

MARINE AND ESTUARINE

Mineral Based

Consolidated Substrate – characterized as expansive, relatively open areas of subtidal, intertidal, and supratidal zones which lack dense populations of sessile plant and animal species. Are solidified rock or shell conglomerates and include coquina, limerock or relic reef materials.

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

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

Algal Bed – characterized as large populations of nondrift 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 waveenergy 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 NCs. 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 NCs are temporary pending comparison and coordination with other states using this methodology to classify and rank vegetation types. (Contact Florida Natural Areas Inventory for most recent natural community ranks.) A few NCs and several Plant Communities occur only or mostly in Florida and can be considered endemic to Florida. (See J.W. Muller et al. 1989. “Summary Report on the Vascular Plants, Animals and Plant Communities Endemic to Florida”. Florida Game and Fresh Water Fish Commission, Nongame Wildlife Program, Technical Report No. 7.) 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

G3 S3 Consolidated Substrate

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

G3 S3 Tidal Swamp

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 / AdvisoryCommittee

C.2 / Public Scoping Meeting

C.3 / Formal Public Meeting

C.3.4 / Summary of the Formal Public Meeting(s) (to come)

C.3.5 / Comments from the Formal Public Meeting(s) (to come)

C.1 / Advisory Committee

The following Appendixes contain information about who serves on the Advisory Committee, when meetings were held, copies of the public advertisements for those meetings, and summary of each meeting (as required by Ch. 259.032(10), F.S.)

C.1.1 / Terra Ceia Aquatic Reserve Advisory Committee (AC) Members

Name	Affiliate	County
Bergeron, Donald	DEP-Dept of Recs & Parks	Manatee
Brown, Rob	Manatee County Environmental Management	Manatee
Burger, Bill	Local Land Owner	Manatee
Eckenrod, Dick	Tampa Bay Estuary Program	Pinellas
Henningsen, Brandt	SWFWMD-SWIM	Hillsborough
Hodgson, Ann	Natl. Audubon Coastal Islands Sanctuaries/ Manager of Washburn Sanctuary	Hillsborough
Isiminger, George	Port Manatee	Manatee
McDonald, John	Local Land Owner	Manatee
McIvor, Carole	USGS - Large Research Program	Pinellas
Nobbe, Rachel	Local Fishing Guide	Manatee
Paul, Ann	Natl. Audubon Coastal Islands Sanctuaries/ Manager of Washburn Sanctuary	Hillsborough
Styron, Ed	Tampa Bay Sea Kayakers	Pinellas

C.1.2 / Meeting dates, times, and attendance

October 30, 2006, 7:00 P.M.

Name	*Affiliation*	*County*	*AC Member*
Bareford, Karen	DEP-Central Office	Leon	
Bergeron, Donald	DEP-Dept of Recs & Parks	Manatee	X
Brown, Rob	Manatee County Environmental Management	Manatee	X
Burger, Bill	Local Land Owner/Archeologist	Manatee	X
Carnahan, Libby	DEP-Tampa Bay Aquatic Preserves	Manatee	
Eckenrod, Dick	Tampa Bay Estuary Program	Pinellas	X
Hemmel, Kurt	Aquaculture Business Owner	Manatee	
Henningsen, Brandt	SWFWMD-SWIM	Hillsborough	X
Krzystan, Andrea	DEP-Tampa Bay Aquatic Preserves	Manatee	
Lytton, Gary	DEP-RBNERR	Collier	
Mathis, Christine	DEP-Tampa Bay Aquatic Preserves	Manatee	
McDonald, John	Local Land Owner	Manatee	X
McIvor, Carol	USGS-Large Research Program	Pinellas	X
Nobbe, Rachel	Local Fishing Guide	Manatee	X
Runnels, Randy	DEP-Tampa Bay Aquatic Preserves	Manatee	
Samek, Kelly	DEP-Office of General Counsel	Leon	
Styron, Ed	Tampa Bay Sea Kayakers	Pinellas	X

November 28, 2006, 7:00 P.M.

Name	*Affiliation*	*County*	*AC Member*
Bareford, Karen	DEP-Central Office	Leon	
Bergeron, Donald	DEP-Dept of Recs & Parks	Manatee	X
Brown, Rob	Manatee County Environmental Management	Manatee	X
Burger, Bill	Local Land Owner/Archeologist	Manatee	X
Carnahan, Libby	DEP-Tampa Bay Aquatic Preserves	Manatee	
Eckenrod, Dick	Tampa Bay Estuary Program	Pinellas	X
Foster, Mary	Florida Native Plant Society	Manatee	
Henningsen, Brandt	SWFWMD-SWIM	Hillsborough	X
Isiminger, George	Port Manatee	Manatee	X
Krzystan, Andrea	DEP-Tampa Bay Aquatic Preserves	Manatee	
Mathis, Christine	DEP-Tampa Bay Aquatic Preserves	Manatee	
McDonald, John	Local Land Owner	Manatee	X

Nobbe, Rachel	Local Fishing Guide	Manatee	X
Runnels, Randy	DEP-Tampa Bay Aquatic Preserves	Manatee	
Samek, Kelly	DEP-Office of General Counsel	Leon	

February 5, 2007, 7:15 P.M.

Name	*Affiliation*	*County*	*AC Member*
Bergeron, Donald	DEP-Dept of Recs & Parks	Manatee	X
Brown, Rob	Manatee County Environmental Management	Manatee	X
Burger, Bill	Local Land Owner/Archeologist	Manatee	X
Carnahan, Libby	DEP-Tampa Bay Aquatic Preserves	Manatee	
Eckenrod, Dick	Tampa Bay Estuary Program	Pinellas	X
Henningsen, Brandt	SWFWMD-SWIM	Hillsborough	X
Krzystan, Andrea	DEP-Tampa Bay Aquatic Preserves	Manatee	
Mathis, Christine	DEP-Tampa Bay Aquatic Preserves	Manatee	
McDonald, John	Local Land Owner	Manatee	X
Runnels, Randy	DEP-Tampa Bay Aquatic Preserves	Manatee	
McIvor, Carol	USGS-Large Research Program	Pinellas	X
Lytton, Gary	DEP-RBNERR	Collier	
Styron, Ed	Tampa Bay Sea Kayakers	Pinellas	X

March 12, 200, 7:15 P.M.

Name	*Affiliation*	*County*	*AC Member*
Bareford, Karen	DEP-Tallahassee	Leon	
Bergeron, Donald	DEP-Dept of Recs & Parks	Manatee	X
Burger, Bill	Local Land Owner/Archeologist	Manatee	X
Carnahan, Libby	DEP-Tampa Bay Aquatic Preserves	Manatee	
Greening, Holly	Tampa Bay Estuary Program (For Dick Eckenrod)	Pinellas	X
Henningsen, Brandt	SWFWMD-SWIM	Hillsborough	X
Krzystan, Andrea	DEP-Tampa Bay Aquatic Preserves	Manatee	
Mathis, Christine	DEP-Tampa Bay Aquatic Preserves	Manatee	
McDonald, John	Local Land Owner	Manatee	X
McIvor, Carol	USGS-Large Research Program	Pinellas	X
Porterfield, Eric	DEP-Tallahassee	Leon	
Runnels, Randy	DEP-Tampa Bay Aquatic Preserves	Manatee	

C.1.3 / Florida Administrative Weekly (F.A.W.) Posting

Item 1: Florida Administrative Weekly Section VI, Volume 32, Number 41, October 13, 2006

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: Monday, October 30, 2006, 7:00 p.m.

Place: Terra Ceia VIA Hall, 1505 Center Road, Terra Ceia, FL 34250

General Subject Matter to be Considered: Terra Ceia Aquatic Preserve Advisory Committee Meeting - 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, Randy Runnels at (941)721-2068.

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, Randy Runnels at (941)721-2068. 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).

Item 2: Florida Administrative Weekly Section VI, Volume 32, Number 46, November 17, 2006

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: Tuesday, November 28, 2006, 7:00 p.m.

Place: Terra Ceia VIA Hall, 1505 Center Road, Terra Ceia, FL 34250

General Subject Matter to be Considered: Terra Ceia Aquatic Preserve Advisory Committee Meeting – purpose is to discuss the revision of the Terra Ceia Aquatic Preserve Management Plan. A copy of the agenda may be obtained by contacting: Aquatic Preserve Manager, Randy Runnels at (941)721-2068.

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, Dr. Randy Runnels at (941)721-2068. 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).

Item 3: Florida Administrative Weekly Section VI, Volume 32, Number 52, December 29, 2006

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: Monday, February 5, 2007, 7:00 p.m.

Place: Terra Ceia VIA Hall, 1505 Center Road, Terra Ceia, FL 34250

General Subject Matter to be Considered: Terra Ceia Aquatic Preserve Advisory Committee meeting. The purpose is for members of the Advisory Committee to review and discuss the draft Terra Ceia Aquatic Preserve management plan. A copy of the agenda may be obtained by contacting Aquatic Preserve Manager, Randy Runnels, (941)721-2068.

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, Randy Runnels, (941)721-2068. 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).

Item 4: Florida Administrative Weekly Section VI, Volume 33, Number 7, February 16, 2007

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: Monday, March 12, 2007, 7:15 p.m.

Place: Terra Ceia VIA Hall, 1505 Center Road, Terra Ceia, FL 34250

General Subject Matter to be Considered: Terra Ceia Aquatic Preserve Advisory Committee meeting. The purpose is for members of the Advisory Committee to discuss the Terra Ceia Aquatic Preserve management plan. A copy of the agenda may be obtained by contacting Aquatic Preserve Manager, Randy Runnels, (941)721-2068.

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, Randy Runnels, (941)721-2068. 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.1.4 / Meeting Summaries

Item 1: Meeting Minutes, October 30, 2006

This is a summary of Libby Carnahan's notes that she took at the advisory committee meeting.

Terra Ceia Management Plans • Advisory Committee Briefing Meeting • October 30, 2006

Attendees: Randy Runnels, Libby Carnahan, Andrea Krzystan, Christine Mathis, Brandt Henningsen, Don Bergeron, Ed Styron, John McDonald, Bill Burger, Kurt Hemmel, Rob Brown, Rachael Nobb, Kelly Samek, Karen Bareford, Gary Lytton, Carol McIvor & Dick Eckinrod

Not intended to be complete cross section. A group of people to guide process.

Randy Runnels

Planning Cycles
- Statewide (1 and 3 year)
- Local Program Strategic & Tactical Plans
- Site Specific Management Plants

CAMA's Resource Management is:

- Big Picture (not managing in a vacuum)
- Place Based
- Science Based
- Adaptive

Common Pitfalls

- Inaccurate characterization of the program (Not a park)
- Conservation based
- Unsustainable initiatives (collaborators, free things, trails without maintenance)
- Committing resources asymmetrically

Karen Bareford

- More opportunities for public & advisory committees to be involved
- Handout – Dates for management plan deadlines.
- Final Draft has to go through governor and cabinet

Comments:

1) Brandt Henningsen – Will ABM get to give comments? Yes, Jan. 19, 2007, ABM will review document.

2) Look into getting onto Tampa Bay Agency for Bay Management's Agenda for the January meeting to advise them of the TCAP Management Plans.

Kelly Samek

- Legal constraints
- Statute 286 keeps government public & open to people.
- We have to give notice of these meetings in a reasonable amount of time
- Guidelines as to how we conduct these meetings
- We cannot discuss the business of this meeting between 2 or more members outside of this meeting (email, phone, conversation).
- Kelly is open for questions
- Board members can talk to TBAP staff, Karen Bareford and/or the public, but they can not talk with each other.
- Any emails, written comments, etc are public record, think before you write.
- Handout – "Overview of the Sunshine Law"

Gary Lytton

- Anticipated outcome, well designed, well though out management plan that will be an effective document for 10-20 years from now.
- Will your time be well spent? We will try.
- Good Management Plans informs communities, governments & public about aquatic preserve programs, an informational tool we can share with leadership.
- ABM meeting next week, make announcement about our public scoping meeting.

Comments:

Brandt: He likes what Dick Eckinrod wrote – a 100 year plan for Tampa Bay (CCMP ?). Normative forecasting. There are several plans that include all of Tampa Bay and address Terra Ceia specifically.

Karen: Management plans are tools for the managers. It should be able to be pulled off the shelf to manage the site now and over the next several years.

Several people commented that the management plan should be done for a period longer than 5 years. Several people stated you can't get anything done in 5 years. They suggested a 20 year plan. They stated it is easier to write the plan for 20 years and revisit the plan every 5 years.

Brandt: Will the aquatic preserve plan take upland preserve into account? Will that be linked?

Karen stopped the meeting because we have gone outside our scope of this meeting.

Libby: Could we have a meeting with the advisory board that is announced to the public so we could continue this discussion?

Meeting set for November 28, 2006 at the Terra Ceia VIA Hall at 7:00 pm.

Kurt: Recreational aspect, commercial group – is not represented on this committee, marina, commercial fisherman & port authority.

Randy: There are no marina's located in Terra Ceia AP. Randy stated he left a message with the port authority, but has not heard anything. Rachael represents the fishing industry. Not meant to be an

overall representation but a cross section.

Dick: November 30th – Meeting on subject of new boat ramp on sunshine skyway, Manatee Civic Center 9am – Noon. Dick will send us the email and we will send to the group.

Item 2: Meeting Minutes, November 13, 2006

This is a summary of Libby Carnahan's notes that she took at the advisory committee meeting.

Terra Ceia Aquatic Preserve Management Plan • Public Scoping Meeting • November 13, 2006

Gary Lytton
- Introduce DEP employees
- CAMA Overview

Randy Runnels
- Four Aquatic Preserves, 20% of acreage in Florida Aquatic Preserves
- Urban aquatic preserves were settled for many reasons, including great resources
- In Terra Ceia we want to better understand the science to recognize the issues.
- We rely on _____, public, partnerships, NGO's, Universities, etc.
- We have to have a big picture perspective and also a smaller scale to deal with specific issues
- Section 258 of the Florida Statues
- Preserve boundary of Terra Ceia Aquatic Preserves
- Habitats of Terra Ceia Aquatic Preserve
  Open Sand Bottom
  SAVs, seagrass and algal beds
  Mangrove forests
  Hard bottom
  Oyster reefs
  Tidal creeks & bayous
- Tampa Bay Study – USGS

Largely focused on Terra Ceia

Karen Bareford
- Last year, 9 public meetings throughout the state
- How might we (CAMA) work better together as a unit
- Management Program Areas
  Eco Science
  Resource Management
  Education & Outreach
  Public Use
  Legal Affairs

Eco Science
  Mapping
  Modeling
  Monitoring
  Research

  Support

Resource Management
  Cultural resources
  Natural resources
  Listed species
  Fire management
  Incident response
  Land use/watershed acquisition

Education & Outreach
  Marketing
  Volunteers
  Engage media outlets for coverage
  Community engagement
  Public informed

Public Use
User research
Boating rules
Enforcement
Aquaculture leases
Eco-Tourism
Private concessions

Legal Affairs
Permit review
Existing authorities
Adaptive Management
Intra/Interagency support

• Solicit public input on issues of concern and opportunities to improve input used to develop management plans. Advisory committee will assist in evaluation from management plans.

Gigi Coulson
• She will be assisting with public input portion of meeting
• Public Scoping Meeting
Public comment period open until November 20, 2006
You can send an email, mail in your comments or give oral comments
Management plan drafts winter/spring 2007 and at that point, will have another chance to give comments.
Web address: www.aquaticpreserves.org
Email address: aquaticpreserves@tteci.com

Questions
• Are the transcripts from tonight's meeting going to be available?
Response from Karen: The power point will be available online.

Gigi's – Public Comment Period

Laura Gesslebracht – The Nature Conservancy
• Happy with the management plan updates and that they will build off each other
• Would like to see how each site is unique in the suite of Florida aquatic preserves and unique naturally.
• Wants to be sure outreach does not characterize resources (_____, temporal, condition); threats (quantify, strategies to abate threats).
• Would like to see CAMA's website more updated with research updates.

Dick Eckinrod – Tampa Bay Estuary Program
• Tampa Bay Management Plan, Charging the Course, available on CD
• Implementing long term restoration for Tampa Bay
• Would like to see this document to consider key points
Reduce pollution recreational boaters
Increasing on water enforcement
Manatee protection zones

Carol McIvor – USGS, Tampa Bay Study
Observations
• Ghost fishing (ie crab traps)
• Bishop Harbor boat ramp
Low water (harbor)
No marked channel
Maybe a better boat ramp
Managing water quality from outside the preserve (ie storm water)

Jim McDonald – Local homeowner
• Purchase of boundary modification should be continued (ie Buffer Preserve, Terra Ceia Preserve State Park)
• Rattlesnake Key, Snead Island, etc.
• 1st Land purchased in 1995
• Wants this in the management plans

Item 3: Meeting Minutes, March 12, 2007

This is a summary of Libby Carnahan's notes that she took at the advisory committee meeting.

Terra Ceia Aquatic Preserve Management Plan • Advisory Committee Meeting • March 12, 2007, 7:15 pm

Attendees: Randy Runnels, Christine Mathis, Libby Carnahan, Andrea Krzystan, Karen Bareford, Eric Porterfield, Bill Burger, John McDonald, Brandt Henningsen, Holly Green (for Dick Eckinrod), Carol McIvor & Don Bergeron.

- Final copy of MGMT plan to Tallahassee next Friday (March 23, 2007)
- The MGMT plan will be posted on the web March 30, 2007
- The advisory committee is encouraged to attend the Public Meeting scheduled for April 30, 2007 at 6 PM at The Manatee Convention Center
- Comments from the advisory committee are due to Randy by Friday, March 16, 2007

Comments from advisory committee:

Brandt Henningsen: No major issues, mostly punctuation and grammar

John McDonald: Education & Outreach – Maybe have volunteers that provide information to the public that work on the water. Randy – Team Ocean maybe? We do not have a lot of people on the water in Terra Ceia. Maybe big holiday weekends. Maybe have neighborhood watch or partner with Dept. Rec & Parks. Bill Burger – Would be cautious about giving more information to people about archaeological sites. First Saturday in November – Outreach – Terra Ceia Mullet Smoke off.

Bill Burger: Historical section is primarily wrong. He rewrote 3 paragraphs for Randy to use. DHR offers a training for preserve managers for cultural resources. Bill suggested ordering bilingual signs for fishing regulations on Terra Ceia Road Bridge.

Don Bergeron: Just grammatical changes.

Carol McIvor: Just grammatical changes.

Holly Green (For Dick Eckenrod): Dick would like to see some of the statutory authority, etc changes in the appendices. Water quality (p.33) – Dick doesn't feel objections are clearly stated. Objective Two – Define objectives of the water quality program. Objective Three – Follow objectives. Do we discuss sea level rise? We need to emphasize resilience of anything we place/do on the shoreline. There is probably enough science to incorporate it into our management plans. Bill – second's Holly statement. Don will loose land to Randy. Brandt (p.41) references sea level change. Randy – Sea level change has a place in land acquisition discussion. Do we talk about land based exotics? Randy – Yes we do in "Shorelines development" section. Karen – There is a native species, non-native species section that Randy has now, but has not seen it before. Randy – We only need to control exotics at shoreline. Carole – Who is the management plan written for? Karen – The management plan is written for the manager but also as a tool for the community.

John McDonald: Wastewater treatment – Manatee County. He thinks the City of Palmetto has outflow into Terra Ceia AP down Hagen Blvd. – they are under EPA directive to clean it up. Palmetto only has one discharge. Randy to Holly – Is there a place for the AP in this situation? It is grandfather in and EPA is handing it. Bill (p.30) – Investigate stage info…..- Bill did not understand working. John feels like Randy has done a heck of a job and thinks everyone does a great job.

Brant Henningsen: Wants to see more mention of collaborating with DEP Parks on management of ecosystem. Randy – Will acquisition be an issue or discussed sooner? Karen – it can be mentioned throughout document. He would like to see a change in font, indentation, etc., to distinguish between issues, goals & objectives.

C.2 / Public Scoping Meeting(s)

The following Appendixes contain information about the Public Scoping Meeting(s) which was held in order to obtain input from the public as what they thought the issues in Terra Ceia Aquatic Preserve were. There are copies of the public advertisements for those meetings, a list of attendees, a summary of the meeting(s) (as required by Ch. 259.032(10), F.S.), and a copy of the written comments received.

C.2.1 / F.A.W. Posting

Item 1: Florida Administrative Weekly Section VI, Volume 32, Number 41, October 13, 2006

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

Place: Manatee Civic Center, Terra Ceia Room, One Haben Blvd., Palmetto, FL 34221

General Subject Matter to be Considered: Terra Ceia Aquatic Preserve Management Plan Public Scoping Meeting – 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, Randy Runnels at (941)721-2068.

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, Randy Runnels at (941)721-2068. 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).

Item 1. 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).

Item 2: Terra Ceia Aquatic Preserve Flyer

Florida Department of Environmental Protection
Coastal and Aquatic Managed Areas

Terra Ceia 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

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
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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).

C.2.3 / List of Attendees

November 13, 2006, 6:00 PM

Name	Affiliation	County	AC Member
Bareford, Karen	DEP-Central Office	Leon	
Bergeron, Donald	DEP-Dept of Recs & Parks	Manatee	X
Brame, Adam		Pinellas	
Brown, Rob	Manatee County Environmental Management	Manatee	X
Browning, Scott		Hillsborough	
Carnahan, Libby	DEP-Tampa Bay Aquatic Preserves	Manatee	
Collins, Kristen	Unk	Manatee	
Eckenrod, Dick	Tampa Bay Estuary Program	Pinellas	X
Geselbracht, Laura	The Nature Conservancy	Pinellas	
Harold, Rob	Unk	Manatee	
Jones, John	Unk	Manatee	
Krebs, Justin	Unk	Manatee	
Krzystan, Andrea	DEP-Tampa Bay Aquatic Preserves	Manatee	
Marston, Heath	Unk	Manatee	
Martino, Ron	Manatee County	Manatee	
Mathis, Christine	DEP-Tampa Bay Aquatic Preserves	Manatee	
McDonald, John	Local Land Owner	Manatee	X
McIvor, Carol	USGS	Pinellas	X
Paris, Jake		Manatee	
Raymond, Stephen	DEP-Parks & Recs	Manatee	
Runnels, Randy	DEP-Tampa Bay Aquatic Preserves	Manatee	
Samek, Kelly	DEP-Office of General Counsel	Leon	
Shaw, Douglas	Unk	Manatee	
Williams, Joanna		Manatee	
Williams, Roger		Manatee	

C.2.4 / Summary of the Public Scoping Meeting(s)

Terra Ceia Aquatic Preserve / November 13, 2006
Public Scoping Meeting Issues Paper
Prepared by Tetra Tech

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 higherquality 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 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 Terra Ceia public scoping meeting located at the Manatee Civic Center, in Palmetto, Florida. The meeting took place on November 13, 2006, at seven o'clock in the evening. According to the sign-in sheet, 24 people 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.

One member of the meeting suggested that the Terra Ceia State Park Buffer Preserve Plan should be completed and incorporated into the Aquatic Preserve plan. They felt the Aquatic Preserve Management

Plan should include an objective of acquiring additional lands such as Rattlesnake Key to make it part of the Terra Ceia Preserve.

Once the additional areas outlined in the Buffer Preserve Plan are acquired, CAMA will succeed in preserving 16-miles of coastline from the Little Manatee River to the Manatee River in its natural state. This attendee commented that managing the coastline and keeping it undeveloped should be a high priority for the Terra Ciea Aquatic Preserve.

Another attendee, who works for the United State Geographical Survey (USGS), has observed ghost fishing in the northern preserve and would like the Preserve Management Team to devise a plan to remove these crab traps. The same commenter mentioned the areas surrounding the boat ramp in Bishop Harbor it are quite shallow and that the Managers should consider ramp improvements to mitigate for negative use impacts such as prop dredging and seagrass scarring.

A member of the Tampa Bay Estuary Program (Program) spoke about their estuary management plan, entitled Charting the Course, which has been included in this Issues Notebook. The Program have recently updated their comprehensive management plan for Tampa Bay and would like to offer the information contained therein as examples of goals, objectives, and strategies for the Terra Ceia Management Plan. Their estuary management plan emphasizes providing restoration of seagrass and other estuarine habitats, and establishing goals such as reducing pollution from boaters, increasing onwater enforcement, establishing and protecting enforcement zones, preserving the diversity and abundance of Bay wildlife, and promoting public involvement in Bay management.

One commenter asked if the plan would give direction on understanding, quantifying and developing strategies to address threats to the Preserve. The public also commented on the threat of water pollution from tributaries, and suggested that CAMA manage and/or mitigate for water quality from outside of the Preserve boundaries.

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.

The public commented more than once on addressing water quality in the Preserve and the importance of including research and monitoring for water quality impacts into

Preserve Management Plan.

One member of the audience informed on a study that USGS has been conducting a four-year study within Tampa Bay and will publish their findings soon. The results will include information on Terra Ceia tidal creeks and estuarine ponds. This information will be beneficial in the creation of the Preserve Management Plan.

The public felt that the Terra Ceia Aquatic Preserve, as well as other Florida Aquatic Preserves, should be treated as jewels that are important to the state. They agreed that new plans are needed and that CAMA is doing a great job addressing that need. The public understands that each preserve and reserve represents a unique resource and commented that the Plan should explain how each Aquatic Preserve is unique, special, and important to Florida. They also want to be sure that the plans characterize the resource's, their locations and condition, and provide trend data that is quantitative and qualitative. Once this information is included in the Plan it will be easier to identify threats and develop strategies to address the threats.

Monitoring was another topic commented on at this meeting. The public stressed the importance of monitoring the strategies in the plan to assess their effectiveness and adjusting as necessary.

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.

More than one member of the public commented on the importance of the Preserve promoting public involvement. They would like to see better use of the website as a public information tool by including links to studies or reports on preserve work projects, information on key issues, and updates on Management Plan activities.

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.

One commenter asked that the preserve take steps to reduce pollution for recreational boaters and provide more on-water enforcement. Another comment suggested that a master public use plan should be incorporated to ensure that recreational use doesn't interfere with the more important goal of preserving habitat and wildlife diversity.

Additional public comments were sent in via e-mail and facsimile. These comments were placed into a summary sheet and included in the Issues Notebook.

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.

Ecosystem Science

The staff suggests that monitoring data management for water quality should be summarized and put into report form on a monthly or quarterly basis.

The waters within Bishop Harbor are very shallow and there have been significant damages to the resources in the area from boating activities. Channel marking was suggested as a solution to boating impacts in the area. In addition, staff feels that they need to quantify the seagrass scars in the area by conducting a baseline survey and then perform subsequent yearly mapping efforts to see if the channel marking had worked or if another proactive approach should be used to decrease these impacts.

Another project was suggested for the Preserve related to the hardbottom areas within the Terra Ceia Aquatic Preserve. These special resources should be mapped, perhaps in partnership with ESRI or Trimble to assure accuracy, good methodology, and frequent updates. Another idea submitted was for a collaboration effort was for sediment quality surveys for heavy metals and other toxins. This information and data could be used to support the claims that Terra Ceia is a pristine waterbody and should be maintained in that state. The data could also be used as justification for additional land acquisitions.

Resource Management

The staff discussed how channel marking in Bishop Harbor needs to be a priority for protection of the hardbottom and shallow seagrass areas from prop scarring.

They also spoke about the fact that FDEP enforcement officers are stretched thin, and so the CAMA staff is approached by the public on a regular basis to respond to illegal activity enforcement and permit violation issues. The staff expressed the desire to be able to focus on practicing science based resource management and not be held accountable for enforcement or regulating duties. A possible solution to this issue would be for Preserve staff to give out information on the local regulatory FDEP and Water Management District offices so that the local stakeholders and users could report dredge and fill violations to the appropriate agencies. This information could be posted on the Terra Ceia website. There is some confusion by the public as to what violations the Florida Marine Patrol, the FFWCC, and the FDEP/WMD have jurisdiction over, and perhaps that detailed information could also be posted on the Aquatic Preserve website.

Managers also want the boundaries of Terra Ceia, as stated in Chapter 258, F.S, to be revised so that they are specific and understandable to the public and the staff. This would also be especially helpful in protecting the area from development. In this new Plan, a map and a description of where the boundaries lie would be very helpful for management.

Education and Outreach

It is important that permitted County, local, and Audubon Society Island waterway signage be uniform, created to state standards, and maintained (also a public safety and access issue).

Staff has agreed that they will communicate goals, projects, and management milestones to the public via a monthly or quarterly newsletter.

Public Use

Staff members feel that Bishop Harbor does not need more access points, or improved access points that would allow for larger vessels. In fact, they believe that current boat access areas should be hardened to lessen the impact to the submerged land. Seagrass scarring is a big issue for these

managers, and one suggestion to lessen this impact is channel marking so the public can tell which areas are too shallow for boating.

Other

Dock permits have been given to several homeowners in direct violation of the Aquatic Preserve rules and guidelines. The staff would like to work with the regulators to develop a better relationship with them, and perhaps give some training on how to use Chapter 18-20, F.A.C. when reviewing permit applications for those lands adjacent to the Aquatic Preserve.

Staff members want to improve interagency communication so they know when another agency or university is conducting research in the Preserve. This communication will foster collaboration, interest in partnering and data sharing, and will allow staff to assist the visiting researchers in their endeavors.

The Preserve is working towards being part of the Global Coastal Oceanic Observation System, where they will collaborate with coastal management agencies around the world through the use of data stations. These data stations will provide Terra Ceia with informative data, and assist in establishing worldwide trend data for coastal areas. The collaboration will also provide Terra Ceia the opportunity to refine their data collection standards and methods, which will in turn provide education for the other Aquatic Preserves around the state.

Conclusion and Findings

Public comments centered around protecting the pristine nature of the Terra Ceia Aquatic Preserve and that managing it so that the resources persist for future generations. Public involvement was stated to be a necessary and appreciated facet of management plan development. The resource issues that were commented on ranged from water quality, illegal crab traps, and enforcement to interagency cooperation and seagrass restoration.

Aquatic Preserve staff also wants to keep Terra Ceia pristine despite development pressures. Their comments were similar to public comments on the subjects of interagency cooperation and addressing impact threats to the Preserve. This staff of four also spoke about the daunting task of managing 400,000 preserve acres. While more staff may not be the answer due to funding restraints, they would like to see that the goals, objectives, and strategies outlined in the plan must take into account the limited staff resources.

There were several common comment themes from both the public and the Preserve staff such as: keep the public involved; preserve undeveloped coastline by acquiring more parcels for the Aquatic Preserve; maintain use levels; keep uses to low impact activities, and establish trend data by conducting baseline surveys and subsequent monitoring.

Solutions that address these issues start with acquiring Florida Forever parcels when they become available, working with regulators to keep development low-impact, using the Aquatic Preserve rule appropriately when permitting. The Florida Department of Environmental Protection (FDEP) regulators may need training to educate them on stormwater, septic system, dock, and marina impacts to aquatic preserves.

C.2.5 / Comments from the Public Scoping Meeting(s)

Name: John McDonald
Date: 11/13/06
Address: 4118 Pompano Lane, Palmetto, FL
Email Address:
Telephone: (941) 722-9695

1: What do you think are the biggest issues of the Terra Ceia Aquatic Preserve? Completion of purchase of proposed Terra Ceia Buffer Preserve properties should be highest priority in the Terra Ceia Aquatic Preserve Management Plan

2. How could we best address these issues? Make combined SWFWMD/DEP via ARC committee acquisitions a high priority. Rattlesnake Key and islands south of Skyway Bridge and properties on Snead Island

3. What opportunities should be considered in the new management plans for this aquatic preserve? Need to keep these adjacent islands pristine and undeveloped

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

5. Do you have comments that deal with the way the resources are being researched, assessed and monitored? (ES) I have with the ARC acquisition list and why funding has not been more available to purchase additional Terra Ceia Buffer Preserve properties.

10. Other comments: Collaboration with the county needs to be done regarding land use and density near or on the aquatic preserve. More density means more pollution into the water, thus damaging the ecosystem.

Name: Roger Williams
Date: 11/13/06
Address: 219 4th Ave East, Bladenton, FL 34208 (Manatee)
Email Address: Rogerinke@aol.com

4. Do you have comments that deal with the way the natural or cultural resources are being managed? (RM) If established, "no motor zone" should be "no combustion engines" i.e. electric trolling motors be allowed. Not everyone is able to pole and use from polling platforms.

Name: Greg Blanchard
Date: November 17, 2006
Address: Manatee County, EMD, PO Box 1000, Bradenton, FL 34206-1000
Email Address: greg.blanchard@co.manatee.fl.us
Telephone: 941 742 5980 ext 1702

1: What do you think are the biggest issues of the Terra Ceia Aquatic Preserve? Surrounding land uses and how they are developed or managed.

2. How could we best address these issues? Make sure TCB AP management plan compatible with management plans of adjacent managed areas.

3. What opportunities should be considered in the new management plans for this aquatic preserve? Continue to support conservation land acquisitions in TCB watershed.

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

5. Do you have comments that deal with the way the resources are being researched, assessed and monitored? (ES) An annual environmental status and trends report should be produced.

6. Do you have comments that deal with the way the community is educated and engaged? (EO) Public communication would be facilitated if there were a TCBAP office or facility located adjacent to the preserve.

7. Do you have comments that deal with the recreation, tourism, and public use or access? (PU) Accurate assessments of TCBAP visitor numbers are very important to establish the value of the TCBAP to the public. They should be collected monthly at a minimum.

8. Do you have comments that deal with legal, regulatory, or authority issues? (LR) Try to create a planning district or overlay in the TCBAP watershed to influence local planning practices.

Name: Laura Geselbracht, The Nature Conservancy
Date: November 20, 2006
Address: 2455 E. Sunrise Blvd., #1101, Ft. Lauderdale, FL 33304
Email Address: lgeselbracht@tnc.org
Telephone: 954-564-6144

1: What do you think are the biggest issues of the Terra Ceia Aquatic Preserve? I think that some of the biggest issues for the above aquatic preserve are having:

- A detailed inventory (preferably geospatial) of the resources present and quantititave information on their current status (size, condition and connectivity to the larger system). This detailed inventory is essential if the aquatic preserve staff is to be capable of assessing whether the status of the resources at the site have changed over time. The inventory will also give CAMA managers and other interested parties the ability to assess the importance and uniqueness of the site regionally, at the state and at the national level.
- An assessment of threats to site resources (both originating at the site and coming from surrounding areas) that identifies, prioritizes, and quantifies these threats, as well as provides an indication of threat trends;

- An inventory of actions that will be taken to abate the highest rated threats and an action plan/ timeline to implement these actions; and
- A monitoring program in place to determine how successful the threat abatement actions have been regarding resource protection/restoration. Without a monitoring program it will be impossible to determine if actions should be adjusted to improve threat abatement success.

Without the above information it would be very difficult to ensure the continued health of natural resources at the site and to justify certain management activities that may be required to enable site resources to persist in a healthy state.

Public use activities occurring at the site should be managed to ensure the long-term health and integrity of site resources.

2. How could we best address these issues? The sites appear to require more funding to accomplish the basics noted above. Also, an annual update made available to the public should be completed each year that highlights the progress made to reduce current threats to an acceptable level and to abate current anticipated threats to site resources. This annual update should also include a astatus report on the site resources, new research done to better assess site resource distribution and condition, and an overview of public outreach activities/programs.

3. What opportunities should be considered in the new management plans for this aquatic preserve? The hardbottom community in particular should be quantitatively and qualitatively assessed. Coral communities occurring at these higher latitudes in Florida are becoming increasingly important in light of the current condition of coral reef communities in the Florida Keys. See also my comments under question #1 above.

4. Do you have comments that deal with the way the natural or cultural resources are being managed? (RM) See my answer to question #1 above.

5. Do you have comments that deal with the way the resources are being researched, assessed and monitored? (ES) See my answer to question #1 above.

6. Do you have comments that deal with the way the community is educated and engaged? (EO) Yes, I noticed that the portion of CAMA's website that deals with the aquatic preserves have little current information on activities going on at the sites and links to reports produced on site resources, management activities, and public outreach. Such readily available information would greatly increase community education and engagement opportunities.

7. Do you have comments that deal with the recreation, tourism, and public use or access? (PU) See my comments to question #6 above.

8. Do you have comments that deal with legal, regulatory, or authority issues? (LR) Yes, site managers and other appropriate officials must have the authority to manage the sites as provided in site management plans, state laws and regulations. If for any reason, there are deficiencies in the ability to protect site resources as identified in site management plans, adjustments should be made to ensure adequate protection of these resources for the use and enjoyment of current and future generations.

9. Do you have comments that deal with funding or purchasing (Capital Investments)? Yes, CAMA must have the resources (staff and programmatic) available to adequately manage AP resources. Without adequate funding, we will likely observe a steady erosion of resource integrity.

10. Other comments: No additional comments.

Thank you for the opportunity to comment.

Name: W. Heath Marston / Manatee County Citizen / Coastal Conservation Association President – Manatee County Chapter.
Address: 8784 E. State Road 70 Ste. 10, Bradenton, FL 34202
Email Address: heath@heathmarston.com
Telephone: 941-758-1200

Thanks for hosting the Terra Ciea meeting at the Manatee Civic Center. Here are my recommendation for management plans.

1. The biggest issue for the preserve is abuse of the resource and pollution

2. My recommendation for management of the preserve are as follows:

- Keep current recreational fishing regulations, laws, and rules.

- Keep current no wake and manatee zones, do not add more.
- Do additional research studies and monitoring of red tide and take any preventive measures.
- Take necessary measure to control run off and pollution
- Protect sea grass beds
- Support additional measures to control and police illegal netting

Thank you for your efforts.

C.3 / Formal Public Meetings

The following Appendixes contain information about the Formal Public Meeting(s) which was held in order to obtain input from the public about the Terra Ceia Aquatic Preserve Draft Management Plan. There are copies of the public advertisements for those meetings, a list of attendees, a summary of the meeting(s) (as required by Ch. 259.032(10), F.S.), and a copy of the written comments received.

C.3.1 / F.A.W. Posting(s)

Item 1: Florida Administrative Weekly Section VI, Volume 33, Number 11, March 16, 2007

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: Monday, April 30, 2007, 6:00 p.m.

Place: Manatee Convention Center, Terra Ceia Room, One Haben Blvd., Palmetto, FL 34221

General Subject Matter to be Considered: The purpose of this public meeting is to receive public comment on the draft Terra Ceia Aquatic Preserve Management Plan. A copy of the draft plan will be available for viewing starting March 30, 2007, at www.aquaticpreserves.org. A copy of the agenda may be obtained by contacting Aquatic Preserve Manager, Randy Runnels, (941)721-2068.

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, Randy Runnels, (941)721-2068. 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).

Item 2: An additional FAW Posting will need to be added *(not yet available)* for the Advertising of the Combined Advisory Committee Meeting.

C.3.2 / Advertisement Flyers

C.3.3 / List of Attendees

C.3.4 / Summary of the Formal Public Meeting(s) (to come)

C.3.5 / Comments from the Formal Public Meeting(s) (to come)

Appendix D

Goals, Objectives, and Strategies Table

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

D.2 / Budget Tables

D.3 / Budget Summary Tables

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

The following table is a summary of the issues, goals, objectives and strategies identified in Chapter 6. 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 & Strategy	Management Program	Implementation Date (Planned)	Project Initiation	Length of Initiative	Estimated Cost $
Issue 1: Marine Debris					
Goal 1: Reduce the Amount of Debris In the Preserve					
Objective 1: Reduce debris at the sources					
Strategy 1: Attempt to determine the relative importance of debris sources	ES	2007/2008	D	2 years	2000
Strategy 2: Ensure that access points to the preserve (boat launches, fishing piers, etc.) have monofilament line depositories	RM	2007/2008	C	1 year	1000
Strategy 3: Public access points in the preserve include signage	EO	2008/2009	D	3 years	5000
Objective 2: Coordinate Debris Removal Programs					
Strategy 1: Prioritize cleanup sites and stratgegies	ES	2008/2009	F	1 year	500
Strategy 2: The shoreline should be cleaned at least once a year and preferably twice	RM	2007/2008	C	ongoing	2000/year
Strategy 3: Public access points to the preserve include signage on the threats and prevention of debris	EO	2008/2009	F	1 year	5000
Strategy 4: Collaborative efforts with local state and county park management to implement debris reduction strategies	PART	2007/2008	C	Ongoing	1000/year
Issue 2: Water Quality					
Goal 1: Develop a baseline and trends perspective on water quality					
Objective 1: Upgrade and/or install permanent monitoring stations at key locations					
Strategy 1: Use existing data to define parameters and protocols.	ES	2007/2008	D	1 year	0
Strategy 2: Upgrade and/or install stations at Frog Ceek, Bishop Harbor and the Terra Ceia River	RM	2007/2008	C	2 years	10,000
Strategy 3: Add a datasonde module to appropriate outreach displays	EO	2008/2009	D	Ongoing	1000
Strategy 4: Stage info should be linked to paddling information sites	PA	2009/2010	F	Ongoing	0
Goal 2: Reduce Untreated Human and Animal Waste into the Preserve					
Objective 1: Encourage effective wastewater treatment systems in the preserve watershed					
Strategy 1: Seek info on wastewater treatment for homes without sewer connections	ES	2009/2010	F	1 Year	0
Strategy 2: Seek info on the abundance and distribution of septic systems in the TCAP watershed	ES	2009/2010	F	1 Year	0
Strategy 3: Encourage local health agencies to be open to new state-of-the-art wastewater treatment ideas	PART	2009/2010	F	Ongoing	0
Objective 2: Encourage the use of pumpouts					
Legend: C = Currently Underway D = Under Initial Development F = Future Implementation					

Goals, Objective & Strategy	Management Program	Implementation Date (Planned)	Project Initiation	Length of Initiative	Estimated Cost $
Strategy 1: Seek out coliform monitoring data in and near the TCAP	ES	2008/2009	F	Ongoing	0
Strategy 2: Location of pumpout facilities should be advertised	EO	2009/2010	F	Ongoing	2000
Objective 3: Encourage proper pet sanitation on waterfront areas					
Strategy 1: Literature addressing pet sanitation in coastal areas	ES	2009/2010	F	1 Year	0
Strategy 2: Preserves staff take notice of the presence and condition of pet cleanup bag stations and should encourage the maintenance of them by their respective management entities	RM	2007/2008	D	Ongoing	0
Strategy 3: Include informational signs on the hazards of pet waste	EO	2009/2010	F	Ongoing	1000
Issue 3: Degradation of Submerged Resources					
Goal 1: Minimize historic degradation to submerged resources in and near Bishop Harbor					
Objective 1: Reduce the frequency of prop scarring of Bishop Harbor shoals					
Strategy 1: Produce a baseline map of Bishop Harbor shoals, sweash channel and prop scarring	ES	2007/2008	C	1 year	1000
Strategy 2: Mark the swash channel to direct boats away from shoals	RM	2007/2008	D	1 year	15,000
Strategy 3: Information and aerial photos of damage at preserve access points, presentations to user groups, signs and other means of designating recovery areas	EO	2007/2008	F	Ongoing	1000
Strategy 4: Give technical assistance in the design of the Bishop Harbor Boat Launch	PART	2007/2008	C	2 years	0
Objective 2: Continue to facilitate/enhance improvements in water quality conditions that enhance seagrass expansion in and near Bishop Harbor					
Issue 4: Disaster/Contigency Planning					
Goal 1: Prepare for Spills					
Objective 1: Maintain partnerships and communications channels necessary for effective spill response					
Strategy 1: Distribute program identity and contact information	EO	2007/2008	F	Ongoing	0
Objective 2: Produce spill contingencies document					
Strategy 1: Use resource inventories and current models from the P.O.R.T.S. system	ES	2008/2009	F	1 year	0
Strategy 2: Ground-truth locations of passes that would be boomed	RM	2008/2009	F	1 year	500
Strategy 3: Produce a map-based laminated document to be used in the field by responders	EO	2008/2009	F	1 year	500
Objective 3: If prudent, encourage the permanent staging of spill control equipment					
Strategy 1: Analyze response time for various spill scenarios	ES	2008/2009	F	1 year	0
Strategy 2: Evaluate any adverse impacts of possible boom staging sites	RM	2008/2009	F	1 year	0
Strategy 3: Identifying signs/markings should be placed on any staged equipment containers	EO	2008/2009	F	If needed	1000
Legend: C = Currently Underway D = Under Initial Development F = Future Implementation					

D.2 / *Budget Table*

Issue	Goals, Objective & Integrated Strategies	Project Initiation	Est.Yearly Cost
2007/2008 Cost Estimate			
Ecosystem Science			
Marine Debris	Attempt to determine the relative importance of debris sources	D	$1,000
Water Quality	Use existing data to define parameters and protocols.	D	$0
Submerged Resources	Produce a baseline map of Bishop Harbor shoals, sweash channel and prop scarring	C	$1,000
Submerged Resources	Assist with ongoing seagrass monitoring efforts and correlate with water quality station data trends	C	$1,000
	Ecosystem Science Sub-total		***$3,000***
Resource Management			
Marine Debris	Ensure that access points to the preserve (boat launches, fishing piers, etc.) have monofilament line depositories	C	$1,000
Marine Debris	The shoreline should be cleaned at least once a year and preferably twice	C	$2,000
Water Quality	Upgrade and/or install stations at Frog Ceek, Bishop Harbor and the Terra Ceia River	C	$5,000
Water Quality	Preserves staff take notice of the presence and condition of pet cleanup bag stations and should encourage the maintenance of them by their respective management entities	D	$0
Submerged Resources	Mark the swash channel to direct boats away from shoals	D	$15,000
Submerged Resources	Participate in shoreline stabilization efforts and improvements to the boat launch	C	$0
	Resource Management Sub-total		***$23,000***
Education and Outreach			
Submerged Resources	Information and aerial photos of damage at preserve access points, pre-sentations to user groups, signs and other means of designating recovery areas	D	$1,000
Planning	Distribute program identity and contact information	D	$0
	Education and Outreach Sub-total		***$1,000***
Partnering			
Marine Debris	Collaborative efforts with local state and county park management to implement debris reduction strategies	C	$1,000
Submerged Resources	Give technical assistance in the design of the Bishop Harbor Boat Launch	C	$0
	Partnering Sub-total		***$1,000***
	2007/2008 Total		***$28,000***
2008/2009 Cost Estimate			
Ecosystem Science			
Marine Debris	Prioritize cleanup sites and stratgegies	D	$500
Marine Debris	Attempt to determine the relative importance of debris sources	D	$1,000
Water Quality	Seek out coliform monitoring data in and near the TCAP	D	$0
Submerged Resources	Assist with ongoing seagrass monitoring efforts and correlate with water quality station data trends	C	$1,000
Planning	Use resource inventories and current models from the P.O.R.T.S. system	D	$0
Planning	Analyze response time for various spill scenarios	D	$0
	Ecosystem Science Sub-total		***$2,000***
Resource Management			
Marine Debris	The shoreline should be cleaned at least once a year and preferably twice	C	$2,000
Water Quality	Upgrade and/or install stations at Frog Ceek, Bishop Harbor and the Terra Ceia River	C	$5,000
Water Quality	Preserves staff take notice of the presence and condition of pet cleanup bag stations and should encourage the maintenance of them by their respective management entities	D	$0
Submerged Resources	Participate in shoreline stabilization efforts and improvements to the boat launch	C	$0
Project Initiation Legend: C = Currently Underway D = Under Initial Development			

Issue	Goals, Objective & Integrated Strategies	Project Initiation	Est.Yearly Cost
Planning	Ground-truth locations of passes that would be boomed	D	$500
Planning	Evaluate any adverse impacts of possible boom staging sites	D	$0
	Resource Management Sub-total		***$7,500***
Education and Outreach			
Marine Debris	Public access points to the preserve include signage on the threats and prevention of debris	D	$5,000
Marine Debris	Public access points in the preserve include signage	D	$1,700
Water Quality	Add a datasonde module to appropriate outreach displays	D	$1,000
Submerged Resources	Information and aerial photos of damage at preserve access points, presentations to user groups, signs and other means of designating recovery areas	D	$1,000
Submerged Resources	Make information from the Clean Boating Partnership available at the boat launch	D	$500
Planning	Produce a map-based laminated document to be used in the field by responders	D	$500
Planning	Identifying signs/markings should be placed on any staged equipment containers	D	$1,000
Planning	Distribute program identity and contact information	D	$0
	Education and Outreach Sub-total		***$10,700***
Partnering			
Marine Debris	Collaborative efforts with local state and county park management to implement debris reduction strategies	C	$1,000
Submerged Resources	Give technical assistance in the design of the Bishop Harbor Boat Launch	C	$0
	Partnering Sub-total		***$1,000***
	2008/2009 Total		***$21,200***

2009/2010 Cost Estimate			
Ecosystem Science			
Water Quality	Seek info on wastewater treatment for homes without sewer connections	D	$0
Water Quality	Seek info on the abundance and distribution of septic systems in the TCAP watershed	D	$0
Water Quality	Literature addressing pet sanitation in coastal areas	D	$0
Water Quality	Seek out coliform monitoring data in and near the TCAP	D	$0
Submerged Resources	Assist with ongoing seagrass monitoring efforts and correlate with water quality station data trends	C	$1,000
	Ecosystem Science Sub-total		***$1,000***
Resource Management			
Marine Debris	The shoreline should be cleaned at least once a year and preferably twice	C	$2,000
Water Quality	Preserves staff take notice of the presence and condition of pet cleanup bag stations and should encourage the maintenance of them by their respective management entities	D	$0
	Resource Management Sub-total		***$2,000***
Education and Outreach			
Marine Debris	Public access points in the preserve include signage	D	$1,700
Water Quality	Add a datasonde module to appropriate outreach displays	D	$1,000
Water Quality	Location of pumpout facilities should be advertised	D	$2,000
Water Quality	Include informational signs on the hazards of pet waste	D	$1,000
Submerged Resources	Information and aerial photos of damage at preserve access points, presentations to user groups, signs and other means of designating recovery areas	D	$1,000
Submerged Resources	Make information from the Clean Boating Partnership available at the boat launch	D	$500
Planning	Distribute program identity and contact information	D	$0
	Education and Outreach Sub-total		***$7,200***
Project Initiation Legend: C = Currently Underway D = Under Initial Development			

Issue	Goals, Objective & Integrated Strategies	Project Initiation	Est. Yearly Cost
Public Use			
Water Quality	Stage info should be linked to paddling information sites	D	$0
	Public Use Sub-total		***$0***
Partnering			
Marine Debris	Collaborative efforts with local state and county park management to implement debris reduction strategies	C	$1,000
Water Quality	Encourage local health agencies to be open to new state-of-the-art waste-water treatment ideas	D	$0
	Partnering Sub-total		***$1,000***
	2009/2010 Total		***$11,200***
2010/2011 Cost Estimate			
Ecosystem Science			
Water Quality	Seek out coliform monitoring data in and near the TCAP	D	$0
Submerged Resources	Assist with ongoing seagrass monitoring efforts and correlate with water quality station data trends	C	$1,000
	Ecosystem Science Sub-total		***$1,000***
Resource Management			
Marine Debris	The shoreline should be cleaned at least once a year and preferably twice	C	$2,000
Water Quality	Preserves staff take notice of the presence and condition of pet cleanup bag stations and should encourage the maintenance of them by their respective management entities	D	$0
	Resource Management Sub-total		***$2,000***
Education and Outreach			
Marine Debris	Public access points in the preserve include signage	D	$1,700
Water Quality	Add a datasonde module to appropriate outreach displays	D	$1,000
Water Quality	Location of pumpout facilities should be advertised	D	$2,000
Water Quality	Include informational signs on the hazards of pet waste	D	$1,000
Submerged Resources	Information and aerial photos of damage at preserve access points, pre-sentations to user groups, signs and other means of designating recovery areas	D	$1,000
Submerged Resources	Make information from the Clean Boating Partnership available at the boat launch	D	$500
Planning	Distribute program identity and contact information	D	$0
	Education and Outreach Sub-total		***$7,200***
Public Use			
Water Quality	Stage info should be linked to paddling information sites	D	$0
	Public Use Sub-total		***$0***
Partnering			
Marine Debris	Collaborative efforts with local state and county park management to implement debris reduction strategies	C	$1,000
Water Quality	Encourage local health agencies to be open to new state-of-the-art waste-water treatment ideas	D	$0
	Partnering Sub-total		***$1,000***
	2010/2011 Total		***$11,200***
2011/2012 Cost Estimate			
Ecosystem Science			
Water Quality	Seek out coliform monitoring data in and near the TCAP	D	$0
Submerged Resources	Assist with ongoing seagrass monitoring efforts and correlate with water quality station data trends	C	$1,000
	Ecosystem Science Sub-total		***$1,000***
Resource Management			
Marine Debris	The shoreline should be cleaned at least once a year and preferably twice	C	$2,000
Project Initiation Legend: C = Currently Underway D = Under Initial Development			

Issue	Goals, Objective & Integrated Strategies	Project Initiation	Est. Yearly Cost
Water Quality	Preserves staff take notice of the presence and condition of pet cleanup bag stations and should encourage the maintenance of them by their respective management entities	D	$0
	Resource Management Sub-total		***$2,000***
Education and Outreach			
Water Quality	Add a datasonde module to appropriate outreach displays	D	$1,000
Water Quality	Location of pumpout facilities should be advertised	D	$2,000
Water Quality	Include informational signs on the hazards of pet waste	D	$1,000
Submerged Resources	Information and aerial photos of damage at preserve access points, presentations to user groups, signs and other means of designating recovery areas	D	$1,000
Submerged Resources	Make information from the Clean Boating Partnership available at the boat launch	D	$500
Planning	Distribute program identity and contact information	D	$0
	Education and Outreach Sub-total		***$5,500***
Public Use			
Water Quality	Stage info should be linked to paddling information sites	D	$0
	Public Use Sub-total		***$0***
Partnering			
Marine Debris	Collaborative efforts with local state and county park management to implement debris reduction strategies	C	$1,000
Water Quality	Encourage local health agencies to be open to new state-of-the-art wastewater treatment ideas	D	$0
	Partnering Sub-total		***$1,000***
	2011/2012 Total		***$9,500***
2012/2013 Cost Estimate			
Ecosystem Science			
Water Quality	Seek out coliform monitoring data in and near the TCAP	D	$0
Submerged Resources	Assist with ongoing seagrass monitoring efforts and correlate with water quality station data trends	C	$1,000
	Ecosystem Science Sub-total		***$1,000***
Resource Management			
Marine Debris	The shoreline should be cleaned at least once a year and preferably twice	C	$2,000
Water Quality	Preserves staff take notice of the presence and condition of pet cleanup bag stations and should encourage the maintenance of them by their respective management entities	D	$0
	Resource Management Sub-total		***$2,000***
Education and Outreach			
Water Quality	Add a datasonde module to appropriate outreach displays	D	$1,000
Water Quality	Location of pumpout facilities should be advertised	D	$2,000
Water Quality	Include informational signs on the hazards of pet waste	D	$1,000
Submerged Resources	Information and aerial photos of damage at preserve access points, presentations to user groups, signs and other means of designating recovery areas	D	$1,000
Submerged Resources	Make information from the Clean Boating Partnership available at the boat launch	D	$500
Planning	Distribute program identity and contact information	D	$0
	Education and Outreach Sub-total		***$5,500***
Public Use			
Water Quality	Stage info should be linked to paddling information sites	D	$0
	Public Use Sub-total		***$0***
Partnering			
Marine Debris	Collaborative efforts with local state and county park management to implement debris reduction strategies	C	$1,000
Project Initiation Legend: C = Currently Underway D = Under Initial Development			

Issue	Goals, Objective & Integrated Strategies	Project Initiation	Est. Yearly Cost
Water Quality	Encourage local health agencies to be open to new state-of-the-art waste-water treatment ideas	D	$0
	Partnering Sub-total		***$1,000***
	2012/2013 Total		***$9,500***
2013/2014 Cost Estimate			
Ecosystem Science			
Water Quality	Seek out coliform monitoring data in and near the TCAP	D	$0
Submerged Resources	Assist with ongoing seagrass monitoring efforts and correlate with water quality station data trends	C	$1,000
	Ecosystem Science Sub-total		***$1,000***
Resource Management			
Marine Debris	The shoreline should be cleaned at least once a year and preferably twice	C	$2,000
Water Quality	Preserves staff take notice of the presence and condition of pet cleanup bag stations and should encourage the maintenance of them by their respective management entities	D	$0
	Resource Management Sub-total		***$2,000***
Education and Outreach			
Water Quality	Add a datasonde module to appropriate outreach displays	D	$1,000
Water Quality	Location of pumpout facilities should be advertised	D	$2,000
Water Quality	Include informational signs on the hazards of pet waste	D	$1,000
Submerged Resources	Information and aerial photos of damage at preserve access points, pre-sentations to user groups, signs and other means of designating recovery areas	D	$1,000
Submerged Resources	Make information from the Clean Boating Partnership available at the boat launch	D	$500
Planning	Distribute program identity and contact information	D	$0
	Education and Outreach Sub-total		***$5,500***
Public Use			
Water Quality	Stage info should be linked to paddling information sites	D	$0
	Public Use Sub-total		***$0***
Partnering			
Marine Debris	Collaborative efforts with local state and county park management to implement debris reduction strategies	C	$1,000
Water Quality	Encourage local health agencies to be open to new state-of-the-art waste-water treatment ideas	D	$0
	Partnering Sub-total		***$1,000***
	2013/2014 Total		***$9,500***
2014/2015 Cost Estimate			
Ecosystem Science			
Water Quality	Seek out coliform monitoring data in and near the TCAP	D	$0
Submerged Resources	Assist with ongoing seagrass monitoring efforts and correlate with water quality station data trends	C	$1,000
	Ecosystem Science Sub-total		***$1,000***
Resource Management			
Marine Debris	The shoreline should be cleaned at least once a year and preferably twice	C	$2,000
Water Quality	Preserves staff take notice of the presence and condition of pet cleanup bag stations and should encourage the maintenance of them by their respective management entities	D	$0
	Resource Management Sub-total		***$2,000***
Education and Outreach			
Water Quality	Add a datasonde module to appropriate outreach displays	D	$1,000
Water Quality	Location of pumpout facilities should be advertised	D	$2,000
Project Initiation Legend: C = Currently Underway D = Under Initial Development			

Issue	Goals, Objective & Integrated Strategies	Project Initiation	Est. Yearly Cost
Water Quality	Include informational signs on the hazards of pet waste	D	$1,000
Submerged Resources	Information and aerial photos of damage at preserve access points, presentations to user groups, signs and other means of designating recovery areas	D	$1,000
Submerged Resources	Make information from the Clean Boating Partnership available at the boat launch	D	$500
Planning	Distribute program identity and contact information	D	$0
	Education and Outreach Sub-total		***$5,500***
Public Use			
Water Quality	Stage info should be linked to paddling information sites	D	$0
	Public Use Sub-total		***$0***
Partnering			
Marine Debris	Collaborative efforts with local state and county park management to implement debris reduction strategies	C	$1,000
Water Quality	Encourage local health agencies to be open to new state-of-the-art wastewater treatment ideas	D	$0
	Partnering Sub-total		***$1,000***
	2014/2015 Total		***$9,500***
2015/2016 Cost Estimate			
Ecosystem Science			
Water Quality	Seek out coliform monitoring data in and near the TCAP	D	$0
Submerged Resources	Assist with ongoing seagrass monitoring efforts and correlate with water quality station data trends	C	$1,000
	Ecosystem Science Sub-total		***$1,000***
Resource Management			
Marine Debris	The shoreline should be cleaned at least once a year and preferably twice	C	$2,000
Water Quality	Preserves staff take notice of the presence and condition of pet cleanup bag stations and should encourage the maintenance of them by their respective management entities	D	$0
	Resource Management Sub-total		***$2,000***
Education and Outreach			
Water Quality	Add a datasonde module to appropriate outreach displays	D	$1,000
Water Quality	Location of pumpout facilities should be advertised	D	$2,000
Water Quality	Include informational signs on the hazards of pet waste	D	$1,000
Submerged Resources	Information and aerial photos of damage at preserve access points, presentations to user groups, signs and other means of designating recovery areas	D	$1,000
Submerged Resources	Make information from the Clean Boating Partnership available at the boat launch	D	$500
Planning	Distribute program identity and contact information	D	$0
	Education and Outreach Sub-total		***$5,500***
Public Use			
Water Quality	Stage info should be linked to paddling information sites	D	$0
	Public Use Sub-total		***$0***
Partnering			
Marine Debris	Collaborative efforts with local state and county park management to implement debris reduction strategies	C	$1,000
Water Quality	Encourage local health agencies to be open to new state-of-the-art wastewater treatment ideas	D	$0
	Partnering Sub-total		***$1,000***
	2015/2016 Total		***$9,500***

Project Initiation Legend: C = Currently Underway D = Under Initial Development

Issue	Goals, Objective & Integrated Strategies	Project Initiation	Est.Yearly Cost
2016/2017 Cost Estimate			
Ecosystem Science			
Water Quality	Seek out coliform monitoring data in and near the TCAP	D	$0
Submerged Resources	Assist with ongoing seagrass monitoring efforts and correlate with water quality station data trends	C	$1,000
	Ecosystem Science Sub-total		***$1,000***
Resource Management			
Marine Debris	The shoreline should be cleaned at least once a year and preferably twice	C	$2,000
Water Quality	Preserves staff take notice of the presence and condition of pet cleanup bag stations and should encourage the maintenance of them by their respective management entities	D	$0
	Resource Management Sub-total		***$2,000***
Education and Outreach			
Water Quality	Add a datasonde module to appropriate outreach displays	D	$1,000
Water Quality	Location of pumpout facilities should be advertised	D	$2,000
Water Quality	Include informational signs on the hazards of pet waste	D	$1,000
Submerged Resources	Information and aerial photos of damage at preserve access points, pre-sentations to user groups, signs and other means of designating recovery areas	D	$1,000
Submerged Resources	Make information from the Clean Boating Partnership available at the boat launch	D	$500
Planning	Distribute program identity and contact information	D	$0
	Education and Outreach Sub-total		***$5,500***
Partnering			
Water Quality	Stage info should be linked to paddling information sites	D	$0
Marine Debris	Collaborative efforts with local state and county park management to implement debris reduction strategies	C	$1,000
Water Quality	Encourage local health agencies to be open to new state-of-the-art waste-water treatment ideas	D	$0
	Partnering Sub-total		***$1,000***
	2016/2017 Total		***$9,500***
Project Initiation Legend: C = Currently Underway D = Under Initial Development			

D.2 / **Budget Summary Table**

2007-2008 Cost Estimate	
Ecosystem Science Sub-total	$3,000
Resource Management Sub-total	$23,000
Education and Outreach Sub-total	$1,000
Partnering Sub-total	$1,000
2007/2008 Total	***$28,000***

2008-2009 Cost Estimate	
Ecosystem Science Sub-total	$2,000
Resource Management Sub-total	$7,500
Education and Outreach Sub-total	$10,700
Partnering Sub-total	$1,000
2008/2009 Total	***$21,200***

2009-2010 Cost Estimate	
Ecosystem Science Sub-total	$1,000
Resource Management Sub-total	$2,000
Education and Outreach Sub-total	$7,200
Public Use Sub-total	$0
Partnering Sub-total	$1,000
2009/2010 Total	***$11,200***

2010-2011 Cost Estimate	
Ecosystem Science Sub-total	$1,000
Resource Management Sub-total	$2,000
Education and Outreach Sub-total	$7,200
Public Use Sub-total	$0
Partnering Sub-total	$1,000
2010/2011 Total	***$11,200***

2011-2016 Annual Cost Estimate	
Ecosystem Science Sub-total	$1,000
Resource Management Sub-total	$2,000
Education and Outreach Sub-total	$5,500
Public Use Sub-total	$0
Partnering Sub-total	$1,000
2011/2012 Total	***$9,500***

10 year plan grand total = $119,100

Terra Ceia Aquatic Preserve
Management Plan • April, 2007

Terra Ceia Aquatic Preserve
130 Terra Ceia Road
Terra Ceia, FL 34250

Florida Department of Environmental Protection
Coastal and Aquatic Managed Areas
3900 Commonwealth Blvd., MS #235
Tallahassee, FL 32399 • aquaticpreserves.org