



Rookery Bay National Estuarine Research Reserve

Management Plan
January 2012 - December 2017



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



This management plan has been developed in accordance with National Oceanic and Atmospheric Administration regulations, including all provisions for public involvement. It is consistent with the congressional intent of Section 315 of the Coastal Zone Management Act of 1972, as amended, and the provisions of the Florida Coastal Management Program 2009.

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Rookery Bay National Estuarine Research Reserve

Management Plan
January 2012 - December 2017

Includes:

- Rookery Bay Aquatic Preserve
- Cape Romano - Ten Thousand Islands Aquatic Preserve
- Rookery Bay NERR

Rookery Bay National Estuarine Research Reserve

300 Tower Road, Naples, Florida 34113
239-417-6310, Fax: 239-417-6315
info@rookerybay.org • www.RookeryBay.org



**Florida Department of Environmental Protection
Coastal and Aquatic Managed Areas**

3900 Commonwealth Blvd., MS #235, Tallahassee, FL 32399
www.aquaticpreserves.org



A male yellow-crowned night heron is poised in its courtship ritual.

Mission Statements

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

Rookery Bay National Estuarine Research Reserve / The mission of the Rookery Bay National Estuarine Research Reserve is to provide a basis for informed stewardship of estuaries in Southwest Florida through research and education.

Executive Summary

Rookery Bay National Estuarine Research Reserve (NERR) Management Plan		
Lead Agency:	Florida Department of Environmental Protection's (DEP) Office of Coastal and Aquatic Managed Areas (CAMA)	
Common Name of Property:	Rookery Bay National Estuarine Research Reserve (RBNERR)	
Location:	Collier County, Florida	
Acreage Total:	110,000 acres	
Acreage Under Lease:	37,876 upland acres under CAMA lease	
Acreage Breakdown for CAMA Management Units According to Florida Natural Areas Inventory (FNAI) Natural Community Types		
<i>FNAI Natural Communities</i>	<i>Total Acreage according to GIS</i>	<i>Upland Acres Under CAMA Lease according to GIS</i>
Scrub	176	176
Beach Dune:	590	590
Coastal Strand:	270	270
Maritime Hammock	105	105
Mesic Flatwoods	1,293	1,293
Mesic Hammock	279	279
Scrubby Flatwoods	58	58
Strand Swamp	69	69
Basin Marsh	90	90
Dome Swamp	2	2
Coastal Intertidal Swale	2	2
Depression Marsh	13	13
Tidal Marsh:	1,862	1,862
Tidal Swamp:	30,728	30,728
Water	72,124	
Agriculture – Fallow	76	76
Disturbed/Developed	2,263	2,263
Total Acreage:	110,000	37,876
Lease/Management Agreement Numbers: 3819		
Designated Use: Single use for Conservation and Preservation		
Legislative or Executive Directives that Constrain the Use of the Property: None		
Management Responsibilities:	Agency - DEP's CAMA lead manager	
Designation:	National Estuarine Research Reserve	
Sublease(s):	None	
Encumbrances:	Reverter clauses on some parcels	
Type Acquisition:	Conservation and Recreation Lands, Environmentally Endangered Lands, Donations.	
Unique Features:	Ten Thousand Islands and Rookery Bay estuaries are considered westernmost extent of Everglades ecosystem. Site includes extensive pristine mangrove forested wetlands, undeveloped barrier islands, and some of the last remaining intact tropical hardwood hammocks and coastal scrub habitats in Southwest Florida.	
Archaeological/Historical Sites:	Site has numerous prehistoric midden and historic sites.	

Management Needs	
Ecosystem Science	Water quality and biological monitoring, seagrass habitat mapping, protected species monitoring, visiting scientist program.
Resource Management	Invasive species eradication and control, prescribed fire management, wetland and hydrology restoration, regulatory permit review.
Education and Outreach	Environmental Learning Center daily education and outreach programs, student and adult education, Coastal Training Program workshops and seminars targeting local decision makers.
Public Use	Recreational boating and fishing, hiking, bird watching, camping, eco-tourism.
Acquisition Needs/Acreage:	Approximately 1,500 acres.
Surplus Lands/Acreage:	None.
Public Involvement:	Two general public meetings, five advisory council meetings.
Rookery Bay NERR Managed Areas	
Agency Breakdown	Acreage according to GIS
Rookery Bay Aquatic Preserve:	58,076 acres
Cape Romano - Ten Thousand Islands Aquatic Preserve (CRTTIAP):	51,470 acres (Overlaps with USFWS)
Uplands Under CAMA Lease:	37,876 acres
United States Fish and Wildlife Service (USFWS)	16,490 acres (Overlaps with CRTTIAP)

Coastal Zone Management Issues / Changing land uses within adjacent watersheds and coastal lands that impact water quality, timing, and volumes; loss of native biodiversity, lack of awareness and community involvement in coastal stewardship, impacts to natural and cultural resources from incompatible public use, and ecological impacts associated with climate change and catastrophic change events.

Goals / Restore natural freshwater inflows, protect and restore natural ecological functions, protect listed species, manage for compatible public use, establish long-term control of key lands and waters, increase understanding of key ecologic processes, increase public awareness and promote community involvement, promote informed coastal decisions, provide for safe work environment, and establish cost effective strategies for aquatic preserves.

Executive Summary

Rookery Bay National Estuarine Research Reserve
2012 through 2017

The Management Plan for the Rookery Bay National Estuarine Research Reserve (RBNERR) covers the time period from 2012 through 2017. RBNERR, located on the Southwest Gulf coast of Florida near Naples, is one of 28 National Estuarine Research Reserves managed through a cooperative agreement with the National Oceanic and Atmospheric Administration's (NOAA) Estuarine Reserve Division (ERD). The Florida Department of Environmental Protection (DEP) Office of Coastal and Aquatic Managed Areas (CAMA) serves as the lead state agency for RBNERR.

The RBNERR Management Plan is a strategic document that describes natural and cultural resources within the boundaries of RBNERR, identifies priority issues that DEP staff must address to adequately protect these resources, and the goals, objectives and strategies necessary to support RBNERR's mission of informed stewardship based on science and education. DEP works in cooperation with NOAA and other federal, state, and local partners to conduct ongoing research and monitoring, educate students and teachers, increase public awareness and understanding, conduct stewardship and restoration, manage public access and use, and provide training for local policymakers.

The coastal ecosystems within the boundaries of RBNERR have national and international significance as the western edge of the Everglades ecosystem. RBNERR includes a significant portion of one of the largest remaining intact mangrove forested wetlands in the world. Rookery Bay and the Ten Thousand Islands are among the nation's few remaining relatively pristine estuaries. Habitats within RBNERR provide essential feeding and nesting grounds for a diverse assemblage of coastal and marine wildlife, including over 150 species of birds, 400 species of plants, and 250 species of fishes.

The economic values associated with sustaining the environmental health of RBNERR are locally significant and are of great importance to the State of Florida. Tourism, sport fishing, and boating are among the most important industries in Southwest Florida. Each generates millions of dollars per year, and each are

inextricably linked to the long-term protection and conservation of the coastal ecosystems within RBNERR. The Friends of Rookery Bay (FORB), a local non-profit volunteer community based organization, was established over 20 years ago in recognition of these values and to support RBNERR's mission.

The RBNERR Management Plan identifies five priority issues: Changing land use that affects freshwater inflows, loss of native biodiversity, lack of public awareness and community involvement in stewardship, incompatible use of RBNERR resources by visitors, and ecological impacts associated with catastrophic change events. The Plan identifies key goals and strategies linked to these issues: restoring natural flow regimes, protecting ecological functions, protecting listed species, managing for compatible public use, establishing long-term control for key lands and water, increasing community awareness and involvement, increasing understanding of ecological processes, and promoting informed coastal decisions.

As of 2011, RBNERR has 13 full-time employees serving in coastal management, research, education, and training roles that directly support the goals and strategies outlined in the RBNERR Management Plan. In addition, contract staff help support priority projects.

An important element of the RBNERR Management Plan is the emphasis on a fully integrated approach that links ongoing research, education, stewardship and training programs together. Past experience at RBNERR in using an integrated management framework has resulted in significant outcomes that directly support RBNERR's mission. An additional important element of the Management Plan is the reliance on strategic partnerships with public and private sector interests at local, regional, and national scales that also directly support RBNERR's mission.

To successfully achieve the goals and strategies described in this Management Plan, RBNERR staff and partners will work to establish a "State of the Reserve" that links research results with critical resource issues and increases community awareness while informing local policymakers. New partnerships with private sector interests including boating, tourism, and sport fishing are envisioned that engage primary users of RBNERR in informed stewardship. To support this effort RBNERR will work toward the future consolidation of 17,721 acres of adjacent public lands, as well as 2,472 acres of high priority lands targeted for acquisition. The boundary expansion will be formally approved at the time of the next management plan.

RBNERR will continue to train local landscapers to utilize best management practices that save money and help protect local water quality, provide education programs for local students that raise awareness of the ecologic and economic values associated with healthy estuaries, restore damaged ecosystems, and conduct ongoing research that improves understanding of the ecological processes that drive the Rookery Bay estuarine ecosystem.

CAMA/BTIITF Approval

CAMA approval date: November 11, 2011

BTIITF approval date:

ARC approval date: February 10, 2012

NOAA approval date: October 2, 2012

Comments:

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Kayakers enjoy a two mile padding trail through mazelike mangrove waterways.

Part One

Basis for Management

Chapter One

Introduction

The National Estuarine Research Reserve (NERR) system is a network of protected areas established for long-term research, education and stewardship. Section 315 of the Coastal Zone Management Act of 1972, as amended, established the NERR system to be administered by the National Oceanic and Atmospheric Administration (NOAA) in cooperation with the coastal states in which the NERRs are designated. Under the system, healthy estuarine ecosystems, which typify different regions of the United States, are designated and managed as sites for long-term research and are used as a base for estuarine education and interpretation programs. The system also provides a framework through which research results and techniques for estuarine education and interpretation can be shared throughout the region and across the nation.

This partnership program between NOAA and the coastal states protects more than one million acres of estuarine land and water, which provide essential habitat for wildlife; offer educational opportunities for students, teachers and the public; and serve as living laboratories for scientists.

The Rookery Bay National Estuarine Research Reserve (RBNERR) was designated in 1978 as the third NERR in the nation due to its outstanding natural features including pristine mangrove forests and barrier islands.

Located in Collier County, on the Southwest Gulf coast of Florida, local government targeted the Rookery Bay estuary for the placement of a major road project that planned to connect the communities of Naples and Marco Island. Local community concern, led by the Conservancy of Southwest Florida, National Audubon Society and the Nature Conservancy, led to community involvement and actions resulting in the purchase of over 3,000 acres of key lands that formed the initial core boundaries of an Audubon Wildlife Sanctuary. These organizations petitioned the State of Florida to seek designation of the sanctuary as a NERR in partnership with NOAA.

A lease agreement signed in 1977 (See Appendix A.8 Trustees Lease Agreement) between the original three founding organizations and the State of Florida transferred land management responsibilities for the original 3,700 acres to the Florida Department of Natural Resources, now the Florida Department of Environmental Protection (DEP). Since the initial designation, DEP has added over 105,000 acres to the boundary, including the Rookery Bay and Cape Romano -Ten Thousand Islands aquatic preserves, and additional lands acquired through state and federal programs.

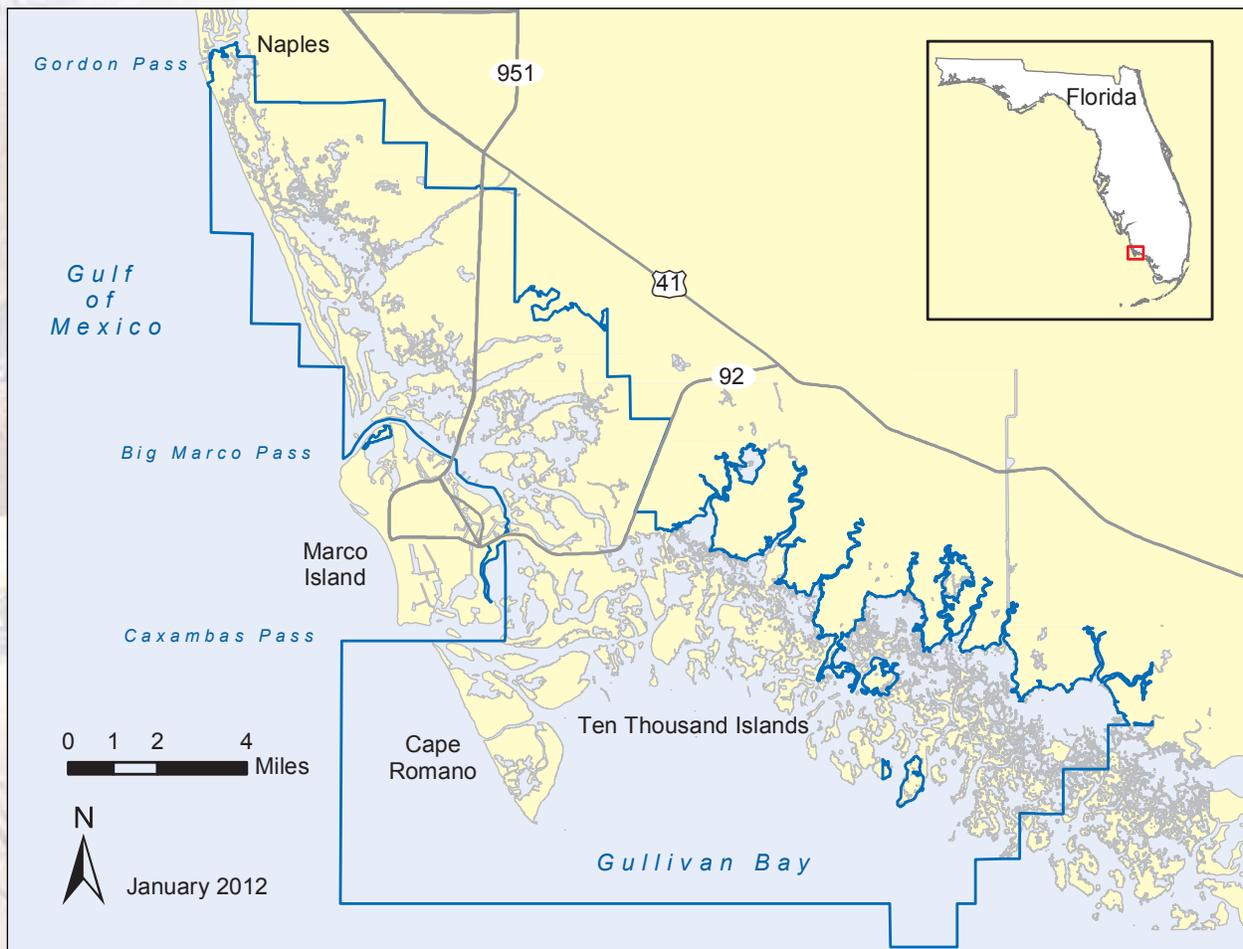
As of 2011, RBNERR boundaries include 110,000 acres of state managed lands and coastal waters. RBNERR is considered the westernmost extension of the Everglades ecosystem, and includes large contiguous tracts of pristine mangrove forested wetlands and key examples of undeveloped barrier islands. Adjacent coastal communities include the cities of Naples and Marco Island. (See Figure 1).

Key public access points include the RBNERR Environmental Learning Center facility, established in 2004 and located at 300 Tower Road in Naples, which includes a two-story visitor center, research labs, and administrative headquarters; five public boat ramps maintained by Collier County (i.e. Collier Boulevard, Goodland, Caxambas Pass, Port of the Islands, and Naples Bay); and Shell Island Road, a limited use boat ramp, and associated hiking trails (See Figure 2).

Access to RBNERR by water is via the inland waterway running south from Naples and around Marco Island, extending south to Goodland and the Ten Thousand Islands. Access from the east is via Henderson Creek, Blackwater River and Faka Union Canal. Entry from the Gulf of Mexico is via Gordon Pass, Hurricane Pass, Big Marco Pass and Coon Key Pass.

There are a number of marinas and boat launching ramps that facilitate recreational boat access to RBNERR.

Located approximately 10 miles south of Naples, major road access to RBNERR includes Interstate 75 to the north and east and U.S. 41 (Tamiami Trail). Collier Boulevard (State Road 951) is located immediately adjacent to the boundaries of the RBNERR. Tower Road, off Collier Boulevard, provides vehicle access to the RBNERR Environmental Learning Center and Headquarters. Shell Island Road provides vehicle access to a field station and fleet operations facility.



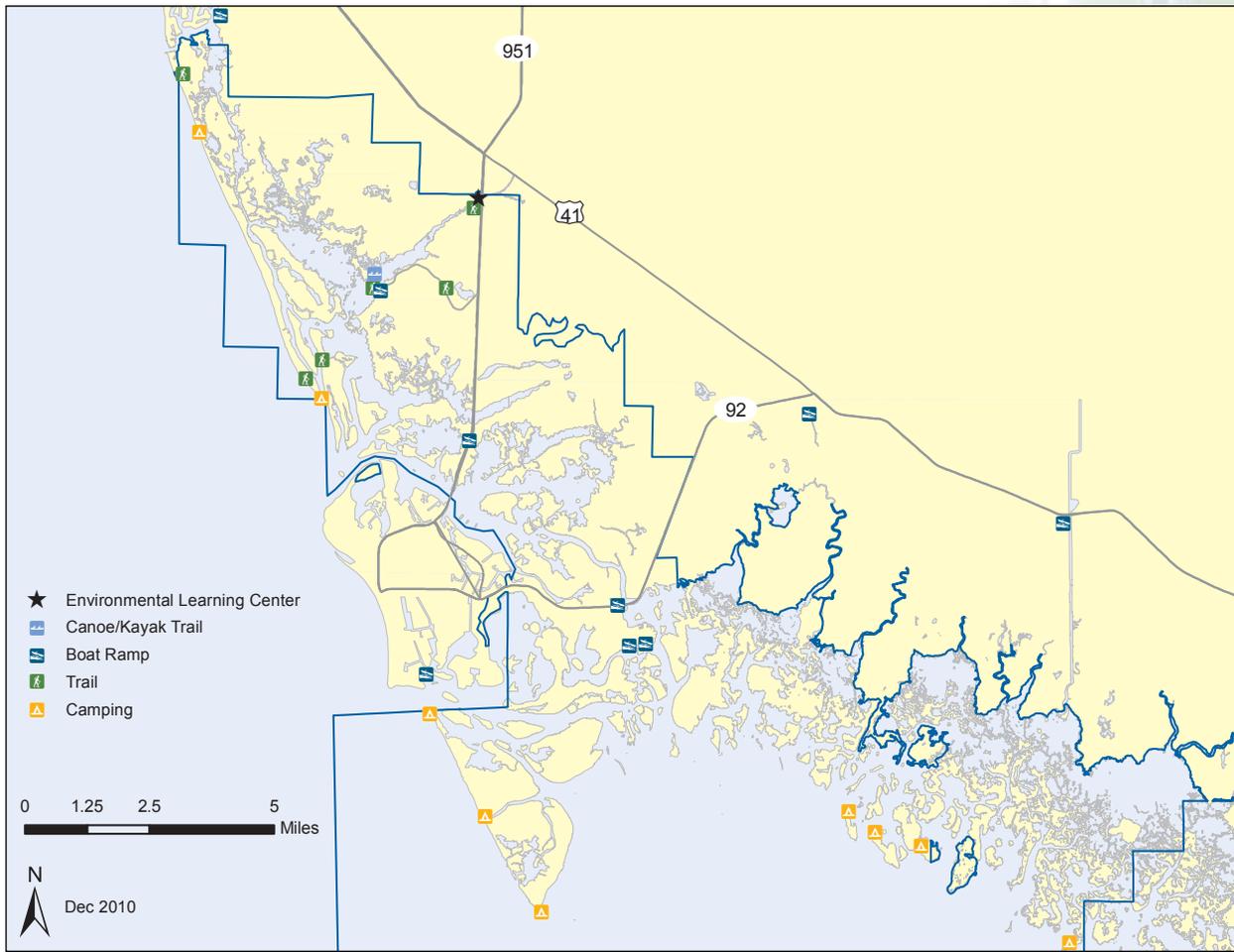


Figure 2 | Public Access points within Rookery Bay National Estuarine Research Reserve

The Florida NERRs are administered on behalf of the state by the DEP’s Office of Coastal and Aquatic Managed Areas (CAMA) as part of a network that includes 41 aquatic preserves, 3 NERRs, a National Marine Sanctuary, the Coral Reef Conservation Program and the Florida Oceans and Coastal Council (See Figure 3). This provides for a system of significant protections to ensure that Florida’s most popular and ecologically important underwater ecosystems are preserved in perpetuity. DEP and a host of other governmental partners manage these special places with strategies based on local resources, issues and conditions.

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

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

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

1.1 / Management Plan Purpose and Scope

With increasing development, recreation and economic pressures, Florida's aquatic resources may be subjected to potentially significant impacts, 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 NERRs and 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.



Figure 3 / CAMA state-wide managed resources.

The NOAA requirements for the preparation of management plans are outlined in the National Estuarine Research Reserve Program Regulations (Coastal Zone Management Act, Section 315, and 15 Code of Federal Regulations (C.F.R.) Part 921). The federal regulations ensure that NERR management programs are consistent with the goals, objectives and policies of the NERR System. The mandate for developing aquatic preserve management plans is outlined in Rule 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 public. The statistical data, public comment and cooperating agency information is then used to identify management issues and threats affecting the present and future integrity of the site, its boundaries and adjacent areas. This information is used in the development and review of the management plan, which is examined for consistency with the statutory authority and with intent of the aquatic preserve and NERR programs. Each management plan is evaluated periodically and revised as necessary to allow for strategic improvements. Intended to be used by site managers and other agencies or private groups involved with maintaining the natural integrity of these resources, the plan includes scientific information about the existing conditions of the site and the management strategies developed to respond to those conditions.

To aid in the analysis and development of the management strategies for the site plans, three comprehensive management programs are identified. In each of these 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 three management program areas will remain constant. These areas are:

- Ecosystem Science
- Resource Management
- Education and Outreach

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

This Management Plan is a revision to a previously approved RBNERR Management Plan (2000-2005). The revised Plan addresses all local, state and federal requirements for: Rookery Bay and Cape Romano-Ten Thousand Islands aquatic preserves, RBNERR, and the RBNERR Buffer Preserve.

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. and federal regulations 15 CFR 921.33:

- 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.
- NOAA may require public notice, including notice in the Federal Register and an opportunity for public comment before approving a boundary or management plan change.

Several key steps have been taken during the development of this management plan. First, staff organized an advisory committee comprised of key stakeholders. Next, staff advertised and conducted public meetings to receive input from stakeholders on the concerns and perceived issues affecting the RBNERR. This input was utilized in the development of a draft management plan that was reviewed by CAMA staff, the advisory committee, and NOAA. After the initial reviews, the staff advertised and conducted, in conjunction with the advisory committee, a second public meeting 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. All public meeting notices were posted on the property, electronically mailed to a large recipient list, placed on the DEP Associated Press wire, announced at a scheduled governmental meeting and advertised in the Florida Administrative Weekly.



Least terns are migratory birds that nest annually on beaches within the reserve.

Chapter Two

National Estuarine Research Reserve System

2.1 / Introduction

The National Estuarine Research Reserve (NERR) System was created by the Coastal Zone Management Act of 1972, as amended, 16 United States Code Section 1461, to augment the Federal Coastal Zone Management Program. The Coastal Zone Management Program is dedicated to comprehensive, sustainable management of the Nation's coasts.

The NERR System is a network of protected areas established to promote informed management of the nation's estuaries and coastal habitats. The reserve system currently consists of 28 reserves in 22 states and territories, protecting over one million acres of estuarine lands and waters.

2.2 / National Estuarine Research Reserve System Mission and Goals

National Estuarine Research Reserve Mission - As stated in the NERR regulations, 15 Code of Federal Regulations (C.F.R.) Part 921.1(a), the NERR System mission is:

"the establishment and management, through Federal-state cooperation, of a national system of Estuarine Research Reserves representative of the various regions and estuarine types in the United States. Estuarine Research Reserves are established to provide opportunities for long-term research, education, and interpretation."

National Estuarine Research Reserve System Goals - Federal regulations, 15 C.F.R. Part 921.1(b), provide five specific goals for the NERR System:

1. Ensure a stable environment for research through long-term protection of NERR resources;
2. Address coastal management issues identified as significant through coordinated estuarine research within the System;

3. Enhance public awareness and understanding of estuarine areas and provide suitable opportunities for public education and interpretation;
4. Promote federal, state, public and private use of one or more Reserves within the System when such entities conduct estuarine research; and
5. Conduct and coordinate estuarine research within the System, gathering and making available information necessary for improved understanding and management of estuarine areas.

The Rookery Bay National Estuarine Research Reserve (RBNERR) has provided significant contributions in support of the NERR System's goals over a thirty-year period since designation in 1978. Research conducted by RBNERR scientists and visiting researchers directly supports informed coastal decisions within the Southwest Florida region, including biological and water quality monitoring guiding Everglades restoration. RBNERR has also played a key role in the development of the NERR Coastal Training Program, piloting professional training programs that have been adopted by NERR sites across the nation. RBNERR was the first NERR in the nation to establish a site resource management program with staff directing onsite stewardship programs.

NERR System Strategic Goals 2005 to 2010 - The NERR system began a strategic planning process in 1994 in an effort to help the National Oceanic and Atmospheric Administration (NOAA) achieve its environmental stewardship mission to "sustain healthy coasts." In conjunction with the strategic planning process, NOAA's Estuarine Reserves Division (ERD) and reserve staff has conducted a multi-year action planning process on an annual basis since 1996. The resulting three-year action plan provides an overall vision and direction for the reserve system. As part of this process, the reserve system developed a vision: Healthy estuaries and watersheds where coastal communities and ecosystems thrive; and mission: To practice and promote coastal and estuarine stewardship through innovative research and education, using a system of protected areas. The following three goals are outlined in the NERR 2010-2015 Strategic Plan.

1. Strengthen the protection and management of representative estuarine ecosystems to advance estuarine conservation, research and education.
2. Increase the use of reserve science and sites to address priority coastal management issues.
3. Enhance peoples' ability and willingness to make informed decisions and take responsible actions that affect coastal communities and ecosystems.

RBNERR is managed compatibly with the NERR Program vision and 2010-2015 Strategic Goals. The topics of the RBNERR's management plan (Public Use, Habitat and Species Management, Cultural Resource Management, Landuse Impacts, Informed Community and Individual Action and Global and Regional Change Events) have a direct linkage with the national program's priority management issues



A butterfly orchid on Sand Hill, the highest elevation in the Rookery Bay National Estuarine Research Reserve.

of land use and population growth, habitat loss and alteration, water quality degradation and changes in biological communities.

RBNERR and other reserves share the national program's 2005- 2010 Strategic Plan - Guiding Principles (www.nerrs.noaa.gov/Background_StrategicPlan.html):

- Strong partnerships between NOAA, state agencies and universities, and other local partners are critical to the success of the reserve system.
- The reserve system integrates science, education and stewardship on relevant topics to maximize the benefits to coastal management.
- Reserves serve as a catalyst and a focal point for demonstrating and facilitating objective problem solving and best management practices.
- Reserves engage local communities and citizens to improve stewardship of coastal areas.
- Reserves implement an ecosystem-based management approach

National Estuarine Research Reserve System National Programs

The three major elements of the Reserve System are:

1. Research on estuarine habitats and processes,
2. Resource stewardship, and
3. Education and interpretation of estuarine processes

National Estuarine Research Reserve System Research and Monitoring Program

The NERR System provides a mechanism for addressing scientific and technical aspects of coastal management problems through a comprehensive, interdisciplinary, and coordinated approach. Research and monitoring programs, including the development of baseline information, form the basis of this approach. NERR research and monitoring activities are guided by national plans that identify goals, priorities, and implementation strategies for these programs. This approach, when used in combination with the education and outreach programs, will help ensure the availability of scientific information that has long-term, system-wide, consistency and utility for managers and members of the public to use in protecting or improving natural processes in their estuaries.

National Estuarine Research Reserve System Research Funding Priorities

Federal regulations 15 C.F.R. 921.50(a) specify the purposes for which research funds are to be used:

- Support management-related research that will enhance scientific understanding of the NERR ecosystem;
- Provide information needed by reserve managers and coastal ecosystem policy makers, and;
- Improve public awareness and understanding of estuarine ecosystems and estuarine management issues.

National Estuarine Research Reserve System-Wide Monitoring Program

It is the policy of RBNERR to implement each phase of the System-Wide Monitoring Program (SWMP) initiated by ERD in 1989, and as outlined in the reserve system regulations and strategic plan:

- Phase I: Environmental Characterization, including studies necessary for inventory and comprehensive site descriptions;
- Phase II: Site Profile, to include a synthesis of data and information; and
- Phase III: Implementation of the SWMP.

The SWMP provides standardized data on national estuarine environmental trends while allowing the flexibility to assess coastal management issues of regional or local concern. The principal mission of the monitoring program is to develop quantitative measurements of short-term variability and long-term changes in the integrity and biodiversity of representative estuarine ecosystems and coastal watersheds for the purposes of contributing to effective coastal zone management. The program is designed to enhance the value and vision of the reserves as a system of national reference sites. The program currently has three main components and the first is in operation.

1. **Abiotic Variables:** The monitoring program currently measures pH, conductivity, salinity, temperature, dissolved oxygen, turbidity, water level and atmospheric conditions. In addition the program collects monthly nutrient and chlorophyll A samples and monthly diel samples at one SWMP data logger station. Each reserve uses a set of automated instruments and weather stations to collect these data for submission to a centralized data management office.
2. **Biotic Variables:** The NERR System will incorporate monitoring of organisms and habitats into the monitoring programs as funds become available. The first aspects likely to be incorporated will quantify vegetation (e.g., marsh vegetation, submerged aquatic vegetation) patterns and their change over space and time. Other aspects that could be incorporated include monitoring infaunal benthic, nekton and plankton communities.
3. **Landuse, Habitat Mapping and Change:** This component will be developed to identify changes in coastal ecological conditions with the goal of tracking and evaluating changes in coastal habitats and watershed landuse/cover. The main objective of this element will be to examine the links between watershed land use activities and coastal habitat quality. These data are compiled electronically at a central data management "hub", the Centralized Data Management Office at the Belle W. Baruch Institute for Marine Biology and Coastal Research of the University of South Carolina. They provide additional quality control for data and metadata and they compile and disseminate the data and summary statistics via the Web (<http://cdmo.baruch.sc.edu>) where researchers, coastal managers and educators readily access the information. The metadata meets the standards of the Federal Geographical Data Committee.

National Estuarine Research Reserve System Education Program

The NERR System provides a vehicle to increase understanding and awareness of estuarine systems and improve decision-making among key audiences to promote stewardship of the nation's coastal resources. Education and interpretation in the reserves incorporate a range of programs and methodologies that are systematically tailored to key audiences around priority coastal resource issues and incorporates science-based content. Reserve staff members work with local communities and regional groups to address coastal resource management issues, such as non-point source pollution, habitat restoration and invasive species. Through integrated research and education programs, the reserves help communities develop strategies to deal successfully with these coastal resource issues. Formal and non-formal education and training programs in the NERRs target K-12 students, teachers, university and college students and faculty, as well as coastal decision-maker audiences such as environmental groups, professionals involved in coastal resource management, municipal and county zoning boards, planners, elected officials, landscapers, eco-tour operators and professional associations. K-12 and professional development programs for teachers include the use of established coastal and estuarine science curricula aligned with state and national science education standards and frequently involve both on-site and in-school follow-up activity. Reserve education activities are guided by national plans that identify goals, priorities, and implementation strategies for these programs. Education and training programs, interpretive exhibits and community outreach programs integrate elements of NERRs science, research and monitoring activities and ensure a systematic, multi-faceted, and locally focused approach to fostering stewardship.

National Estuarine Research Reserve System Education Goals

The NERR System mission includes an emphasis on education, interpretation and outreach. Education policy at the RBNERR is designed to fulfill the reserve system goals as defined in the regulations 15 C.F.R. 921.1(b). Education goals include:

1. Enhance public awareness and understanding of estuarine areas and provide suitable opportunities for public education and interpretation;
2. Conduct and coordinate estuarine research within the system, gathering and making available information necessary for improved understanding and management of estuarine areas.

National Estuarine Research Reserve System Education Objectives

Education-related objectives in the Reserve System Strategic Plan 2005-2010 include:

1. People are aware of the ecological, economic, historical, and cultural importance of estuarine resources.
2. People understand how human choices and natural disturbances impact social, economic, and estuarine ecological systems.

3. People apply science-based information when making decisions that could impact coastal and estuarine resources.

National Estuarine Research Reserve System Coastal Training Program

The Coastal Training Program (CTP) provides up-to-date scientific information and skill-building opportunities to coastal decision-makers who are responsible for making decisions that affect coastal resources. Through this program, NERRs can ensure that coastal decision-makers have the knowledge and tools they need to address critical resource management issues of concern to local communities. CTPs offered by NERRs relate to coastal habitat conservation and restoration, biodiversity, water quality and sustainable resource management and integrate reserve-based research, monitoring and stewardship



Walks on an ancient shell mound provide peaceful pondering of the rich history of Rookery Bay Estuary.

activities. Programs target a range of audiences, such as land-use planners, elected officials, regulators, land developers, community groups, environmental non-profits, business and applied scientific groups. These training programs provide opportunities for professionals to network across disciplines and develop new collaborative relationships to solve complex environmental problems. Additionally, the CTP provides a critical feedback loop to ensure that professional audiences inform local and regional science and research agendas. Programs are developed in a variety of formats ranging from seminars, hands-on skill training, participatory workshops, lectures and technology demonstrations. Participants benefit from opportunities to share experiences and network in a multidisciplinary setting, often with a reserve-based field activity. RB-NERR has also established effective partnerships with Florida Sea Grant, NOAA's Coastal Services Center, and the Florida Keys National Marine Sanctuary.

Partnerships are important to the success of the CTP. NERRs work closely with state coastal programs, Florida Sea Grant Extension Program and education staff, and a host of local partners in determining key coastal resource issues to address, as well as the identification of target audiences. Partnerships with local agencies and organizations are critical in the exchange and sharing of expertise and resources to deliver relevant and accessible training programs that meet the needs of specific groups. The CTP requires a systematic program development process, involving periodic review of the reserve niche in the training provider market, audience assessments, and development of a three to five year program strategy, a marketing plan and the establishment of an advisory group for guidance, program review and perspective in program development. The CTP implements a performance monitoring system, wherein staff report data in operations progress reports according to a suite of performance indicators related to increases in participant understanding, applications of learning and enhanced networking with peers and experts to inform programs.

RBNERR has played a significant role in supporting the NERR's Strategic Plan by striving to work beyond its boundaries and providing a basis for informed coastal decisions within the region. A key example is the regional support that RBNERR provides to the Office of Coastal and Aquatic Managed Areas' (CAMA) Aquatic Preserves located within South Florida, including field offices and staff in Tampa Bay, Charlotte Harbor, Estero Bay, and Biscayne Bay.

2.3 / Biogeographic Regions

NOAA has identified 11 distinct biogeographic regions and 29 subregions in the United States, each of which contains several types of estuarine ecosystems (15 C.F.R. Part 921, for NERR typology system).

RBNERR is located within the West Florida Subregion of the West Indian Biogeographic region, including the subtropical west coast of Florida extending from Tampa Bay to the Florida Keys, and the Caribbean Basin. The Rookery Bay and the Ten Thousand Islands ecosystem is a prime example of a nearly pristine subtropical mangrove forested estuary located adjacent to one of the fastest developing coastal areas in the United States. As such, RBNERR is well positioned to utilize research, education and training to effectively address coastal issues of relevance to the coastal communities located within the Bioregion.

When complete, the NERR System will contain examples of estuarine hydrologic and biological types characteristic of each biogeographic region (See Figure 4).

As of 2010, the NERR System includes 28 designated reserves and 1 reserves in the process of designation (See Figure 5).



2.4 / Reserve Designation and Operation

Under federal law (16 United States Code Section 1461), a state can nominate an estuarine ecosystem for Research Reserve status so long as the site meets the following conditions:

- The area is representative of its biogeographic region, is suitable for long-term research and contributes to the biogeographical and typological balance of the System;
- The law of the coastal state provides long-term protection for the proposed Reserve's resources to ensure a stable environment for research;
- Designation of the site as a Reserve will serve to enhance public awareness and understanding of estuarine areas, and provide suitable opportunities for public education and interpretation; and
- The coastal state has complied with the requirements of any regulations issued by the Secretary [of Commerce].

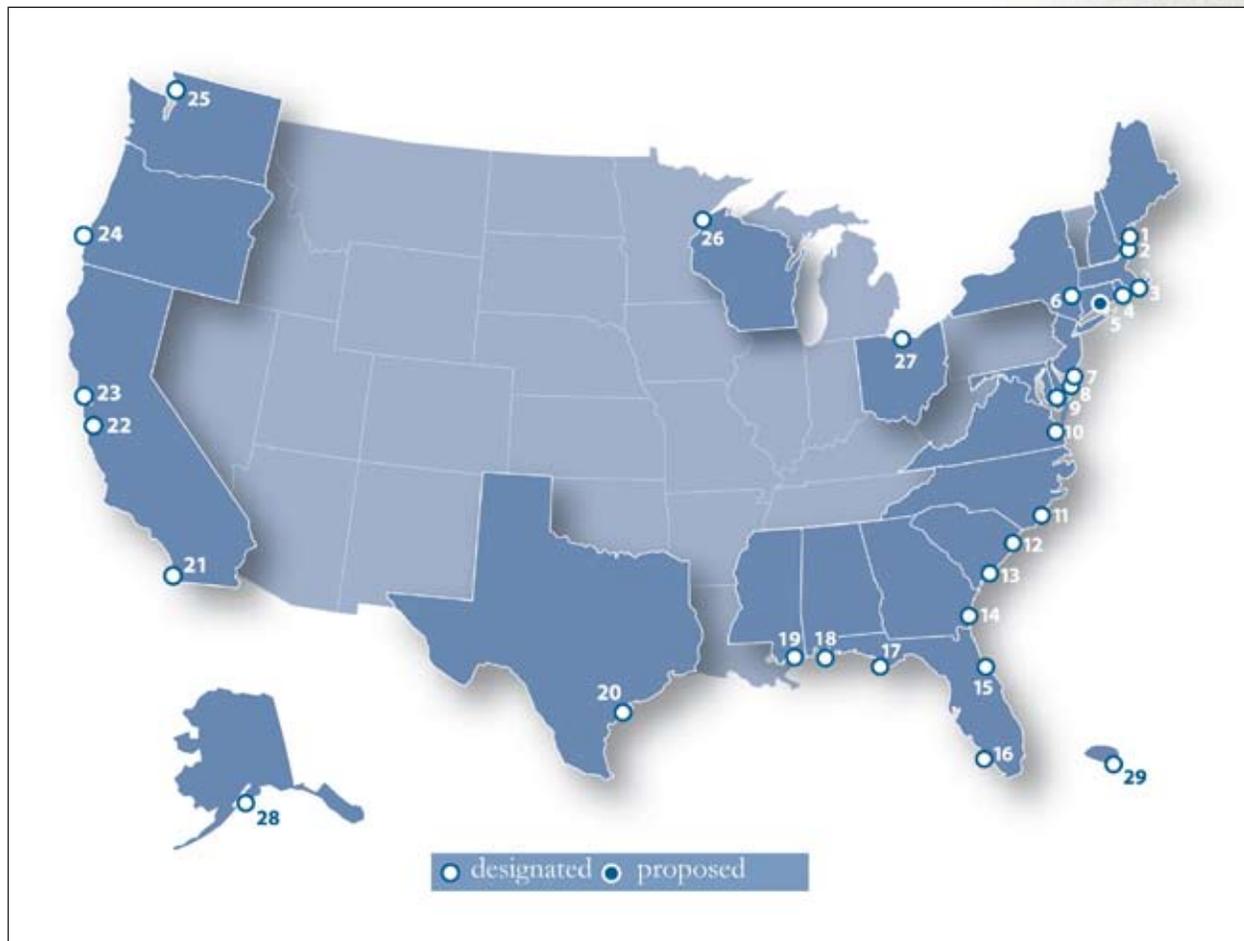


Figure 5 / NERR systems. (* designates proposed site)

- | | | |
|-----------------------------------|--|--------------------------------|
| 1. Wells, Maine | 11 North Carolina | 21. Tijuana River, California |
| 2. Great Bay, New Hampshire | 12. North Inlet-Winyah Bay, South Carolina | 22. Elkhorn Slough, California |
| 3. Waquoit Bay, Massachusetts | 13. ACE Basin, South Carolina | 23. San Francisco, California |
| 4. Narragansett Bay, Rhode Island | 14 Sapelo Island, Georgia | 24. South Slough, Oregon |
| 5. Connecticut* | 15. Guana Tolomato Matanzas, Florida | 25. Padilla Bay, Washington |
| 6. Hudson River, New York | 16. Rookery Bay, Florida | 26. Lake Superior, Wisconsin |
| 7. Jacques Cousteau, New Jersey | 17. Apalachicola, Florida | 27. Old Woman Creek, Ohio |
| 8. Delaware | 18. Weeks Bay, Alabama | 28. Kachemak Bay, Alaska |
| 9. Chesapeake Bay, Maryland | 19. Grand Bay, Mississippi | 29. Jobos Bay, Puerto Rico |
| 10. Chesapeake Bay, Virginia | 20. Mission-Aransas, Texas | * proposed |

Reserve boundaries must include an adequate portion of the key land and water areas of the natural system to approximate an ecological unit and to ensure effective conservation.

If the proposed site is accepted into the NERR System, it is eligible for NOAA financial assistance on a cost-share basis with the state. The state exercises administrative and management control, consistent with its obligations to NOAA, as outlined in a memorandum of understanding. A reserve may apply to NOAA's ERD for funds to help support operations, research, monitoring, education/interpretation, stewardship, development projects, and facility construction and land acquisition.

2.5 / *Administrative Framework*

The ERD of the Office of Ocean and Coastal Resource Management (OCRM) administers the reserve system. The OCRM is part of NOAA's National Ocean Service. The Division establishes standards for designating and operating reserves, provides support for reserve operations and system-wide programming, undertakes projects that benefit the reserve system, and integrates information from individual reserves to support decision-making at the national level. As required by federal regulation, 15 C.F.R. Part 921.40, OCRM periodically evaluates reserves for compliance with federal requirements and with the individual reserve's federally-approved management plan.

The ERD currently provides support for four system-wide programs: the SWMP, the Graduate Research Fellowship Program, the K-12 Estuarine Education Program (KEEP) and the CTP. They also provide support for reserve initiatives on restoration science, invasive species, K-12 education, and reserve specific research, monitoring, education, and resource stewardship initiatives and programs.

The NERR System is intended to operate as a federal/state partnership.

The state interest is usually represented through one or more state agencies, typically agencies charged with environmental, wildlife or coastal management responsibilities. States usually administer NERR personnel and day-to-day NERR management. For Florida, CAMA within the Florida Department of Environmental Protection is the agency that manages NERRs.

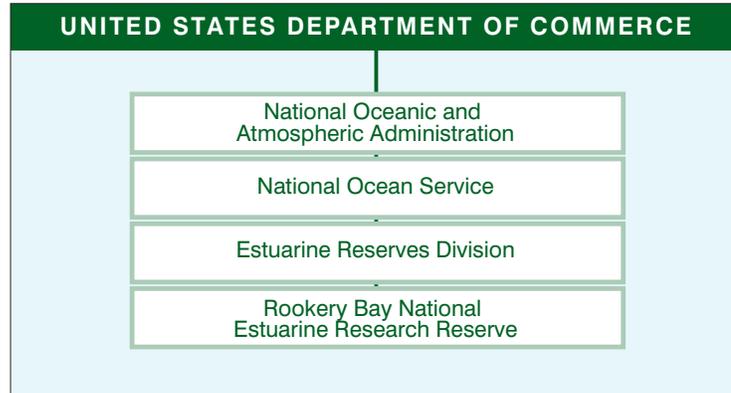


Figure 6 / Federal Structure for Managing National Estuarine Research Reserves.



Osprey pairs nesting on channel markers in the Rookery Bay Reserve are monitored for nesting success as an indicator of estuarine health.

Chapter Three

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

3.1 / Introduction

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

The Office of Coastal and Aquatic Managed Areas (CAMA) is the unit within the DEP that manages more than four million acres of submerged lands and select coastal uplands. This includes 3 National Estuarine Research Reserves (NERRs), 41 aquatic preserves, the Florida Keys National Marine Sanctuary and the Coral Reef Conservation Program (CRCP). The three NERRs, the Florida Keys National Marine Sanctuary and the CRCP are managed in cooperation with the National Oceanic and Atmospheric Administration (NOAA).

CAMA manages sites in Florida for the conservation and protection of natural and historical resources and resource-based public use that is compatible with the conservation and protection of these lands. CAMA is a strong supporter of the NERR System and its approach to coastal ecosystem management.

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

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

3.2 / *State Management Authority*

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

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

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

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



The Rookery Bay National Estuarine Research Reserve works in support with community partners to restore habitat.

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

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 DEP and CAMA have proprietary authority to manage the sovereignty lands, the water column, spoil islands (which are merely deposits on sovereignty lands), and some of the natural islands and select coastal uplands to which the Trustees holds title.

NERR sites include state-owned uplands in addition to sovereignty lands. Florida's first acquisition program was established in 1963 as the Land Acquisition Trust Fund (LATF), which funded the Outdoor Recreation and Conservation Program to purchase park and other recreational areas. The Environmentally Endangered Lands (EEL) program was created in 1972.

In 1979, the current Division of State Lands was created within the Florida Department of Natural Resources, a predecessor agency to the DEP. The same year the legislature substantially amended Chapter 253, F.S., pertaining to the use and management of state lands and created the Conservation and Recreation Lands (CARL) program to replace EEL. CARL and its successors were eventually codified in Chapter 259, F.S. 1981 saw the establishment of the Save Our Coast (SOC) program, which augmented the LATF to focus on coastline purchases. CARL eventually subsumed the responsibilities of both SOC and LATF.

Preservation 2000 Program commenced in 1990 to fund CARL and other acquisition initiatives. Preservation 2000 was intended as a ten-year program and was succeeded by Florida Forever Program at the end of its course. Florida Forever has replaced CARL and continues to provide for the evaluation of land for acquisition and inclusion within the boundaries of Florida's three NERRs.

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

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

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

3.3 / State 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 (the Trustees), 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. (See Appendix A.5 for Florida Statutes).

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 only sovereignty or state-owned lands that are specifically authorized for inclusion as part of an aquatic preserve.

Management responsibilities for aquatic preserves may be fulfilled directly by the Trustees or by staff of the DEP through delegation of authority. Other governmental bodies may also participate in the management of aquatic preserves under appropriate instruments of authority issued by the Trustees. CAMA staff serves as the primary managers who implement provisions of the management plans and rules applicable to the aquatic preserves. CAMA does not regulate the lands per se; rather, that is done primarily by the DEP Districts (in addition to the WMDs and the Division of Aquaculture in the Florida Department of Agriculture and Consumer Services), which grant regulatory permits and—through delegated authority from the Trustees—proprietary authorizations for certain public and private uses within the aquatic

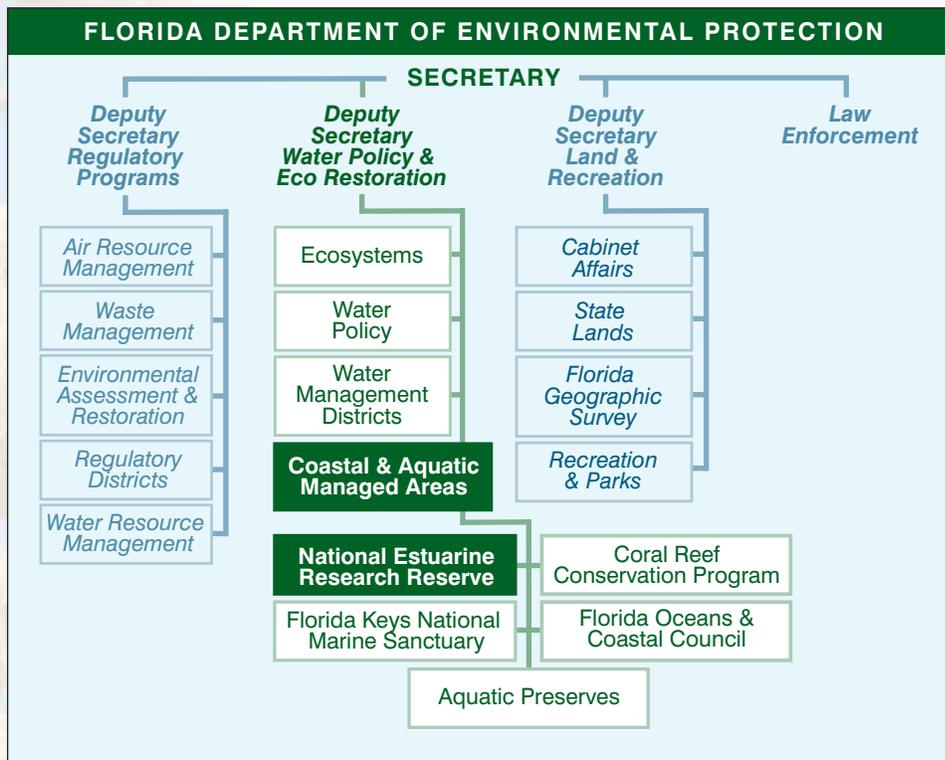


Figure 7 | State structure for managing Aquatic Preserves.

Trustees. This mechanism provides a basis for the Trustees to evaluate public interest and the merits of any project while also considering potential environmental impacts to the aquatic preserves. Any activity located on sovereignty lands requires a letter of consent, a lease, an easement, or other approval from the Trustees.

The same authorities in Chapters 258 and 253, F.S., discussed above, provide management directives relevant to the NERRs. Of critical importance, Section 253.86 grants CAMA the explicit authority to promulgate rules for the management of uplands assigned to its management. Additionally, NERR management must take into account Chapter 259, F.S., which authorizes and governs acquisition and use of lands to conserve and protect important habitats, wildlife, water resources, and archaeological sites in accordance with the Land Conservation Act of 1972. Land managing agencies must prepare management plans in compliance with guidelines established in Chapter 259, F.S. Once again, the Trustees fulfill the proprietary management overview role for the NERRs, with management responsibilities assigned to staff acting as “agents” of the Trustees, pursuant to delegations of authority, management agreements, and other legal mechanisms. Typically, a lease agreement with the Trustees delegates management authority for the uplands assigned to the DEP and CAMA. Leases for Trustees lands within this NERR are included in Appendix A.8.

Many provisions of the Florida Statutes that empower non-CAMA programs within DEP or other agencies may be important to the management of CAMA sites. For example, Chapter 403, F.S., authorizes DEP to create rules concerning the designation of “Outstanding Florida Waters” (OFW), a designation

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, Florida Administrative Code (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

program that provides aquatic preserves with additional regulatory protection. Chapter 379, F.S., regulates saltwater fisheries and wildlife management and provides enforcement authority and powers for law enforcement officers within the Florida Fish and Wildlife Conservation Commission. Chapter 597 F.S. regulates the use of submerged lands for aquaculture. The Legislature declares in section 253.68(2)(a), F.S., that aquaculture shall be recognized as a practicable resource management alternative to produce marine aquaculture products, to protect and conserve natural resources, to reduce competition for natural stocks, and to augment and restore natural populations. Section 253.68(b) adds that it shall be the policy of the state to foster aquaculture development when the aquaculture activity is consistent with state resource management goals, environmental protection, proprietary interests, and the state aquaculture plan. Section 258.42, F.S., provides that aquaculture is in the public interest and that aquaculture leases may be authorized in aquatic preserves. Because the NERR boundaries encompass areas directly managed by other state and federal agencies, interested parties should refer to the management plans produced by the relevant agencies for those parcels for a discussion of their legal authorities. The sheer number of statutes that affect NERR management prevents an exhaustive list of all such laws from being provided here.

3.4 / Administrative Rules

Chapters 18-18, 18-20 and 18-21, F.A.C., are the three administrative rules directly applicable to the uses allowed in aquatic preserves specifically and sovereignty lands generally. These rules are intended to be cumulative, meaning that Chapter 18-21, F.A.C., should be read together with Chapter 18-18, F.A.C., or Chapter 18-20, F.A.C., to determine what activities are permissible within an aquatic preserve. If Chapter 18-18, F.A.C., or Chapter 18-20, F.A.C., are silent on an issue, Chapter 18-21, F.A.C., will control; if a conflict is perceived between the rules, the stricter standards of Chapter 18-18, F.A.C., or Chapter 18-20, F.A.C., supersede those of Chapter 18-21, F.A.C. Because Chapter 18-21, F.A.C. concerns all sovereignty lands, it is logical to discuss its provisions first. (See Appendix A.6 for Florida Administrative Codes)

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

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

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

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

Chapter 18-20, F.A.C., expands on the definition of “public interest” by outlining a balancing test that is to be used to determine whether benefits exceed costs in the evaluation of requests for sale, lease, or

transfer of interest of sovereignty lands within an aquatic preserve. The rule also provides for the analysis of the cumulative impacts of a request in the context of prior, existing, and pending uses within the aquatic preserve, including both direct and indirect effects.

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

NERRs, because they manage uplands in addition to their oversight of sovereignty lands within aquatic preserves, must follow the provisions of Chapter 18-2, F.A.C., Chapter 18-23, F.A.C., and Chapter 18-24, F.A.C. Chapter 18-2, F.A.C., establishes policies concerning use of uplands owned by the Trustees and managed by state entities. Originally codified in 1996, this rule expands upon the guidelines set forth in the Conceptual State Lands Management Plan (See Appendix A.3). It requires that uses of the uplands be not contrary to the public interest and mandates that direct and indirect impacts and cumulative effects be considered as part of the public interest determination.

Chapter 18-23, F.A.C., supplements Chapter 18-2, F.A.C., by establishing guidelines and criteria specifically for uplands managed by CAMA. It limits certain activities on these uplands, such as hunting and admission of pets, “to conserve, preserve and restore the natural and cultural resources and ensure the safety and enjoyment of visitors” (Subsection 18-23.007(2), F.A.C.). The rule provides a schedule of fines for violations of these policies, which are considered non-criminal infractions.

Chapter 18-24, F.A.C., delineates procedures specific to the use of monies from the Florida Forever Trust Fund for the acquisition and restoration of uplands. It also prescribes the procedures that are to be followed by the Acquisition and Restoration Council in advising the Trustees in administering the Florida Forever Program.

As with statutes, aquatic preserve management relies on the application of many other DEP and outside agency rules. Perhaps most notably, Chapter 62-302, F.A.C., concerns the classification of surface waters, including criteria for OFW, a designation that provides for the state’s highest level of protection for water quality. All aquatic preserves contain OFW designations. No activity may be permitted within an OFW that degrades ambient water quality unless the activity is determined to be in the public interest. 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. For areas within NERR boundaries directly managed by other agencies, interested parties should refer to the relevant management plans for those areas for a discussion of their applicable rules and regulations.



Sunset over the Gulf of Mexico.

Chapter Four

The Rookery Bay National Estuarine Research Reserve

4.1 / Description of Representative Ecosystem Region

4.1.1 / History of the Rookery Bay National Estuarine Research Reserve

Recent archeological studies at the Rookery Bay National Estuarine Research Reserve (RBNERR), conducted in cooperation with the Florida Division of Historical Resources, have confirmed that the Rookery Bay estuary was used by pre-Calusa Indians and by pioneer settlers. RBNERR has midden sites scattered throughout mangrove basin forests and barrier islands. Early pioneers settled in the Shell Island Road and Henderson Creek vicinity, first establishing small farms and later dredging shell from several large mounds to provide fill for local roads and construction. Shell Island Road was constructed using shell material as fill providing vehicle access to what is now a core area of RBNERR.

Efforts to preserve the Rookery Bay estuary were initiated in 1964, when developmental pressures were directed toward this relatively undisturbed estuary. A proposed road would have allowed access to the area and facilitated residential development. However, local opposition resulted in a site recommendation for preservation. Instrumental in this action were the newly founded Collier County Conservancy, now the Conservancy of Southwest Florida (CSF), the National Audubon Society (NAS), and The Nature Conservancy (TNC). From 1964 through 1974, over 3,700 acres of lands associated with Rookery Bay were primarily acquired through the efforts of these three organizations. The title for most of these wetlands was vested in the NAS, and the area was designated as an Audubon Wildlife Sanctuary.

In order to provide adequate protection for the Rookery Bay ecosystem and establish a long-term source of operational funds, CSF, TNC and the NAS requested that the State of Florida apply to the National Oceanic and Atmospheric Administration (NOAA) for National Estuarine Research Reserve (NERR) status for Rookery Bay. As a condition of the designation process, these parties signed an agreement with the State in 1977 that leased Audubon's holdings around Rookery Bay to the State of Florida for a period of 99 years (Appendix A.8). A final Environmental Impact Statement (EIS) was prepared that included plans for initial operation and acquisition.

In September 1978, Rookery Bay was formally designated a NERR in accordance with Section 315 of the Coastal Zone Management Act. A three-member Reserve Management Board (Florida Department of Environmental Protection [DEP], CSF and NAS) provides for periodic review of issues and site man-

agement as outlined in the lease agreement in Appendix A.8. For details of the Management Board, refer to Appendix A.7.

Since designation of the RBNERR, DEP has constructed and operates an on-site headquarters, a two-story visitor center, research laboratories, two field research stations and dormitories, a boat dock and maintenance/fleet support facilities. As of 2010, RBNERR employs thirteen permanent staff, including administration, research, education, training, stewardship and maintenance personnel. Additional contractual and temporary staff are supported through state and federal funds, are utilized to support RBNERR operations and projects. Currently twelve vessels and six vehicles are used by RBNERR staff and volunteers to support research, education and resource management. (See Chapter 7 for details of staffing and facilities.)

4.1.2 / General Description

Reserve Mission

The mission of the RBNERR is to provide a basis for informed stewardship of estuaries in Southwest Florida through research and education.

International/National/State/Regional Significance

RBNERR comprises the western extent of the Everglades ecosystem, an ecological region of international significance due to its high level of biodiversity, contiguous freshwater and marine wetlands and abundance of coastal and marine wildlife.

Location/Boundaries

NERR System Program Regulations, 15 Code of Federal Regulations (C.F.R.) Part 921, state that a NERR's boundaries "encompass an adequate portion of the key land and water areas of the natural system to approximate an ecological unit and to ensure effective conservation." RBNERR boundaries should provide the basis for long-term protection and preservation of the estuarine ecosystem, and should include significant physical, chemical and biological factors that contribute to the diversity of flora, fauna and habitat occurring within the estuary. The NERR site should include the resources to attract a broad range of research and educational interests.

In 1985, the DEP and CSF developed a land acquisition project boundary to purchase and incorporate privately-owned lands from willing sellers adjacent to the RBNERR. The State's Conservation and Recreation Lands (CARL) Selection Committee approved the project boundary (Figure 1), enabling these lands to be eligible for purchase using CARL funds. The project's stated purpose is to protect RBNERR water quality, preserve habitat for native plants and animals, and to provide recreational opportunities to local communities in Southwest Florida. The Rookery Bay CARL project boundary identified approximately 10,850 acres of key land and water areas adjacent to the original RBNERR. All lands from the original EIS were included in the CARL boundary. In 1990, RBNERR and community partners initiated an effort to gain local support for the project. Significant state funding was provided through Preservation 2000, enacted by the Florida legislature in 1990 to provide up to \$300 million per year in bond revenues to purchase environmentally sensitive lands. Additional federal funds to acquire RBNERR lands have been provided by NOAA and the United States Fish and Wildlife Service (USFWS).

The CARL project boundary was modified in 1995 to include additional parcels along Henderson Creek. As a result of significant efforts by local, state and federal partners, the Rookery Bay CARL project was declared essentially complete by the State of Florida in 1999. Parcels totaling approximately 3,575 acres represent privately-owned inholdings and are not within the boundaries of the RBNERR. Only the outside perimeter boundary of RBNERR is depicted on the boundary maps, not the privately-owned inholdings.

DEP, supported by the Reserve Management Board, submitted a proposal to NOAA in 2000 to expand the RBNERR boundary to incorporate adjacent state-owned coastal lands. Approved by NOAA in 2002, the expanded boundaries of RBNERR currently incorporate key land and water components that total approximately 110,000 acres (Figure 1). The RBNERR boundary includes an estuarine system extending from Gordon Pass to the north and all state-owned uplands and submerged lands within the Ten Thousand Islands region to the south.

DEP signed a lease agreement (Appendix A.7.1) in 1990 with the Board of Trustees of the Internal Improvement Trust Fund that provides management authority for all uplands identified in the RBNERR boundary. Title and authority for submerged lands management within the RBNERR is provided for in Chapter 258 Florida Statutes (F.S.). All lands located within RBNERR are essential components of a contiguous estuarine ecosystem, and will not be considered as surplus under current and planned management strategies.

The total estimated surface area open waters encompassed within RBNERR are 70,000 acres, or approximately 64% of the RBNERR. The remaining 40,000 acres are composed primarily of estuarine mangrove wetlands, fresh to brackish water marshes and upland habitats consisting of pine flatwoods, cabbage palm associations, coastal hammocks and dunes, xeric scrub and cypress slough/prairies.

Approximately 3,772 acres within RBNERR boundaries are leased to DEP by NAS, TNC and CSF and are managed by RBNERR staff. State owned lands including 70,000 acres of submerged lands and approximately 22,928 acres of acquired lands are held in fee simple title by the Board of Trustees of the Internal Improvement Trust Fund. An additional approximate 13,300 acres within the boundaries were acquired by the State as part of a settlement agreement with the Deltona Corporation. Parcels totaling approximately 3,575 acres represent privately owned in-holdings within the RBNERR and are not included as part of the RBNERR boundary. During the time of this management plan 17,721 acres of land are planned for consolidation. Formal approval of RBNERR's boundary expansion through consolidations will be finalized with the next management plan.

4.1.3 / Resource Description

Rookery Bay is a prime example of a subtropical coastal estuary and forest system that typifies the West Indian Biogeographic Region. Some studies indicate that elements of the warm temperate continental Carolinian fauna may find their southern limits here (Hedgepeth, 1953; Tabb & Manning, 1961). Briggs (1974) suggests the area is a probable subtropical transition zone between warm-temperate and tropical biotas. An estuary is defined as a coastal body of water with a measurable fresh-water inflow. High primary and secondary productivity associated with estuaries is a consequence of physical, chemical and biological factors. Variations in salinity, as a result of seasonal or tidal effects, have a significant influence on estuarine fauna. Lifecycles of many estuarine-dependent organisms, such as the pink shrimp (*Farfantepenaeus duorarum*) and tarpon (*Megalops atlanticus*), considered to be economically important for their recreational and commercial value, are linked to salinity regimes

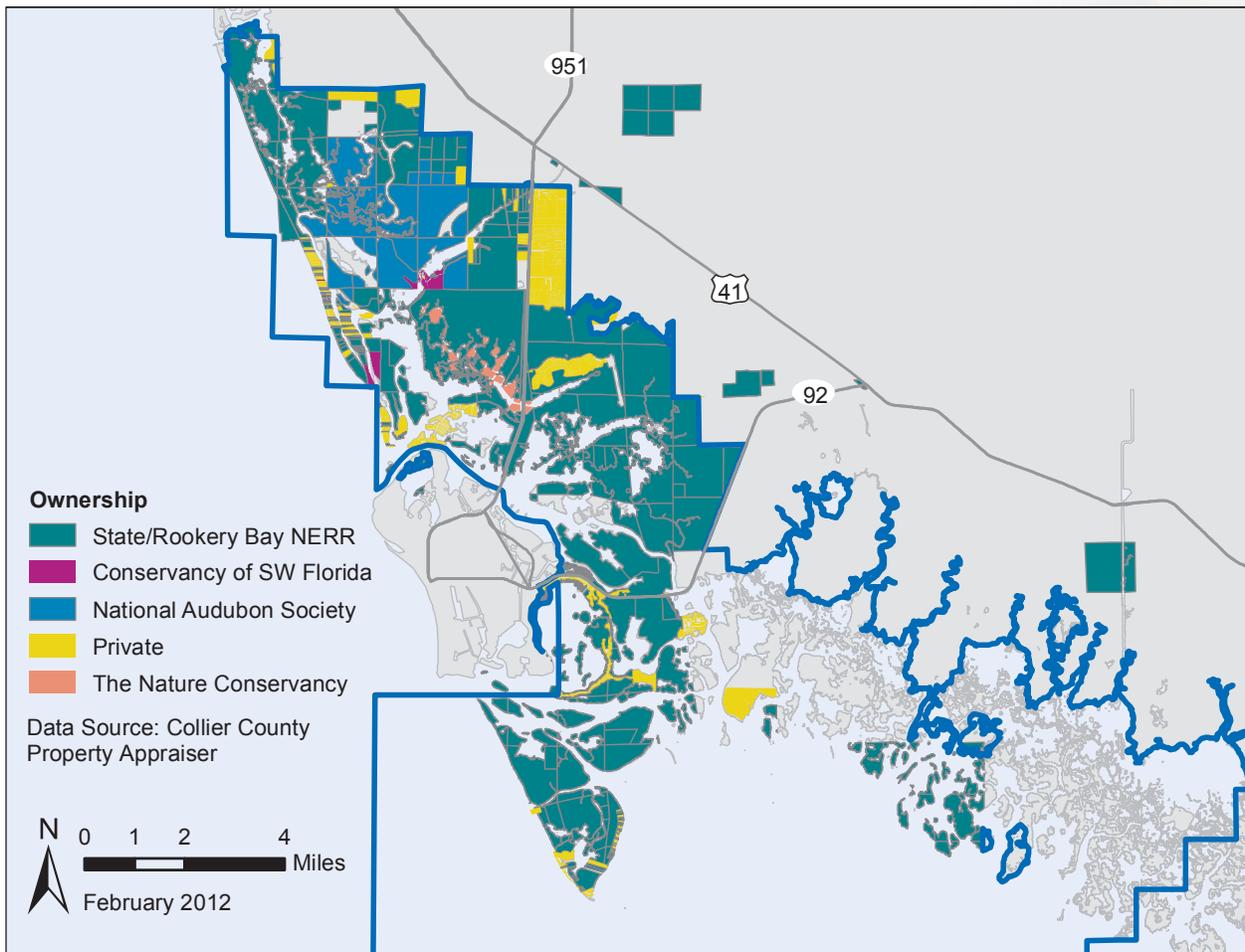


Figure 8 / RBNERR Boundary with Private Parcels Boundaries

based on these natural fluctuations. Most marine flora and fauna penetrate estuaries to their limits of tolerance to low and rapidly changing salinities. Relatively few species have evolved mechanisms to tolerate salinity extremes.

The watershed, or drainage basin, of an estuary represents the source of freshwater inflow into the system. Rivers, tidal creeks, sheetflow and sub-surface flow discharge freshwater from land drainage along with sediments and particulate and dissolved organic material.

The Rookery Bay and Ten Thousand Islands estuarine ecosystem contains bays, interconnected tidal embayments, lagoons and tidal streams. Sources of freshwater drainage include sloughs, strands, a series of tidal creeks and channels, surface and sub-surface sheetflow and canals.

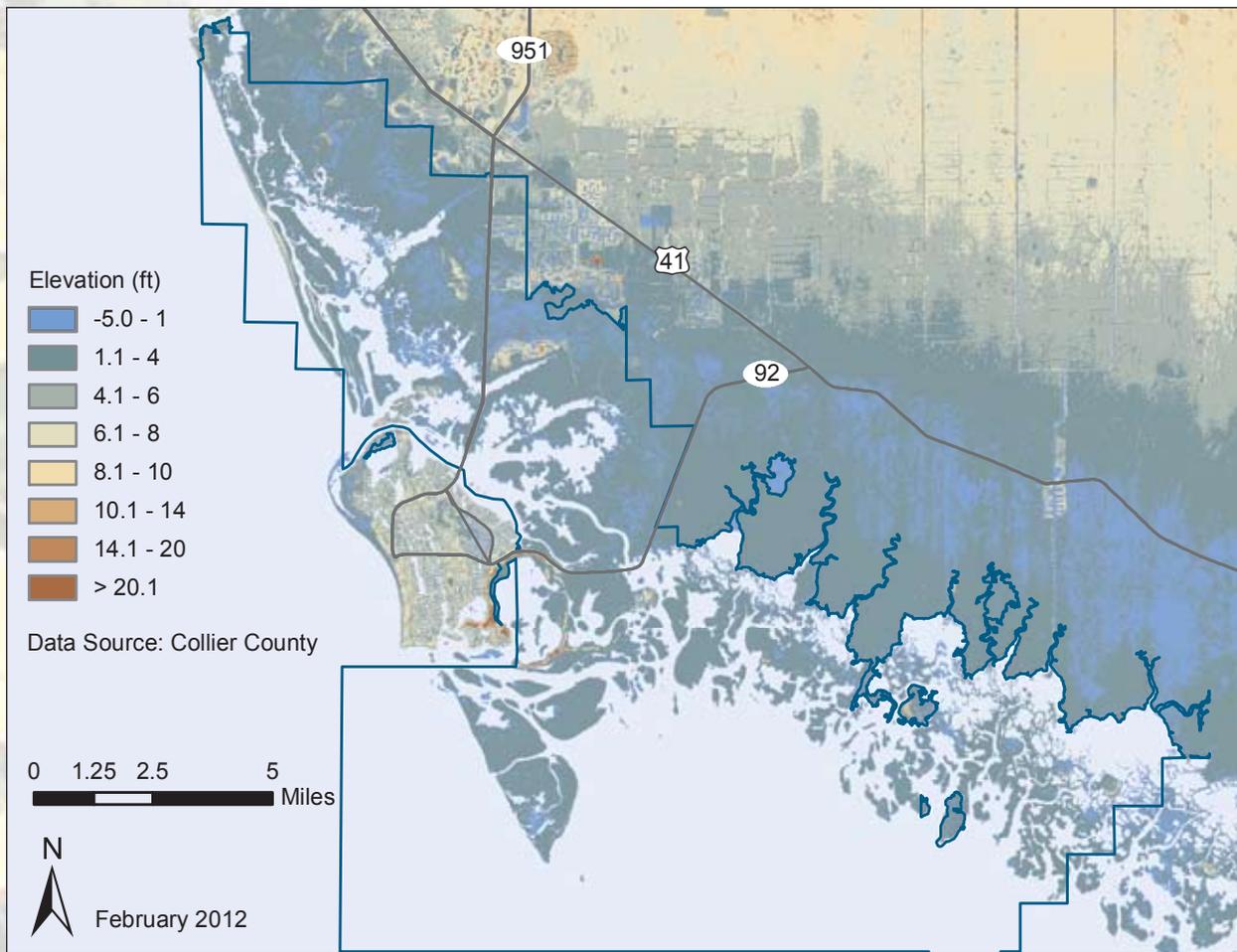
Surrounding Population Data and Future Projected Changes

Collier County currently is ranked among the highest metropolitan growth rates in Florida and is considered one of the fastest growing areas in the nation. Between 1980 and 1998, County population increased 144% from 85,971 to an estimated 210,100 (US Census Bureau, 2000). The County's population is currently estimated at 332,854, an additional increase of 58% over the population in 1998 (Florida Statistical Abstract, 2008). In 2008, over 1.3 million tourists visited Collier County (Naples, Marco Island, and Everglades Convention and Visitors Bureau, 2010). Collier County's population is projected to increase by an additional 64% by 2030 (BEBR, 2008).

Topography and Geomorphology

RBNERR is characterized by flat sandy coastal lowlands supporting pine flatwoods and xeric scrub communities, inland freshwater marshes, cypress slough and prairies, coastal margin saltwater marshes, extensive mangrove forests, a reticulated mangrove island system, and associated mudflats, oyster bars and seagrass beds.

The lagoonal bays that comprise Rookery Bay, Dollar Bay and Johnson Bay are part of a larger interconnected system that once extended all the way up the western Florida coast to the vicinity of Tampa Bay. Many of these bays, which formed on the landward side of enclosing or barricading barrier islands, have



filled in over time either through natural hydrographical processes or by human activities. Consequently, the once uninterrupted inter-coastal lagoon system is now mostly interdicted, with only ragged remnants existing north of Rookery Bay.

The barrier islands in the vicinity of Rookery Bay, have become coalesced into incipient (Marco Island) or actual (Naples area) headlands. However, the extensive mangrove-dominated ecosystem continued to flourish and to expand into these areas as well as the coastal mainland. It now forms a vast uninterrupted coastal ecosystem from south of Naples to the lower southeastern margin of Florida Bay in Everglades National Park.

The uplands of the RBNERR are predominantly higher elevation sand dunes of Pleistocene age, mixed with various organic sediments and soils. Much of these uplands are at a mean elevation of four feet, but a sandy ridge running roughly parallel with Shell Island road in a north-south direction is more than five and one-half feet in elevation. These sandy regions are intermediately to well-drained and, as a consequence, support characteristic xeric vegetational assemblages.

The highest elevation in the RBNERR is 22 feet above mean sea level and is located on the shore of Stopper Creek. This area, named Sand Hill, is part of a long dune ridge that extends to the northeast beyond the RBNERR boundaries and eventually intergrades into the higher contours of the Belle Meade and Camp Keais coastal zones (Gore, 1984). Test borings in this area produced sand down to six feet, which is believed to extend to the Tamiami bedrock (The Conservation Foundation, 1968).

Another unique upland feature of RBNERR and the region are shell mounds. These are mostly kitchen middens and refuse sites used by the aboriginal Calusa Indians. They often form prominent topographical features above the low-lying contiguous tidelands of the RBNERR.

Geology

The Rookery Bay basin is a combined result of Floridian geology and oceanology. The Miocene Tamiami Limestone formation underlies all of Collier County, including Rookery Bay. Lying on this limestone is the Pleistocene Anastasia Formation, a combination of subaerially lithified sands and shell hash (McCoy, 1962).

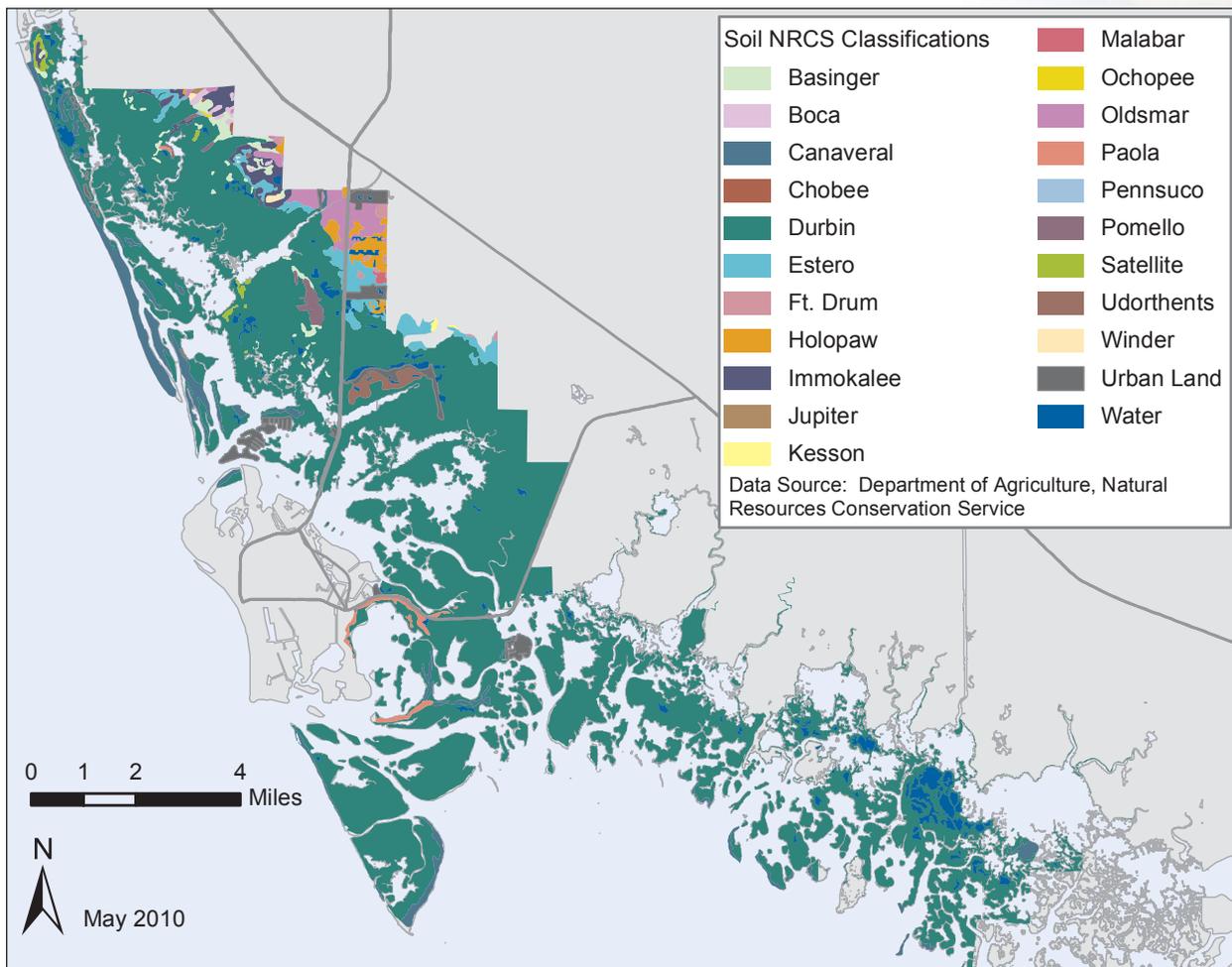


Figure 10 | Rookery Bay National Estuarine Research Reserve Soils.

During the Pleistocene era, much of Florida was under water. Several different long-term sea rises left remnants of shorelines at seven different levels within that era, and are now referred to as terraces. The two lowest levels, Talbot and Pamlico, are evident in Collier County. These sea levels were estimated to be 25 to 42 feet above sea level in mid-20th century for the Talbot terrace and 20 to 25 feet above sea level for the Pamlico (Wanless et al., 1994; Scholl, 1964; McCoy, 1962).

Using current topographical information for Collier County, an estimated shoreline for these terraces can be illustrated using GIS. The 5-meter elevation contour is used to represent the Pamlico terrace. This elevation may also match the sea rise 3200 YBP (Wanless et al., 1994), when most of the southwest Florida coastline was again temporarily inundated. The 10-meter contour is used to represent the Talbot terrace. This means that all of Collier County, except for a small island near present day Immokalee, was under water for most of the Pleistocene era.

There are several periods in geologic history when the shoreline was much further out on the Gulf of Mexico shelf (Wanless et al., 1994), but current bathymetry maps covering areas far enough out to illustrate this level are not available.

Because of the relatively rapid change in sea levels throughout the period from 15,000 YBP to 3200 YBP, no significant marine ridges were formed, and coastal lagoons and estuaries were ephemeral and narrow bands of vegetation. The rate of advance and retreat has slowed from a high of about 2 meters per year (9000 YBP) to the current rate of 30 cm per 100 years. While mangrove forests and marl levees provide stability and slow changes to the shoreline during these rises, barrier islands such as Keewaydin experience highly variable changes in shoreline due to currents and wave action.

The geologic formations and related surficial geology present in the RBNERR core-area, associated aquatic preserves, and watersheds draining into its estuaries are described by the United States Geological Survey (USGS) as:

- **Quaternary**

- Qh1:** Holocene sediments; quartz sand with minor amount of clay and organic matter from lagoon deposits; no formations recognized.

- Qsu1:** undifferentiated shell-beds.

- **Tertiary**

- Tt2:** Tamiami formation; limestone, clay, sand and marl, sometimes fossiliferous.

Minerals

There are no known abundant mineral resources (e.g., oil, gas, phosphates) located within RBNERR.

Soils

During sea level transgressions in the late Pleistocene, one of the dominant geomorphic features in Collier County was formed. This feature is the Immokalee Rise which is described as a southerly extension of the Pamlico marine sands. The most abundant soil classification type represented here (Figure 10) is "Durbin Series" consisting of level, very poorly drained organic soils in tidal mangrove swamps (Liudahl et al., 1998). These soils were formed in thick layers of organic material over sandy marine sediments and are mixed with decaying organic material and mangrove peats to form the mixtures of soils found in RBNERR today (Leighty, 1954).

Quartz sand and shell hash produced by erosion of marine and subaerial limestones to the north and subsequently carried southward into the Rookery Bay area by longshore currents, also comprise an important sedimentary layer in RBNERR. In addition, mangrove-derived peats from 1-2 feet thick, marls (calclitic mud), and shelly-sand or plain sand may form a typical stratigraphic sequence along the mainland shore. Much of the shell hash within the bay has been, and is today produced, by shallow water estuarine bivalves, particularly the common oyster (*Crassostrea virginica*). Lying beneath the shell hash in the protected bays and tidal creeks are layers of fine sand or muds. Various composites of all of these sediments may occur anywhere in the bay.

Hydrology and Watershed

Natural drainage patterns within Collier County have been significantly altered by the construction of canal systems, designed to lower annual peak water levels during the rainy season to prevent flooding. The canal system includes the Golden Gate Canal, Henderson Creek Canal, Lely Canal, Lely Manor Canal, Faka Union Canal and borrow canals used for the construction of U.S. 41, State Road (S.R.) 84, S.R.

951, and County Road 92 (Figure 1). A combination of fixed weirs and gates control canal flow, preventing excessive freshwater drainage and saltwater encroachment.

The primary watersheds for RBNERR are Lely Basin (Water Management District (WMD) No. 6), the Henderson Creek Basin and the Picayune Strand Basin (Southern Golden Gates Estates) (Figure 11). These basins are sub-units of the South Florida WMD. Freshwater inflow to Rookery Bay comes primarily from Henderson Creek at the northeastern corner of the RBNERR (Figure 1). This creek, with an average water depth of 0.8 meter (m) and a mean flow rate of 2,073,600 cubic feet/day (Water Resources Data, Florida 1983, FL-83-2A), drains the Henderson Creek Basin (Gore, 1984).

The Lely and Lely Manor canals are also significant sources of freshwater inflow. These waterways drain the inland areas to the immediate northeast of Rookery Bay and produce mean daily flow rates of 144,000 cubic feet/day. A substantial, but unmeasurable, amount of sheetflow also drains overland into the region.

The Faka Union Canal, located southeast of Marco Island, drains the Southern Golden Gate Estates through a series of connected canals, and discharges into the Ten Thousand Islands estuary.

Rookery Bay has a surface area of 1,034 acres and a mean depth of about 1 m (Lee & Yokel, 1973). Average open water depths range from about 1 m at low tide to a maximum at high tide of 5.5 m in the channel at the southern entrance to the Bay. Salinities, affected by tidal cycles and freshwater inflow, range from 18.5 parts per thousand (ppt) to 39.4 ppt with lower values occurring during the wet season from May through October. Highest values occur during the dry (winter and spring) season and can exceed those of the open Gulf of Mexico (35-36 ppt).

Rookery Bay has a mixed semi-diurnal tide. Tidal range averages 0.6 m with higher and lower extremes during periods of spring tides. Approximately 75 million cubic feet of water, estimated to be half of the volume of water in the Bay, moves into and out of Rookery Bay over each tidal cycle through the northern and southern openings. Two thirds of this water passes through the southern entrance, which has a deeper channel and a swifter current (The Conservation Foundation, 1968).

DEP has designated tidally connected waters within the boundaries of RBNERR, the Rookery Bay and Cape Romano-Ten Thousand Islands aquatic preserves as Class II and Outstanding Florida Waters

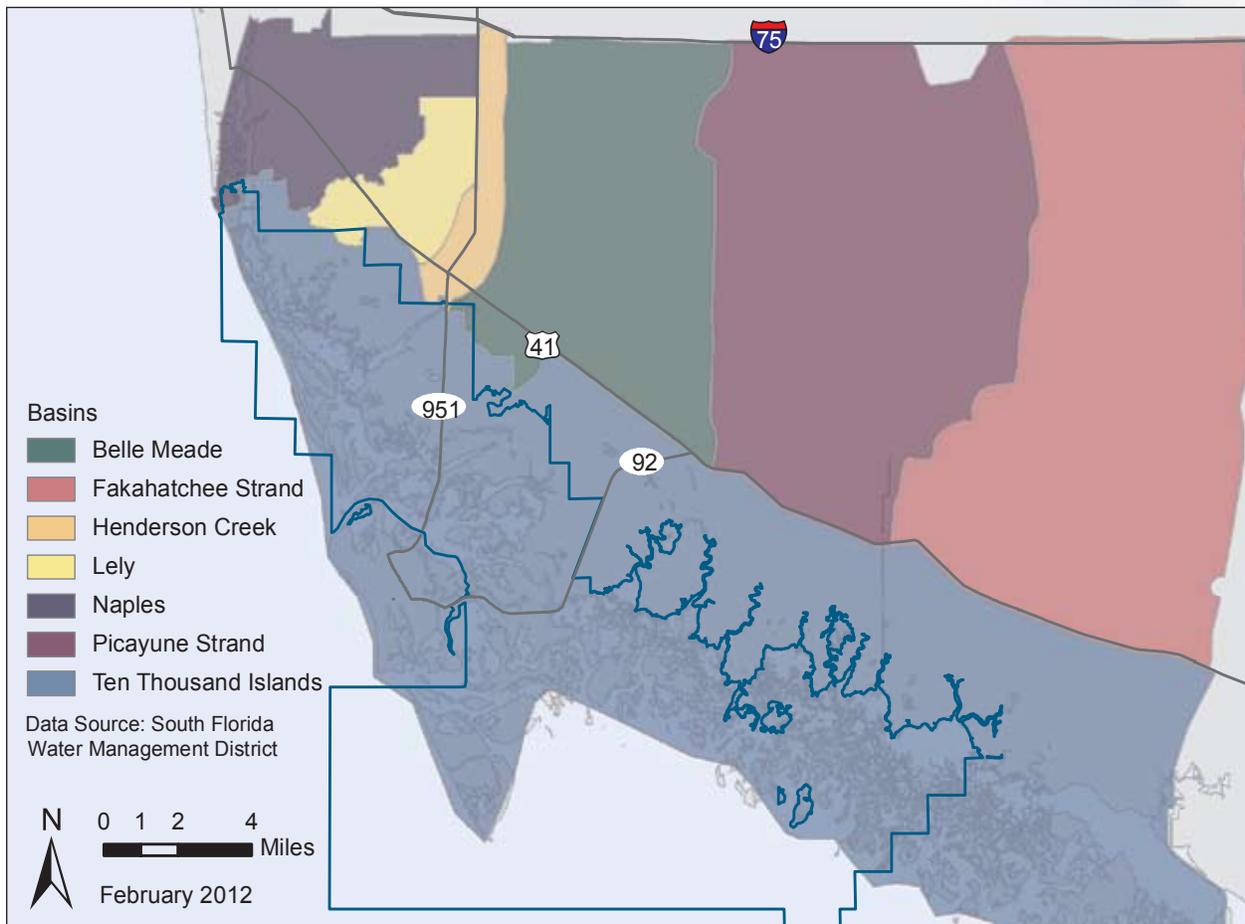


Figure 11 | RBNERR Drainage Basins

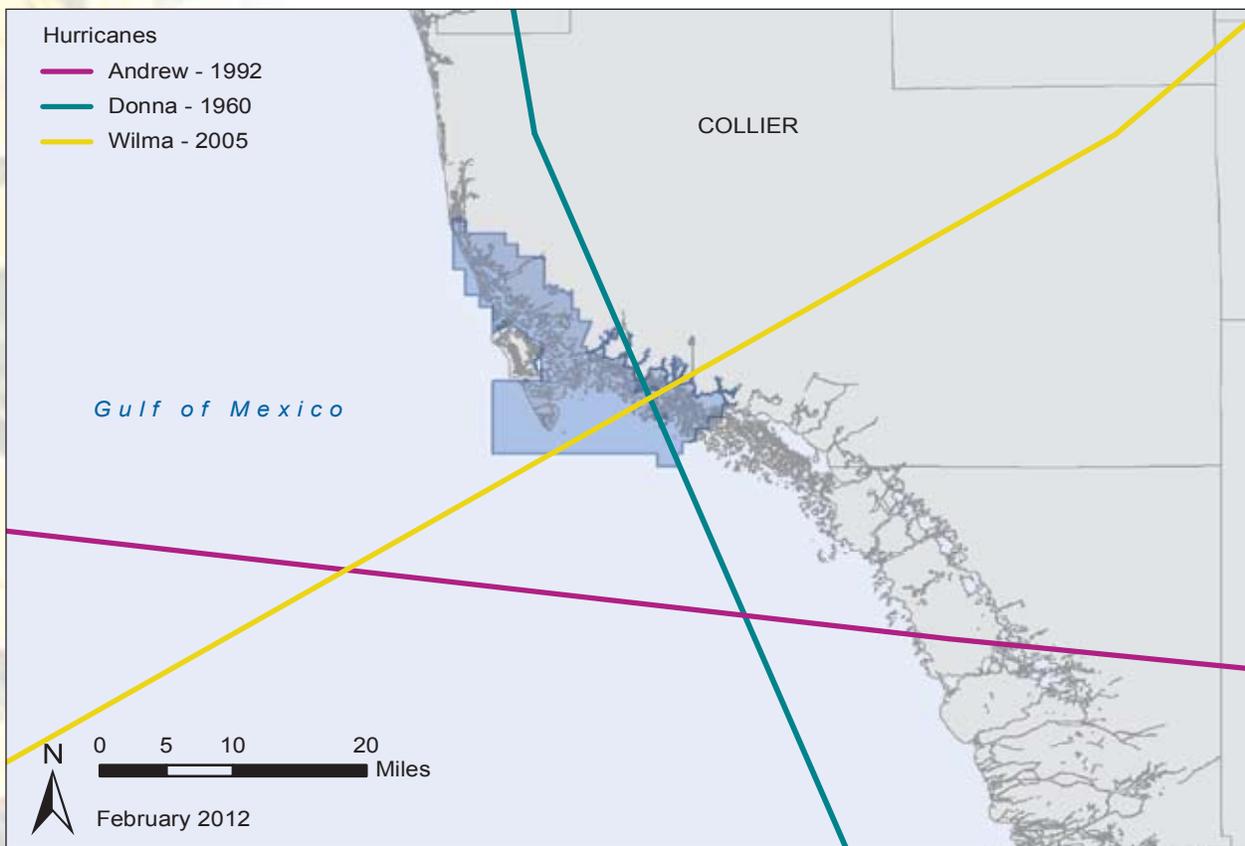
(OFW). OFW designation implements the state's highest standards for proposed developments, and does not allow for direct discharges that would lower ambient water quality, or indirect discharges that would significantly degrade water quality.

Climate

Rookery Bay is located in the Tropical Rainy climatic group of Koppen (1931), i.e., the area below a west-east line extending from Ft. Myers to Melbourne, and where the mean temperature does not fall below 17.7° C (64° F) in the coolest month of the year. Owing to the influence of the warm-water Florida Current, the seasonal effects from the Gulf of Mexico Loop Current, and its geographical position at 26° N latitude, the average annual temperature in the Rookery Bay area is about 24° C (75° F). Winter temperatures range from -1° C (ca. 30° F) to about 26° C (75° F), with cooler days and nights (10-15° C) in the months of January and February. Warming trends in April and May are frequently modified by blustery winds from the southwest off the Gulf of Mexico, and by late season cold fronts with northerly breezes. Summer high temperatures approach 35° C (95° F) or higher on occasion (Thomas, 1974).

Rookery Bay and vicinity have an annual rainfall of 50-55 inches (127-140 cm) per year (Thomas, 1974). The heaviest average monthly rainfall, eight to nine inches per month, occurs from June through September. Lowest average rainfall, one to two inches per month, occurs from November through March. Approximately 66% of the total yearly rainfall occurs between the months of June and October. Southwest Florida lies in the seasonal tropical weather belt that channels hurricanes toward or along the coast. Historically, the area is fortunate in that few severe hurricanes have come ashore.

The most recent catastrophic storm that caused extensive damage to the Naples area was Donna in 1960, which exerted massive flooding and high winds. The storm resulted in devastation of the vegetation and wide-spread damage to the homes and buildings in the Rookery Bay-Naples area. An earlier storm in 1918 also produced severe damage to human and natural features and is considered responsible for destroying or severely damaging much of the mangrove systems in Collier County. In 1992, Hurricane Andrew struck South Florida from the Atlantic, heading due west and exiting to the Gulf of Mexico approximately 35 miles south of RBNERR. Damage to vegetation and structures was relatively light in Naples, but increased to an extensive level in Everglades National Park south of Pavilion Key on the west coast. In 2005, Hurricane Wilma, a Category 4 storm, hit the Southwest Florida coast with the center of



the storm making landfall directly in the center of RBNERR at Cape Romano, causing significant shore-line changes in barrier islands within the Ten Thousand Islands, and deforestation within mangrove forested wetlands along the coast. See Figure 12 for hurricane tracking at RBNERR.

Although a major storm can strike the county at any time, projections based on storm-track averaging suggest that the probability for a storm in any year is 5 in 10, and for two such storms 1.5 in 10 (Jordan, 1973). The probability that any of these storms will be hurricanes or great hurricanes is 5% and 1%, respectively (Gentry, 1974). Such catastrophic events may have long-term impacts on the Rookery Bay ecosystem and could permanently change the ecology (Alexander and Crook, 1974).

Natural Communities

The natural community classification system used in this plan was developed by the Florida Natural Areas Inventory (FNAI) and the Florida Department of Natural Resources, now the DEP. The community types are defined by a variety of factors, such as vegetation structure and composition, hydrology, fire regime, topography and soil type. The community types are named for the most characteristic biological or physical feature (FNAI, 2010). (See Appendix B.6 for FNAI descriptions.)

The natural communities described below represent the dominant upland and wetland communities within RBNERR: Cabbage Palm/Oak Hammock, Pine Flatwoods, Coastal Xeric Scrub, Cypress Slough/Prairies, Freshwater Marshes, Tropical Hardwood Hammock, Saltwater Marshes, Mangrove Forests and Islands, Coastal Strand, Submerged Vegetated Bottom, Submerged Non-vegetated Bottom and Open Water. The dominant wetland habitats are Mangroves, Saltwater Marshes, Cypress Sloughs and Freshwater Marshes. These comprise more than 90% of the emergent wetland vegetation. The non-wetland assemblages ranked by aerial dominance are: Pine Flatwoods, Coastal Strand, Coastal Xeric Scrub, Cabbage Palm/Oak, and Tropical Hardwood Hammocks. Figure 13 represents the approximate location and extent of the primary upland and wetland habitats within RBNERR boundaries. Appendix B.4 indicates commonly observed species of mammals, reptiles, fishes, and birds. A list of common and scientific names for plant species referenced in the habitat descriptions is provided in Appendix B.4.

Table 1 / Coastal change analysis program (C-CAP) and the Florida Natural Areas Inventory habitat classification crosswalk.

CCAP Classification	FNAI Classification
Evergreen Forest	Mesic Flatwoods
Evergreen Forest	Maritime Hammock
Evergreen Forest	Mesic Flatwoods
Evergreen Forest	Scrubby Flatwood
Evergreen Forest	Pine Flatwood
Scrub/Shrub	Scrub
Scrub/Shrub	Coastal Xeric Scrub
Scrub/Shrub	Coastal Strand
Palustrine Forested Wetland	Strand Swamp
Palustrine Forested Wetland	Dome Swamp, Cypress Slough
Palustrine Emergent Wetland	Basin, Freshwater Marsh
Palustrine Emergent Wetland	Coastal Interdunal Swale
Palustrine Emergent Wetland	Depression Marsh
Estuarine Forested Wetland	Tidal Swamp
Estuarine Emergent Wetland	Tidal Marsh
Estuarine Aquatic Bed	Submerged Vegetated Bottom
Unconsolidated Shore	Submerged Non-vegetated Bottom
Barren Land	Beach Dune
Barren Land	Disturbed
Water	Open Water
Cultivated Crops	Agriculture

Upland natural communities in RBNERR include:

- 1. Pine Flatwoods (synonyms: Evergreen Forest):** This habitat is dominated by slash pine and saw palmetto. Cabbage palm (*Sabal palmetto*) islands are interspersed through some areas. Large areas are covered with various wiregrasses and broomsedges. The assemblage comprises less of the predominant upland vegetation than the cabbage palm/oak habitat. Even though this habitat is indicative of higher, drier land, standing water may cover certain areas in the slash pine habitat for several weeks or months in the rainy season.
- 2. Coastal Strand (synonyms: Scrub/shrub):** A series of high energy coastal barrier islands from Gordon Pass south to Everglades National Park (e.g. Keewaydin, Kice, Morgan, Cape Romano and Gullivan and White Horse keys) are exposed to moderate and high energy wave action, and sediment transport via longshore currents. Coastal strand communities are highly adapted to a harsh environment of high temperature extremes, porous coastal sands, salt spray and abrasive aeolian sand. Sea oat (*Uniola paniculata*), bay cedar (*Suriana maritima*) and railroad vine (*Ipomoea pes-caprae*) are typical pioneer plants found on the beaches and foredunes. Shorebirds, including the least tern (*Sternula antillarum*) and black skimmer (*Rynchops niger*) feed and rest along the Gulf beaches. The Atlantic loggerhead sea turtle (*Caretta caretta*) nests on Keewaydin, Kice, Cape Romano, Gullivan and White Horse keys during summer months.
- 3. Scrub (synonyms: Scrub/shrub):** Scrub oak species occur on RBNERR lands where the elevation exceeds five feet. This association is dominated by sand live oak (*Quercus geminata*), scrub oak (*Q. inopina*), myrtle oak (*Q. myrtifolia*), Chapman's oak (*Q. chapmanii*) and saw palmetto. In association with these plants is a variety of xerophytic shrubs and annual and perennial weeds such as rusty lyonia (*Lyonia ferruginea*) and wild rosemary (*Ceratiola ericoides*). These species are adapted to grow in continuously dry, sandy, nutrient-poor soil. Although these areas receive as much rainfall as the contiguous ecosystems, the permeable sand precludes significant water absorption or storage. The vegetation thus assumes a brushy and shrub-like appearance.
- 4. Cabbage Palm/Oak Hammock (synonyms: Evergreen Forest, Mesic Hammock):** This habitat consists of a series of scattered mixed hardwoods including live oaks (*Q. virginiana*) and myrtle oaks, red maple (*Acer rubrum*), red bay (*Persea borbonia*), cabbage palm, and a variably dense understory of saw palmetto, wax myrtle and numerous other shrubs. This habitat is distinguished from the pine flatwoods, which lack most of the hardwoods and have an understory of palmetto, wiregrasses and sedges. Depending on their distribution in topographical depressions, this habitat may be variably inundated with water during any part of the year, although in the wet season standing water areas are more often seen. It is generally inundation-tolerant. This habitat intergrades into the pine flatwoods habitat in some areas.

Both pine flatwoods and cabbage palm/oak habitats are fire dependant systems, surviving or benefiting from periodic fires. During the dry season, these habitats may be subject to natural or man-induced fires. Fire is beneficial in removing dry understory, recycling nutrients to the soils, inducing seed dispersal and germination in many of the plants, and halting successional changes, which would result in the development of a different association of plants and animals.

- 5. Tropical Hardwood Hammock (synonyms: Evergreen Forest, Mesic Hammock):** Examples of this habitat occur on the coastal barrier islands in RBNERR and scattered among the shell mounds of the mangrove forest. The assemblage is dominated by oaks, cabbage palms, stopper, gumbo limbo (*Bursera simaruba*) and sea grape (*Coccoloba uvifera*). The understory contains a variety of lesser hardwood species and ferns. Some areas are also variously invaded with Brazilian pepper (*Schinus terebinthifolius*), Australian pine (*Casuarina* spp.) and latherleaf (*Colubrina asiatica*).

Open water and wetland habitats consist of the following:

- 6. Open Water (synonyms: Water):** Rookery Bay, Henderson Creek, Johnson Bay, Blackwater River, Pumpkin Bay, Faka Union Bay, Fakahatchee and Gullivan Bay are the dominant water bodies in RBNERR. Resident and migratory birds make extensive use of the open waters for feeding and resting. Migratory waterfowl, including several species of ducks, concentrate there during fall and winter. Resident and migratory egrets, herons, pelicans, cormorants, and other piscivorous birds also feed along the open water margins or directly in this habitat. Over 219 species of fishes have been identified in the waters of Rookery Bay and the Ten Thousand Islands (DEP unpublished data).
- 7. Submerged Non-vegetated Bottom (synonyms: Unconsolidated Shore):** This habitat, also associated with the open water region, is comprised primarily of soft mud (i.e. very fine sand and silt/clay) that is not stabilized by vegetation. Non-vegetated bottom is more extensive in Rookery

Bay than the vegetated bottom, and creates a habitat for various benthic invertebrates including polychaetes, assorted crustaceans and mollusks. Oyster beds, limited to the mid-intertidal zone, support a variety of fauna including sponges, bryozoans, mussels, barnacles and slipper shells. Oyster reefs are found in hard and soft bottoms consisting of sand or firm mud (DEP, 1988). Hard bottom communities, consisting of soft corals, sponges and bryozoans have been observed off-shore of Keewaydin Island. Reef structures formed by the vermatid gastropod (*Petalococonchus* sp.) are found in the Ten Thousand Islands. No living vermatids have been observed recently, but the reefs support a diverse live bottom community including bryozoans, hydroids, ascidians, sponges, and occasional corals (DEP, 1988).

8. Mangrove Forests (synonyms: Estuarine Forested Wetland): Three species of mangroves occur in RBNERR: red (*Rhizophora mangle*), black (*Avicennia germinans*) and white (*Laguncularia racemosa*). Buttonwood (*Conocarpus erectus*), which is not a true mangrove species, is usually grouped with this assemblage because of its occurrence in higher, less tidally inundated areas. Red mangroves comprise the dominant vegetation on most of the islands and along the immediate shoreline of the bays and tidal creeks. Black mangroves form extensive forests in the periodically tidally flushed basins located landward from the shoreline. White mangroves are found in small numbers throughout the mangrove forest. Buttonwood trees occur in the higher areas of the mangrove forest along berms and high island margins, as well as along the mangrove salt marsh fringe.

Conditions that limit the distribution of mangroves and determine the extent of the mangrove ecosystem include climate, salinity, tidal fluctuation, substrate, and available nutrients. The existence of optimal conditions for these factors in RBNERR has contributed to the development of lush, often mono-specific forests. In RBNERR, distinct zones occur with red mangrove living farther out into the water and extensive black mangrove forest occurring immediately behind.

Nearly all of the mangrove forest in RBNERR is second growth, probably ranging from 30 to 100 years old. This is a result of destructive hurricanes in 1918 and 1960, which caused extensive deforestation

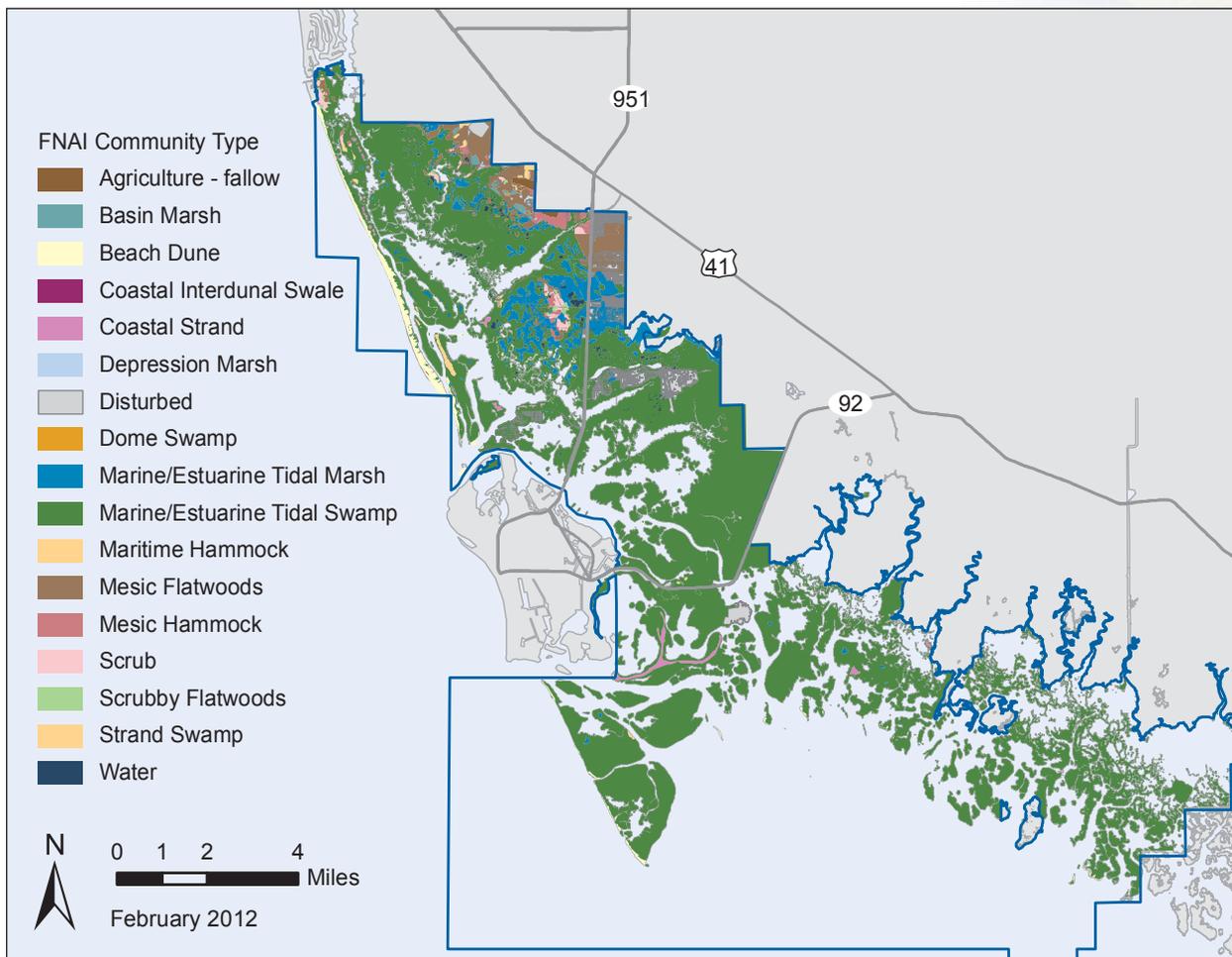


Figure 13 | National Estuarine Research Reserve Florida Natural Areas Inventory Natural Communities

along the southwest Florida coast. Some forest remnants greater than 100 years old are still found along the north shore of Rookery Bay and in Henderson Creek (The Conservation Foundation, 1968).

Regardless of age, the mangrove forests of RBNERR are of critical value to the estuarine ecosystem. The complex branching prop roots of the red mangrove support a large number of plants and animals. Numerous invertebrates and fishes seek shelter and food in the maze of trunks and roots. Other species such as the mangrove tree crab, brown mangrove crab and mangrove snail graze in the mangrove canopy. The insect population living as symbionts on the trunks and leaves includes ants, beetles, cockroaches, and aphids. Herbivorous grazers on the forest floor include amphipods, fiddler crabs, melampus snails and ladderhorn snails. A variety of birds are associated with the mangrove forest. Herons, egrets, pelicans, cormorants and ibis use red mangrove islands in RBNERR as night roosts. These islands also serve as heron and egret rookeries. Raptors such as the American bald eagle (*Haliaeetus leucocephalus*) and osprey (*Pandion haliaetus*) depend on the fishes and smaller birds and mammals associated with the mangroves.

The leaves of the mangrove trees are constantly being shed. These rapidly decay to form small particulate material called detritus. Detritus is the major food source for many of the small estuarine invertebrates that inhabit the soft bottom sediments among the mangrove roots. Lugo et. al. (1980) estimated that detritus generated from the mangroves surrounding Rookery Bay provided 32% of the energy base for the organisms in this community.

Mangrove forests also reduce the physical impact of storms, particularly wave overwash, because of their extensive above-ground root systems. These same root systems slow freshwater runoff and act as a filter for nutrients, as well as trapping silt and sediments and thereby stabilizing shorelines and preventing erosion.

9. **Submerged Vegetated Bottom:** Seagrasses, associated with the open water habitat, are not extensive in Rookery Bay but are considered seasonally abundant in adjacent waters such as Johnson Bay and Gullivan Bay. Seagrass communities are more extensive in the shallow waters south of Cape Romano. The dominant species is Cuban shoal grass (*Halodule wrightii*), with manatee grass (*Syringodium filiforme*), star grass (*Halophila engelmannii*) and turtle grass (*Thalassia testudinum*) occurring to a lesser extent. Seagrass beds were apparently more abundant and widely distributed in Rookery Bay years ago, but have declined in the Bay due to environmental and/or human factors. Seagrasses are estimated to occupy no more than 20% of the land below mean high water in Rookery Bay (Yokel, 1975). This important habitat plays a vital role as a nursery area and feeding ground for many of the fishes and invertebrates inhabiting Rookery Bay and adjacent waters.
10. **Saltwater Marsh (synonyms: Estuarine Emergent Wetland, Tidal Marsh):** The saltwater marsh habitat is found landward or interspersed among the inland side of the mangrove fringing forests. Although it does not usually have a direct tidal connection, it invariably contains brackish water and is periodically inundated at the higher spring tides and during storm events. The dominant plants are black needle rush (*Juncus roemerianus*), cord grass (*Spartina* spp.), and salt grass (*Distichlis spicata*). Salt marshes are among the most productive systems for organic matter in any estuary and support large numbers of vertebrate and invertebrate species. In the Reserve, they are prime feeding sites for many resident wading or migratory game birds, raptors and several species of mammals (Appendix B.4). An associated habitat, found interspersed either in salt or freshwater marshes, are coastal ponds. These small, clearly delineated areas usually hold permanent water that can be saline, brackish or fresh. They form important feeding sites for numerous birds and mammals, as well as providing an ecotonal transition between saline and freshwater areas in RBNERR.
11. **Freshwater Marsh (synonyms: Palustrine Emergent Wetland, Basin Marsh):** The freshwater marsh habitat typically borders pine flatwoods and cypress assemblages. Although a distinct ecotone may exist between freshwater marshes and upland habitats such as pine flatwoods, freshwater marshes often intergrade into salt marshes with little noticeable ecotonal transition. The dominant plants are bulrushes, assorted grasses and sedges, ferns and cattails.
12. **Cypress Slough/Cypress Prairie (synonyms; Palustrine Forested Wetland):** The habitat is dominated by pond or bald cypress (*Taxodium ascendens*, *T. distichum*) with a mixed understory throughout. The cypress habitat is restricted to areas subjected to flowing fresh water (i.e. sheetflow). It is exposed at one time or another to surface waters flowing through RBNERR uplands, and therefore the quality and quantity of water is important to the system.

This wetland community in the headwaters of RBNERR has been impacted by invasive plant species, causing an interruption in the natural hydroperiod. This interruption may also be due to water table lowering.

Native Species

Native flora and fauna within RBNERR is diverse and abundant, ranging from large mammals including the West Indian manatee (*Trichechus manatus*), Florida panther (*Puma concolor coryi*), black bear (*Ursus americanus floridanus*) and bobcat (*Lynx rufus*) to a diverse assemblage of microscopic plankton in coastal waters including algae and larval stages of crabs, shrimp, and fishes. Of particular note is the abundance of fishes and shellfish of commercial and recreational importance, including blue crabs (*Callinectes sapidus*), pink shrimp, snook (*Centropomus undecimalis*), tarpon, snapper (*Lutjanus* spp.), sheepshead (*Archosargus probatocephalus*), and flounder.

RBNERR is nationally recognized for its importance in providing foraging grounds, resting areas and rookeries for over 150 species of wading birds, raptors and shorebirds, including the bald eagle, osprey, least tern, roseate spoonbill (*Platalea ajaja*), and reddish egret (*Egretta rufescens*).

See Appendix B.4 for a detailed listing of plants and animals found within RBNERR.

Listed Species

RBNERR provides important habitats for many species listed as endangered, threatened or species of special concern by the federal government and Florida Fish and Wildlife Conservation Commission (Chapter 39-27.003-005, Florida Administrative Code). Some of the most notable are the West Indian manatee (federally endangered), Atlantic loggerhead sea turtle (state threatened), gopher tortoise (*Gopherus polyphemus*) (state threatened), least tern (state threatened), Eastern indigo snake (*Drymarchon corais*) (federally threatened), American crocodile (*Crocodylus acutus*) (federally threatened), Florida black bear (*Ursus americanus floridanus*) (state threatened), and Florida scrub jay (*Aphelocoma coerulescens*) (federally threatened). Sightings of the Florida panther (federally endangered) have been confirmed by telemetry and photo evidence within the boundaries of RBNERR and are increasing as local populations appear to be in recovery.

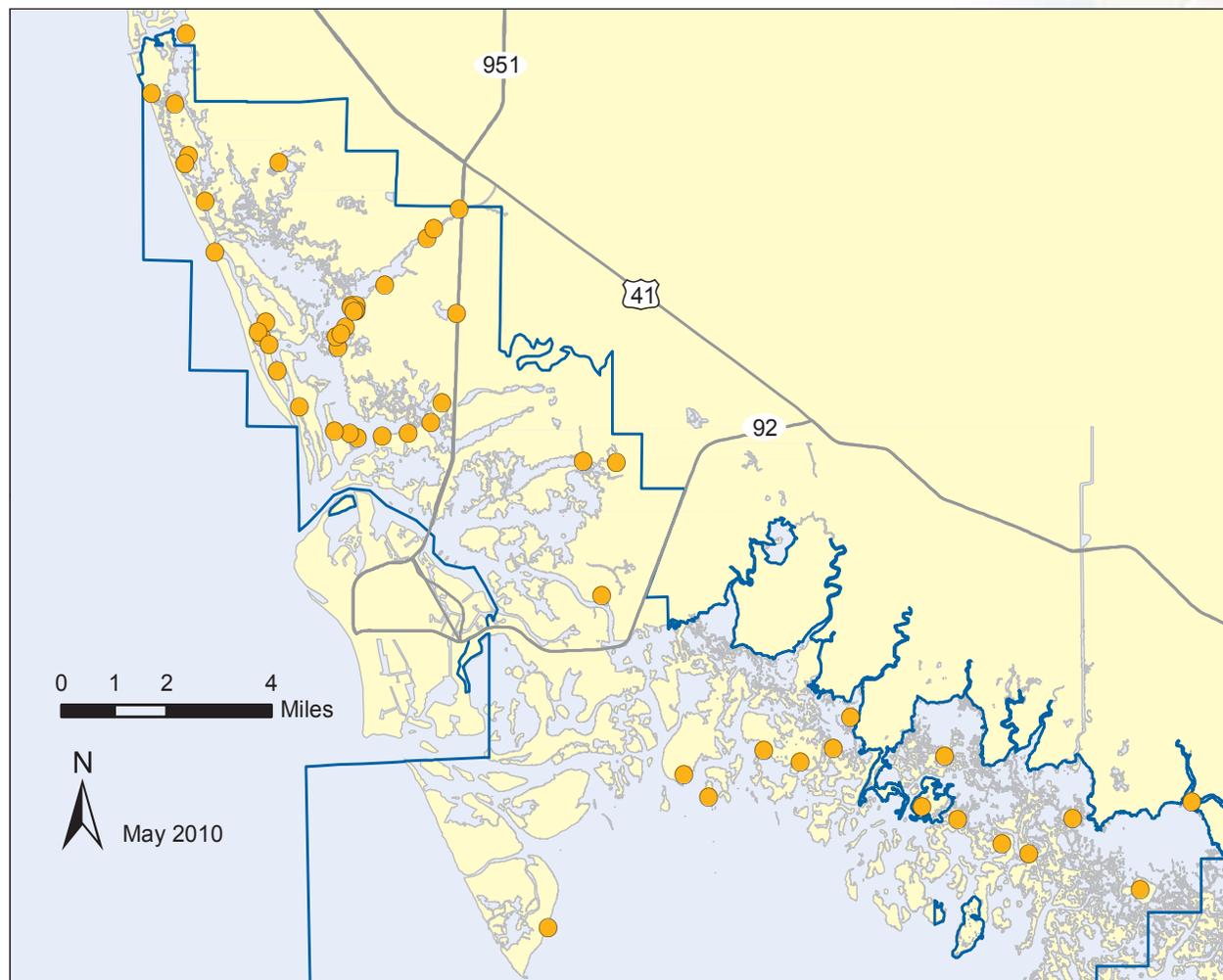


Figure 14 | RBNERR Cultural Resources

Several sub-management plans addressing the more intimate details of managing the natural resources are presently under preparation and include: RBNERR Gopher Tortoise Management Plan, RBNERR Listed Species Management Plan (flora & fauna). As these individual plans are finished and finalized they will be posted for viewing at www.dep.state.fl.us/coastal/sites/rookery/, www.rookerybay.org, and www.nerrs.noaa.gov/Reserve.aspx?ResID=RKB.

A complete list of endangered and threatened species known to occur in RBNERR, based on information from the FNAI and on staff observations, is located in Appendix B.4.

Invasive Non-native Species

Invasive non-native plant species in RBNERR are a significant management issue. Dominant invasive species include Australian pine, Brazilian pepper, melaleuca (*Melaleuca quinquenervia*), latherleaf, climbing fern (*Lygodium* spp.) and a number of other non-native plants that are disrupting the native biodiversity of RBNERR natural communities. Natural communities that are at highest risk include those located on barrier islands and within transition zones such as freshwater marshes.

Invasive animals found in RBNERR include feral hogs (*Sus scrofa*), found on barrier islands and uplands within RBNERR. Feral hogs have recently been observed by staff depredating sea turtle nests on Keewaydin Island, located within RBNERR boundaries. Other non-native animals observed in RBNERR include marine invasives such as the Asian green mussel (*Perna viridis*). See Chapter 6 and Appendix B.4 for more detailed descriptions of invasive plants and animals found in RBNERR, and Appendix B.10 for their control plan.

Problem Species

Raccoon (*Procyon lotor*) populations on isolated barrier islands within RBNERR have caused serious problems due to depredation of sea turtle nests during summer months. See Chapter 6 for details on RBNERR strategies to help address this issue.

Forest Resources

There are limited forest resources located the RBNERR; a timber assessment was conducted by Florida Division of Forestry.

Archaeological and Historical Resources

RBNERR has a relatively high number of prehistoric midden sites located on mangrove-forested islands and within coastal scrub and pine flatwood communities. A number of these sites have been the subject of research projects conducted by visiting scientists in cooperation with the Florida Division of Historical Resources (DHR). Most notably, a recent study was completed in the Ten Thousand Islands that cataloged a series of prehistoric sites located within both RBNERR and the Ten Thousand Islands National Wildlife Refuge (NWR). Records for these sites are on file at the RBNERR headquarters facility. In addition, the Henderson Creek area contains several historic sites that are relatively undisturbed remnants of pioneer settlements dating from the 1800s. At present the RBNERR Cultural and Historical Resources Management Plan is being written to provide direct and detailed guidance in the management of RBNERR's cultural resources. When finalized, this management plan will be posted for viewing at www.dep.state.fl.us/coastal/sites/rookery/, www.rookerybay.org, and www.nerrs.noaa.gov/Reserve.aspx?ResID=RKB.

See Figure 14 for the general location of cultural resources on RBNERR and see appendices B.9 for a list of recorded managed archaeological sites and E.4 for DHR Procedures for Historic and Archaeological Resources.

4.1.4 / Values

The natural and aesthetic values of the landscapes and wildlife within RBNERR represent a significant economic contribution to the coastal communities of southwest Florida. As one example, Collier County's tourism industry is estimated to yield over \$1.06 billion per year to the local economy (Collier County, 2009). Annual visitation approaches 750,000 people. With increasing county population, interest in use of the Reserve for recreational purposes has also increased.

The estuarine environment of RBNERR provides an ideal setting for a variety of recreational activities, including sportfishing, boating, hiking, sailing, bird watching and other nature study, or simply enjoying the aesthetics of the area. These activities, when integrated with RBNERR management and education efforts, play a key role in public awareness and appreciation of estuaries.

The economic valuation (economic dollar value) of points-of-entry into RBNERR such as: marinas, and boat ramps (for both motorized and non-motorized vessels) can be evaluated and quantified, however, the inherent value of those points-of-entry only have worth because of the good health and maintenance of the natural resources upon which they depend. The overall health and biodiversity present in RBNERR supports and sustains the: beauty, healthy fisheries, clean water, healthy bird populations, healthy forests (mangrove and uplands), clean air, and more. These managed natural resources attract tourists to enjoy the fishing, eco-tourism, beaches and recreational boating. In addition, the estuaries are also inherently tied to the economic dollar value of local real estate. No one wants to buy coastal property located in or next to badly degraded and unhealthy natural areas. Protecting and properly managing the estuaries means that we are not only protecting the communities' economy but also protecting its resiliency against damage from storm-surge and wind.

Recreational fishing represents a primary public use of RBNERR resources and provides significant contributions to the economy of local communities, including charter/guide services, sales of boats and fishing tackle and fuel. Major recreational species include snook, mangrove snapper, sheepshead, redfish, tarpon and spotted sea trout. In an effort to encourage conservation and protection of coastal resources among local anglers, Florida Sea Grant, in partnership with RBNERR, offers programs that provide information on fishing while emphasizing concepts of estuarine ecology. Enforcement of state and county rules and regulations by federal, state and local marine law enforcement offices supports management efforts in resource protection and conservation.

Commercial: Commercially valuable fishes and shellfish total 16 species, with mullet the principle finfish, and blue crabs and stone crabs (*Menippe mercenaria*) the major shellfish. Harvest of shellfish is strictly regulated by DEP. Marine enforcement officers enforce all county and state rules and regulations regarding commercial fishing and shellfish harvest. Gill netting for mullet was prohibited in Florida's inshore waters by the State of Florida in 1996, due to concerns regarding overharvest and impact on non-target species.

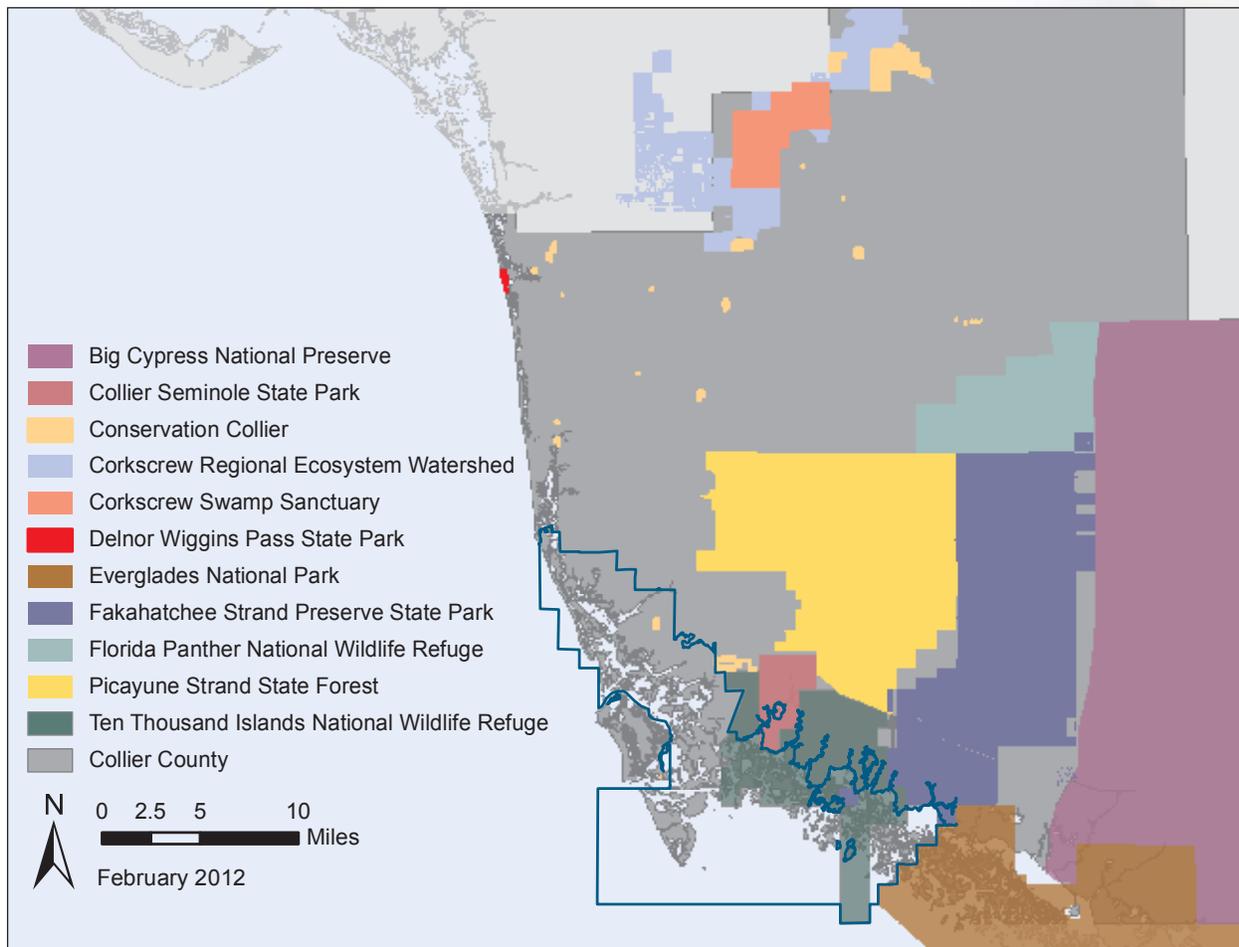


Figure 15 / RBNERR Adjacent Public Lands and Designated Resources

Aquaculture: In response to a request from the Board of Collier County Commissioners, the Board of Trustees of the Internal Improvement Trust Fund authorized during 2004 the use of sovereignty submerged lands to establish two aquaculture use areas within the boundaries of RBNERR. Two tracts of submerged lands were identified as the Cape Romano Aquaculture Use Area (50 acres) and the White Horse Key Aquaculture Use Area (44 acres). In total, 32 leases of two acres each were granted within the aquaculture use areas for the production of the hard clam, *Mercanaria mercenaria*, as a food product.

Eco-tourism: This represents a significant and growing industry within RBNERR's waters that contributes to the local economy and provides an important opportunity to increase public awareness of coastal resources. RBNERR has worked with local ecotour boat operators to provide training and promote conservation of RBNERR resources. See Chapter 6 for details.

Research and Education: RBNERR is used for research and education purposes at all academic levels, from elementary school to post-doctoral. RBNERR staff are responsible for promoting estuarine research and education activities. Since designation as a NERR, visiting scientists and students from Florida, Louisiana, Texas, Virginia, South Carolina, Georgia, Illinois, Michigan, Iowa, Delaware, Switzerland, Netherlands, England and Canada have conducted over 50 studies within the boundaries of RBNERR. Projects have focused on seagrass and mangrove studies, wading bird and shorebird population dynamics, shark population studies, sea turtle ecology, and non-chemical mosquito control. In addition, RBNERR staff are conducting an ecological monitoring program within RBNERR. For more detailed information on the Reserve's research efforts, please refer to Chapter 6.

DEP conducts extensive education programs in RBNERR, in partnership with Florida Gulf Coast University, Edison College, Collier County Public Schools and others. Target audiences range from primary and secondary students to college students, general public and environmental professionals. On-site programs feature hands-on field activities including the use of boats, canoes and interpretive boardwalks and trails.

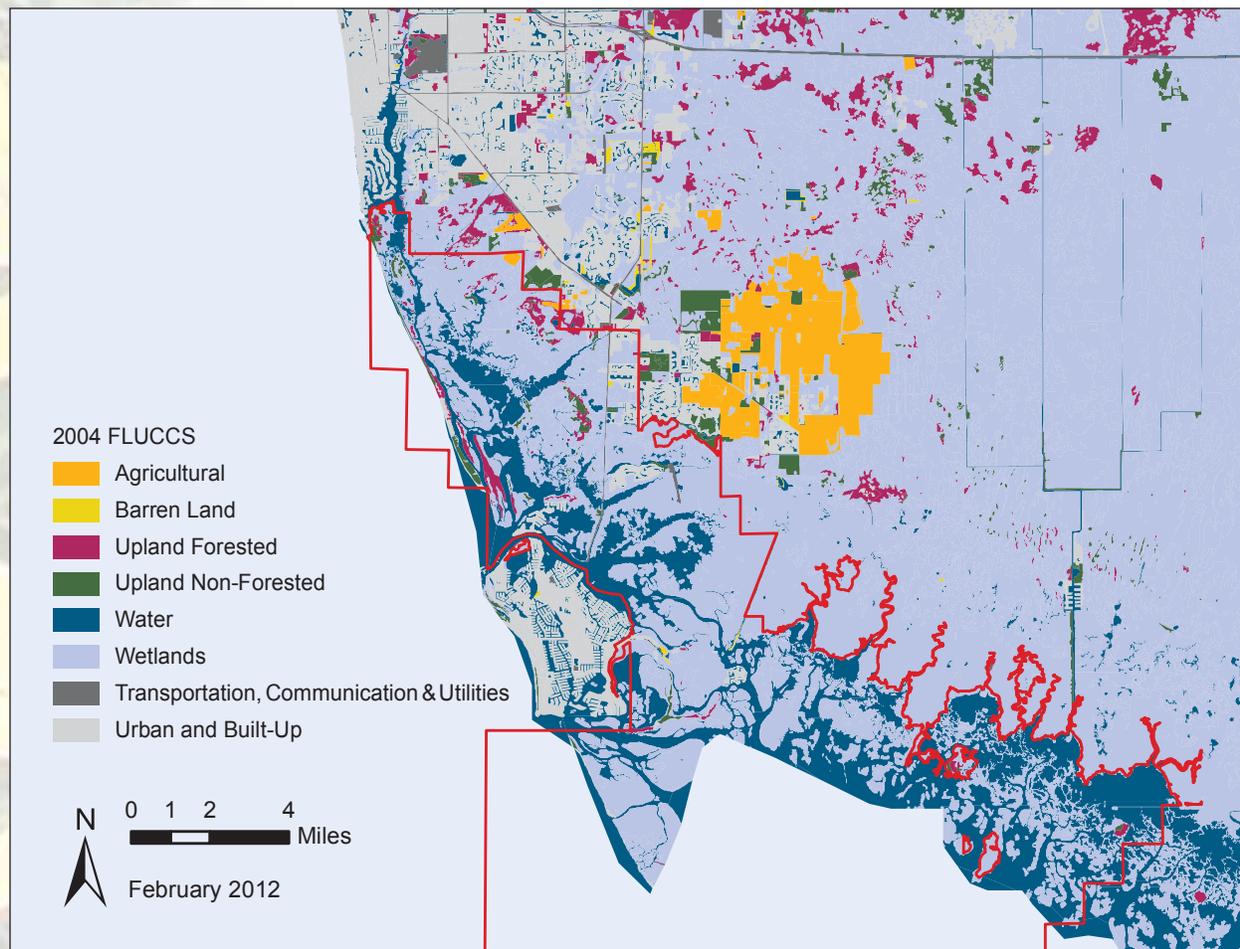


Figure 16 | Land Use Surrounding RBNERR

4.1.5 / Citizen Support Organization

The Friends of Rookery Bay, Inc. (FORB) was established in 1987 as a local, non-profit community volunteer organization, to help DEP achieve priority goals and the mission of RBNERR. FORB plays an essential role for RBNERR as a link to the local community, providing hundreds of volunteers in support of priority projects, fundraising to augment state and federal funding, and education and outreach to promote and encourage active community involvement in coastal stewardship. See www.rookerybay.org for more information.

Mission Statement: Connecting people with Southwest Florida's dynamic estuarine environment through education, engagement and stewardship by supporting the RBNERR

4.1.6 / Adjacent Public Lands and Designated Resources

Collier County is the second largest county in the State, covering approximately 2,025 square miles of land (Florida Statistical Abstract, 1999). Over 50% of this area has been set aside under public or private ownership for conservation purposes. In addition to Rookery Bay, these areas include the following sites (see Figure 15):

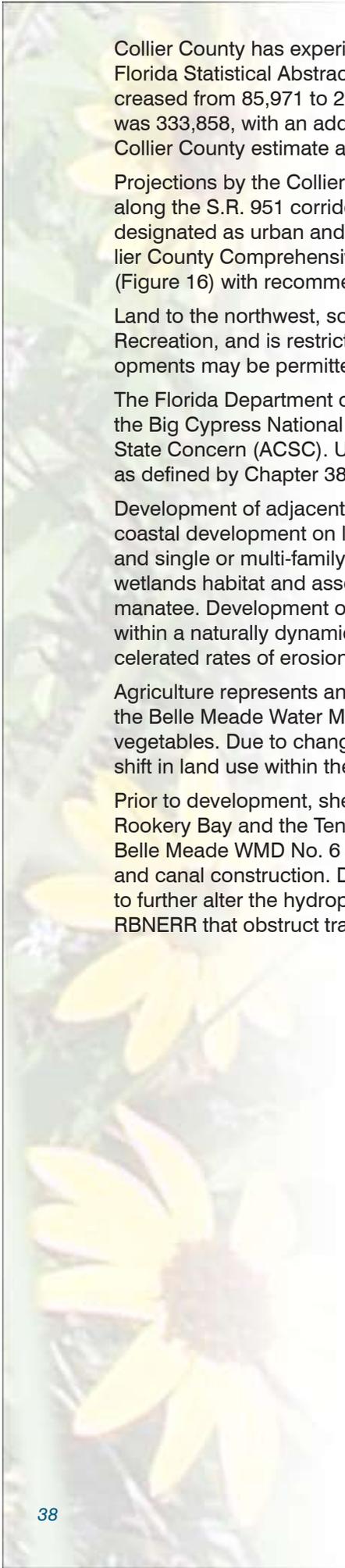
- Big Cypress National Preserve: Managed by the National Park Service (NPS), this protected area encompasses approximately 750,000 acres in eastern Collier County.
- Everglades National Park: Managed by the NPS, the Park has become the focal point of a South Florida ecosystem restoration project involving federal, state, and local partners.
- Ten Thousand Islands and Florida Panther National Wildlife Refuges: In 1996, the USFWS was conveyed title to approximately 35,000 acres south of U.S. 41 Tamiami Trail to establish the Ten Thousand Islands NWR. The NWR boundaries overlap with the Cape Romano/Ten Thousand Islands Aquatic Preserve managed by RBNERR. A Cooperative Agreement was established by both agencies to formalize ongoing cooperative management of the area. The USFWS also manages the nearby Florida Panther NWR.
- Corkscrew Swamp Sanctuary: Managed by NAS, the Sanctuary is located in northeast Collier County and represents a nearly pristine cypress wetland ecosystem.
- Picayune Strand State Forest: Managed by the Florida Division of Forestry, the Forest includes both the Belle Meade and Southern Golden Gate Estates watersheds that drain to RBNERR estuarine resources.
- Fakahatchee Strand Preserve State Park, Collier-Seminole State Park, and Delnor-Wiggins Pass State Park: Managed by the DEP Division of Recreation and Parks, these sites represent important coastal and wetland ecosystems within Southwest Florida.
- Shell Island Preserve: Managed by Collier County's Conservation Collier Program located within RBNERR's boundary just off the entrance onto Shell Island Road from Highway 951 (Collier Blvd.). The management plan for this parcel of protected land can be found at: www.colliergov.net/Index.aspx?page=546.

4.1.7 / Surrounding Land Use

To meet the challenges associated with increased development and population, RBNERR must work cooperatively with local, state and national partners to ensure the best available science-based information is used to make decisions affecting coastal resources. The goal of the research with respect to watershed issues is to reduce the impact of watershed land use on coastal resources by identifying priority pollutants and encouraging best management practices in partnership with state, federal and local agencies, colleges and universities, private industry and citizens. Specific research, stewardship and education strategies are presented in the issue characterization section of this plan.

Change in land use of watersheds and adjacent coastal lands has resulted in significant environmental changes within RBNERR. Urban development and agricultural land use within RBNERR's watersheds, and their associated impacts on freshwater inflows to the Rookery Bay and Ten Thousand Islands estuaries, remain one of the most significant threats to the ecological integrity of RBNERR. These impacts include alterations to the volume and timing of freshwater with a resulting negative influence on changes in natural salinity regimes within the estuary, and degradation of water quality as land use upstream contributes pollutants from leaching of septic tanks and the use of fertilizers and pesticides.

Coastal development along Collier County's shoreline still occurs, although not as prevalent today as in previous years due to increased regulatory protection for coastal wetlands. Much of this anticipated change in land use is related to recent trends in redevelopment within the cities of Naples and Marco Island.



Collier County has experienced an unprecedented population growth rate over the last 25 years. The Florida Statistical Abstract (1999) indicated that between 1980 and 1998, the County's population increased from 85,971 to 210,100, an increase of 144%. As of 2007, the County's permanent population was 333,858, with an additional estimated 20% seasonal increase to 406,882. Current projections for Collier County estimate an additional population increase of 64% through 2030 (BEBR, 2008).

Projections by the Collier County government anticipate continued growth in the next five to ten years along the S.R. 951 corridor (Collier Boulevard) and south of U.S. 41 (Tamiami Trail). These areas are designated as urban and directly adjoin the eastern and northern boundaries of the RBNERR. The Collier County Comprehensive Plan presents criteria for development of county lands and provides a map (Figure 16) with recommendations for land use.

Land to the northwest, south and west of the Reserve is designated as Coastal Resource Management/Recreation, and is restricted for large scale development. Smaller projects, including Planned Unit Developments may be permitted.

The Florida Department of Community Affairs (DCA) has designated portions of Collier County, including the Big Cypress National Preserve and Fakahatchee Strand Preserve State Park as an Area of Critical State Concern (ACSC). Under the ACSC program, DCA reviews any development order for construction as defined by Chapter 380.04 F.S. for consistency. RBNERR lands are not located within the ACSC.

Development of adjacent coastal lands can also threaten the ecological integrity of RBNERR. Potential coastal development on lands adjacent to RBNERR over the next ten years includes marinas, docks and single or multi-family housing with the potential for negative impacts to water quality, loss of coastal wetlands habitat and associated threats to wildlife including protected species such as the West Indian manatee. Development on barrier islands can result in impacts; installation of hardened infrastructure within a naturally dynamic landscape can have a detrimental effect on barrier beach habitats through accelerated rates of erosion.

Agriculture represents another major land use of the RBNERR's watersheds, with farmlands located in the Belle Meade Water Management District that drain into Henderson Creek. Crops include citrus and vegetables. Due to changes in real estate values during the last ten years, there has been a significant shift in land use within the Belle Meade agricultural area, from agriculture to urban development.

Prior to development, sheetflow was the primary source of surface runoff in the drainage basins for Rookery Bay and the Ten Thousand Islands. Significant alterations in the natural drainage patterns of the Belle Meade WMD No. 6 and Southern Golden Gate Estates Basins have occurred as the result of road and canal construction. Dredge and fill operations associated with planned future developments threaten to further alter the hydroperiods of these basins. U.S. 41 and S.R. 951 are major roads adjacent to the RBNERR that obstruct traditional sheetflow patterns.



A newly-hatched loggerhead sea turtle, helped out of its nest by reserve staff, makes its way to the sea.

Part Two

Management Programs and Issues

Chapter Five

The Office of Coastal and Aquatic Managed Areas' Management Programs

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

5.1 / The Ecosystem Science Management Program

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

5.1.1 / National Estuarine Research Reserve System Research and Monitoring Plan (§921.50, Code of Federal Regulations—See Appendix A.2)

The reserve system provides a mechanism for addressing scientific and technical aspects of coastal management problems through a comprehensive, interdisciplinary and coordinated approach. Research and Monitoring Programs, including the development of baseline information, form the basis of this approach. NERR research and monitoring activities are guided by the reserve system research and monitoring plan 2006-2011, which identifies goals, priorities and implementation strategies. This approach, when used in combination with the education and outreach programs, will help ensure the availability of scientific information that has long-term, system-wide consistency and utility for managers and members of the public to use in protecting or improving natural processes in their estuaries. Research within the NERRs is designed to fulfill the reserve system goals as defined in program regulations. These include:

- Address coastal management issues identified as significant through coordinated estuarine research within the System;
- Promote federal, state, public and private use of one or more NERRs within the System when such entities conduct estuarine research; and
- Conduct and coordinate estuarine research within the System, gathering and making available information necessary for improved understanding and management of estuarine areas.

National Estuarine Research Reserve System Research Funding Priorities

15 Code of Federal Regulations (C.F.R.) Part 921.50(a), specify the purposes for which research funds are to be used:

- Support management-related research that will enhance scientific understanding of the NERR ecosystem,
- Provide information needed by reserve managers and coastal ecosystem policy-makers, and
- Improve public awareness and understanding of estuarine ecosystems and estuarine management issues.

The reserve system has identified the following five priority research areas to complement the funding priorities outlined above:

- Habitat and ecosystem processes
- Anthropogenic influences on estuaries
- Habitat conservation and restoration
- Species management
- Social science and economics

National Estuarine Research Reserve System Research Goals

The NERR System research goals are embedded in Goal 2 of the NERR System Strategic Plan 2005-2010, 'Increase the use of reserve science and sites to address priority coastal management issues,' and are outlined in the 2006-2011 NERR System Research and Monitoring Plan. They include:

- Biological, chemical, physical and ecological conditions of reserves are characterized and monitored to describe reference conditions and to quantify change.
- Scientists conduct research at reserves that is relevant to coastal management needs and increases basic understanding of estuarine processes.
- Scientists have access to NERRs datasets, science products and results
- The scientific, coastal management and education communities, as well as the general public, use data, products tools and techniques generated at the NERRs.

Currently, there are two reserve system-wide efforts to fund estuarine research. The Graduate Research Fellowship Program supports students to produce high quality research in the reserves. The fellowship provides graduate students with funding for 1-3 years to conduct their research, as well as an opportunity to assist with the research and monitoring program at a reserve. Projects must address coastal management issues identified as having regional or national significance; relate them to the reserve system research focus areas; and be conducted at least partially within one or more designated reserve sites. Proposals must focus on the following areas: 1) Eutrophication, effects of non-point source pollution and/or nutrient dynamics; 2) Habitat conservation and/or restoration; 3) Biodiversity and/or the effects of invasive species; 4) Mechanisms for sustaining resources within estuarine ecosystems; or 5) Economic, sociological and/or anthropological research applicable to estuarine ecosystem management.

Students work with the research coordinator or manager at the host reserve to develop a plan to participate in the reserve's research and/or monitoring program. Students are asked to provide up to 15 hours per week of research and/or monitoring assistance to the reserve; this training may take place throughout the school year or may be concentrated during a specific season.

Secondly, research is funded through the NERR System's Science Collaborative Program, through funds allocated by Congress to the National Oceanic and Atmospheric Administration (NOAA). The University of New Hampshire administers the competitive research program under contract to the Estuarine Research Division, working with the NERR System to encourage the development and implementation of collaborative research initiatives that engage NERR resources in partnership with academic and public research institutions throughout the United States.

5.1.2 / Background of Ecosystem Science at Rookery Bay National Estuarine Research Reserve

The earliest records of research for the Rookery Bay area are water quality and red tide studies (Finucane & Dragovich, 1959; Dragovich, Finucane, & May, 1969; Dragovich, 1963). Ten years later, a small marine laboratory was established, funded through the Conservancy of Southwest Florida (CSF). At this time, staff and community volunteers conducted baseline studies of water quality, hydrodynamics and fish populations. The results of these studies were published as a series of reports (Lee & Yokel, 1973; Clark, 1974; Yokel 1975 a, b & c). Additional investigations were conducted on mangrove forest ecology and productivity and nearshore sedimentological processes (Lugo et al., 1973; Lugo & Snedaker, 1973 & 1975; Poole and Lugo, 1973; Poole et al., 1975 & 1977; Snedaker & Poole, 1973; and Wanless, 1974).

In the late 1970's, a series of reports were generated in support of the draft environmental impact statement for the Deltona Corporation's residential development in wetlands near Marco Island. These reports catalogue a variety of ecological measurements including nutrient cycling, watershed hydrology, fish and macroinvertebrate abundance, floral surveys and water quality (Tabb et al., 1977; Weinstein et al., 1977; Heald, 1978, 1979 & 1981; Below & Kahl, 1979; Carpenter & Larsen, 1979; Courtney, 1979; Daddio & van der Kreeke, 1979; Finan, 1979; Finan & Finan, 1979; Huber & Brezonik, 1979 & 1981; Larsen, 1979). Since 1974, biologist Theodore Below has conducted ongoing monitoring of wading and shorebird numbers and fledging success at several important habitats.

In 1978, the area was designated as a NERR. The Department of Environmental Protection (DEP) assumed responsibility for Rookery Bay NERR's (RBNERR) research program. Studies by on site staff and visiting investigators continued to expand RBNERR's knowledge base (Twilley, 1982, 1985; Twilley et al., 1986 & 1988; Thoemke and Gyorkus, 1988 a & b).

In 1990, in response to recommendations from a NOAA site review, DEP established a research coordinator position with initial funding support from NOAA. RBNERR developed additional laboratory facilities and research support capabilities, including water quality monitoring equipment, research vessels and a weather station. RBNERR's initial bimonthly water quality program was upgraded to allow for continuous monitoring of physical (temperature, turbidity and depth) and chemical measurements (pH, dissolved oxygen, and salinity).

In August 1992, Hurricane Andrew swept across South Florida and exited to the Gulf of Mexico approximately 35 miles south of Rookery Bay, in Everglades National Park, causing extensive damage to mangrove-forested wetlands. RBNERR played a key role, in cooperation with federal and State agencies, in conducting research to assess impacts of this catastrophic event (Smith, 1993; Nalley et al., 1997). Rookery Bay NERR (RBNERR) expanded monitoring of water quality, and fish and macroinvertebrate populations in the Ten Thousand Islands ecosystem, to establish baseline conditions in support of an Everglades restoration project located within the watershed for the Ten Thousand Islands.

To effectively assess adverse impacts of the drift and deposition of mosquito control aerial spraying on non-target species, RBNERR played a lead role in developing a biological monitoring program using pesticide sensitive species (Shirley & McKenney, 1994; Shirley et al., 1997; Shirley et al., 1996; McKenney et al., 1996). RBNERR staff worked in cooperation with the local mosquito control district and research partners to develop and test new technologies designed to further reduce impacts from these pesticides (McKenney et al., 1993).

5.1.3 / Current Status of Ecosystem Science at Rookery Bay National Estuarine Research Reserve

Recent research projects have examined a wide range of topics. These topics have included mangrove ecology, oyster reef ecology, crocodile biology, sea turtle biology, food web dynamics, toxicology, landscape ecology, mangrove genetics, archeology, shark ecology, mangrove herbivore interactions, wetland restoration ecology, bacterial genetics, historic salinity patterns, phytoplankton dynamics, sediment

accretion rates, terrestrial habitat mapping, freshwater fish physiology, dune habitat ecology, estuarine nutrient cycling and exotic vegetation physiology. RBNERR, in accordance with NOAA NERR System's national research objectives (see above), developed and produced a site characterization and site profile that includes a synthesis of research initiatives for distribution to visiting investigators, educators, coastal managers and other interested individuals. In addition, the synthesis provides guidance to RBNERR staff to help identify research needs for future efforts.

RBNERR has expanded facilities and equipment to support visiting investigators at Rookery Bay. In addition to establishing two research field stations with overnight accommodations and boat access at Shell Island Road and Goodland, RBNERR offers two graduate fellowships per year, with NOAA support. Partnerships with Florida Gulf Coast University (FGCU) and Edison State College (ESC) have resulted in an increase in student and faculty research and courses conducted at the Reserve. The RBNERR Environmental Learning Center, completed in 2004, includes two research laboratories, a wet lab, and a Geographic Information System (GIS) facility and research library. These recent additions are a significant investment designed to increase visiting research opportunities at RBNERR by universities and research institutions.

In 2010, research staffing at RBNERR includes a research coordinator and a research biologist. Additional temporary and contractual staff assist with priority projects including grant funded research. RBNERR hosts up to two competitively awarded NOAA Graduate Research fellows per year.

RBNERR plans to focus baseline monitoring efforts within the Henderson Creek ecosystem to assess impacts of water management regimes and recommend management strategies to help sustain the ecological integrity of this freshwater resource. In addition, RBNERR will be working to establish a State of the Reserve biennial report that links results of ongoing research to priority issues.



A Reserve water quality tech retrieves a YSI data sonde from the monitoring station

5.2 / The Resource Management Program

The Resource Management Program addresses how CAMA manages RBNERR and its resources. The primary concept of RBNERR 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 they have direct management responsibility, and by influencing the activities of others within and adjacent to their managed areas and within their watershed. Watershed and adjacent area management activities, and the resultant changes in environmental conditions, affect the condition and management of the resources within their boundaries. CAMA managed areas are especially sensitive to upstream activities affecting water quality and quantity. CAMA works to ensure that the most effective and efficient techniques used in management activities are used consistently within our sites, throughout our program, and when possible, throughout

the state. The strongly integrated Ecosystem Science, Education and Outreach, and Public Use programs provide guidance and support to the Resource Management Program. These programs work together to provide direction to the various agencies that manage adjacent properties, our partners and our stakeholders. RBNERR 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 RBNERR are diverse. This section explains the history and current status of our resource management efforts.

5.2.1 / Background of Resource Management at Rookery Bay National Estuarine Research Reserve

RBNERR's stewardship activities were initiated in 1990 and a formal staffed program developed in 1993 to address the stewardship, restoration and land acquisition needs for RBNERR. Since that time, this program has worked effectively to maintain the ecological integrity of RBNERR to provide a stable environment for research and education consistent with the NERR's mission. Current staffing (2011) for the RBNERR Resource Management program includes a stewardship coordinator, watershed biologist and field biologist. Additional Other Personal Services (OPS) staff and contractual personnel, funded through grant and management funds, assist with priority projects.

Key elements of the RBNERR resource protection strategy have included:

- Facilitating public acquisition of key lands associated with the Rookery Bay and Ten Thousand Islands ecosystems to help ensure long-term preservation of resources. The Rookery Bay Land Acquisition Project, consisting of approximately 20,000 acres of key land and water resources, was successfully completed after ten years of effort by RBNERR personnel in cooperation with DEP Division of State Lands, local landowners and public and private community partners including CSF and The Nature Conservancy. The State of Florida's investment of over \$57 million in Conservation and Recreation Lands (CARL) and Preservation 2000 funds resulted in completion of a nationally significant acquisition project. RBNERR personnel also played a lead role in securing funding for the controversial 19,000-acre Belle Meade watershed with the CARL's Land Acquisition Project by chairing a work group of landowners, local government and environmental interests and reaching consensus on project recommendations that were subsequently approved by the State. By 2011, approximately 85% of the revised boundary has been purchased, providing long-term protection for a key watershed that contributes inflows to Rookery Bay and the Ten Thousand Islands.
- Identifying essential habitats within RBNERR. This work has been significantly enhanced through the application of GIS and associated technology. Results have directed management decisions for restoration, prescribed burns, stewardship and land acquisition projects.
- Working in cooperation with federal and state agencies to protect listed species such as the West Indian manatee, American crocodile, gopher tortoise, Florida scrub jay and loggerhead sea turtle. RBNERR personnel have been trained and authorized by the United States Fish and Wildlife Service (USFWS) to recover dead and injured manatees and other marine mammals. RBNERR staff have participated in the recovery of over 100 injured and dead manatees during the past fifteen years, including such events as the 1996 red tide induced manatee mortality event.
- Working with the regulatory and development community to address potential impacts associated with planned development projects within the watersheds of RBNERR. Faced with unprecedented growth in Southwest Florida, RBNERR staff established effective partnerships with local, state, and federal regulatory agencies, and with the local development community, to seek opportunities to sustain and restore essential watershed resources through the project design and permit review process.
- RBNERR is subject to local (county), state (DEP and Water Management District) and federal (US Army Corps of Engineers) regulations and obtains permits for activities related to those regulations, e.g. hydrologic restoration activities in wetlands. RBNERR has also undergone a number of project specific environmental reviews. An Environmental Impact Statement was prepared when RBNERR was established. As lands were acquired through the Rookery Bay CARL Program, Environmental Impact Assessments were completed through the DEP-Division of State Lands to assess site resources, trash or potential for hazardous waste disposal. National Environmental Policy Act documentation has been completed for a number of USFWS National Coastal Wetlands grants.
- Designing and conducting restoration of disturbed wetlands, altered watershed inflows, and plant communities infested with invasive non-native plants. When feasible, RBNERR has incorporated research and monitoring elements into restoration design to help improve understanding of restoration ecology and methodology.

5.2.2 / Current Status of Resource Management at Rookery Bay National Estuarine Research Reserve

RBNERR's Resource Management Program is responsible for implementing science-based management strategies to conserve natural biodiversity. This strategy is accomplished through recommending and implementing approved management strategies to

1. protect the natural and cultural resources of RBNERR and its watershed;
2. identify needed hydrologic and habitat restoration within RBNERR and its watershed;
3. restore natural conditions to the fullest extent possible using the best available techniques; and,
4. export information on management and restoration activities to environmental managers and decision makers.

A primary function of the Resource Management program is to identify and pursue acquisition, management and restoration of natural and cultural resources at the watershed, community, habitat and site levels by coordinating with federal, state, local and private entities to affect watershed-scale restoration and conservation. This science-based hierarchical approach is necessary to more effectively protect and manage the resources of RBNERR.

To be successful, these activities must be closely coordinated with RBNERR's research, education and public access programs. To assess effectiveness of RBNERR's stewardship efforts, a multi-agency team conducted a Land Management Review in April 2009. The report and the Department's response are included in Appendix E.7.

Habitat restoration projects are proposed in this management plan to address the need for restoring natural tidal flows to impounded mangrove wetlands near Fruitfarm Creek, eradicate invasive non-native plants, implement stormwater treatment near Griffin Road, and increase native biodiversity of forested ecosystems. In addition, RBNERR plans to expand existing boundaries by an estimated 20,788 acres through land acquisitions, donations, and consolidation of adjacent public lands in partnership with other land managing agencies.

5.3 / The Education and Outreach Management Program

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

5.3.1 / National Estuarine Research Reserve System Education Plan (§921.13(a) (4), Code of Federal Regulations)

The NERR System provides a vehicle to increase understanding and awareness of estuarine systems and improve decision-making among key audiences to promote stewardship of the nation's coastal resources. Education and interpretation in the reserves incorporates a range of programs and methodologies that are systematically tailored to key audiences around priority coastal resource issues and incorporate science-based content. NERR staff members work with local communities and regional groups to address coastal resource management issues, such as non-point source pollution, habitat restoration and invasive species. Through integrated research and education programs, the reserves help communities develop strategies to deal successfully with these coastal resource issues.

Formal and non-formal education and training programs in the NERRs target K-12 students, teachers, university and college students and faculty, as well as coastal decision-maker audiences such as environmental groups, professionals involved in coastal resource management, municipal and county zoning boards, planners, elected officials, landscapers, eco-tour operators and professional associations.

K-12 and professional development programs for teachers include the use of established coastal and estuarine science curricula aligned with state and national science education standards and frequently



Fourth-grade students from a local school learn about coastal animals during an Estuary Explorers field trip.

involves both on-site and in-school follow-up activity. NERR education activities are guided by national plans that identify goals, priorities and implementation strategies for these programs. Education and training programs, interpretive exhibits and community outreach programs integrate elements of NERR's science, research and monitoring activities and ensure a systematic, multi-faceted and locally focused approach to fostering stewardship.

National Estuarine Research Reserve System Education Goals

The NERR System's mission includes an emphasis on education, interpretation and outreach. Education policy at RBNERR is designed to fulfill the reserve system goals as defined in the regulations (15 C.F.R. Part 921.1[b]). Education goals include:

- Enhance public awareness and understanding of estuarine areas and provide suitable opportunities for public education and interpretation.
- Promote federal, state, public and private use of one or more Reserves within the System when such entities conduct estuarine research.

National Estuarine Research Reserve System Education Objectives

Education-related objectives in the NERR System Strategic Plan 2005-2010 include:

- People are aware of the ecological, economic, historical and cultural importance of estuarine resources.
- People understand how human choices and natural disturbances impact social, economic and estuarine ecological systems.
- People apply science-based information when making decisions that could impact coastal and estuarine resources.

The updated NERR System Strategic Plan for 2011 – 2016 will be completed within the year. This plan should be amended in 2011 to reflect updated goals.

National Estuarine Research Reserve System Coastal Training Program

The Coastal Training Program (CTP) provides up-to-date scientific information and skill-building opportunities to coastal decision-makers who are responsible for making decisions that affect coastal resources.

Through this program, NERRs can ensure that coastal decision-makers have the knowledge and tools they need to address critical resource management issues of concern to local communities.

CTPs offered by NERRs relate to coastal habitat conservation and restoration, biodiversity, water quality and sustainable resource management and integrate reserve-based research, monitoring and stewardship activities. Programs target a range of audiences, such as land-use planners, elected officials, regulators, land developers, community groups, environmental non-profits, business and applied scientific groups. These training programs provide opportunities for professionals to network across disciplines, and develop new collaborative relationships to solve complex environmental problems. Additionally, the CTP provides a critical feedback loop to ensure that professional audiences inform local and regional science and research agendas. Programs are developed in a variety of formats ranging from seminars, hands-on skill training, participatory workshops, lectures and technology demonstrations. Participants benefit from opportunities to share experiences and network in a multidisciplinary setting, often with a reserve-based field activity.

Partnerships are important to the success of the program. NERRs work closely with state coastal programs, Sea Grant College extension and education staff, and a host of local partners in determining key coastal resource issues to address, as well as the identification of target audiences. Partnerships with local agencies and organizations are critical in the exchange and sharing of expertise and resources to deliver relevant and accessible training programs that meet the needs of specific groups.

The CTP requires a systematic program development process, involving periodic review of the reserve niche in the training provider market, audience assessments, development of a three to five year program strategy, a marketing plan and the establishment of an advisory group for guidance, program review and perspective in program development. The CTP implements a performance monitoring system, wherein staff report data in operations progress reports according to a suite of performance indicators related to increases in participant understanding, applications of learning and enhanced networking with peers and experts to inform programs.

5.3.2 / Background of Education and Outreach at Rookery Bay National Estuarine Research Reserve

In 1986, DEP initiated an on-site estuarine ecology education program. Funds were used for an education coordinator position, and an educational needs assessment was conducted. The needs assessment identified the need for hands-on field trips using boats, boardwalks, trails, interpretive signs, on-site education facilities and outreach programs to include slide presentations, brochures and a newsletter. During this time, the CSF was conducting environmental programs for primary school students under contract to Collier County Public Schools (CCPS) based at the Briggs Nature Center, located on Shell Island Road within RBNERR. A cooperative education agreement was developed with CSF to enhance effectiveness of RBNERR's education program, and to avoid duplication of effort.

In response to the needs assessment, RBNERR education staff developed a series of programs targeting high school and college students, adults, teachers and environmental professionals. The core of this effort included boat-based, hands-on field experience into RBNERR. The Shell Island Road field station was expanded to include a small fleet of educational/research vessels, a wet lab and classroom space for use with students. To encourage further involvement with collegiate students, RBNERR partnered with ESC and FGCU to provide undergraduate research opportunities for their students as well as guided field trips. A full-time educational biologist was hired to oversee this core programming effort. Additionally, a series of interpretive trails was established at the end of Shell Island Road adjacent to the field station and on several of RBNERR's offshore islands.

RBNERR's Master Facilities Plan included a new 14,700 sq. ft. building adjacent to the existing administration building on Tower Road and construction began on this project by early 2002. The building was to include a research wing with office space for research staff and both wet and dry laboratory facilities. The center section of the building would be dedicated to visitor services with a welcome desk, small gift shop, two-story interpretive exhibit area and a series of aquarium tanks where a variety of estuarine creatures could be on display. The other wing of this building was designed as an education and training wing to serve visitors as well as the education programs associated with school groups and coastal training. This wing would have a large hallway that would be used for art exhibits, a 140-person capacity auditorium, two classrooms, and additional office space for education staff. This entire building became known as the Rookery Bay Environmental Learning Center (ELC).

In 2004, Phase One of the ELC was opened to the public. The ELC is open year-round and serves as a visitor center for the public to enhance understanding of estuarine systems through interpretive exhibits, aquaria and naturalist-led programs. In addition, the ELC serves as a gathering place for college and professional training programs and courses as well as for research lectures, etc.

Shortly after the completion of the ELC, CSF decided to close the Briggs Nature Center and RBNERR entered into a collaborative agreement with CCPS to provide an environmental education program for Collier County school students in the fourth grade. This program was named Estuary Explorers and involved a comprehensive series of activities for students to complete in the classroom before and after an educational field trip to the ELC. Estuary Explorers became a cornerstone of the RBNERR education program and has garnered a strong following among teachers and is highly regarded by CCPS.

Coastal Training Program

In 1988, RBNERR initiated a series of technical training workshops targeting environmental professionals in southwest Florida, including land use planners, regulatory officials and coastal managers. Workshop topics ranged from watershed management and wetlands restoration, to mangrove ecology and exotic plant control. The workshops provided a much-needed forum for professional training, and proved so successful that RBNERR established a partnership with the Florida Coastal Management Program to provide similar training workshops at five other sites in Florida, including Apalachicola NERR and the Florida Keys National Marine Sanctuary. Within two years, the NERR System adopted the RBNERR training workshop model for incorporation into designated NERRs around the nation in partnership with state coastal programs.

The NERRs CTP, initially established in 1999, was based in part on the RBNERR model of training targeted local decision makers using science-based information. During the last ten years, NOAA and Congress have recognized the effectiveness of CTP programs and federal funding has been provided to increase the capacity of the NERRs to deliver training services for professional coastal decision-makers at the local level. RBNERR currently has a CTP coordinator, assisted by contractual personnel serving as training specialists and several grant-funded staff members.

5.3.3 / Current Status of Education and Outreach at Rookery Bay National Estuarine Research Reserve

Education and interpretation are an integral part of the management of RBNERR. RBNERR provides a unique opportunity for interpretation of sub-tropical estuarine resources. The education program is designed to address priority resource issues including increased demands on coastal resources generated from unprecedented urban development. Environmental education is therefore a critical tool in the management of the coastal zone. A well-informed public is better equipped to make sound decisions about problems and issues facing the estuarine environment. RBNERR's education program targets audiences ranging from students and resource users, to environmental professionals and elected officials.

RBNERR's education efforts demonstrate effective partnering at the national, state and local level. Key education partners include NOAA, ESC, FGCU and CCPS. RBNERR staff also conducts education and outreach programs Rookery Bay and Cape Romano-Ten Thousand Islands aquatic preserves.

As of 2011, RBNERR has three education staff, including the ELC manager, CTP coordinator, and education coordinator. Additional contract personnel assist in education and training programs. RBNERR's education staff works cooperatively with DEP's CAMA personnel in south Florida, including field offices for aquatic preserves in Estero Bay, Charlotte Harbor, Tampa Bay and Biscayne Bay. RBNERR has provided training, developed workshops, outreach publications and products, and demonstration projects that have been successfully incorporated into these aquatic preserve programs. Regional coordination and dissemination is consistent with DEP's establishment of RBNERR as the southwest Florida CAMA region headquarters, and with the mission of the NERR System to support informed coastal management within RBNERR's biogeographic region.

There are five key initiatives that will help direct RBNERR's priority education objectives for the 2012 - 2017 planning period.

1. **Increased Community Awareness:** Through a significant and continuing upward trend in visitation to the ELC by local residents and visitors, the ELC has vastly increased community awareness and understanding of coastal and estuarine issues and the work of the RBNERR. RBNERR hosts annual community events at the ELC including Dive into Oceans, Estuary Day, and the Southwest Florida Nature Festival. The ELC is located adjacent to the headquarters building at 300 Tower Road. A pedestrian bridge and boardwalk system, completed in 2009, provides visitor access to important representative examples of key RBNERR habitats and cultural resources.
2. **Coastal Training Program:** RBNERR's CTP is a regional training forum for professionals involved in making decisions that affect coastal resources in southwest Florida. RBNERR has expanded its

capacity to serve as an active, interface between science and management. CTP training integrates relevant science and technology to address priority issues affecting the coastal resources of southwest Florida. Target audiences include environmental professionals, business interests, elected officials, local government staff, coastal law enforcement officials, landscape managers, ecotour operators, developers and agricultural interests. RBNERR's CTP has recently developed a training program designed to promote Best Management Practices for local landscape professionals, in partnership with the Cities of Naples and Marco Island, and the United States Environmental Protection Agency. Project Greenscape is now serving as a statewide model for training landscape managers, recently enacted by the Florida Legislature (2009). RBNERR serves as a regional training center, along with its two sister NERR sites in Florida at Apalachicola NERR and Guana Tolomato Matanzas NERR.

3. **Field-based Student Education:** RBNERR staff is committed to continued support of field trip programs designed to promote and enhance critical thinking skills for school students in various grade levels. Field trips also enhance student's knowledge of coastal ecology and increase awareness of the value of estuaries. RBNERR's revised field manual and lab guide supports this field experience. Partnerships with FGCU, ESC, and CCPS provide important opportunities for collaborative education program development. RBNERR staff provides on-the-water marine science programs to secondary and post-secondary students, inquiry based field trips for 4th grade students through the Estuary Explorers program and teacher training, both of which include SWMP data interfacing. RBNERR also partnered with Florida Department of Environmental Education, CCPS and Florida Panther National Wildlife Refuge to establish a Learning in Florida's Environment site that provides a hands-on, full-day field experience for nearly 500 7th grade students. RBNERR also understands the value of professional development for teachers and conducts various training programs as a part of its comprehensive formal-education initiatives. These programs incorporate K-12 Estuarine Education Program (KEEP) principles throughout the lessons. A K-12 Market Analysis and Needs Assessment is contingent upon necessary resources.
4. **Enhanced Public Access:** RBNERR's public lands, including pristine barrier islands and uplands, provide an important opportunity to develop and manage compatible public access and use projects designed to enhance the visitor's experience and contribute to increased community awareness and involvement in coastal stewardship. Existing accomplishments include terrestrial and aquatic interpretative trails and signage, a pedestrian bridge, designated camping areas, and low impact (e.g. kayak and canoe) launch sites. Projects currently being planned developed or under construction include a new trail and boardwalk, an observation tower and a new kayak/canoe public access site.
5. **Enhanced Outreach and Partnering:** RBNERR has developed strategic partnerships in southwest Florida designed to enhance linkages with local communities including Naples, Marco Island, Fort Myers and Tampa. RBNERR's support organization, the Friends of Rookery Bay, Inc. (FORB) and RBNERR's volunteers play an important role in this effort to support informed coastal decisions through community incentives and recognition programs. RBNERR staff and FORB volunteers participate in a number of local community events, ranging from Earth Day to the annual Fourth of July parade in Naples. Other outreach efforts include production of a variety of printed materials including brochures, posters and information sheets, contributions to an extensive website (see www.rookerybay.org), and creation of multi-media outreach tools designed to support RBNERR's mission.

5.4 / *The Public Use Management Program*

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

While access by the public has always been a priority, the conservation of natural resources at 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, critical upland, wetland and submerged habitats through the coordination of visitor program planning with social science research. One of CAMA's critical management challenges during the next 10 years is balancing anticipated increases in public use with the need to ensure preservation of site resources. This section explains the history and status of our Public Use Management Program efforts.

5.4.1 / Background of Public Use at Rookery Bay National Estuarine Research Reserve

In 1990, the State of Florida initiated a land acquisition program at RBNERR funded through Preservation 2000 and Florida's CARL program that ultimately resulted in preservation of an additional 10,500 acres of key lands at a cost of approximately \$57 million. Public access and use of RBNERR lands, when compatible with DEP and RBNERR management goals, is an important component of the mission of RBNERR, and is consistent with the intent of the CARL program. Compatible public use for RBNERR is primarily defined as passive and low-impact to ensure continued long-term preservation of essential coastal resources. With the exception of recreational fishing and commercial harvest, allowed public use within RBNERR is non-consumptive. One of RBNERR's critical management challenges during 2011 through 2016 is balancing significant increases in public use with the need to protect natural and cultural resources.



Coastal clean up on the barrier island beach

through 2000 included dumping of trash, poaching of deer and other wildlife, vandalism and theft of signs and equipment, and camping and fires in prohibited areas. RBNERR staff observed destruction of wetlands (e.g. illegally cut mangroves and construction of illegal structures) and impacts to sea grasses from vessels operating in shallow waters of RBNERR. Over the last 20 years, RBNERR has experienced a significant increase in manatee mortality from boating impacts.

Use of personal watercraft, airboats and similar shallow draft vessels has increased significantly, providing motorized access to shallow waters and submerged resources of RBNERR that have not previously been impacted. Wading bird colonies have been disturbed by boaters moving into such close proximity that the birds are flushed from their sites. Recreational boaters are using RBNERR waters more frequently for overnight anchorages, which can contribute to degraded water quality with waste discharges, and impacts to submerged resources from anchoring. RBNERR staff have observed evidence of off-road vehicle use in upland/wetland areas that cause rutting and sheetflow disturbances. Areas within RBNERR that are exposed to the highest level of intensive public use currently include South Key Island, Shell Island Road and seasonal use of barrier islands (e.g., camping) in the Cape Romano/Ten Thousand Islands.

RBNERR is located in one of the fastest growing metropolitan areas in the nation, with county population increasing 144% during 1980 to 1998 (Florida Statistical Abstract, 2008) and an additional 58% by 2008 (Florida Statistical Abstract, 2008). Over 1.3 million tourists visited Collier County in 2008 (Naples, Marco Island, Everglades Convention and Visitors Bureau, 2010). Boating registrations have increased significantly during the last ten years. Primary public use of RBNERR resources has traditionally been boating and fishing, although staff observations indicate an increase in vehicle access in certain areas (e.g. Shell Island Road). Initial steps taken by RBNERR to promote compatible public use include the construction of trails and boardwalks, installation of informational signage, conducting workshops, seminars and courses for the general community and targeted users (e.g. inshore fishing interests).

Despite these efforts, incompatible public use resulting in destruction or degradation of natural resources is increasing within RBNERR.

Examples from 41 cases of disturbances and violations documented on Shell Island Road during 1996

5.4.2 / Current Status of Public Use at Rookery Bay National Estuarine Research Reserve

RBNERR staff identified four priority principles that guide ongoing stewardship efforts:

- Promote and encourage visitors to accept RBNERR as a wilderness area with a high degree of aesthetic and natural value that is worth protecting through active stewardship. Promote uses of RBNERR resources that are compatible with the mission of RBNERR, ensures protection of key natural and cultural resources and takes into consideration the changing needs of local communities.
- Utilize public access and visitor use sites within RBNERR as education and interpretation opportunities that encourage coastal stewardship through the application of “Leave No Trace” principles for visitors.
- Using existing authority provided by local, state and federal laws, establish appropriate policies for public access and visitor use that ensures protection of important natural and cultural resources and wildlife, conduct visitor outreach efforts to convey use policies and the need for them, and work cooperatively with partner agencies and law enforcement to provide enforcement.
- Monitor public access and visitor use to assess impacts to environmental conditions within RBNERR, and use adaptive management methods to eliminate, avoid, or reduce potential adverse impacts to natural resources.

The following actions or activities have been considered under the multiple-use concept as possible uses to be allowed on the site. “Approved” uses are deemed to be in concert with the purposes for state acquisition, with the Conceptual State Lands Management Plan, and with DEP’s agency mission, goals and objectives. “Conditional” means the use may be acceptable, but will be allowed only if approved through a process other than the land management plan development and approval process. “Rejected” means the item is not in concert with one or more of these various forms of guidance available for decision-making:

Table 2 / Analysis of Multi-Use Potential

Activity	Approved	Conditional	Rejected
Protection of endangered and threatened species	•		
Ecosystem maintenance	•		
Soil and water conservation	•		
Hunting*		•	
Fishing		•	
Wildlife observation	•		
Hiking	•		
Bicycling		•	
Horseback riding		•	
Timber harvest		•	
Cattle grazing			•
Camping		•	
Apiaries		•	
Linear facilities		•	
Off road vehicle use			•
Environmental education	•		
Citriculture or other agriculture			•
Preservation of archaeological and historical sites	•		
(Other uses as determined on an individual basis)			

*At present hunting is not allowed on lands that fall within the area where the Cape Romano- Ten Thousand Islands Aquatic Preserve overlaps with the Ten Thousand Islands National Wildlife Refuge. The activity status for hunting is listed here as “Conditional” so as to address the possibility of future changes in State law or management needs within these overlapping areas and to allow for possible future discussion of this status if it becomes necessary. Any possible future requests from the National Wildlife Refuge (NWR) managing staff to allow waterfowl hunting will change only in the areas where the boundaries of the NWR overlaps the aquatic preserve boundaries. All other areas within the RBNERR boundary will remain off limits to hunting as directed by 18-23.007(2)(a)(2) Florida Administrative Code.

CAMA intends to manage RBNERR as a single use property within the guidelines of the CARL and Florida Forever land acquisition programs, and advocates the specific uses described above. Other activities may be permitted as long as they do not interfere with the primary purpose of acquisition.



A few red mangrove propagules (seedlings) begin the formation of an island on an inshore oyster bed.

Chapter Six

Issues

6.1 / Introduction to Issue-Based Management

The hallmark of the National Estuarine Research Reserve (NERR) System is that each site's natural resource management efforts are in direct response to, and designed for, unique local and regional issues. When a NERR addresses issues, it allows for an integrated approach by all of the NERR's component 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, a NERR may address declines in water clarity by monitoring levels of turbidity and chlorophyll (Research), planting eroded shorelines with vegetation (Resource Management - Stewardship), 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 (Coastal Training Program).

Not only does issue-based management create a unified direction for the NERR programs, it allows any number of partners to become involved in addressing an issue. Partnering is invaluable to the NERRs, and by bringing issues into a broad public consciousness, partners who wish to be involved are able to collaborate. Involving partners in issue-based management ensures that a particular issue receives attention from angles that the NERR may not normally address.

This section will explore issues that impact the management of Rookery Bay National Estuarine Research Reserve (RBNERR) directly, or are of significant local or regional importance that the NERR's participation in them may prove beneficial. While an issue may be the same from NERR to NERR, 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 NERR's boundary. In this management plan, RBNERR will characterize each of its issues and delineate the unique goals, objectives and strategies that will set the framework for meeting the challenges presented by the issues.

Each issue will have goals, objectives, strategies and performance measures associated with it. Goals are broad statements of what the organization plans to do and/or enable in the future. They should address identified needs and advance the mission of the organization. Objectives are a specific

statement of expected measurable results that contribute to the associated goal. RBNERR strategies are the means in which the objectives are met and they provide the actions of how the goals will be met and issues addressed. The strategies provide a means by which programs (e.g. research, stewardship, education and CTP) are fully integrated in approach. An important example of this level of integration is the extent to which research and stewardship often share strategies, and the associated activities, to achieve complementary objectives. Also, there are some objectives identified herein that do not have sector specific strategies at all. This represents an intentional effort to concentrate limited resources where they can have the most impact. Not all sectors can focus equally on all objectives. Regardless of which sector has the most strategies or does the most work, performance measures identify specific results or effects that can be quantified to determine progress toward achieving the objective.

Florida's Land Management Uniform Accounting Council (LMUAC) developed objectives and measures for land management plans. RBNERR objectives and measures that are consistent with LMUAC guidelines are noted (e.g. LMUAC 1-8).

While this management plan is designed to guide the actions of RBNERR over the next five years, the fundamental principles of adaptive management may require modification of specific objectives, strategies or performance measures at any time. However, the issues and goals will almost certainly remain the same. Appendix D contains a summary table of all the goals, objectives, strategies and performance measures associated with each issue.

To be successful the objectives identified in this plan will be accomplished in partnership with local citizens, city, county, state, and federal officials, college and university students and faculty, nongovernmental organizations, and the business community. Strategies are linked to these objectives through performance measures. Strategies can be viewed as tools in a toolbox. It is not necessary to implement every strategy fully as long as the performance measures indicate progress toward achieving an objective. Implementation of the strategies identified in this management plan is also dependent upon administrative and financial support for reassigning or otherwise acquiring staff, volunteers, contract services, equipment, training, and supplies. (See Figure 17—Issue-Based Adaptive Management.)

Introduction to Issue-Based Adaptive Management

Natural resource management efforts are in direct response to, and designed for, unique local and regional issues.

Challenges of an identified issue are met by integrating research, education and stewardship strategies.

Objectives are measurable.

Continued monitoring allows the reserve to evaluate progress and, if needed, adaptively adjust strategies to achieve the desired objective.



Management strategies in this plan have been categorized as either core or contingent. Core strategies are those for which the RBNERR staff will actively devote existing resources, and pursue additional funding and partnerships to accomplish. Contingent strategies are beyond our current abilities, but will be accomplished as partnerships or other opportune funding sources become available. It must be emphasized that the ability of any RBNERR program (e.g. research, education, CTP, and stewardship) to successfully address issues, goals, and objectives is directly correlated to its ability to hire necessary personnel and access sufficient financial resources to get the job done.

No issue-based management plan would be complete without the acknowledgement of the substantial amount of effort required to manage and maintain the personnel, facilities, communications, and associated infrastructure required to safely and effectively meet management plan objectives. While successfully addressing the issues indentified in this plan is considered fundamental to the long term success of the RBNERR mission, ordinary day-to-day tasks and compliance obligations can easily consume 15-25% of allocated staff time and associated financial resources. While a description of these efforts is not explicitly included herein, they should not be overlooked when evaluating the merits of this plan.

6.2 / Public Use

Issue One: Impacts to wildlife, habitat and cultural resources related to incompatible public use.

Goal: Ensure user experiences are environmentally sustainable and consistent with natural and cultural resource protection for the benefit of existing and future generations.

Introduction: Encouraging public use that is compatible with natural and cultural resource protection is a priority of RBNERR. The natural and cultural resources of RBNERR provide a unique user experience unavailable elsewhere. Consistent with public expectations and RBNERR's mission, sustainability will be used as a guiding principle for decisions affecting natural and cultural resources.

Population growth and incompatible use can threaten the sustainability of natural resources. RBNERR must work cooperatively with stakeholders to ensure information regarding the condition of the resources is known and that this information is used proactively to support compatible public use. Public users of the RBNERR are considered key stakeholders and primary stewards of its resources. Some user activities may be restricted if they result in adverse environmental impacts or if they conflict with existing user experiences.

RBNERR provides important opportunities for compatible recreational use such as hiking, boating, camping and fishing that in turn provide significant economic benefits to the local community. The unprecedented rate of population growth experienced in Collier County correlates with a significant increase in public use of RBNERR resources. RBNERR staff observations indicate that the intensity of public beach and inshore waters use within specific areas such as Keewaydin Island and Cape Romano has resulted in a significant increase in the frequency of incompatible public use and related damage to wildlife and essential habitats. These impacts also degrade the wilderness experience that many visitors come to RBNERR to enjoy.

Along with an increase in population, boating registrations in Collier County have increased dramatically with over 25,000 registered boaters in 2008 (Florida Statistical Abstract, 2008). RBNERR staff report a significant increase in use of recreational boats within RBNERR.

Recently observed trends involving visitor use within RBNERR include an increasing frequency of:

- Guided tours with up to 12 or more personal high speed watercraft operating in shallow backwater bays (e.g. Morgan Bay and Grassy Bay near Cape Romano);
- Professional guided sport fish trips within RBNERR waters, with a significant increase noted within the Ten Thousand Islands;
- Overnight camping in all barrier beach habitats within RBNERR, with a significant increase noted in the Ten Thousand Islands (e.g. Cape Romano and Kice Islands, White Horse Key, Gullivan Key, etc.);
- Larger scale eco-tour boat operations, utilizing vessels capable of carrying up to 40 passengers and involving shell collecting, marine mammal observations, and wildlife viewing (e.g. Keewaydin Island, Cape Romano);
- Overnight anchoring of sailing and power vessels within RBNERR waters, often for extended periods of time (e.g. Goodland, north entrance to Rookery Bay, and Hurricane Pass);
- Parasailing and kite boarding (e.g. Cape Romano shoals);

- Kayaks and canoes used for conducting backwater camping expeditions;
- Resource damage caused by paddle-craft and/or power boats entering environmentally sensitive areas (e.g. illegally trimming mangroves to open and maintain boat access);
- Increased mortality of wading birds associated with entanglement with monofilament line used in fishing;
- Use of helicopters and fixed wing aircraft for aerial tours of RBNERR;
- Unauthorized use of all-terrain vehicles (ATVs) and other off-road vehicles for recreation and poaching activities;
- Increased wildlife/vehicle collisions on Shell Island Road.

These trends are expected to continue as the local population increases, requiring a significant expenditure of limited RBNERR resources to provide for sufficient protection of wildlife and RBNERR's natural resources, and to preserve the wilderness experience for visitors.

Staff and volunteers continue to note periodic boat-related disturbances at rookeries in RBNERR; although the frequency and intensity of disturbances at the ABC Islands bird rookery has diminished significantly as a result of the establishment of an enforced No Entry Critical Wildlife Area (CWA). Boat-related deaths of manatees continue to be a problem within RBNERR waters, as a result of impacts with boat hulls traveling at high speed, or as a result of injuries sustained from engine propellers. RBNERR staff also report increasing evidence of long-term damage to essential submerged habitats such as seagrass beds as a result of prop dredging from boats operating in the shallow waters of RBNERR (e.g. prop scarring within the Cape Romano shoals).

Boating access and recreational use of barrier island beaches within RBNERR, such as Keewaydin Island and Cape Romano, represents a key economic contribution to the local community. Staff observations over the last ten years indicate that camping activity by boaters is increasing, including the frequency, number, and duration of overnight campers utilizing beach sites within RBNERR. Examples of incompatible use associated with intensive beach use by boaters/campers include loss of wildlife from unleashed dogs, destruction of wetlands and beach habitats for campfires, deposition of human waste and trash, and increasing evidence of human conflicts from too many people targeting the same sites for camping or recreational use.

Upland and wetland habitats show continuing evidence of off-road vehicle use, which is prohibited within RBNERR due to the potential for causing ruts and alterations to freshwater sheet-flow. Upland areas of RBNERR periodically are used for the illegal dumping of trash, and more recently for paint ball activities involving the documented destruction of forested habitats.

Incompatible consumptive uses of RBNERR by the public, such as illegal hunting/poaching, plant and live shell collecting, and removal of artifacts, can result in serious cumulative negative impacts to RBNERR's natural and cultural resources. Non-compliance with established RBNERR policies, based on existing county, state and federal rules and regulations regarding conservation of cultural and natural resources, contributes to decreased productivity of the Rookery Bay and Ten Thousand Islands estuaries, and loss of important information on past cultures.

Issue One, Objective One: Minimize adverse impacts to natural and cultural resources from incompatible use.

Research Strategies

Core Strategies

1. Provide input into the RBNERR State of the Reserve (SOTR) document.
2. Provide input into the Office of Coastal and Aquatic Area's (CAMA) "State of the Coast."

Contingent Strategies

1. Review and assist with the prioritization and development of public access.
2. Monitor populations of flora and/or fauna in sensitive habitats to determine the effects of public use on population size, location, and, if possible, behavior.
3. Identify vulnerable resources located in sensitive areas that warrant more intensive management. This increased management is especially needed when the effects of visitor-use are compounded by the effects of sea level rise.

Resource Management Strategies

Core Strategies

1. Provide input into the RBNERR SOTR document.
2. Provide input into the Office of Coastal and Aquatic Area's (CAMA) "State of the Coast."
3. Posting of boundary locations, management regulations and install fencing where appropriate and possible.
4. Work cooperatively with partner agencies, and local, state and federal law enforcement agencies to protect natural and cultural resources within RBNERR.
5. Utilize trained volunteers to provide additional public information dissemination (e.g., non-law enforcement patrol of RBNERR waters – based on models currently used in the Florida Keys National Marine Sanctuary and Tampa Bay).
6. Continue cooperative efforts with local governments (e.g., Collier County, City of Marco Island and other partners) promoting conservation and protection of RBNERR resources (e.g., seagrass and manatee protection).

Contingent Strategies

1. Through partnering and based on resource availability, continue patrols of public access areas, including primary as well as remote visitor use areas.
2. Establish seasonal beach-nesting bird intern position to post, monitor and manage data collection for potentially all beach-nesting bird areas from north Keewaydin Island to Cape Romano shoals (including both Big Marco Pass and Caxambas Pass CWAs).
3. Establish appropriate policies and/or use existing authority to manage public access and visitor use that ensure protection of natural and cultural resources including wildlife (e.g. zoning).
4. Identify higher value wildlife habitats (e.g. bird rookeries, sea turtle nesting areas, panther habitat and corridors, etc.), and initiate, as applicable, the establishment of areas of additional protection such as Second Chance CWA or other CWAs.



The annual Southwest Florida Nature Festival includes dozens of field trips providing numerous opportunities to see wildlife and appreciate our spectacular natural surroundings.

Education and Outreach Strategies

Core Strategies

1. Conduct education and outreach programs for targeted audiences, such as marine industries, tourism and visitor's groups, eco-tour providers and naturalists (e.g. Master Naturalist Program and Eco-tour Provider Training Series) and the general public, that incorporate the best available science, RBNERR use policies and the need for them, and low-impact and leave-no-trace principles.
2. Partner with law enforcement officers and agencies to provide them access to information, tools or training.

3. Maintain current signage, publications and interpretive exhibits educating various audiences about best stewardship practices for visitors.

Contingent Strategies

1. Utilize RBNERR's Coastal Training Program to disseminate information, provide training and demonstration projects on RBNERR restoration projects to environmental professionals, regulatory personnel and decision makers.
2. Use social science tools to increase understanding of visitors' attitudes, beliefs or behaviors to influence management and education.
3. Develop web-based distribution methods of information on public use guidelines for visitors to RBNERR.
4. Partner with local natural resource managers to coordinate visitor use management including the joint distribution of information (e.g. responding to red tide, signs at boat ramps, etc).
5. Provide training and gain access to resources to assist RBNERR staff and other local natural resource managers with the knowledge, tools and resources necessary to address visitor use issues (e.g. Water Words that Work training, NOAA CSC Visitor Use Training).

Issue One, Objective One - Performance Measures:

1. Track the number of programs and participants for targeted audiences, such as eco-tour providers and naturalists.
2. Measure knowledge or skills gained through post-program surveys.
3. Track the number of people exposed to RBNERR publications, exhibits or signs.
4. Count the number of information submissions to SOTR and State of the Coast coordinators.
5. Establish effective methods for surveying and quantifying public-use activities and associated damage to natural and cultural resources.
6. Find additional funding for the continuation of the "Team Ocean" program that supports a multi-tiered public outreach effort.
7. Measure the extent of visitor education contacts delivered by Team Ocean personnel.
8. Obtain funding to complete an updated cultural resource survey for the northern half of the RBNERR. This survey will include specific resource management outcomes as well as the creation of a cultural resource database.
9. Track trends in law enforcement citations and incompatible use incidents.

Issue One, Objective Two: Create and maintain a variety of opportunities for low impact public access and compatible public use of RBNERR. (LMUAC 2)

Research Strategies

Core Strategies

1. Detrimental effects of public use will be monitored.

Resource Management Strategies

Core Strategies

1. Provide public use of RBNERR through the encouragement of traditional, low-impact recreational uses including, but not limited to bird watching, nature photography, hiking and camping (in designated areas), canoeing/kayaking, wildlife viewing, recreational fishing and shell-fishing, commercial fishing and power boating as long as such activity is in compliance with existing local, state and federal laws and does not result in adverse impacts to cultural and natural resources.
2. Develop public access and visitor use projects (e.g. new access sites, trail improvement) that are compatible with RBNERR's mission, protect key natural and cultural resources and keep pace with the changing needs of local communities.
3. Construct a public access facility for non-motorized vessels.
4. Develop and install visitor education signage regarding the responsible use of coastal areas in the RBNERR.
5. Complete a trail improvement project for the Sam Williams Island/Isles of Capri Community public access trail.

Contingent Strategies

1. Encourage compatible public use while protecting natural and cultural resources through the establishment of appropriate visitor use policies and procedures (e.g. zoning).

Education and Outreach Strategies

Core Strategies

1. Provide training and gain access to resources to assist RBNERR staff and other local natural resource managers with the knowledge, tools and resources necessary to create low impact visitor use opportunities (e.g. Water Words that Work training, NOAA CSC Visitor Use Training).
2. Partner with law enforcement officers and agencies to provide them access to information, tools or training.
3. Continue providing a variety of educational programs and tours that offer visitors a chance to experience the coastal environment while learning about low impact environmental ethics.

Contingent Strategies

1. Utilize RBNERR's Coastal Training Program to disseminate information, provide training or demonstration projects on RBNERR restoration projects to environmental professionals, regulatory personnel and decision makers.
2. Use social science tools to increase understanding of visitors' attitudes, beliefs or behaviors to influence management and education.
3. Develop web-based distribution methods of information on public use guidelines for visitors to RBNERR.
4. Partner with local natural resource managers to coordinate visitor use management including the joint distribution of information (e.g. responding to red tide, signs at boat ramps, etc.).

Issue One, Objective Two - Performance Measures: (LMUAC 2)

1. Track the number of programs and participants for targeted audiences, such as eco-tour providers and naturalists.
2. Measure knowledge or skills gained through post-program surveys.
3. Track the number of people participating in field-based tours and programs.

6.3 / Habitat and Species Management

Issue Two: Loss of native biodiversity and ecosystem integrity within RBNERR.

Goal: Improve the conservation of native biodiversity.

Introduction: An integrated educational and resource management strategy to interpret the results of research and modeling is an effective tool for coastal decision makers, stakeholders implementing restoration/conservation planning and the general public. Inherent in the mission of the NERR System is the need to provide for a stable, relatively pristine environment with the prevailing goal of managing for essentially natural conditions.

An ongoing SOTR framework of research and stewardship programs designed to assess key biological and physical/chemical parameters within RBNERR, and restore and maintain essential natural conditions within ecological communities of RBNERR, is required to achieve the NERR System mission. The SOTR framework helps to ensure that science and stewardship programs conducted by RBNERR personnel and partners are focused on addressing key research questions in support of informed stewardship actions while RBNERR education and training programs link resulting research and stewardship outcomes to ongoing outreach efforts directed to coastal managers, local decision-makers, scientists and the public.

RBNERR's SOTR is also intended to be integrated into a state-wide effort led by CAMA that will periodically disseminate results of ongoing research and monitoring, education, restoration and stewardship within CAMA-managed sites. This project is envisioned as an innovative tool that inventories environmental trends within CAMA-managed areas and identifies trends affecting some key coastal issues. CAMA's state-wide report will provide coastal decision-makers with a better understanding of Florida's natural, cultural, and economic coastal resources, and thus support improved resource management by local, regional, and state governments.

Specifically, the biodiversity associated with native plant and wildlife communities within and adjacent to RBNERR boundaries is threatened by invasive non-native plants and animals, suppression of natural



Thousands of mangrove islands fringe the Gulf of Mexico where rivers meet the sea.

fires, and the quantity, quality and timing of freshwater releases to coastal estuaries. Habitat restoration is implemented through passive and active methods from seed dispersal by wildlife, to replanting native species by staff and volunteers.

Worldwide, invasive non-native plant and wildlife species critically degrade natural processes within ecosystems and are a direct result of human influence. Often they do not have the natural checks and balances (diseases, pests, climate factors, predators, etc.) found in their native habitats. Unfortunately, RBNERR's natural lands are not immune to these aggressive invasives of which Brazilian pepper, melaleuca, fire ants and wild hogs are only some examples. Money and human resources (staff and volunteers) are perpetually necessary for fighting these unrelenting exotics through physical, mechanical, chemical and prescribed fire removal methods.

Fire is not only a method for reducing non-native species, but periodic fire is also a significant factor playing an important role in maintaining habitat value for wildlife, and species diversity within plant communities. For example, fire controls successional processes in south Florida pine flatwoods, and pine/cabbage palm/oak assemblages. In addition, fires recycle nutrients to the soils, induce seed dispersal and germination in many native plants, and remove understory that can fuel dangerous wildfires that threaten residential areas.

A consequence of urbanization adjacent to RBNERR is the suppression of natural fires to prevent destruction of residential and commercial areas. Restriction of periodic fires disrupts the natural fire ecology necessary to maintain biodiversity of upland habitats within RBNERR. Therefore, prescribed fire is a critical tool in RBNERR's land management.

Issue Two, Objective One: Restore and sustain critical habitats within the RBNERR.

Introduction: There is a continued need for establishing RBNERR key habitat baseline conditions in order to evaluate, process and prioritize future management activities. RBNERR habitat use evaluations (Visitor Surveys 2002 and 2005) show a concentrated use of the key habitats within RBNERR, including

boating within seagrass meadows, fishing in mangrove communities, poaching wildlife, trash dumping in natural communities, as well as recreating within beach/dune systems using ATVs and other off-road vehicles. In addition, observations of vegetative habitat-change, possibly due to sea level rise, is also of concern and begs for the establishment of accurate and up to date natural resource baselines.

To assist in managing these important resources, RBNERR staff and volunteers conduct habitat and species inventories. This important baseline data is useful for analyzing future evaluation of management successes and challenges. Also, RBNERR's other data-logging methods (e.g. sondes, weather stations, and soil substrate temperature loggers) provide important qualitative and quantitative information for analyzing trends and guiding future monitoring locations and protocols.

Ideally, biological monitoring should focus on multiple trophic levels (e.g., phytoplankton, zooplankton, macroinvertebrates, reptiles, birds, fishes and marine mammals) and habitats incorporating measures of both species/habitat biodiversity and condition. In order to guide future decisions, predictive models must be developed linking management activities to outcomes.

In addition, monitoring strategies for listed species will be in accordance with approved recovery plans. Opportunities for partner agencies within RBNERR to coordinate efforts to enhance limited resources will be actively encouraged.

Research Strategies

Core Strategies

1. Monitor physical parameters and nutrients of water according to NOAA's System Wide Monitoring Program protocols.
2. Collect weather data according to NOAA's System Wide Monitoring Program protocols.
3. Facilitate research to examine the factors affecting the occurrence, extent and biological significance of harmful algal blooms (HABs), mangrove die-offs, seagrass declines, and other biological phenomena.
4. Gather data and monitor for changes in plant communities over time.

Contingent Strategies

1. Determine and monitor the status of critical habitats within RBNERR (e.g., sea-grasses, marshes, mangroves, upland habitats, beach/dune communities, and key barrier islands).
2. Identify areas within RBNERR in need of restoration activities and identify associated research needs.
3. Conduct periodic water and sediment sampling to maintain baselines in case of contaminants (e.g. hydrocarbons related to oil spill events).
4. Facilitate and conduct research to examine impacts of oil and related substances on RBNERR managed lands.
5. Establish surface elevation tables for the prediction of sea level rise effects within RBNERR.
6. Identify applicable indicator species of fauna (frogs, fish, crustaceans, etc.) and determine their present status.
7. Identify and quantify the most significant stressors that threaten seagrass health within RBNERR.

Resource Management Strategies

Core Strategies

1. Implement principles of adaptive management including habitat restoration, habitat creation, habitat mitigation and habitat maintenance activities.
2. Maintain and strengthen the RBNERR's prescribed fire management program.
3. Incorporate volunteers into appropriately skilled activities and outreach opportunities (e.g. flora and fauna bio-surveys, visitor orientation, invasive exotic patrols, etc.).
4. Assure that staff acquire and maintain the appropriate level of training and/or licensing (certification) needed to properly and efficiently manage RBNERR's natural resources.
5. Implement Fruit Farm Creek Mangrove Restoration Project including assessment of previous research, identification of funding, engineering planning, permitting, and initiation restoration. The goal of this restoration project is to restore hydrological connection to a mangrove die-off area and improve habitat for related biodiversity such as the smalltooth sawfish and other species associated with mangrove habitats.

6. Complete and finalize a new set of ground-truthed vegetative habitat maps for RBNERR. These maps will identify sensitive areas that warrant more intensive monitoring and management.
7. Determine locations for geodetically controlled data-gathering stations (surface elevation tables and vegetation transects) that can be monitored for vegetation changes in key sensitive habitats located in areas identified as vulnerable to sea-level rise.
8. Forge partnerships with local government agencies and non-governmental organizations that will help RBNERR staff to facilitate the planning, funding identification, and initiation of efforts to restore natural resources impacted by humans and/or climate change (sea level rise).
9. Complete the RBNERR Vertical Control Plan and establish appropriate phases of a local network (CORS, NWLON, and other geodetic controls). Acquire training for staff in the appropriate use of sub-foot survey RTK equipment.
10. Establish and maintain strong partnerships and work-agreements with other agency (national wildlife refuges, national parks, state parks, county and city fire departments) fire management/control programs and maintain and update all trainings and certifications for RBNERR fire team staff.
11. Establish capability to monitor any influence of sea level rise on estuarine habitat range and distribution through the establishment of vertical control (local network) within RBNERR, as well as, the updating of present RBNERR vegetative habitat maps.

Contingent Strategies

1. Work with Collier County government towards the planning and completion of the Griffin Road habitat improvement project. The goal of the project is to re-hydrate wetlands and improve habitat for the Florida panther and other wetland dependent species.
2. Remove contaminants, including oil and oil-related substances, from lands managed by RBNERR.
3. Assist and facilitate the recovery of oil related or human induced wildlife impacts within RBNERR.
4. Monitor identified indicator species of fauna for changes indicating presence and/or increase of stressors brought on by human activities.
5. Increase baseline coastal waterbird monitoring to provide pre-event data collection prior to occurrence of natural disasters (e.g. hurricanes, tropical storms) or human caused events (e.g. oil spills).
6. Develop a plan and strategy for the identification and prioritization of stressed and/or dying areas of mangrove forest within RBNERR and use this plan for subsequent mangrove restoration projects. This will have an ultimate positive effect on specific listed species (e.g. smalltooth sawfish) as well as the overall biodiversity within RBNERR.

Education and Outreach Strategies

Core Strategies

1. Conduct education, training and outreach programs for targeted audiences, such as GIS users, land-use planner, elected and appointed officials, natural resource managers, landscapers, eco-tour providers and naturalists (e.g. GIS Training, Marine Mammal Stranding workshop, and Master Naturalist Program) and the general public, that incorporates the best available science, and stewardship of critical wildlife habitats.
2. Partner with entities with a vested interest in habitat and species management and provide them, and the RBNERR staff, with increased access to information, tools or training and cooperatively address issues.
3. Maintain interpretive signage, outreach publications, exhibits and educational programs at the Environmental Learning Center to inform various audiences about critical wildlife habitats and what they can do to help protect them.

Contingent Strategies

1. When appropriate, create tools that translate scientific data to be included in related management, policy and/or planning.
2. Develop web-based distribution methods of information on public use guidelines for visitors to RBNERR.
3. Provide training and gain access to resources to assist RBNERR staff and other local natural resource managers with the knowledge, tools and resources necessary to restore and sustain habitats (e.g. shorebird monitoring training, statistical analysis training).

4. Monitor terrestrial, emergent and submerged habitat through the creation and management of a geographic information system (GIS) database including data layers representing the distributions of invasive non-native species from the annual species surveys.
5. Monitor wildlife species and their associated habitats through the creation and management of a geographic information system (GIS) database including data layers representing the distributions of invasive non-native wildlife species.
6. Monitor for changes in seagrass, oyster reef, mud flat, sand bar and other key benthic habitats through the establishment of an aquatic (GIS) database.

Issue Two, Objective One - Performance Measures:

1. Track the number of programs and participants for targeted audiences, such as eco-tour providers and naturalists.
2. Measure knowledge or skills gained through post-program surveys.
3. Track the number of visitors to the Environmental Learning Center that are exposed to RBNERR exhibits or who participate in educational programs that address critical wildlife habitat.
4. Maintain training database identifying all training/licenses obtained, required and renewal status.
5. Measure the number of fire dependant acres of Critical Habitat, such as scrub, burned per year.
6. Measure the number of burrows of Critical Habitat keystone species such as gopher tortoise.
7. Measure and map identified areas of Critical Habitat.
8. Measure the number of acres per year of exotic/invasive flora removed (ex. Brazilian pepper).

Issue Two, Objective Two: Reduce non-native invasive plant and animal species. (LMUAC 5)

Introduction: Non-native invasive plant and wildlife species are chronic problems requiring staff and monetary resources. RBNERR's ecosystem services require invasive species control and eradication efforts through perpetuity. Invasive plants, including Brazilian pepper, Australian pine, downy rose myrtle (*Rhodomyrtus tomentosa*), and lather leaf, have become established within RBNERR and adjacent lands. These invasive plants displace native species, may promote soil erosion and do not provide the diversity of habitat and food essential for native wildlife.

RBNERR staff report increased sightings of non-native wildlife, including feral hogs, spiny iguanas, African cichlid fishes, as well as other recent non-native introductions such as the Asian green mussel and Burmese python (*Python molurus bivittatus*). As with invasive plants, the introduction and establishment of non-native animals threatens the ecological integrity of RBNERR resources and native wildlife.

With limited staffing and resources to address this issue, RBNERR must take a strategic approach to ensure best possible outcomes of efforts to control non-native invasive plants and animals. The use of GIS and biosurveys to monitor baseline conditions will be incorporated with existing eradication and control methods (e.g. see Nuisance and Invasive Species Control Plan in Appendix B.10) and deployment of rapid response teams to achieve this objective.

Research Strategies

Core Strategies

1. Support visiting investigators conducting research on invasive species.

Contingent Strategies

1. Conduct periodic floral and faunal surveys that will serve as a baseline of native and invasive organisms.
2. Monitor changes in natural biodiversity in sensitive habitats due to invasive non-native plants and non-native wildlife.

Resource Management Strategies

Core Strategies

1. Remove and/or control Florida Exotic Pest Plant Control Council Category I and Category II (see Appendix B.4) invasive exotic plant species within RBNERR managed lands.
2. Remove and/or control non-native invasive wildlife species within RBNERR managed lands.

3. Implement preventative and protective measures to avoid or reduce the new establishment of non-native species.
4. Proactively respond (e.g. Early Detection Rapid Response) to new, non-native species invasions with the intention of their removal and/or control.
5. Control existing invasive species consistent with state and federal protocol to minimize non-target damage.
6. Maintain GIS database of invasive species and treated/capture sites.
7. Maintain and/or acquire appropriate level of training/licensing.
8. Work with state government to identify approved applicable bio-controls for use in control or eradication of invasives.

Contingent Strategies

1. Monitor non-native wildlife species that are not considered invasive at this time by federal and state regulatory agencies and document their potential impacts within RBNERR (e.g., coyotes, armadillo and cattle egret).
2. Work collaboratively with local government partners to prevent or reduce the establishment of non-native species.
3. Decrease the trend of ecological impacts from non-native invasive species as measured by loss of native indicator species.
4. Prevent introduction of non-native species onto RBNERR lands through the establishment of, and adherence to, protocols regarding “weed-wash” (exotic removal) stations for vehicles and equipment.

Education and Outreach Strategies

Core Strategies

1. Conduct education, training and outreach programs for targeted audiences, such as landscape and lawn care providers, natural resource managers, city and county staff, realtors, home owners associations, eco-tour providers and naturalists (e.g. Project Greenscape refresher classes, Master Naturalist Program and Eco-tour Provider Training Series) and the general public, that incorporates the best available science, identification of non-natives, the value of native plants and associated stewardship practices.
2. Partner with entities with a vested interest in non-native species management to provide them, and RBNERR staff, with increased access to information, tools or training and cooperatively address issues.
3. Maintain current signage, outreach publications and interpretive exhibits at the Environmental Learning Center that educate various audiences about invasive, non-native species.

Contingent Strategies

1. Utilize RBNERR’s Coastal Training Program to disseminate information, provide training or demonstration projects on RBNERR non-native invasive species removal projects to environmental professionals, regulatory personnel and decision makers.
2. Use social science tools to increase understanding of landowner’s attitudes, beliefs or behaviors to influence management and education.
3. Develop web-based distribution methods of information on non-native invasive species.
4. Provide training and gain access to resources to assist RBNERR staff and other local natural resource managers with the knowledge, tools and resources necessary to address non-native invasive species.
5. Partner with local natural resource managers to coordinate non-native invasive species management, including the joint distribution of information.
6. When appropriate, create tools that translate scientific data to be included in related management, policy and/or planning.

Issue Two, Objective Two - Performance Measures:

1. Track the number of programs and participants for targeted audiences, such as eco-tour providers and naturalists.

2. Measure knowledge or skills gained through post-program surveys.
3. Track the number of people visiting the Environmental Learning Center who are exposed to RBNERR publications, interpretive exhibits or programs that address the challenges posed by non-native invasive species.
4. Track the number of visiting investigators conducting research on invasive species in RBNERR.
5. Track the number of acres treated and number of animals removed.
6. Document active participation in local Cooperative Invasive Species Management Areas.
7. Measure the reduction of invasive non-native plant and wildlife species within RBNERR managed habitats compared to adjacent unmanaged landscapes.
8. Maintain training database identifying all training/licenses obtained, required and renewal status.

Issue Two, Objective Three:

Maintain natural fire ecology of pyrogenic habitats through implementation of natural fire regimes. (LMUAC 1)

Introduction: Prescribed fire is an important tool that is used by the RBNERR's resource management team to maintain and restore pyrogenic habitats. Public awareness of the benefits of an active prescribed fire program is essential to ensure public acceptance of the short-term inconveniences such as smoke and road closure. The RBNERR staff are also committed to applying scientific monitoring to understand the implications of its fire management program on habitats and species composition. (See Appendix B.8.)

Research Strategies

Core Strategies

1. Map pyrogenic habitats to monitor size and boundaries of habitats for use in management activities.

Contingent Strategies

1. Establish experimental plots in pyrogenic habitats to determine the effects of fire on native and exotic plants and animals.
2. Facilitate research to evaluate methods of restoring natural biodiversity and microclimate of pyrogenic habitats.

Resource Management Strategies

Core Strategies

1. Use fire as a tool to restore the natural processes of critical habitats and to support listed species recovery efforts (examples include gopher tortoise, Eastern indigo snakes, and scrub jays).



The Gulf fritillary butterfly is a frequent visitor to wildflowers in the sustainable garden behind the Environmental Learning Center.

2. Reduce hazards associated with past fire suppression through the implementation of fire and/or mechanical fuels reduction.
3. Dedicate, maintain and procure adequate and reliable equipment and ensure staff are adequately trained to implement the RBNERR's prescribed fire program.
4. Use all fire management resources available to meet RBNERR's designated goal of 780 acres burned annually. This goal is based on the number of acres of each fire dependant habitat type along with the recommended burn frequency for each habitat type.

Education and Outreach Strategies

Core Strategies

1. Use the interpretive opportunities available at the Environmental Learning Center to educate the public about the importance and value of maintaining the natural fire ecology of pyrogenic habitats.

Contingent Strategies

1. Conduct education, training or outreach programs for targeted audiences, including communities in high fire hazard areas adjacent to RBNERR, or eco-tour providers and naturalists, or the general public, that incorporates the best available science and the value of implementing a natural fire regime.

Issue Two, Objective Three - Performance Measures:

(See Prescribed Fire Plan performance measures in Appendix B.8.)

1. Track number of acres of fire hazard reduced, acres of habitats restored and acres of habitats sustained in a prescribed successional rotation as they relate to the RBNERR Prescribed Fire Plan. (LMUAC 1)
2. Track number of acres of fire-dependant habitat types burned and report these numbers in the CAMA quarterly report as related to the CAMA designated yearly burn goal of 780 acres.
3. Track the number of acres of pyrogenic habitat burned by prescribed fire that will provide enhanced and restored conditions for listed species such as gopher tortoises, Eastern indigo snakes, and scrub jays.
4. Track the extent of RBNERR assistance provided to various local, state, and federal agencies in prescribed fire, wildfire suppression and related activities.
5. Review maintenance logs for all vehicles, vessels, and equipment.

Issue Two, Objective Four: Research, manage, and protect state and federal listed species in their recovery while assisting federal, state and local agencies, and private organization efforts to do the same. (LMUAC 8)

Introduction: Southwest Florida is under extreme human development pressure. With less natural habitat available in this region, many federal and/or state imperiled species rely on RBNERR as essential habitat for their survival. The Cape Romano/Ten Thousand Islands area has been designated as "critical habitat" for the smalltooth sawfish by NOAA's National Marine Fisheries Service (NMFS). These species may use RBNERR as permanent habitat (e.g., gopher tortoise, Florida manatee, smalltooth sawfish, Eastern indigo snake within the scrub habitat, *Tillandsia pruinosa*), nesting sites (e.g., Atlantic loggerhead turtle, least tern, American crocodile), wading bird colonies (e.g. wood stork), migratory habitat or over-wintering sites (e.g., red knot), or as travel corridors (e.g., Florida panther, West Indian manatee) which may lead to future permanent residence. Refer to Appendix B.4 for a complete list of listed species within RBNERR.

In addition to researching and protecting imperiled species, RBNERR personnel have been trained and authorized by the USFWS to recover dead and injured manatees and other marine mammals. Continued training and maintenance of authorization levels allows this important scientific data to be accumulated through the recoveries that can be directly implemented into RBNERR's resource management.

Research Strategies

Core Strategies

1. Monitor beach/dune habitat size and locations in RBNERR.
2. Evaluate the status of and monitor protected wildlife species within RBNERR, with a specific focus on sea turtles, wading birds, shorebirds, American crocodile, Florida panther, Eastern indigo snake, gopher tortoise and the West Indian manatee.
3. Develop GIS database of protected species negatively impacted by nuisance species.

Contingent Strategies

1. Evaluate the status of and monitor protected plant species and habitat types within RBNERR such as Curtiss' milkweed (*Asclepias curtissii*), sand dune spurge (*Chamaesyce cumulicola*), butterfly orchid (*Encyclia tampensis*), wild pine (*Tillandsia fasciculata*), fuzzy wuzzy (*T. pruinosa*) and sweetscented pigeonwings (*Clitoria fragrans*) and coastal strand habitat.
2. Monitor nuisance animals that are negatively impacting imperiled species within RBNERR and develop future management strategies.
3. Monitor American crocodile nest abundance and distribution to develop future management strategies.
4. Establish partnerships with local universities or other targeted entities to facilitate research to evaluate methods of restoring coastal strand habitat biodiversity and microclimate through the use of prescribed fire.
5. Work with local universities to encourage and facilitate research related to the smalltooth sawfish and its habitat.

Resource Management Strategies

Core Strategies

1. Utilize data from research and monitoring efforts to develop management recommendations with a specific focus on listed species of fauna such as sea turtles, wading birds, shorebirds, American crocodile, Florida panther, Eastern indigo snake, gopher tortoise and the West Indian manatee.
2. Utilize data from research and monitoring efforts to develop management recommendations with a specific focus on protected plant species such as Curtiss' milkweed, sand dune spurge, butterfly orchid, wild pine, fuzzy wuzzy and sweetscented pigeonwings.
3. Control nuisance wildlife species that are negatively impacting imperiled species within RBNERR managed lands.
4. Continue active involvement with marine mammal stranding network including attending update meetings, trainings and providing community awareness of partner efforts.
5. Complete a RBNERR "Species Management Plan" focusing on listed species and providing management recommendations for both flora and fauna (for both core strategies 1 and 2).
6. Develop and implement a "Nuisance Animal Control Plan" based on GIS database developed in conjunction with research staff.

Contingent Strategies

1. Continue to monitor American crocodile nest abundance and distribution with USFWS and visiting researchers to help develop future management strategies.
2. Expand and enhance "Team Ocean" program to assist in the ongoing effort to manage listed species.

Education and Outreach Strategies

Core Strategies

1. Conduct education, training and outreach programs for targeted audiences, such as landscape and lawn care providers, natural resource managers, homeowners associations, realtors, eco-tour providers and naturalists (e.g. Project Greenscape refresher classes, Marine Mammal Stranding Training) and the general public, that incorporates the best available science, identification of listed species, the value of them and associated stewardship practices.
2. Partner with entities with a vested interest in listed species management to provide them, and RBNERR with increased access to information, tools or training and cooperatively address issues (e.g. law enforcement training).
3. Maintain current outreach publications, interpretive exhibits and educational programs at the Environmental Learning Center that address the importance of protecting listed species.

Contingent Strategies

1. Utilize RBNERR's Coastal Training Program to disseminate information, provide training or demonstration projects on RBNERR listed species management to environmental professionals, regulatory personnel and decision makers.



The Rookery Bay National Estuarine Research Reserve has a rich cultural history dating back to the days of the mighty Calusa.

2. Use social science tools to increase understanding of landowner's or decision makers attitudes, beliefs or behaviors to influence management and education.
3. Develop web-based distribution methods for disseminating information on listed species.
4. Provide training and gain access to resources to assist RBNERR staff and other local natural resource managers with the knowledge, tools and resources necessary to address listed species management.
5. Partner with local natural resource managers to coordinate listed species management, including the joint distribution of information.
6. When appropriate, create tools that translate scientific data to be included in related management, policy and/or planning.

Issue Two, Objective Four - Performance Measures:

1. Track the number of programs and participants for targeted audiences, such as landscapers, eco-tour providers and naturalists.
2. Measure knowledge or skills gained through post-program surveys.
3. Track the number of visitors to the Environmental Learning Center exposed to programs or products that address the importance of protecting listed species.
4. Track the number of nesting shorebird monitoring trips and miles of beach monitored. (LMUAC 8)
5. Track the number of nesting sea turtle monitoring trips and miles of beach monitored. (LMUAC 8)
6. Track the number of incidents of protected species negatively impacted by nuisance species.

6.4 / Cultural Resource Management

Issue Three: Loss of cultural resource integrity.

Goal: Enhance the preservation of the RBNERR's cultural resources through good science resulting in informed management practices.

Introduction: In order to assess, interpret and protect the vast range of cultural resources on RBNERR lands, RBNERR will initiate, facilitate and/or conduct targeted research to function as the basis for developing a comprehensive cultural resources management plan.

Issue Three, Objective One: Complete cultural resource assessment surveys within the RBNERR boundary.

Research Strategies

Core Strategies

1. Conduct assessments and facilitate research efforts on cultural resources within the RBNERR focusing on those most vulnerable to damage from sea level rise, erosion, and human activities.

Contingent Strategies

1. Refine information on known cultural site(s) and identify prehistoric and historic settlement patterns.
2. Conduct the Florida Division of Historical Resources (DHR) Phase I (site assessment of historical and archaeological resources) and Phase II (test excavation) archaeological surveys of RBNERR managed lands as needed.
3. Conduct Phase III archaeological surveys (adverse impact mitigation alternatives) for applicable archaeological sites, as needed.

Resource Management Strategies

Core Strategies

1. Utilize data from research and monitoring efforts to develop management recommendations for cultural and historical resources with a specific focus on those resources most vulnerable to sea level rise, erosion, and human activities (development).
2. Provide for safe, secure, and effective cultural and historical resource management activities for RBNERR personnel and volunteers.
3. Utilize RBNERR GIS capabilities to utilize the latest LiDAR data and digital aerial photography to identify, locate, and assess previously unknown cultural resource sites.
4. Identify the location and condition of all artifacts previously collected by both amateur and professional archaeologists in RBNERR and provide recommendations as to the management of all related data and artifacts.
5. Complete the RBNERR "Cultural and Historical Resource Management Plan." Include management recommendations that focus on resources most vulnerable to sea level rise, erosion, and human activities.
6. Assemble a "Scope of Collections" document, including a catalog and inventory of all RBNERR artifacts in permanent collections held at RBNERR or other known agencies (DHR) or institutions (universities and/or museums) and include in the RBNERR "Cultural and Historical Resource Management Plan."

Contingent Strategies

1. Plan and initiate a program of professionally conducted cultural landscape studies throughout RBNERR managed uplands incorporating Phase I and, if feasible, Phase II archaeological surveys.
2. Create a cultural resource GIS map containing comprehensive site-specific information including master site-file information, surveys, research publications, reports, deed records and oral histories as available.
3. Cooperate with staff at the Ten Thousand Islands National Wildlife Refuge to get the refuge designated as a historic district.
4. Establish applicable areas in RBNERR and the Ten Thousand Islands as part of Florida's Historic Marker program.

Issue Three, Objective One - Performance Measures:

1. Number of cultural resource sites assessed, as well as, sites newly recorded and/or updated in the DHR Master Site File list. (LMUAC 7)

2. Number of new cultural resource sites discovered with aid from newest available LiDAR data and digital aerial imagery.
3. Update and maintain Florida Master Site File forms for all known but unrecorded sites.
4. Track efforts to get the RBNERR designated as a Cultural Historic District.
5. Number of new projects provided support by RBNERR GIS specialist.

Issue Three, Objective Two : Develop an effective monitoring and education approach to help maintain and conserve known archaeological sites and their associated artifact assemblage from vandalism, erosion and other forms of degradation.

Introduction: Degradation, including erosion, vandalism and destruction by wildlife and natural occurrences, impact the integrity of RBNERR cultural resources. Sea level rise may also be adversely influencing coastal erosion. RBNERR will collaborate with other governmental agencies, universities, private groups and citizens to seek solutions to preserving the cultural heritage of RBNERR managed lands in Southwest Florida.

Research Strategies

Core Strategies

No core strategies applicable

Contingent Strategies

1. Monitor the condition of cultural resource sites through the use of photo station points.

Resource Management Strategies

Core Strategies

1. Explore effective methods to discourage vandalism and other disturbance of resources.
2. Seek professional archaeological assessments to document and determine feasibility of relocation, re-creation and repair of historic structures.
3. Erect fencing and other measures of protection around chosen resource sites deemed vulnerable to human activities.
4. Relocate, recreate, and repair historic sites and related structures if applicable and if feasible as directed by professional archaeological assessment. (LMUAC 7)

Contingent Strategies

1. Define eligibility list of cultural resource sites to be established as part of the Florida State Historical Marker program and work to establish formal designation for all applicable RBNERR sites.
2. Work cooperatively with partners to explore, and if feasible, preserve and interpret historical maritime settlements or sites threatened by coastal erosion.

Education and Outreach Strategies

Core Strategies

1. Conduct education, training and outreach programs for targeted audiences that incorporates the best available science, the value of cultural resources and their associated cultures, and appropriate resource management practices (e.g. law enforcement training, eco-tour operator series, cultural resource bmp training).
2. Utilize the Environmental Learning Center interpretive exhibits and guided walks to develop public appreciation for the value of RBNERR's cultural resources.

Contingent Strategies

1. Partner with entities with a vested interest in cultural resource management to provide them and the RBNERR with increased access to information, tools or training and cooperatively address issues.
2. Utilize RBNERR's Coastal Training Program to disseminate information, provide training or demonstration projects on RBNERR cultural resource management to environmental professionals, regulatory personnel and decision makers.
3. Use social science tools to increase understanding of landowners or visitors attitudes, beliefs or behaviors to influence management and education.
4. Develop web-based distribution methods of information on listed species.

5. Partner with cultural resource managers to coordinate cultural resource management, including the joint distribution of information.
6. When appropriate, create tools that translate scientific data to be included in related management, policy and/or planning.

Issue Three, Objective Two - Performance Measures:

1. Track the number of programs and participants for targeted audiences and measure the knowledge of said audiences, including cultural resource managers, eco-tour providers, naturalists, and the general public, gained through post-program surveys.
2. Track the number of visitors to the Environmental Learning Center and those participating in guided walks.

6.5 / Land Use Impacts

Issue Four: Adverse environmental impacts from past, current and future land use resulting in negative environmental changes within RBNERR.

Goal: Minimize adverse environmental impacts from land use while restoring the ecosystem services.

Introduction: Changes in the land use of watersheds and adjacent coastal lands and waters has resulted in significant environmental changes within RBNERR. Urban development and agricultural land-use within RBNERR's watersheds, and their associated impacts on freshwater inflows to the Rookery Bay and Ten Thousand Islands estuaries, remain one of the most significant threats to the ecological integrity of the RBNERR. These impacts include alterations to the volume and timing of freshwater with a resulting negative influence on changes in natural salinity regimes within the estuary, and degradation of water quality as land use upstream contributes pollutants from leaching of septic tanks and the use of herbicides, fertilizers and pesticides.

Coastal development along Collier County's shoreline still occurs, although not as prevalent today as in previous years due to increased regulatory protection for coastal wetlands. Much of this anticipated change in land use is related to recent trends in redevelopment within the cities of Naples and Marco Island.

Collier County has experienced an unprecedented population growth rate over the last 25 years. The Florida Statistical Abstract (1999) indicated that between 1980 and 1998, the County's population increased from 85,971 to 210,100, which is an increase of 144%. For 2008, Collier County (www.colliergov.net) documents a peak season population of 399,109 people and the United States Census Bureau estimates the 2009 resident population as 318,537. Current projections for Collier County estimate an additional population increase of 64% through 2030 (BEBR, 2008).

Projections by the Collier County government anticipate continued growth in the next five to ten years along the State Road 951 corridor (Collier Boulevard) and south of U.S. 41 (Tamiami Trail). These areas are designated as urban and directly adjoin the eastern and northern boundaries of RBNERR. The Collier County Comprehensive Plan presents criteria for development of county lands and provides a map (Figure 18) with recommendations for land use.

Land to the northwest, south and west of RBNERR is designated as Coastal Resource Management/ Recreation, and is restricted for large-scale development. Smaller projects, including Planned Unit Developments may be permitted.

The Florida Department of Community Affairs (DCA) has designated portions of Collier County, including the Big Cypress National Preserve and Fakahatchee Strand Preserve State Park as an Area of Critical State Concern (ACSC). Under the ACSC program, DCA reviews any development order for construction as defined by Florida Statutes, Chapter 380.04 for consistency. RBNERR lands are not located within the ACSC.

Watersheds for RBNERR, including the Henderson Creek/Belle Meade watershed and the Picayune Strand State Forest, are located within existing restoration project boundaries for the Comprehensive Everglades Restoration Plan (CERP). The Southwest Florida Feasibility Study (SWFFS), part of the CERP process, identifies priority restoration needs within the region. The SWFFS will be integrated with Collier County's Watershed Management Plans, and represents an important planning tool for hydrologic restoration.

Development of adjacent coastal lands can also threaten the ecological integrity of RBNERR. Potential coastal development on lands adjacent to RBNERR over the next ten years includes marinas, docks

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URBAN DESIGNATION

MIXED USE DISTRICT

- URBAN RESIDENTIAL SUBDISTRICT
- RESIDENTIAL DENSITY BANDS
- URBAN COASTAL FRINGE SUBDISTRICT
- URBAN RESIDENTIAL FRINGE SUBDISTRICT
- BUSINESS PARK SUBDISTRICT
- OFFICE AND INFILL COMMERCIAL SUBDISTRICT
- PUD NEIGHBORHOOD VILLAGE CENTER SUBDISTRICT
- RESIDENTIAL MIXED USE NEIGHBORHOOD SUBDISTRICT
- ORANGE BLOSSOM MIXED USE SUBDISTRICT
- VANDERBILT BEACH / COLLIER BLVD. COMMERCIAL SUBDISTRICT
- HENDERSON CREEK MIXED USE SUBDISTRICT
- RESEARCH AND TECHNOLOGY PARK SUBDISTRICT
- BUCKLEY MIXED USE SUBDISTRICT
- COMMERCIAL MIXED USE SUBDISTRICT
- DAVIS BOULEVARD / COUNTY BARN ROAD MIXED USE SUBDISTRICT
- LIVINGSTON ROAD / RADIO ROAD COMMERCIAL INFILL SUBDISTRICT
- VANDERBILT BEACH ROAD NEIGHBORHOOD COMMERCIAL SUBDISTRICT
- COLLIER BOULEVARD COMMUNITY FACILITY SUBDISTRICT
- INDUSTRIAL DISTRICT
- BUSINESS PARK SUBDISTRICT
- RESEARCH AND TECHNOLOGY PARK SUBDISTRICT

COMMERCIAL DISTRICT

- MIXED USE ACTIVITY CENTER SUBDISTRICT
- INTERCHANGE ACTIVITY CENTER SUBDISTRICT
- LIVINGSTON / PINE RIDGE COMMERCIAL INFILL SUBDISTRICT
- BUSINESS PARK SUBDISTRICT
- RESEARCH AND TECHNOLOGY PARK SUBDISTRICT
- LIVINGSTON ROAD / EATONWOOD LANE COMMERCIAL INFILL SUBDISTRICT
- LIVINGSTON ROAD COMMERCIAL INFILL SUBDISTRICT
- COMMERCIAL MIXED USE SUBDISTRICT
- LIVINGSTON ROAD / VETERAN'S MEMORIAL BLVD. COMMERCIAL INFILL SUBDISTRICT
- GOODLETTE / PINE RIDGE COMMERCIAL INFILL SUBDISTRICT
- ORANGE BLOSSOM / AIRPORT CROSSROADS COMMERCIAL SUBDISTRICT

AGRICULTURAL / RURAL DESIGNATION

- AGRICULTURAL/RURAL MIXED USE DISTRICT
- RURAL COMMERCIAL SUBDISTRICT
- CORKSCREW ISLAND NEIGHBORHOOD COMMERCIAL SUBDISTRICT
- RURAL FRINGE MIXED USE DISTRICT**
- RECEIVING LANDS
- SENDING LANDS
- NEUTRAL LANDS

- RURAL SETTLEMENT AREA DISTRICT
- RURAL INDUSTRIAL DISTRICT

ESTATES DESIGNATION

CONSERVATION DESIGNATION

OVERLAYS AND SPECIAL FEATURES

- INCORPORATED AREAS
- COASTAL HIGH HAZARD AREA
- TRAFFIC CONGESTION BOUNDARY
- AREA OF CRITICAL STATE CONCERN OVERLAY
- AIRPORT NOISE AREA OVERLAY
- NATURAL RESOURCE PROTECTION AREA (NRPA) OVERLAY
- BAYSHORE/GATEWAY TRIANGLE REDEVELOPMENT OVERLAY
- RURAL LANDS STEWARDSHIP AREA OVERLAY
- URBAN-RURAL FRINGE TRANSITION ZONE OVERLAY
- NORTH BELLE MEADE OVERLAY

NOTE :

- (1) THIS MAP CAN NOT BE INTERPRETED WITHOUT THE GOALS, OBJECTIVES AND POLICIES OF THE COLLIER COUNTY GROWTH MANAGEMENT PLAN.
- (2) THE FUTURE LAND USE MAP SERIES INCLUDES NUMEROUS MAPS IN ADDITION TO THIS COUNTYWIDE FUTURE LAND USE MAP; THESE MAPS ARE LISTED AND LOCATED AT THE END OF THE FUTURE LAND USE ELEMENT TEXT.
- (3) MOST SUBDISTRICTS AS DEPICTED MAY NOT BE TO SCALE. THE FUTURE LAND USE MAP SERIES DEPICTS THESE SUBDISTRICTS TO SCALE.
- (4) THE CONSERVATION DESIGNATION IS SUBJECT TO CHANGE AS AREAS ARE ACQUIRED AND MAY INCLUDE OUTPARCELS.
- (5) REFER TO THE GOLDEN GATE AREA MASTER PLAN AND THE IMMOKALEE AREA MASTER PLAN FOR FUTURE LAND USE MAPS OF THOSE COMMUNITIES.

HENDRY COUNTY



FUTURE LAND USE MAP	
ADOPTED	- JANUARY, 1989
AMENDED	- JANUARY, 1990
AMENDED	- FEBRUARY, 1991
AMENDED	- MAY, 1992
AMENDED	- MAY, 1993
AMENDED	- APRIL, 1994
AMENDED	- OCTOBER, 1997
AMENDED	- JANUARY, 1998
AMENDED	- FEBRUARY, 1999
AMENDED	- FEBRUARY, 2000
AMENDED	- MAY, 2000
AMENDED	- DECEMBER, 2000
AMENDED	- MARCH, 2001
AMENDED	- MAY 14, 2002 (Ord. No. 2002-24)
AMENDED	- JUNE 19, 2002 (ORD. NO. 2002-32)
AMENDED	- OCTOBER 22, 2002 (Ord. No. 2002-54)
AMENDED	- FEBRUARY 11, 2003 (Ord. No. 2003-7)
AMENDED	- SEPTEMBER 9, 2003 (Ord. No. 2003-43)
AMENDED	- SEPTEMBER 10, 2003 (Ord. No. 2003-44)
AMENDED	- DECEMBER 16, 2003 (Ord. No. 2003-67)
AMENDED	- OCTOBER 26, 2004 (Ord. No. 2004-71)
AMENDED	- JUNE 7, 2005 (Ord. No. 2005-25)
AMENDED	- JANUARY 25, 2007 (Ord. No. 2007-18)
AMENDED	- DECEMBER 4, 2007 (Ord. No. 2007-78,79,81)
AMENDED	- OCTOBER 14, 2008 (Ord. No. 2008-57,58,59)

R 31 E R 32 E R 33 E R 34 E

MONROE COUNTY

BROWARD COUNTY

DADE COUNTY

T 46 S
T 47 S
T 48 S
T 49 S
T 50 S
T 51 S
T 52 S
T 53 S

and single or multi-family housing with the potential for negative impacts to water quality, loss of coastal wetlands habitat and associated threats to wildlife including protected species such as the West Indian manatee. Development on barrier islands can result in accelerated erosion processes due to “hardening” of naturally dynamic systems.

Agriculture represents another major land use of RBNERR’s watersheds with farmlands located in the Belle Meade Water Management District that drain into Henderson Creek. Crops include citrus and vegetables. Due to changes in real estate values during the last ten years, there has been a significant shift in land use within the Belle Meade agricultural area from agriculture to urban development.

Aerial spraying of pesticides for mosquito control within the watershed, if conducted improperly, could have a significant impact on non-target arthropods such as crabs, shrimp and insects.

The development of offshore oil and gas resources in the Gulf of Mexico is a land use that carries a potential risk for hazards to coastal estuaries related to oil spills. Oil spills can impact coastal wildlife and emergent wetland habitats, inducing both lethal and sublethal ecological effects.

Issue Four, Objective One: Promote informed coastal decisions by providing science-based information and education to targeted audiences including elected officials, government agencies and the private sector.

Introduction: Much of the RBNERR’s watershed is likely to be developed over the next few decades. Current projections for Collier County estimate an additional population increase of 64% through 2030 (BEER, 2008). Therefore, wise watershed-scale planning is necessary for the future health of the southwest coastal habitats.

Scientists and engineers have research techniques and modeling approaches that are useful in predicting the necessary buffers for protecting water quality and wildlife corridors. The state, county and local agencies identify impaired waters and in some cases probable pollutant sources. Watershed basin land use or action plans need to be developed for the continued health of RBNERR and surrounding coastal communities. Implementation of these plans will involve a consolidated effort of government agencies, scientists, engineers, non-governmental organizations, private developers and citizens. Successful strategies must involve these stakeholders and provide research-based solutions that allow long-term conservation of public trust resources while not infringing on the rights of private property owners. To the extent possible, RBNERR will seek to shift from engaging on proposed land use with regulatory agencies in the permitting process, to engaging with local governments in comprehensive land use plan development that recognizes core values and functions associated with RBNERR.

Research Strategies

Core Strategies

1. Strategically engage RBNERR staff in local and regionally comprehensive land use planning efforts (e.g. Collier County Watershed Management Plans, SWFFS, CERP) conducted by the Southwest Florida Water Management District (SFWMD), Collier County, City of Naples and City of Marco Island.
2. Position RBNERR staff to be regionally recognized for input during land use and watershed decisions.
3. Strategically identify and actively support RBNERR partnerships with communities, agencies and organizations at the local, regional, national and international levels that will provide mutual benefits and advance RBNERR’s mission.
4. Provide GIS support for education and training programming targeting coastal decision makers to encourage BMPs for RBNERR’s watershed as requested.
5. Attend land use decision meetings hosted by regulatory agencies and others to proactively provide environmental research-based comments for example County Watershed Plan, etc.

Contingent Strategies

1. Determine the total economic value associated with RBNERR, including but not limited to natural resources (e.g. ecological value of mangrove wetlands in terms of economic value functions), recreational and commercial opportunities, aesthetics and tourism.
2. Present research summaries and results at regional workshops and meetings.

Resource Management Strategies

Core Strategies

1. Encourage watershed-scale ecosystem management principles to be included in the city and county comprehensive plans.

Education and Outreach Strategies

Core Strategies

1. Conduct education, training and outreach programs for targeted audiences, such as landscape and lawn care providers, elected and appointed officials, land use planners, stormwater managers, developers, regulatory agencies, realtors, homeowners associations, marine industries, etc. (e.g. Project Greenscape and Green Industries Best Practices training, Erosion Control Inspector training, Managing Small Docks and Piers, Go With the Flow, Leadership Training Programs, Science and Media Conference) and the general public, that incorporates the best available science, decision-making related to land use issues, and associated stewardship practices.
2. Partner with entities with a vested interest in land use planning and impacts to provide them and RBNERR with increased access to information, tools or training and cooperatively address issues (e.g. Greenscape Alliance, Gulf of Mexico Alliance, Gulf of Mexico Marine Protected Areas Network).
3. Utilize RBNERR's Coastal Training Program to disseminate information, provide training or create demonstration projects about land use planning and associated impacts to a range of audiences.
4. Develop web-based distribution methods of information related to land-use planning decision-making (e.g. www.floridacoastalstrategies.org).
5. Provide training and gain access to resources to assist RBNERR staff and other natural resource managers and local government staff with the knowledge, tools and resources necessary to address land-use planning and associated impacts (e.g. Managing Small Docks and Piers Training, Innovative Floodplain Strategies training).

Contingent Strategies

1. Use social science tools to increase understanding of decision-maker attitudes, beliefs or behaviors to influence management and education.
2. Partner with local natural resource managers to coordinate land-use planning decision making, including the joint review and distribution of information (e.g. coordinate with local governments to review their existing rules, codes and ordinances to adapt to changing conditions).
3. When appropriate, create tools that translate scientific data to be included in related management, policy and/or planning.

Issue Four, Objective One - Performance Measures:

1. Track the number of programs and participants for targeted audiences, such as landscaper and stormwater managers.
2. Measure knowledge gained through post-program surveys.
3. Track outputs and products associated with partnering efforts.
4. Number of land use planning meetings or conference calls attended.
5. Number of GIS training sessions administered or maps produced.

Issue Four, Objective Two: To the greatest extent possible, restore natural flow-ways and freshwater hydroperiods to assure the correct quality, quantity and timing of freshwater entering into RBNERR's estuaries. (LMUAC 3)

Introduction: Prior to development, sheetflow was the primary source of surface runoff in the drainage basins for Rookery Bay and the Ten Thousand Islands. Significant alterations in the natural drainage patterns of the Belle Meade, Water Management District No. 6 and Southern Golden Gate Estates Basins have occurred as the result of road and canal construction. Dredge and fill operations associated with planned future developments threaten to further alter the hydroperiods of these basins. U.S. 41 and S.R. 951 are major roads adjacent to RBNERR that obstruct traditional sheetflow patterns.

Storm water runoff contributes to substantial increases in sedimentation and turbidity, resulting in an influx of organic and inorganic materials including nutrients from agriculture and sewage outfalls, pesticides and



Volunteers and staff work together to clean up the coast during the annual International Coastal Clean-up.

heavy metals. Significant alterations in estuarine salinity regimes due to changes in timing and volume of freshwater discharge have a profound negative impact on estuarine-dependent organisms.

Within RBNERR boundaries, roads and canals alter traditional sheetflow patterns that discharge freshwater to the estuary. These structures obstruct or channel sheetflow, disrupting natural wetlands filtration and altering salinity regimes. Roads within RBNERR that contribute to hydropattern alterations include Shell Island Road, Powerline Road, and Old County Road 22. Major canals that channelize freshwater discharge include Lely Canal, Henderson Creek/S.R. 951, and Faka Union Canal. RBNERR must work in collaboration with SFWMD, Collier County, DEP's Ft. Myers District Office, and others to achieve successful outcomes for the following strategies. (LMUAC 3)

Research Strategies

Core Strategies

1. Monitor physical parameters and nutrients of water according to NOAA's System Wide Monitoring Program protocols.
2. Collect weather data according to NOAA's System Wide Monitoring Program protocols.
3. Provide water quality data, when requested, to facilitate conservation of natural flow-ways.

Contingent Strategies

1. Determine the quantity, quality, and timing of freshwater inflows needed to sustain a high degree of ecological integrity and productivity within the Rookery Bay and Ten Thousand Islands estuaries.
2. Identify watershed flow-ways and adequate buffers that protect water quality using available GIS data.
3. Determine how and to what degree water quality within RBNERR is influenced by land use, including hydrologic restoration.
4. Establish informal working groups with local area expertise in land use planning, watershed drainage, stormwater engineering and design, and hydrologic restoration, to provide recommendations for restoration of freshwater flows to RBNERR (e.g. Water Council).

Resource Management Strategies

Core Strategies

1. Collaborate with other agencies to restore and protect natural freshwater inflows (e.g., water quality, timing and quantity) to the fullest extent possible. This to be accomplished by keeping applicable areas listed on the South Florida Water Management District “Priority Water Body List”, as well as by working towards the establishment of applicable “Minimum Flows and Levels”, and “Water Reservations.”
2. Establish adequate long-term control of key land and water resources and essential buffer areas necessary for the protection of RBNERR resources.

Contingent Strategies

1. Support regional efforts to reestablish the hydrologic connection of the Fakahatchee watershed to the area managed by RBNERR and to identify and maintain minimum flows into the Ten Thousand Islands estuaries from the Fakahatchee watershed.
2. Support regional efforts to reestablish the hydrologic connection of the Southern Golden Gate Estates watershed to the area managed by RBNERR and to identify and maintain minimum flows into RBNERR from the Southern Golden Gate Estates.
3. Continue promotion of conservation areas protected under the Deltona Settlement Agreement and the State of Florida’s CARL and Aquatic Preserve Programs (e.g., Hideaway Beach, Steven’s Landing and Barfield Bay) to assess and minimize impacts during development of adjacent areas.

Education and Outreach Strategies

1. The previous objective for this issue (Objective One) already identifies potentially beneficial education and outreach strategies to inform the general public, environmental professionals, and coastal decision makers about this issue. These will be equally effective and appropriate strategies for this objective and thus are not repeated here.

Issue Four, Objective Two - Performance Measures:

1. Number of times water quality equipment retrieved and water samples taken.
2. Number of times weather station calibrated or serviced.
3. Number of requests for water quality data.
4. Insure that RBNERR remains listed on the “Priority Water-body List” of the South Florida Water Management District.
5. Establish “Minimum Flows and Levels” for Henderson Creek, as well as other tributaries if applicable and feasible.
6. Establish “Water Reservations” for applicable areas of the RBNERR.

Issue Four, Objective Three: Increase land acquisition for environmental protection within the Rookery Bay watershed.

Introduction: Due to human sprawl throughout Florida, natural ecosystem integrity has been significantly altered. Highly productive natural communities have often been transformed into minimal (or no) environmental value through land use changes including intensive development, habitat loss and fragmentation, water flow modifications and wetland drainage. To preserve an important balance, conservation of ecosystem services is critical and is often accomplished through land acquisition.

The Rookery Bay watershed also has experienced the vast development pressures found throughout Florida. RBNERR’s continued proactive land acquisition program and partnering facilitation is imperative to the future health of Southwest Florida waterways.

Research Strategies

Core Strategies

1. Identify wetlands, flow-ways, critical habitats, conservation areas, cultural sites and land uses within RBNERR and its watershed in need of protection and/or restoration utilizing the GIS database developed by the RBNERR’s research staff.

Resource Management Strategies

Core Strategies

1. Work with local government agencies, institutions (for-profit and non-profit), as well as, private land-owners to minimize habitat fragmentation within RBNERR’s watershed.

2. Work with local government agencies, institutions (for-profit and non-profit), as well as, private land-owners to identify and maximize functional wildlife corridors within RBNERR's watershed.

Contingent Strategies

1. Support and encourage: science-based sustainable land-use strategies, land acquisition for conservation, and less-than-fee-simple conservation programs within RBNERR's watershed.
2. Pursue, as funding allows, the acquisition of outparcels within the RBNERR's boundaries including parcels that connect the watershed and estuaries, and parcels that will be needed to reconstruct historic flow-ways.

Education and Outreach Strategies

None specifically for this objective.

Issue Four, Objective Three - Performance Measures:

1. Number of sites identified for protection and/or restoration.
2. Number of acres of habitat-fragmentation minimized.
3. Number of wildlife corridors identified and protected and/or restored.
4. Prioritized list of land acquisition of out-parcels within RBNERR's watersheds.

6.6 / Informed Community and Individual Action

Issue Five: Lack of community awareness and involvement in coastal stewardship.

Goal: To increase the community's level of awareness, knowledge, skills and sense of value for the coastal environment that would result in positive attitudinal and behavioral change.

Introduction: With the population of Collier County and other coastal areas in Southwest Florida experiencing unprecedented growth during the last 20 years, the challenge of providing for an informed and actively engaged community has increased significantly. No single agency or organization within the region, including RBNERR, has the resources to effectively reach all segments of the Southwest Florida population. Public awareness and involvement in the long-term management and conservation of coastal resources is fundamental to natural resource protection.

In the past, land use decisions targeting the Southwest Florida coast have been made with serious consequences for the ecological integrity of estuarine ecosystems. Key local examples include the placement of high density development projects on sensitive barrier island habitats such as Marco Island and Fort Myers Beach that contribute to significant loss of important habitats and degradation of coastal water quality through storm water runoff, the dredging and filling of vitally important mangrove forested wetlands in estuaries such as Naples Bay, and the placement of drainage canals and roads within the Southern Golden Gate Estates watershed that resulted in a massive redirection and channeling of surface freshwater sheetflow with an associated impact on salinity regimes in the Ten Thousand Islands estuary.

While these projects, in some cases, resulted in short-term economic value added to the region, the loss of wetlands and wildlife associated with these decisions represents a significant long-term negative impact with the loss of economic and environmental services that can help sustain and drive the local economy.

Key decision-makers with a high potential for influencing the long-term health of estuaries and coastal resources include local elected officials (e.g. Collier County Commissioners, Marco and Naples City Councils, Everglades City Council, State of Florida legislators), government agency personnel involved in land use planning and regulatory decisions (e.g. Collier County, Florida Department of Environmental Protection, South Florida Water Management District, United States Army Corps of Engineers, United States Fish and Wildlife Service, etc.), and representatives from private interest industries including land development, agriculture, tourism, and landscaping.

Issue Five, Objective One: Promote active stewardship by increasing the community's understanding of the value of coastal resources.

Introduction: Significant opportunities exist for increasing awareness and promoting informed stewardship among adults and students through various partnerships within the community. Residents, seasonal visitors, and tourists have the potential for significant influence on the health of the Southwest Florida coast through the cumulative effects of their daily decisions. Key examples include the overuse of fertilizers and herbicides that contribute to degrading water quality in coastal waters through storm water runoff. Another issue is the lack of freshwater conservation that results in less freshwater reaching the coast and hyper-saline conditions

with associated stress on estuarine habitats (e.g. seagrasses) and wildlife (i.e. life cycles of recreationally important fishes such as snook and tarpon that depend on early wet season releases of freshwater).

The RBNERR mission of promoting informed decision-making extends specifically to professional audiences, leaders in the community and decision-makers who are involved in choices that affect coastal resources. This sector not only requires the understanding of coastal issues, but requires specific skills and often access to resources or technical information that will help them balance the economic and environmental needs of the greater community. As Southwest Florida continues to experience growth and development pressures, moving science to management and establishing best practices in a wide variety of sectors becomes even more important.

The recent economic downturn has affected professionals, businesses and local governments who are under-staffed and under pressure to deliver, sometimes without adequate time and resources to consider effects on RBNERR. In addition, RBNERR provides its network of contacts and local research and monitoring to partners and professionals to assist them in making informed decisions. Much of this strategy is accomplished through systematically assessing the science-based knowledge, skill gaps and needs of coastal decision-makers and environmental professionals within the biogeographic region and the state, when appropriate.



Barrier islands offer white sand beaches and gentle lapping waves.

Through partnerships, training, development and delivery of science-based tools, RBNERR has the opportunity to affect the process and trends of decision-making within the watershed to benefit both the community and the environment.

Public school students in Collier County also currently have limited access to environmental education opportunities, due to constraints in budget, staffing and transportation. Only a limited number of students in the Collier County Public Schools (CCPS) District participate in off-site programs such as those offered through RBNERR.

While colleges and universities in the region provide undergraduate and graduate programs in environmental sciences and coastal ecology, and encourage students to learn basic concepts of local ecology through colloquium courses, bridging the gap between awareness and stewardship remains a challenge. Through educational outreach partnerships with organizations such as CCPS, Edison State College, Florida Gulf Coast University, Greater Naples Area Chamber of Commerce, the Conservancy of Southwest Florida, National Audubon Society, South Florida Water Management District's Big Cypress Basin Region and others, RBNERR is able to influence individual actions through environmental education.

Research Strategies

Core Strategies

1. Facilitate and support research in RBNERR conducted by visiting investigators, through partnerships with universities, research institutions, agencies, etc.
2. Provide a steady stream of information and updates on scientific research and environmental conditions to the community at large as well as targeted audiences in the scientific and resource management communities.
3. Establish Research Advisory Committee comprised of representatives from regional agencies and institutions, including, but not limited to, Florida Gulf Coast University, Edison State College, and United States Geological Survey.

Contingent Strategies

1. Establish an ongoing educational internship program that seeks to engage students in the work of RBNERR.

Resource Management Strategies

Core Strategies

1. Work with the RBNERR Education and Coastal Training Programs to provide them with information regarding the most current and applicable land management tools currently being utilized by the RBNERR Stewardship team. This information can then be interpreted and provided to the general public, as well as coastal decision-makers (appointed and/or elected officials).

Contingent Strategy

1. Identify and acquire funding to support the completion of an Ecosystem Services Valuation Survey for all applicable habitats and the related service(s) that they provide. This survey will generate economic dollar values regarding the natural resources that are managed within RBNERR and the importance of these resource values to the sustainment of a healthy and productive local economy (i.e. jobs). The Resource Management team will then work with the Research and CTP teams to determine the parameters and goals of the survey and also determine the best way to translate this information to the target audiences.

Education and Outreach Strategies

Core Strategies

1. Conduct education, training and outreach programs for a variety of targeted audiences that incorporates the best available science and stewardship practices while emphasizing the value of coastal resources. Audiences may include visitors to the Environmental Learning Center, K-16 students, community groups, private non-profit and government staff, elected and appointed officials, local businesses, industry representatives, etc. Program examples include “Estuary Explorers”, “Coastal Considerations for Professionals”, “Coastal Cleanup”, and interpretive kayak tours.
2. Partner with entities with a vested interest in environmental education to provide them, and RBNERR staff, with increased access to information, tools or training to cooperatively address issues.
3. Maintain current signage, outreach publications, websites and interpretive exhibits educating about coastal stewardship.
4. Work in partnership with the FORB to sustain a robust and effective local grassroots community organization that supports all key elements of the RBNERR mission.
5. Develop, conduct and sustain a robust community volunteer program that effectively engages students and adults in stewardship activities.
6. Enhance and maintain communication systems for RBNERR personnel (internal and external) and with the local community, key partners, agencies, and DEP (CAMA and region offices) through email, voicemail, networking, etc.

Contingent Strategies

1. Use social science tools to increase understanding of targeted audiences attitudes, beliefs or behaviors to influence management and education.
2. Develop additional web-based information distribution tools.
3. Provide training and gain access to resources to assist RBNERR staff and other environmental educators with the knowledge, tools and resources necessary to address the lack of coastal stewardship among various audiences.
4. Partner with environmental educators or natural resource managers to coordinate environmental education, including the joint distribution of information.
5. Create a partnership with one or more Visitor Service Providers to expand RBNERR's ability to develop and deliver to the public a wide variety of outreach and education opportunities.
6. Fulfill the requirements for full implementation of the K-12 Estuary Education Program (KEEP).

Issue Five, Objective One - Performance Measures:

1. Number of programs and participants for targeted audiences, such as eco-tour providers, Estuary Explorers, Florida Master Naturalist programs, etc.
2. Measure knowledge gained through post-program surveys.

3. Number of educational outreach products produced and distributed to the public.
4. Number of visitors to the Environmental Learning Center and its activities, exhibits, and programs.
5. Track outputs and products associated with partnering efforts.
6. Number of volunteers and hours of volunteering.
7. Track the amount of RBNERR staff time contributed to the FORB partnership.
8. Number of visiting investigators.
9. Number of scientific summary documents and presentations delivered to the community at large.
10. Number of advisory committee meetings.
11. Number of meetings held to transmit information to the Education and CTP teams regarding Land Management tools currently being used by RBNERR staff.

6.7 / *Global and Regional Change Events*

Issue Six: Adverse environmental impacts related to global and regional change events such as climate change, catastrophic environmental events and harmful algal blooms (HAB).

Goal: To determine appropriate level of response and serve as a regional clearinghouse of accurate and credible science-based information and a coordinator of appropriate response for partners and the general public related to global and meteorological change events, catastrophic environmental events (both natural and human-induced) and harmful algal blooms (HAB).

Introduction: Global and regional change events, both natural and human induced, have the potential for significant impacts to the ecologic integrity of RBNERR. Analysis of climate data worldwide and trends in global temperatures indicate that accelerated changes in climate are occurring, driven primarily by an atmospheric increase in carbon dioxide emissions related to the burning of fossil fuels (Intergovernmental Panel on Climate Change—IPCC, 2008). The most significant impact on RBNERR associated with climate change will be sea level rise as a result of thermal expansion and the melting of continental ice sheets. Current projections of sea level rise by 2100 vary; conservative estimates range from of 1 to 2 feet of sea level rise while other scientists estimate higher levels of 7 feet of sea level rise or more (NOAA, 2009). There is evidence of a landward migration of mangrove-forested wetlands within RBNERR over a period of 50 years based on analysis of aerial imagery of the Ten Thousand Islands (Savarese, 2008).

As sea level rise continues, RBNERR can anticipate significant and potentially catastrophic changes to the natural habitats and wildlife within the region. Priority concerns include protected species that depend upon beach habitats for nesting (e.g. loggerhead sea turtle) and resting, foraging and nesting (e.g. shorebirds including the least tern, snowy plover and black skimmer). Also of concern is the anticipated loss of emergent wetlands as the migration of marine wetlands continues to track rising sea levels, until reaching a static urban boundary. The long-term impacts of sea level rise will likely be the single most significant threat to the ecological integrity of RBNERR due to the potential for catastrophic and irreversible change.

In addition to long-term sea level rise, short-term catastrophic events such as periodic hurricanes and HABs, including red tide events, could impact natural resources within RBNERR. Barrier islands such as Keewaydin, Little Marco and Cannon Islands provide evidence of significant changes in geomorphology through trend analysis of aerial photographs from 1928 compared to today. These changes are primarily a result of storm events and the cumulative effects of longshore currents.

Historical records indicate that mangrove forested wetlands in RBNERR were severely damaged as a result of hurricanes in 1918 and 1960. Hurricane Andrew impacted mangrove forests and hardwood hammocks in the Ten Thousand Islands in 1992 (Nalley et al., 1997). Hurricanes may have long-term impacts that can permanently change the ecology of the Bay (Alexander and Crook, 1974).

Not only do catastrophic events impact coastal systems, but red tides and other harmful algal blooms can have a significant effect on wildlife. In 1996, a severe red tide event resulted in the mass mortality of over 150 West Indian manatees, an endangered species.

The severe cold event observed in January 2010, when temperatures in Rookery Bay and the Ten Thousand Islands dropped to 47 degrees while similar conditions were observed in other Florida coastal areas, resulted in 197 confirmed manatee deaths across the State and mass mortality of cold susceptible fishes (e.g. common snook) observed within RBNERR. Ecological changes resulting from such events,

such as an observed significant increase in local pinfish populations (i.e. typical prey item for snook) following the cold event warrants close observation and monitoring to improve understanding of coastal processes and to determine appropriate responses.

The Deepwater Horizon oil spill in the Gulf of Mexico, beginning in April 2010, is an example of a regional catastrophic event with the potential for significant environmental effects within RBNERR and adjacent coastal areas. Oil spills can result in loss of emergent wetlands (e.g. saltmarsh and mangroves) and submerged habitats (e.g. seagrass and corals), mortality of marine mammals and sea turtles, and long-term lethal and sub-lethal effects to estuarine animals. The loss of coastal wetlands in the northern Gulf of Mexico related to the oil spill event amplifies the need to sustain and restore remaining intact Gulf wetland ecosystems that can help sustain wildlife.

Issue Six, Objective One: Develop and sustain effective regional networks with local and regional environmental interests and disseminate the best available scientific information regarding significant change events such as climate change, catastrophic events such as the Deepwater Horizon oil spill and the occurrence of HABs.

Research Strategies

Core Strategies

1. Work in partnership with NOAA and other agencies to access up-to-date data and projections on sea level rise.
2. Work in partnership with NOAA, United States Coast Guard, and other agencies to access up-to-date science-based information related to human-induced environmental catastrophic events (e.g., oil and fuel spills, vessel groundings/collisions, pollutant discharges/release).
3. Work in partnership with NOAA and other agencies to access current algal bloom predictions/projections on HABs.
4. Conduct baseline data collection of water, fish, and habitat characteristics to monitor changes associated with major events.

Contingent Strategies

1. Based on threshold review of event significance to RBNERR and/or the region, work in partnership with NOAA's Estuarine Reserves Division, NERRs, other federal/state Marine Protected Areas, Florida Gulf Coast University, Edison State College, Mote Marine Lab, Florida Fish and Wildlife Research Institute, and other institutions to design and conduct applied research to improve understanding of ecosystem response, define and characterize event impacts, and guide possible restoration efforts.
2. Work with neighboring local, state, and federal government agency land managers to coordinate research efforts and protocols ensuring that at least some research questions regarding climate change and sea level rise will be common to all. This should increase the likelihood data gathered will be comparable one to another.

Resource Management Strategies

Core Strategies

1. Provide GIS support for climate change and sea level rise educational and research initiatives.
2. Ensure RBNERR's preparedness for future possible oil spill incidents.
3. Ensure that RBNERR "Vertical Control Plan" goals and outcomes integrate common goals and outcomes of adjacent land management agencies and research institutions and as much as possible. Resource management will integrate commonalities into the Vertical Control Plan as guided by collaborative discussions and agreements facilitated by the RBNERR research team.
4. Update the RBNERR's oil spill response plan.
5. Complete the RBNERR Vertical Control Plan and establish appropriate phases of a local network (CORS, NWLON, and other geodetic controls). Acquire training for staff in the appropriate use of sub-foot survey RTK equipment. Vertical Control goals and outcomes common with our neighboring land management agencies and research institutions will be integrated as much as is possible.

Contingent Strategies

1. Initiate cooperative working agreements with local and regional partners to develop and implement restoration, mitigation, and acquisition plans to respond to habitat migration scenarios predicted with sea level rise and climate change.

2. Assess potential habitat impacts related to human-induced change events (e.g. oil spills) and plan and implement restoration actions as appropriate and as funding allows.
3. Facilitate incorporation of sea level rise projections for local communities into urban land use planning and permit review.

Education and Outreach Strategies

Core Strategies

1. Partner with entities with a vested interest in responding to catastrophic events, such as NOAA and other federal state and regional agencies and entities, to provide them and RBNERR with increased access to information, tools or training and cooperatively address issues (e.g. Deepwater Horizon Briefing Session from the USCG, and Gulf of Mexico Alliance Resilience Index Training).

Contingent Strategies

1. Conduct education, training and outreach programs for targeted audiences, such as elected and appointed officials, natural resource and emergency managers, planners, and other professionals (e.g. Living with Red Tide workshop, State of the Gulf/Reserve) and the general public, that incorporates the best available science, and response, mitigation or adaptation information as appropriate.
2. Create tools that translate scientific data to be included in related management, policy and/or planning
3. Use social science tools to increase understanding of the community's attitudes, beliefs or behaviors to influence management and education.
4. Develop web-based distribution methods of information on global and regional change events.
5. Provide training and gain access to resources to assist RBNERR staff and other local natural resource managers with the knowledge, tools and resources necessary to address global and regional change events.
6. Partner with local natural resource managers to address global and regional change events, including the joint distribution of information.

Issue Six, Objective One - Performance Measures:

1. Track outputs and products associated with partnering efforts.
2. Determine trends in long-term planning for habitat migration resulting from climate change and sea level rise.
3. Number of requests made by RBNERR staff for data and projections of significant change events.
4. Number of sites in RBNERR where baseline data is collected.
5. Track number of times that GIS support is provided for climate change and sea level rise educational and research initiatives.



Reserve staff and volunteers pull a seine net to explore coastal life along Cape Romano.

Part Three

Additional Plans

Chapter Seven

Administrative Plan

Background

Administration of a National Estuarine Research Reserve (NERR) is accomplished through federal, state and local partnerships. At the national level, the National Oceanic and Atmospheric Administration (NOAA) is responsible for the administration of the NERR System. NOAA's Estuarine Research Division works with state agencies in developing a national network of estuarine research reserves. NOAA provides funding to eligible state agencies for the establishment and continued operation of reserves, as well as funding for construction and land acquisition activities; provides program guidance and oversight including review and approval of management plans; and conducts periodic evaluations to validate that operations are consistent with NERR goals and objectives. The Department of Environmental Protection (DEP) is responsible for local administration and management of Florida's research reserves. The Office of Coastal and Aquatic Managed Areas (CAMA), within DEP's Water Policy and Ecosystem Restoration section, administers on-site operations, hires Rookery Bay National Estuarine Research Reserve (RBNERR) staff and reviews program content for each NERR in the state. CAMA also manages the state's 41 aquatic preserves and partners with NOAA in the management of the Florida Keys National Marine Sanctuary. It uses information developed within the NERR program to improve management in its other marine and estuarine program areas of responsibility.

Successful implementation of the RBNERR goals and objectives outlined in this management plan is dependent on an effective administration and facilities strategy. The administrative framework must provide for adequate staffing and facilities, cooperation with other agencies, citizen support and adequate funding.

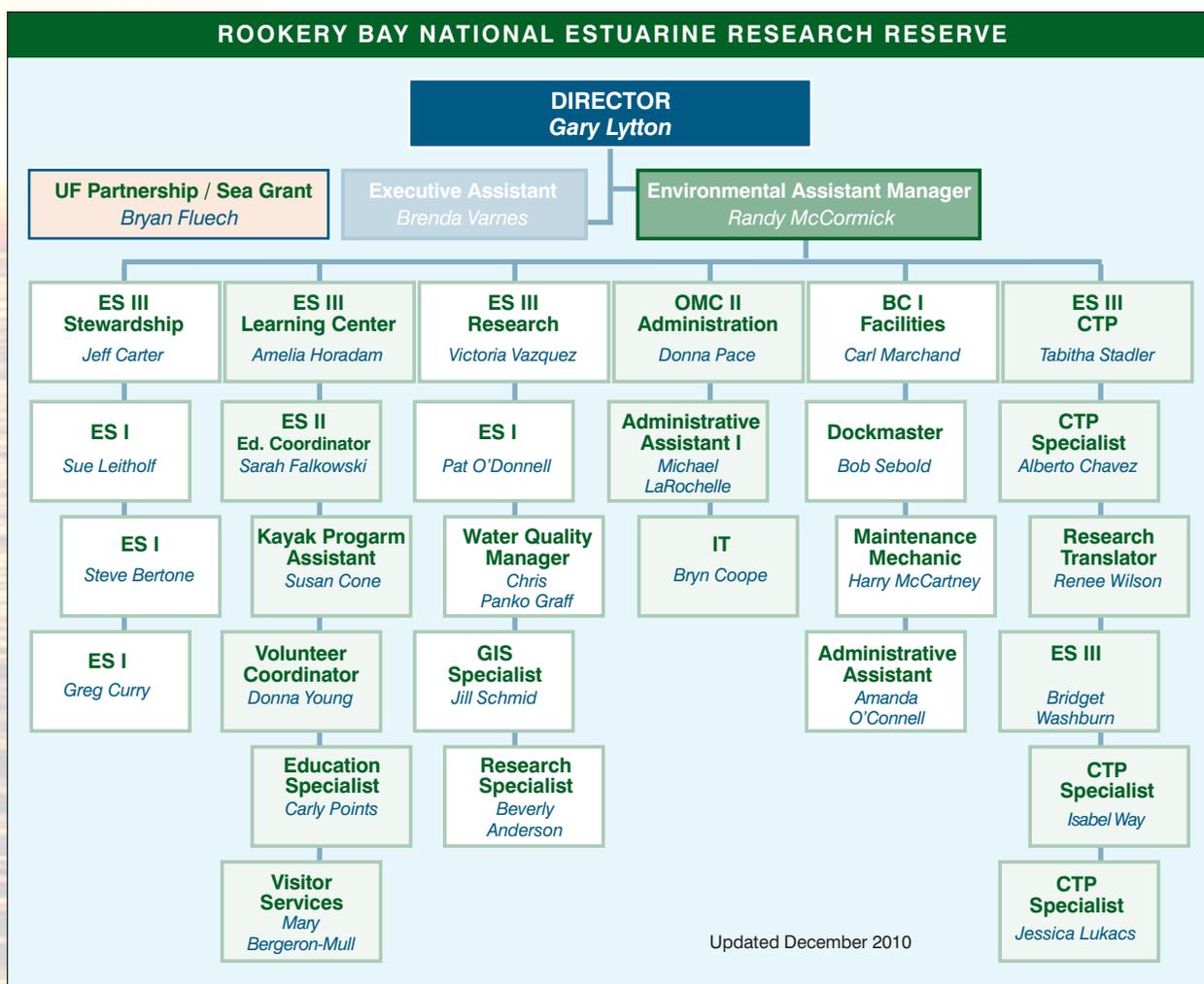
Staffing

As of 2011, DEP has 13 permanent positions at RBNERR funded by the State and NOAA, and an additional 18 contractual and/or Other Personal Services (OPS) positions funded through state, local, and federal grants. They include the following: field research biologists, maintenance mechanics, receptionist, information specialist, research translator, research specialist, landscape ecologist and park service specialist. The staff at RBNERR is essential to RBNERR's long-term progress in achieving management plan objectives. DEP will pursue continued state and federal funding for staff support as needed during the 2012 - 2017 period. See Figure 19 for the staffing organization chart for RBNERR.

As part of NERR program, RBNERR receives substantial federal funding through an annual operations grant from the NOAA. This annually recurring grant is based on an agreement that the RBNERR participate in a variety of national programs associated with estuarine research, education, and stewardship. This grant requires participation in a system-wide water quality monitoring program, administration of a coast training program for environmental professionals and coastal decision-makers, and participation in annual meetings to share knowledge and to facilitate effective administration of this state/federal partnership. In addition to the mission-critical annual meeting, this grant also requires participation by various program managers at sector level meetings that are necessary for successful implementation of science-based adaptive management. Annual meetings also provide managers with guidance from NOAA on annual federal budget allocations, federal grant preparation and various reporting requirements.

The following describes RBNERR permanent staff positions and related primary responsibilities:

- **RBNERR Director / Environmental Administrator** (State-funded): Directs and supervises research, administration, education, resource management and maintenance programs in the implementation of management objectives; acts as liaison for state, federal and local agencies in cooperative resource protection/management. Serves as CAMA Region Administrator for South Florida, including staffed field offices in Estero, Charlotte Harbor, Tampa Bay and Biscayne Bay.



- **Assistant Manager / Environmental Manager** (State-funded): Supervises program managers, oversees operational issues including facilities and construction projects, acts as budget manager in developing annual work plans and budget requests.

Research

- **Research Coordinator / Environmental Specialist III** (State-funded): Coordinates RBNERR research and monitoring program and supervises research staff in on-site projects; works with visiting investigators; and acts as liaison for Florida Gulf Coast University (FGCU) and Edison State College (ESC).
- **Fisheries Biologist / Environmental Specialist I** (State-funded): Conducts field surveying, sampling and laboratory analysis for fish and other biological monitoring.

Education

- **Education Manager / ELC Manager** (State-funded): Supervises all education personnel and manages daily operations of the Environmental Learning Center (ELC) and acts as liaison for Friends of Rookery Bay citizen support organization.
- **Education Coordinator / Environmental Specialist II** (State-funded): Coordinates RBNERR education program and coordinates with education staff and volunteers in implementing on-site and outreach programs.

Coastal Training Program

- **Coastal Training Coordinator / Environmental Specialist III** (State funded): Supervises the coastal training program team, coordinates training around the state, partners with a range of government, professional and business organizations, conducts audience needs assessments, manages budgets and facilitates stakeholder input events.

Resource Management

- **Resource Management Coordinator / Environmental Specialist III** (State-funded): Supervises resource management team, coordinates biomonitoring, restoration, watershed management and land acquisition.
- **Watershed Biologist / Environmental Specialist I** (State-funded): Involved in regulatory permit review, hydrologic restoration planning land acquisition and resource management.
- **Research Assistant** (State-funded): Coordinates water surveys, conducts field research. Assists in exotic control programs and prescribed burns.

Administration

- **Operations Management Consultant II** (State-funded): Provides supervision of administrative staff, oversees budget, grant, contract management and network administration.
- **Administrative Assistant I** (State-funded): Provides administrative support for RBNERR staff including purchasing, property and support.

Maintenance

- **Facilities Supervisor / Business Consultant I** (State-funded): Supervises maintenance staff, supports RBNERR in maintaining facilities, vehicles, vessels and property.

The following describes additional permanent full-time employee staff positions required to successfully achieve RBNERR's management goals and objectives. DEP will pursue local, state and federal funds to implement these positions:

Current Contract Positions and Anticipated Needs:

Administration

- **Operations & Management Consultant:** Provides administrative support to the Environmental Administrator and Manager; manages personnel department for region.
- **Administrative Assistant II:** Responsible for purchasing and administrative support, and coordinating with CAMA and regional offices to implement needed training.

Coastal Training

- **Coastal Training Specialist III / Research Translator:** Conducts Coastal Training programs, manages communications, press and media contacts, serves as website liaison and environmental interpreter.

- **Coastal Training Specialist II / GI-BMP Regional Coordinator:** Organizes and conducts professional training programs for landscape and lawn care professionals in the Green Industries including coordination of regional train-the-trainers programs in English and Spanish, and non-point source education programs and partnerships.
- **Coastal Training Specialist III / Statewide GI-BMP Coordinator:** Conducts professional training programs for landscape and lawn care professionals in the Green Industries including coordination of statewide train-the-trainers programs in English and Spanish, non-point source education programs and partnerships and serves as liaison between CAMA and other GI-BMP partners.
- **Coastal Training Specialist II / Project Greenscape Coordinator:** Organizes and conducts professional training programs for landscape and lawn care professionals in the Green Industries including in English and Spanish and facilitates cooperative initiatives in the region to promote sustainable landscaping and educate diverse audiences.
- **Coastal Training Specialist I:** Assists the CTP Coordinator in all aspects of job to conduct professional training programs and deliver programs, projects and services to professionals who make decisions about coastal resources.

Maintenance

- **Facilities Supervisor SES:** Supervises maintenance staff, supports Reserve in maintaining facilities, vehicles, vessels and property.
- **Maintenance Mechanic:** This position is needed to help maintain the existing fleet of vessels used in support of ongoing research and education activities within the Reserve.
- **Maintenance Mechanic:** This position is needed for maintenance within the Reserve, landscaping, repairs, etc.

Research

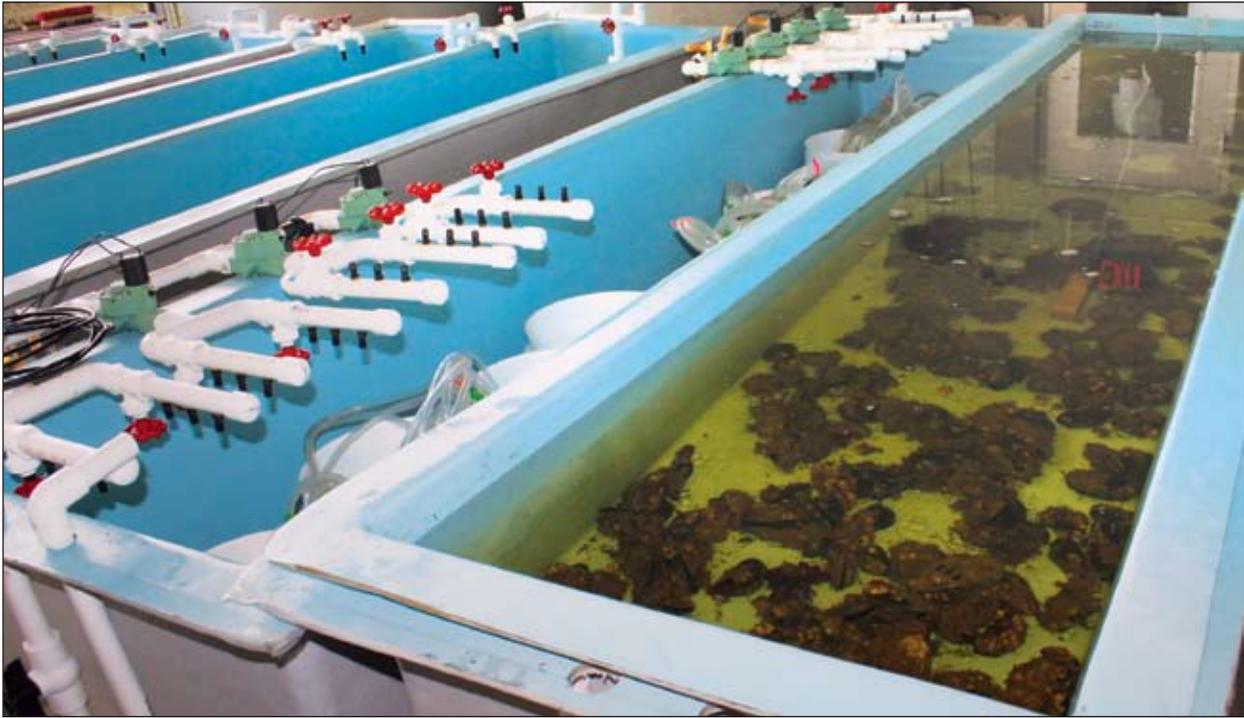
- **Environmental Specialist II / Water Quality Specialist:** Water quality monitoring is a primary and essential component of the Reserve's estuarine habitat monitoring program. Numerous visiting investigators have come to rely on this dataset for ancillary data in support of their research program. Several key initiatives identified in the management plan and required by the National program depend upon this position.
- **Environmental Specialist II / GIS Specialist:** Geographic information systems are essential tools for effective resource management. Several priority projects identified in the management plan depend upon this position, currently a temporary OPS position. This specialist will improve the Reserve's ability to serve as a regional hub for the Department's Office of Coastal and Aquatic Managed Areas GIS needs, through training and technical support.
- **Environmental Specialist II / Laboratory Manager:** This position is needed to adequately manage current and proposed laboratory facilities at the Reserve. This position is also essential to safely and efficiently support an expanding visiting investigator program. The Lab Manager would also oversee technical support for equipment (including computers).

Education

- **Environmental Specialist II / Community Outreach / Public Access Coordinator:** Manages volunteer program and serves as liaison for FORB. Serves as Reserve's coordinator for public access including the design and implementation of trails and signage.
- **Administrative Secretary / Receptionist:** An essential position for coordinating staff requests, directing calls, greeting visitors, responding to public inquiries and making reservations for training workshops and education programs.
- **Education Specialist / Environmental Specialist II (State-funded):** Conducts on-site field trips and outreach programs in support of RBNERR education objectives.

Resource Management

- **Park Service Specialist / Island Manager / Park Service Specialist:** Will reside in the Cannon Island field station and provide facility upkeep and maintenance, exotic control, island management, public access and information.
- **Environmental Specialist I / Wildlife Biologist:** This position is needed to promote a multi-species conservation strategy for management of natural resources. An assessment of the Reserve's resident wildlife species is needed to develop baseline data for comparison with implemented



A variety of research projects are underway in the Environmental Learning Center's wet lab.

management strategies to determine effects on listed, resident and nuisance wildlife. This position will also oversee nuisance animal control activities associated with conserving and maintaining the natural resources at the Reserve.

- **Two Park Rangers:** The installation of boundary signs, fencing of specific locations and posting of management regulations around and within the state-owned lands managed by RBNERR are an ongoing effort. These positions are key to staff, public and contractor use of sites within RBNERR by regularly checking that signage is in place, and fences are intact and maintained. With an increase in public access points within RBNERR. Rangers will also conduct regular patrols to those sites to be sure the access areas are maintained in a safe manner for the visiting public. Rangers will also participate in other resource management related activities, including invasive plant control, nuisance animal control and team related activities.

In addition to the positions described above, RBNERR will pursue funding for contractual services and OPS temporary staff. OPS funds are often used to implement contract and specific short-term work projects (e.g. exotic plant control, wetlands restoration, prescribed burn projects, trail development and construction, seasonal educator).

Facilities Plan and Construction

The Facilities Team at RBNERR provides facilities and infrastructure for staff, visiting scientists and the public to effectively implement its Ecosystem Science, Resource Management, and Education and Outreach strategies. RBNERR would like to be recognized as a regional center of excellence for innovative expertise in coastal natural resource management and conservation, research, monitoring and education and advocacy of coastal stewardship through ecologically sensitive planning and construction of new or remodeled facilities.

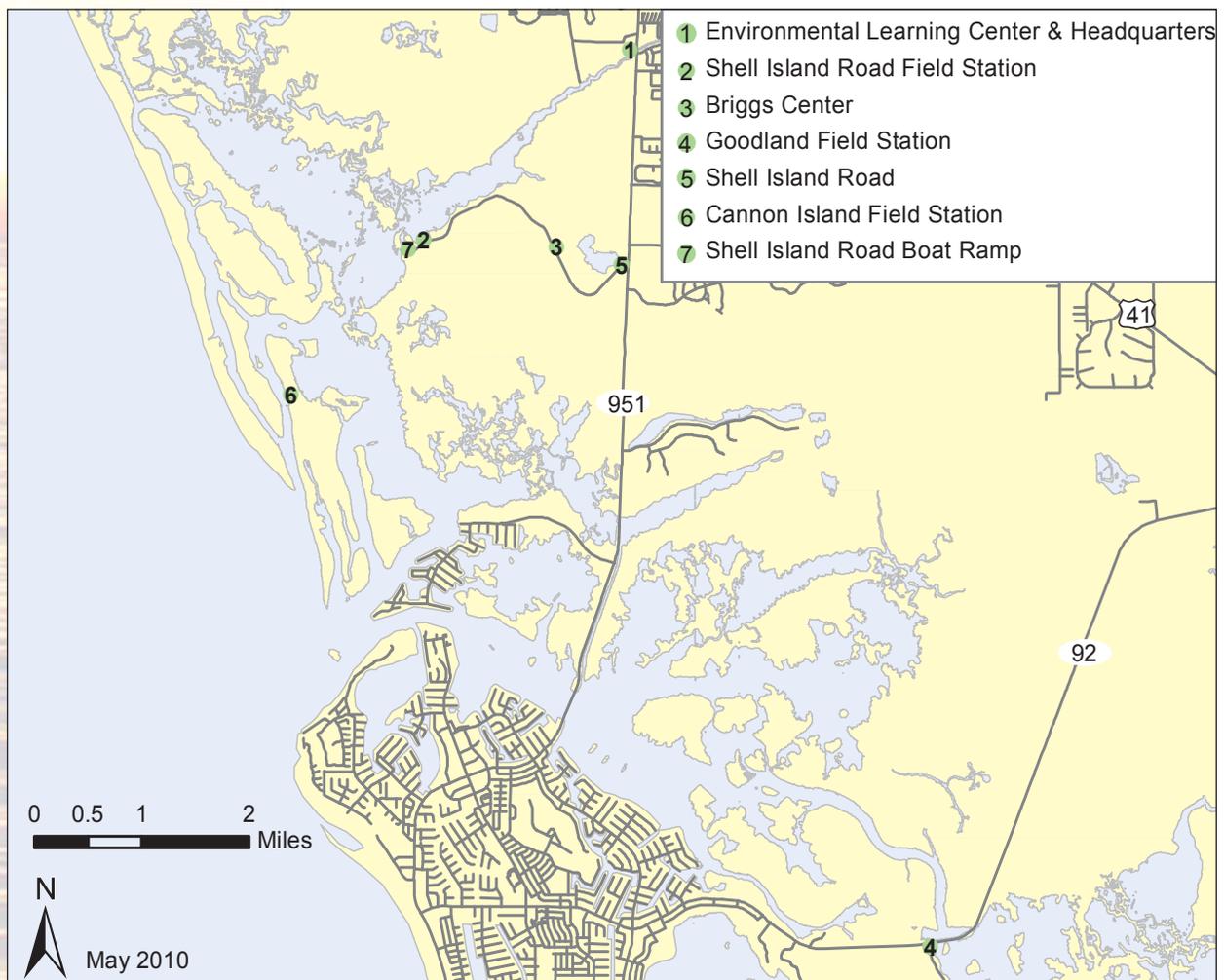
The following describes existing and planned facilities, and proposed construction projects for the RBNERR through FY 2015. (Refer to figures 20 and 21 for location of sites.)

Existing Facilities

RBNERR, with funding support from NOAA, completed a Master Facilities Plan (MFP) in 1996 (See Appendix B.11). The MFP included input from key community partners, and identified the need to direct new facilities away from the existing field/lab station on Shell Island Road due to concerns over resource protection and anticipated significant increases in public use and access. Following an extensive site review process involving the cooperation of federal and state regulatory officials, a new site was located

on Tower Road and S.R. 951 that would minimize environmental impacts, by utilizing an already disturbed/ altered site, and providing for connections to sewer and water utilities (eliminating the need for a septic tank and drainfield) and a well with reverse osmosis (which are currently supporting the Shell Island Road facility). The Tower Road site provides for an optimal balance of resource protection and public use.

1. **Environmental Learning Center and Headquarters:** A new headquarters building was completed in 1996 at the Tower Road site including offices for the RBNERR Director, administrative staff, research, education and resource management staff. In 2004, the new ELC was completed, adding a two-story visitor center, four research labs, two classrooms, and an auditorium. The MFP identified the headquarters as Phase I of the Facility Plan, the ELC as Phase II, and pedestrian bridge and boardwalk as Phase III. All Phases of the MFP have been completed.
2. **RBNERR Field Station:** The field station, including classroom and marine laboratory, is located approximately 2.5 miles off S.R. 951 on Shell Island Road. This 1,500 square foot building was completed in 1982 and currently provides for office space, and a small laboratory for RBNERR staff and visiting investigators. A screened-in wet lab was constructed in the lower level to provide storage and a staging area for field trips. A modular building was also added at this site in 1990 through NOAA funds, to provide additional office space and a small indoor classroom. A screened-in classroom is available on the lower level to provide a staging area for field trips. A fenced-in maintenance and vehicle/vessel storage compound and a dock providing 12 wet slips for RBNERR vessels are located adjacent to field station. Following completion of the ELC in 2004, a portion of the field station was converted for overnight use by visiting investigators, and continued maintenance support.
3. **Briggs Center:** Completed in 1982 and located on state lands on Shell Island Road, the Center is owned and operated by the Conservancy of Southwest Florida (CSF) and has been subleased to



the Florida Fish and Wildlife Conservation Commission (FWC) to serve as a field office for 21 marine law enforcement officers.

4. **Dormitory Field Station:** A small dormitory field station for visiting investigators is located in Goodland (approximately 10 miles from the RBNERR headquarters). This site provides a more accessible facility to the Cape Romano - Ten Thousand Islands Aquatic Preserve for conducting field research and education programs from an on-site location, and includes a boat dock, storage facility and overnight accommodations for four to six people. An extended dock was added in 2010 to provide for a safe platform for boating operations.
5. **Shell Island Road:** This three-mile long paved road represents the primary vehicle entry into RBNERR, and accesses FWC's field office, RBNERR field station and dock, and a small boat launch area. Installation of thirteen culverts and hydrologic restoration improvements were completed in 2009 through a partnership with Collier County and the United States Fish and Wildlife Service (USFWS) to enhance tidal flushing and sheetflow.
6. **Cannon Island Field Station:** This field station is located on a barrier island and was acquired in 1988 by the state through Conservation and Recreation Lands funds. The existing three-bedroom house was renovated by RBNERR with federal grant funds to establish a biological field station for use by RBNERR staff, visiting investigators and educational groups. Plans for necessary upgrades of the facility include the addition of solar power, cistern and composting toilets. An existing foot trail is planned to be upgraded into an interpretive trail, traversing a coastal hardwood hammock.
7. **Shell Island Road Boat Ramp and Dearholt Facility:** Located at the end of Shell Island Road, the small boat launch area is owned by CSF and provides recreational boat access to RBNERR. Also on this site is CSF's Dearholt facility, a small building with service dock. See "Planned Facilities" in Chapter Seven for more on this site.

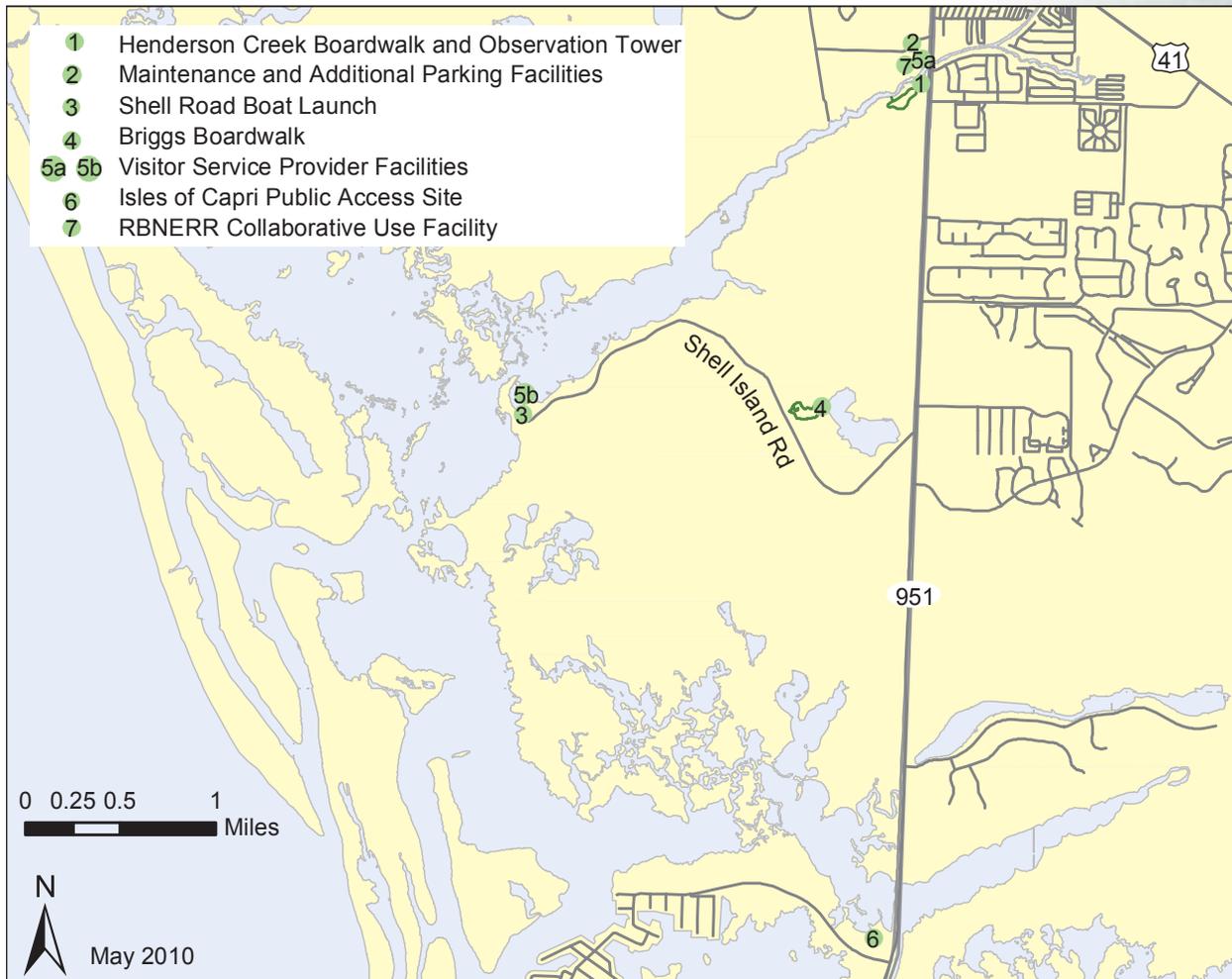


Figure 21 / Rookery Bay National Estuarine Research Reserve planned facilities

Planned Facilities:

The planned facilities listed below include some projects that are already underway as well as several that are merely in the conceptual phase. This section is intended to capture not only structural components, but also management issues that may directly impact particular facilities. It is also intended to guide RBNERR's facilities development and management into the foreseeable future. For this reason each item has a designation of low, medium or high priority attached along with projected costs. It is important to note, however, that availability of funds, collaborative partnerships, or unexpected windows of opportunity may appear that may propel a given project higher or lower in the priority ranking. This should be viewed as an application of adaptive management where flexibility has many virtues.

The following planned facilities and improvements are illustrated in Figure 21 - Planned Facilities.

- 1. Henderson Creek Interpretive Boardwalk and Observation Tower:** Located across Henderson Creek from the Rookery Bay ELC, the trails and observation tower are the second phase of the pedestrian bridge project that was completed in 2009. The interpretive trail provides important opportunities for visitors to observe key representative examples of important habitats within RBNERR, including mangrove wetlands, pine forests, coastal scrub, and other communities. Everything on this project is complete except the observation tower. While this component was included in the local environmental permitting process, there appears little likelihood that the tower will be constructed until the state and federal funding climate improves. The current estimated cost of this tower project is around \$400,000 and it is currently ranked as a LOW priority.
- 2. RBNERR Collaborative Use Facility:** RBNERR envisions a need for increased office, meeting, laboratory, dormitory and multi-use space as the population of this county grows and the education, research and stewardship responsibilities of RBNERR increase. To this end a collaborative use facility is projected that may involve a partnership with other organizations or agencies, such as the U.S. Fish and Wildlife Service, which would provide significant benefits to all involved. It should be interpreted that this management plan supports the development and expansion of our facilities plan to include a project of this type on the 20+/- acres of land immediately to the west of our existing Learning Center and Administration Building. This is a previously disturbed site located on Tower Road with water, power and sewer lines immediately accessible. If the opportunity presents itself RBNERR will engage in the development of a master plan that would move this project toward construction and eventual completion. The initial master planning, engineering and permitting of this project would cost an estimated \$600,000 and it is currently ranked as a LOW priority.
- 3. Maintenance, Storage and Additional Parking Facilities:** Located on RBNERR lands adjacent to the ELC on Tower Road, this site will include two storage buildings that serve stewardship programs and facility maintenance needs. One has been in use for many years and a new storage facility, called the Martin Building, is currently under construction and is being paid for with state funding. Also, adjacent to these buildings on Tower Road is a parcel of vacant land previously used for agricultural use and now covered primarily with exotic species. This site will be converted to additional visitor and staff parking, particularly for special events that draw a large number of visitors. With some additional site work and installation of underground utilities, this site is also intended to serve as a suitable location for a small number of recreational vehicle campsites to be occupied by seasonal employees and/or volunteers. Site work for the parking area has an estimated cost of approximately \$100,000 and is ranked as a MEDIUM priority. Expansion of this to include two recreational vehicle campsites would cost an estimated \$90,000 additional and is ranked a LOW priority.
- 4. Briggs Center and Boardwalk:** This existing building and boardwalk located on RBNERR property on Shell Island Road is currently owned by the CSF. The building is presently leased to the Florida Fish and Wildlife Conservation Commission. The CSF has expressed interest in the possible ownership transfer of these facilities to the State of Florida at some future time. When and if a transfer of this type, or other mutually acceptable management agreement were to occur, a physical inspection of the building and boardwalk would be required to determine if they are in a safe, serviceable condition. If it is determined that the building and/or boardwalk would be an appropriate and worthwhile addition to RBNERR's list of public access facilities, then the addition would be pursued and the activity would be considered as incorporated into this management plan. While new construction costs associated with these facilities are not anticipated, there would be ongoing maintenance costs which would be recovered by the lessee, public user fees, or a combination of both. This project is ranked as a MEDIUM priority.

5. **Shell Island Road Boat Ramp:** RBNERR is working toward a lease or other type of agreement with the CSF that will allow RBNERR to manage and maintain the parcel of land at the end of Shell Island Road that is currently owned by CSF. This location is primarily used for launching powerboats, canoes and kayaks. This site also includes CSF's Dearholt facility, a small building with service dock. A lease or other suitable agreement would enable RBNERR to manage this already heavily used site as a rich recreational and cultural history experience for visitors. This may include renovation or modification of parking areas and other facilities that might be associated with low impact recreation and natural and cultural history interpretation. It is anticipated that there will also be the provision for some type of restroom facilities. If a suitable lease or agreement can be negotiated, RBNERR will require some type of user fee collection mechanism to generate funds sufficient to support the maintenance and general upkeep of this site. While this is primarily a facility management issue, the out-of-pocket cost to provide the renovations described here are estimated to be \$40,000 or less, depending on the terms of the agreement. These costs should be recovered within three years by appropriate user fees. This project is ranked as a HIGH priority.
6. **Miscellaneous Visitor Service Provider Facilities:** It is anticipated that at some point in time it will be advisable and desirable for RBNERR to enter into various types of visitor service agreements with one or more service providers or concessionaires. These agreements will be for the purpose of providing greater public access to recreational and interpretive experiences to the public beyond those currently available from existing RBNERR staff and/or resources. This may include arrangements with the Friends of Rookery Bay which could play an important role in assisting with the provision of these services. At such time that these agreements are established, it may require construction of new, or alteration of existing facilities such as docks, storage facilities, rest rooms, parking areas, etc. Any additional visitor use infrastructure would be located adjacent to existing facilities and in areas where impacts to natural resources would be minimal and localized, and carrying capacity of the natural resources in the vicinity would be taken into consideration. The specific details of these infrastructure modifications, along with the cost, cannot be identified at this time as they would be dependent on the interests and abilities of the service provider. It is expected that costs to RBNERR would be either none or minimal. However, arrangements of this type are considered highly desirable and will contribute directly toward meeting RBNERR goals and objectives. For this reason, this management plan specifically identifies them as appropriate and approved for further development with a ranking of HIGH priority.
7. **Isle of Capri Park:** This public access site, previously call the Tarpon Bay Project, is located at the corner of S.R. 951 and Isle of Capri Boulevard. This area is the location of a previously completed hydrologic and mangrove restoration project and it is also planned for public recreation and educational use with a canoe/kayak launch on MacIlvane Bay. The facility will include a parking area, covered pavilions, restrooms, interpretive kiosks, a canoe/kayak launch ramp and other amenities typically associated with recreation sites of this type. Bids for construction were issued and work is expected be underway soon with final completion by the end of 2011. After completion of this project, funded entirely by a \$1,000,000 grant from the Florida Division of State Lands, RBNERR plans to enter into a sublease agreement with Collier County to manage the park as a component of the county's public parks portfolio. Ongoing management criteria for this park will be delineated in a cooperatively developed lease or a management agreement that will specify the tasks, responsibilities and obligations of each party. This may include a revenue sharing arrangement and will result in a significant public access facility that offers visitors the opportunity to explore and enjoy an area of the reserve where this use is appropriate and considered desirable. This project is already underway and is ranked as a HIGH priority.

RBNERR staff will ensure that all planned construction of new facilities, and renovation or enhancement of existing structures, will occur with minimal disturbance to natural resources. Sites for all new facilities have been selected in cooperation with regulatory officials from DEP, South Florida Water Management District, and Army Corps of Engineers to minimize or avoid impact to native vegetation, surface waters, and to wetlands. New and renovated structures will incorporate environmental technology as demonstration projects where feasible, using solar cells, cisterns for collecting rainwater and composting toilets. Reverse osmosis systems are currently in use at both RBNERR Shell Island Road field station and the Briggs Center.



Mangrove trees continuously drop their leaves into estuarine waters near Hall Bay.

Chapter Eight

Rookery Bay National Estuarine Research Reserve Land Consolidation and Acquisition Plan

8.1 / Scope & Purpose

“Core” and “Buffer” Areas: National Estuarine Research Reserve (NERR) System Regulations

NERR System regulations, 15 Code of Federal Regulations (C.F.R.) Sec. 921.13, outlines requirements for “identifying the ecologically key land and water areas of the Reserve, ranking these areas according to their relative importance, and including a strategy for establishing adequate long-term state control over those areas sufficient to provide protection for Reserve resources to ensure a stable environment for research...”

The ecological characteristics of a NERR, including its “biological productivity, diversity of flora and fauna, and capacity to attract a broad range of research and educational interests,” must necessarily be defined to establish requirements for managing in the most effective way possible the entire NERR, but particularly its most sensitive, or “core” areas. Assurance that the boundaries of RBNERR “encompass an adequate portion of the key land and water areas of the natural system [is defined] to approximate an ecological unit and to ensure effective conservation...Reserve boundaries must encompass the area within which adequate control has or will be established by the managing entity over human activities occurring within the Reserve ...Key land and water areas and a buffer zone will likely require significantly different levels of control.” (15 C.F.R. 921.11). Key land and water areas are identified as “that core area within the Reserve that is so vital to the functioning of the estuarine ecosystem that it must be under a level of control sufficient to ensure the long-term viability of the Reserve for research on natural processes” (15 C.F.R. 921.11). Key land and water areas are those ecological units that “preserve, for research purposes, a full range of significant physical, chemical and biological factors contributing to the diversity of fauna, flora and natural processes occurring within the estuary” (15 C.F.R. 921.11). The establishment of which specific areas are to be identified as “core” within the Reserve is determined by scientific knowledge of that area and the degree of scientific research occurring within that area.

Buffer areas of the Reserve are identified as those areas that are “adjacent to or surrounding key land and water areas and essential to their integrity. Buffer zones protect the core area and provide additional protection for estuarine-dependent species...” (15 C.F.R. 921.11).

Rookery Bay National Estuarine Research Reserve (RBNERR) Core and Buffer Areas: Designation & Rationale

Core Area of the Rookery Bay National Estuarine Research Reserve

The core areas of RBNERR are the estuarine waters and associated mangrove forests, marshes, and uplands within the designated boundary of the Reserve associated with the barrier islands, estuaries and bays, as well as, their associated tributaries (Figure 1). These core components ensure adequate, and direct, applications of state and federal control and management, providing sufficient protection to ensure the integrity of a stable platform for the continuation of ongoing scientific investigation.

Buffer Area of the Rookery Bay National Estuarine Research Reserve

Buffer zones protect the core area and provide additional protection for estuarine-dependent species, including those that are rare or endangered. When determined appropriate by the state and approved by the National Oceanic and Atmospheric Administration (NOAA), buffer zones may also include areas necessary for facilities required for research and interpretation. Additionally, buffer zones are established sufficient to accommodate for a reasonably expected occurring shift of the core area resulting from biological, ecological or geo-morphological change (i.e. climate change and related sea-level rise).

The historic natural watershed that serves as RBNERR’s buffer area and supports RBNERR’s core area is defined by both biotic and abiotic aspects including dynamics of natural areas, as well as, areas altered by human urbanization activities such as housing developments, roadways, canals, weirs, dikes, and dams. Located within RBNERR’s watershed are multiple basins that comprise the areas providing water crucial to the RBNERR. These basins include Belle Meade, Picayune Strand, Naples Bay, Henderson Creek, Fakahatchee Strand and Lely. All the previously mentioned basins feed into the Ten Thousand Islands basin which covers the entire RBNERR (Figure 11). In the Belle Meade, Picayune Strand and Fakahatchee Strand basins are found the more pristine inland mosaic complexes of uplands, wetlands, sloughs, and waterways comprising the ecological systems that preserve most of the remaining natural hydrological pathways for the collection, storage, filtration, and conveyance of water and sheet-flow into



RBNERR. These inland buffer areas surrounding the core area of RBNERR represent over 20,788 acres of buffer and provide outstanding protection to estuarine water quality. In addition to the inland buffer areas there is the Ten Thousand Islands National Wildlife Refuge totaling 35,000 acres of predominately mangrove forest with its more inland estuarine fringe consisting of brackish marsh interspersed with ponds, and small coastal hammocks of oak, cabbage palms, and tropical hardwoods.

Plan Leads:

Gary Lytton, Environmental Administrator, RBNERR.

Jeffrey A. Carter, Natural Resources Stewardship Coordinator, RBNERR.

Jill Schmid, GIS Specialist, RBNERR.

Role of the Rookery Bay National Estuarine Research Reserve: Stewardship, education, and research involving coastal ecosystems.

Geographic Scope: The RBNERR boundary currently encompasses 110,000 acres of submerged lands and leased uplands in southwest coastal Collier County, Florida (Figure 1). After the addition of planned consolidations (17,721 acres) and the acquisition of high-priority lands (2,472 acres) RBNERR will be approximately 129,775 acres. Formal approval of RBNERR's boundary expansion through consolidations will be finalized with the next management plan.

Purpose: Land consolidation and acquisition activities within RBNERR includes acquisition goals focused on assuring for the establishment of adequate long-term state control over areas sufficient to provide protection for RBNERR resources. This protection in turn will ensure a stable environment for research activities within RBNERR.

8.2 / Fee-Simple Acquisition

Fee-simple land acquisition activities, as directed by the six areas of focus listed below, will provide an additional 2,472 acres of watershed protection to the submerged lands of RBNERR, as well as, enhancing the protection of RBNERR's upland natural and cultural resources. The areas of land acquisition focus listed below must be adaptable to changing times. Land costs, land availability, funding availability and associated requirements are constantly in flux requiring this land acquisition plan to be flexible. Also, state and federal budget, legislative and policy changes can warrant a need for adaptation. Therefore, the areas of focus listed below are open to adjustment as needed and as warranted by changes in any of the above mentioned factors. Flexibility in adapting to changes within the land market and government agencies requires that adaptive management techniques be utilized. Additions to the acquisition list may be considered at any time as long as the parcel(s) under consideration meets one or more of the areas of focus listed below. All parcels proposed for acquisition will be subject to NERR System regulations. Acquisition of lands to RBNERR boundaries encompasses areas representing both core, and buffer zones for key land and water areas.

There are six areas of focus providing aid in directing land acquisition activities and include:

1. Protection, preservation, and restoration of watershed systems to insure adequate availability, amount, quality, and timing of water-flows within RBNERR's historic watershed.
 - a. Identification and prioritization of parcels crucial for the preservation and/or restoration of flow-ways and sheet-flow necessary for required water conveyance.
2. Protection, preservation, and restoration of natural habitats and species.
3. Fostering of compatibility between built and natural systems.
 - a. Providing compatibility with existing shoreline protection structures such as: jetties, T-groins, hardened shorelines.
 - b. Establishment of urban interface buffer-zones providing for timely and safe land management activities that give protection for natural resources and the human communities that they border.
 - c. Identification and prioritization of parcels crucial for the preservation and/or restoration of wild-life corridors.
4. Sea level rise planning for land acquisition in response to shifting shorelines and increased coastal storms and erosion.
 - a. Increase community resiliency through the protection of public health and safety from problems associated with coastal hazards affecting community resources (natural and man-made) including shifting shorelines, and damage from storms and storm surge.
 - b. Reduce the public financial burden caused by the destruction of or damage to coastal property.

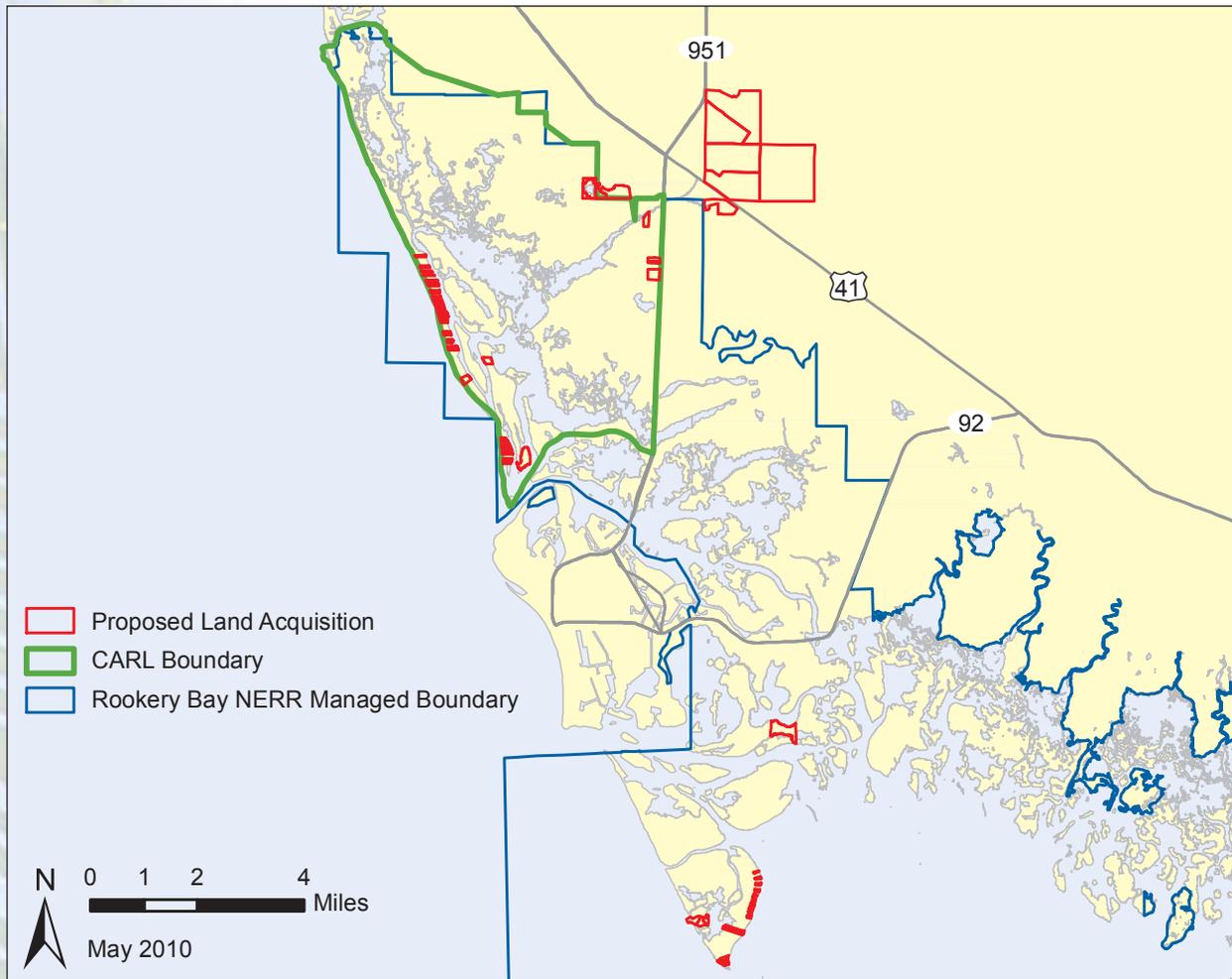


Figure 22 | Proposed land acquisition parcels

- c. Plan for shifting shorelines and inland migration of buffering estuaries, wetlands, and shifting sand formations and the species that utilize these habitats.
- 5. Funding availability plays a large role in the prioritization of land acquisition. The prioritization of funding opportunities may be influenced by multiple factors including affordability, as well as, special requirements associated with specific funding sources.
 - a. Targeted parcels available at low prices and/or those under foreclosure or for donation to the state warrant a degree of higher priority for acquisition.
 - b. Some funding is not available for properties with structures on them (example NOAA's Coastal and Estuarine Land Conservation Program).
 - c. Price thresholds for purchases require the property cost to fall within a certain price range. The engagement of entities such as Trust for Public Lands (TPL) requires that they can only help facilitate land purchases that equal at least two million dollars. As a result, entities that own multiple parcels allows for purchases that can meet the requirement for engaging TPL's assistance in acquisitions. Thus multiple parcels owned by the same entity are given certain priority status for purchase.
- 6. The presence of culturally important sites on land parcels affords that parcel a higher degree of priority for purchase especially if the site is threatened by development or erosion.

8.3 / Less-than-Fee Land Acquisition

Less-than-fee acquisition of lands is the purchase of *limited* property rights. In other words, the state acquires the right to conserve and protect resources on the property at a lesser cost to taxpayers, while keeping the land in private ownership and on the tax rolls. This means protection of more land using fewer funds.

8.3.1 / Consolidation of existing public land

The proposed consolidation of adjacent lands within the RBNERR boundary includes lands managed by local, state, and federal government agencies that represent key lands identified as buffer lands to the core area of RBNERR. This land consolidation effort will serve to streamline the coordination of these agencies within a very large complex of conservation managed lands strengthening the partnerships of all cooperating parties. Lands will be consolidated into the RBNERR boundary either through acquisition (lands purchased by the State of Florida and then leased to RBNERR) and/or through a Memorandum of Understanding (MOU) management agreement. Direct management of all lands consolidated into the RBNERR boundary, through an MOU only and not through acquisition, will remain with the existing designated managing entities that own and/or lease those lands. Any lands consolidated through acquisition will be managed directly by RBNERR under the authority of the RBNERR Management Plan. If proposals for a portion(s) of the RBNERR boundary to be consolidated within the boundary of another neighboring managed area, such as the Ten Thousand Islands National Wildlife Refuge, is applicable then this process may be explored. Other state and federally managed lands bordering RBNERR but not presently authorized by their agencies for consolidation consideration will continue to be considered for future plans of possible consolidation within the RBNERR boundary.

Lands presently proposed for consolidation within RBNERR either through acquisition and/or MOU are:

- Ten Thousand Islands National Wildlife Refuge / United States Fish and Wildlife Service / 16,387 acres. (Consolidation through MOU management agreement)
- Conservancy of Southwest Florida / 126 acres. (Consolidation through MOU management agreement)
- Sabal Bay Mitigation / Collier Enterprise / 634 acres. (Consolidation through acquisition)
- City of Naples / 46 acres. (Consolidation through MOU management agreement)
- Collier County / 20 acres. (Consolidation through MOU management agreement)
- Conservation Collier / 373 acres. (Consolidation through MOU management agreement)
- Fiddler's Creek / 135 acres. (Consolidation through MOU management agreement)

Total Acreage = 17,721 acres

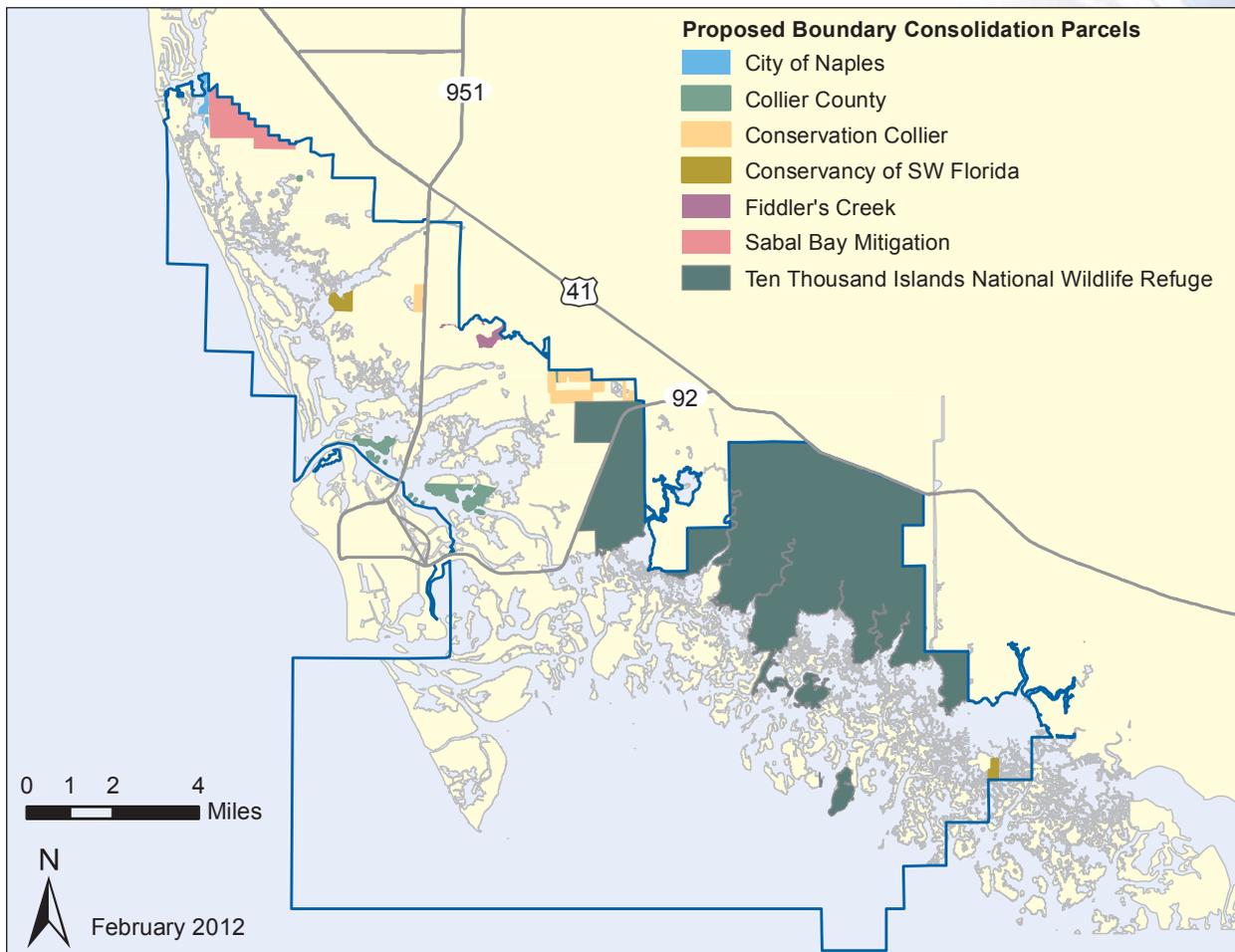


Figure 23 / Proposed boundary consolidation

8.3.2 / Conservation Easements (as defined in Florida Statute, Title XL, Chapter 704.06 Conservation easements; creation; acquisition; enforcement)

Conservation easements may be acquired through agreements with property owners to protect habitats and related species, as well as, cultural and historical sites. A conservation easement is a voluntary, legally binding agreement between a landowner and a government agency or non-government conservation organization that keeps land in natural habitat, agricultural and/or open space uses. The agreement is customized to meet the landowner's and conservation entity's objectives and, in most cases, is perpetual. In essence, the landowner sells or donates certain rights to use the land, which typically include the right to develop all or part of his/her land for non-agricultural or non-natural habitat, or non-open space uses. Current uses, including residential and recreational uses, agriculture, forestry, and ranching can continue under certain, legally-binding stipulations. The easement will protect qualities of the property such as wildlife habitat, open space, forest management or aesthetics. Public access to the property is not a requirement to participate in a conservation easement, but the easement grantee will reserve the right to enter the property to monitor compliance with the agreement. Generally, conservation easements are donations rewarded by certain tax benefits to the landowner. In Florida, perpetual conservation easements (meaning easements that shall run with the land and be binding on all subsequent owners of the servient estate) may be either donated or sold at less-than-fee. If the easement is purchased, the payment is negotiated between the landowner and conservation entity and may be as much as an amount equal to the difference between the fair market value of the land without the easement and fair market value of the land with the easement. These agreements can be focused or multi-use in nature.

An erosion control easement, is a legal agreement between a landowner and a land trust or government agency that restricts development in erosion-prone areas. Erosion control easements can be placed on the entire property or just along the property's shoreline and can also be used to prevent shoreline hardening or specify which types of shoreline stabilization can be used. Finally, erosion control easements can prohibit the removal or cutting of natural vegetation within the shoreline buffer and/or restrict any other land use or activity that may either contribute to erosion or impair natural shoreline processes.

A type of easement not yet being utilized in Florida but one that RBNERR hopes to utilize in the near future is known as a rolling easement and can be tied to changing conditions such as climate change and sea-level rise. Rolling easements protect those shifting complexes of ecosystems that form borders of habitat transition between uplands and submerged areas that usually occur along shorelines, estuaries, and wetlands. Rolling easements are usually placed along the shoreline or other transition zone between upland and submerged lands. This type of easement prevents property owners from holding back the mosaic of transition (tidal) zone habitats (marsh, mangrove, dune, and/or beach). As sea-level rise occurs and tidal areas advance, the easement automatically moves or "rolls" landward. Although some uses and activities are retained by the owner, shoreline stabilization structures cannot be erected thus ensuring that sediment transport remains undisturbed and wetlands and other important tidal habitats can migrate naturally.

8.4 / Potential Funding Sources and other Conservation and Acquisition Efforts

RBNERR will continue to pursue all possible county, state and federal fee-simple land acquisition programs for funding. RBNERR has developed a strong partnership with TPL, The Nature Conservancy, Conservation Collier, and other major landowners to explore less-than-fee options for strategic conservation. TPL's Conservation Finance Team advises governments on conservation funding and helps to design, pass, and implement measures that dedicate new public funds towards acquisition of lands for conservation.

The Collier County conservation program, Conservation Collier, seeks to identify, acquire, manage, and transfer ownership of, or consolidate properties that support at least two of the following qualities: rare habitat, aquifer recharge, flood control, water quality protection, and/or listed species habitat. In addition, mitigation from several large developments proposed within RBNERR's watershed may also provide opportunities for conservation.

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Appendix A Legal Documents

A.1 / Executive Summary (table format)

Rookery Bay National Estuarine Research Reserve (NERR) Management Plan		
Lead Agency:	Florida Department of Environmental Protection's (DEP) Office of Coastal and Aquatic Managed Areas (CAMA)	
Common Name of Property:	Rookery Bay National Estuarine Research Reserve (RBNERR)	
Location:	Collier County, Florida	
Acreage Total:	110,000 acres	
Acreage Under Lease:	37,876 upland acres under CAMA lease	
Acreage Breakdown for CAMA Management Units According to Florida Natural Areas Inventory (FNAI) Natural Community Types		
<i>FNAI Natural Communities</i>	<i>Total Acreage according to GIS</i>	<i>Upland Acres Under CAMA Lease according to GIS</i>
Scrub	176	176
Beach Dune:	590	590
Coastal Strand:	270	270
Maritime Hammock	105	105
Mesic Flatwoods	1,293	1,293
Mesic Hammock	279	279
Scrubby Flatwoods	58	58
Strand Swamp	69	69
Basin Marsh	90	90
Dome Swamp	2	2
Coastal Intertidal Swale	2	2
Depression Marsh	13	13
Tidal Marsh:	1,862	1,862
Tidal Swamp:	30,728	30,728
Water	72,124	
Agriculture – Fallow	76	76
Disturbed/Developed	2,263	2,263
Total Acreage:	110,000	37,876
Lease/Management Agreement Numbers: 3819		
Designated Use: Single use for Conservation and Preservation		
Legislative or Executive Directives that Constrain the Use of the Property: None		
Management Responsibilities:	Agency - DEP's CAMA lead manager	
Designation:	National Estuarine Research Reserve	
Sublease(s):	None	
Encumbrances:	Reverter clauses on some parcels	
Type Acquisition:	Conservation and Recreation Lands, Environmentally Endangered Lands, Donations.	
Unique Features:	Ten Thousand Islands and Rookery Bay estuaries are considered westernmost extent of Everglades ecosystem. Site includes extensive pristine mangrove forested wetlands, undeveloped barrier islands, and some of the last remaining intact tropical hardwood hammocks and coastal scrub habitats in Southwest Florida.	
Archaeological/Historical Sites:	Site has numerous prehistoric midden and historic sites.	

Management Needs	
Ecosystem Science	Water quality and biological monitoring, seagrass habitat mapping, protected species monitoring, visiting scientist program.
Resource Management	Invasive species eradication and control, prescribed fire management, wetland and hydrology restoration, regulatory permit review.
Education and Outreach	Environmental Learning Center daily education and outreach programs, student and adult education, Coastal Training Program workshops and seminars targeting local decision makers.
Public Use	Recreational boating and fishing, hiking, bird watching, camping, eco-tourism.
Acquisition Needs/Acreage:	Approximately 1,500 acres.
Surplus Lands/Acreage:	None.
Public Involvement:	Two general public meetings, five advisory council meetings.
Rookery Bay NERR Managed Areas	
Agency Breakdown	Acreage according to GIS
Rookery Bay Aquatic Preserve:	58,076 acres
Cape Romano - Ten Thousand Islands Aquatic Preserve (CRTTIAP):	51,470 acres (Overlaps with USFWS)
Uplands Under CAMA Lease:	37,876 acres
United States Fish and Wildlife Service (USFWS)	16,490 acres (Overlaps with CRTTIAP)

Executive Summary

Rookery Bay National Estuarine Research Reserve
2012 through 2017

The Management Plan for the Rookery Bay National Estuarine Research Reserve (RBNERR) covers the time period from 2012 through 2017. RBNERR, located on the Southwest Gulf coast of Florida near Naples, is one of 28 National Estuarine Research Reserves managed through a cooperative agreement with the National Oceanic and Atmospheric Administration's (NOAA) Estuarine Reserve Division (ERD). The Florida Department of Environmental Protection (DEP) Office of Coastal and Aquatic Managed Areas (CAMA) serves as the lead state agency for RBNERR.

The RBNERR Management Plan is a strategic document that describes natural and cultural resources within the boundaries of RBNERR, identifies priority issues that DEP staff must address to adequately protect these resources, and the goals, objectives and strategies necessary to support RBNERR's mission of informed stewardship based on science and education. DEP works in cooperation with NOAA and other federal, state, and local partners to conduct ongoing research and monitoring, educate students and teachers, increase public awareness and understanding, conduct stewardship and restoration, manage public access and use, and provide training for local policymakers.

The coastal ecosystems within the boundaries of RBNERR have national and international significance as the western edge of the Everglades ecosystem. RBNERR includes a significant portion of one of the largest remaining intact mangrove forested wetlands in the world. Rookery Bay and the Ten Thousand Islands are among the nation's few remaining relatively pristine estuaries. Habitats within RBNERR provide essential feeding and nesting grounds for a diverse assemblage of coastal and marine wildlife, including over 150 species of birds, 400 species of plants, and 250 species of fishes.

The economic values associated with sustaining the environmental health of RBNERR are locally significant and are of great importance to the State of Florida. Tourism, sport fishing, and boating are among the most important industries in Southwest Florida. Each generates millions of dollars per year, and each are inextricably linked to the long-term protection and conservation of the coastal ecosystems within RBNERR. The Friends of Rookery Bay (FORB), a local non-profit volunteer community based organization, was established over 20 years ago in recognition of these values and to support RBNERR's mission.

The RBNERR Management Plan identifies five priority issues: Changing land use that affects freshwater inflows, loss of native biodiversity, lack of public awareness and community involvement in stewardship, incompatible use of RBNERR resources by visitors, and ecological impacts associated with catastrophic change events. The Plan identifies key goals and strategies linked to these issues: restoring natural flow regimes, protecting ecological functions, protecting listed species, managing for compatible public use, establishing long-term control for key lands and water, increasing community awareness and involvement, increasing understanding of ecological processes, and promoting informed coastal decisions.



As of 2011, RBNERR has 13 full-time employees serving in coastal management, research, education, and training roles that directly support the goals and strategies outlined in the RBNERR Management Plan. In addition, contract staff help support priority projects.

An important element of the RBNERR Management Plan is the emphasis on a fully integrated approach that links ongoing research, education, stewardship and training programs together. Past experience at RBNERR in using an integrated management framework has resulted in significant outcomes that directly support RBNERR's mission. An additional important element of the Management Plan is the reliance on strategic partnerships with public and private sector interests at local, regional, and national scales that also directly support RBNERR's mission.

To successfully achieve the goals and strategies described in this management plan, RBNERR staff and partners will work to establish a "State of the Reserve" that links research results with critical resource issues and increases community awareness while informing local policymakers. New partnerships with private sector interests including boating, tourism, and sport fishing are envisioned that engage primary users of RBNERR in informed stewardship. Consolidation of 17,747 acres of adjacent public lands and acquisition of private lands are planned for addition to the RBNERR boundary. Future expansion of the RBNERR boundary will be formally approved during the next management plan revision.

RBNERR will continue to train local landscapers to utilize best management practices that save money and help protect local water quality, provide education programs for local students that raise awareness of the ecologic and economic values associated with healthy estuaries, restore damaged ecosystems, and conduct ongoing research that improves understanding of the ecological processes that drive the Rookery Bay estuarine ecosystem.

National Estuarine Research Reserve Legal Requirements
15 Code of Federal Regulations Part 921

SUBCHAPTER B—OCEAN AND COASTAL RESOURCE MANAGEMENT

PART 921—NATIONAL ESTUARINE RESEARCH RESERVE SYSTEM REGULATIONS

Subpart A—General

Sec.

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- 921.2 Definitions.
- 921.3 National Estuarine Research Reserve System biogeographic classification scheme and estuarine typologies.
- 921.4 Relationship to other provisions of the Coastal Zone Management Act and the Marine Protection, Research and Sanctuaries Act.

Subpart B—Site Selection, Post Site Selection and Management Plan Development

- 921.10 General.
- 921.11 Site selection and feasibility.
- 921.12 Post site selection.
- 921.13 Management plan and environmental impact statement development.

Subpart C—Acquisition, Development and Preparation of the Final Management Plan

- 921.20 General.
- 921.21 Initial acquisition and development awards.

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- 921.30 Designation of National Estuarine Research Reserves.
- 921.31 Supplemental acquisition and development awards.
- 921.32 Operation and management: Implementation of the management plan.
- 921.33 Boundary changes, amendments to the management plan, and addition of multiple-site components.

Subpart E—Ongoing Oversight, Performance Evaluation and Withdrawal of Designation

- 921.40 Ongoing oversight and evaluations of designated National Estuarine Research Reserves.
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Subpart F—Special Research Projects

- 921.50 General.
- 921.51 Estuarine research guidelines.

- 921.52 Promotion and coordination of estuarine research.

Subpart G—Special Monitoring Projects

- 921.60 General.

Subpart H—Special Interpretation and Education Projects

- 921.70 General.

Subpart I—General Financial Assistance Provisions

- 921.80 Application information.
- 921.81 Allowable costs.
- 921.82 Amendments to financial assistance awards.

APPENDIX I TO PART 921—BIOGEOGRAPHIC CLASSIFICATION SCHEME

APPENDIX II TO PART 921—TYPOLOGY OF NATIONAL ESTUARINE RESEARCH RESERVES

AUTHORITY: Section 315 of the Coastal Zone Management Act, as amended (16 U.S.C. 1461).

SOURCE: 58 FR 38215, July 15, 1993, unless otherwise noted.

Subpart A—General

§921.1 Mission, goals and general provisions.

(a) The mission of the National Estuarine Research Reserve Program is the establishment and management, through Federal-state cooperation, of a national system (National Estuarine Research Reserve System or System) of estuarine research reserves (National Estuarine Research Reserves or Reserves) representative of the various regions and estuarine types in the United States. National Estuarine Research Reserves are established to provide opportunities for long-term research, education, and interpretation.

(b) The goals of the Program are to:

- (1) Ensure a stable environment for research through long-term protection of National Estuarine Research Reserve resources;
- (2) Address coastal management issues identified as significant through coordinated estuarine research within the System;

(3) Enhance public awareness and understanding of estuarine areas and provide suitable opportunities for public education and interpretation;

(4) Promote Federal, state, public and private use of one or more Reserves within the System when such entities conduct estuarine research; and

(5) Conduct and coordinate estuarine research within the System, gathering and making available information necessary for improved understanding and management of estuarine areas.

(c) National Estuarine Research Reserves shall be open to the public to the extent permitted under state and Federal law. Multiple uses are allowed to the degree compatible with each Reserve's overall purpose as provided in the management plan (see §921.13) and consistent with paragraphs (a) and (b) of this section. Use levels are set by the state where the Reserve is located and analyzed in the management plan. The Reserve management plan shall describe the uses and establish priorities among these uses. The plan shall identify uses requiring a state permit, as well as areas where uses are encouraged or prohibited. Consistent with resource protection and research objectives, public access and use may be restricted to certain areas or components within a Reserve.

(d) Habitat manipulation for research purposes is allowed consistent with the following limitations. Manipulative research activities must be specified in the management plan, be consistent with the mission and goals of the program (see paragraphs (a) and (b) of this section) and the goals and objectives set forth in the Reserve's management plan, and be limited in nature and extent to the minimum manipulative activity necessary to accomplish the stated research objective. Manipulative research activities with a significant or long-term impact on Reserve resources require the prior approval of the state and the National Oceanic and Atmospheric Administration (NOAA). Manipulative research activities which can reasonably be expected to have a significant adverse impact on the estuarine resources and habitat of a Reserve, such that the activities themselves or their resulting short- and

long-term consequences compromise the representative character and integrity of a Reserve, are prohibited. Habitat manipulation for resource management purposes is prohibited except as specifically approved by NOAA as: (1) A restoration activity consistent with paragraph (e) of this section; or (2) an activity necessary for the protection of public health or the preservation of other sensitive resources which have been listed or are eligible for protection under relevant Federal or state authority (e.g., threatened/endangered species or significant historical or cultural resources) or if the manipulative activity is a long-term pre-existing use (*i.e.*, has occurred prior to designation) occurring in a buffer area. If habitat manipulation is determined to be necessary for the protection of public health, the preservation of sensitive resources, or if the manipulation is a long-term pre-existing use in a buffer area, then these activities shall be specified in the Reserve management plan in accordance with §921.13(a)(10) and shall be limited to the reasonable alternative which has the least adverse and shortest term impact on the representative and ecological integrity of the Reserve.

(e) Under the Act an area may be designated as an estuarine Reserve only if the area is a representative estuarine ecosystem that is suitable for long-term research. Many estuarine areas have undergone some ecological change as a result of human activities (e.g., hydrological changes, intentional/unintentional species composition changes—introduced and exotic species). In those areas proposed or designated as National Estuarine Research Reserves, such changes may have diminished the representative character and integrity of the site. Although restoration of degraded areas is not a primary purpose of the System, such activities may be permitted to improve the representative character and integrity of a Reserve. Restoration activities must be carefully planned and approved by NOAA through the Reserve management plan. Historical research may be necessary to determine the "natural" representative state of an estuarine area (*i.e.*, an estuarine ecosystem minimally affected by

§ 921.2

human activity or influence). Frequently, restoration of a degraded estuarine area will provide an excellent opportunity for management oriented research.

(f) NOAA may provide financial assistance to coastal states, not to exceed, per Reserve, 50 percent of all actual costs or \$5 million whichever amount is less, to assist in the acquisition of land and waters, or interests therein. NOAA may provide financial assistance to coastal states not to exceed 70 percent of all actual costs for the management and operation of, the development and construction of facilities, and the conduct of educational or interpretive activities concerning Reserves (see subpart I). NOAA may provide financial assistance to any coastal state or public or private person, not to exceed 70 percent of all actual costs, to support research and monitoring within a Reserve. Notwithstanding any financial assistance limits established by this Part, when financial assistance is provided from amounts recovered as a result of damage to natural resources located in the coastal zone, such assistance may be used to pay 100 percent of all actual costs of activities carried out with this assistance, as long as such funds are available. Predesignation, acquisition and development, operation and management, special research and monitoring, and special education and interpretation awards are available under the National Estuarine Reserve Program. Predesignation awards are for site selection/feasibility, draft management plan preparation and conduct of basic characterization studies. Acquisition and development awards are intended primarily for acquisition of interests in land, facility construction and to develop and/or upgrade research, monitoring and education programs. Operation and management awards provide funds to assist in implementing, operating and managing the administrative, and basic research, monitoring and education programs, outlined in the Reserve management plan. Special research and monitoring awards provide funds to conduct estuarine research and monitoring projects with the System. Special educational and interpretive awards provide funds to conduct estuarine educational and

15 CFR Ch. IX (1-1-06 Edition)

interpretive projects within the System.

(g) Lands already in protected status managed by other Federal agencies, state or local governments, or private organizations may be included within National Estuarine Research Reserves only if the managing entity commits to long-term management consistent with paragraphs (d) and (e) of this section in the Reserve management plan. Federal lands already in protected status may not comprise a majority of the key land and water areas of a Reserve (see § 921.11(c)(3)).

(h) To assist the states in carrying out the Program's goals in an effective manner, NOAA will coordinate a research and education information exchange throughout the National Estuarine Research Reserve System. As part of this role, NOAA will ensure that information and ideas from one Reserve are made available to others in the System. The network will enable Reserves to exchange information and research data with each other, with universities engaged in estuarine research, and with Federal, state, and local agencies. NOAA's objective is a system-wide program of research and monitoring capable of addressing the management issues that affect long-term productivity of our Nation's estuaries.

[58 FR 38215, July 15, 1993, as amended at 62 FR 12540, Mar. 17, 1997; 63 FR 26717, May 14, 1998]

§ 921.2 Definitions.

(a) *Act* means the Coastal Zone Management Act of 1972, as amended, 16 U.S.C. 1451 *et seq.*

(b) *Assistant Administrator* means the Assistant Administrator for Ocean Services and Coastal Zone Management or delegee.

(c) *Coastal state* means a state of the United States, in or bordering on, the Atlantic, Pacific, or Arctic Ocean, the Gulf of Mexico, Long Island Sound, or one or more of the Great Lakes. For the purposes of these regulations the term also includes Puerto Rico, the Virgin Islands, Guam, the Commonwealth of the Northern Mariana Islands, the Trust Territories of the Pacific Islands, and American Samoa (see 16 U.S.C. 1453(4)).

(d) *State agency* means an instrumentality of a coastal state to whom the coastal state has delegated the authority and responsibility for the creation and/or management/operation of a National Estuarine Research Reserve. Factors indicative of this authority may include the power to receive and expend funds on behalf of the Reserve, acquire and sell or convey real and personal property interests, adopt rules for the protection of the Reserve, enforce rules applicable to the Reserve, or develop and implement research and education programs for the reserve. For the purposes of these regulations, the terms "coastal state" and "State agency" shall be synonymous.

(e) *Estuary* means that part of a river or stream or other body of water having unimpaired connection with the open sea, where the sea water is measurably diluted with fresh water derived from land drainage. The term also includes estuary-type areas with measurable freshwater influence and having unimpaired connections with the open sea, and estuary-type areas of the Great Lakes and their connecting waters (see 16 U.S.C. 1453(7)).

(f) *National Estuarine Research Reserve* means an area that is a representative estuarine ecosystem suitable for long-term research, which may include all of the key land and water portion of an estuary, and adjacent transitional areas and uplands constituting to the extent feasible a natural unit, and which is set aside as a natural field laboratory to provide long-term opportunities for research, education, and interpretation on the ecological relationships within the area (see 16 U.S.C. 1453(8)) and meets the requirements of 16 U.S.C. 1461(b). This includes those areas designated as National Estuarine Sanctuaries or Reserves under section 315 of the Act prior to enactment of the Coastal Zone Act Reauthorization Amendments of 1990 and each area subsequently designated as a National Estuarine Research Reserve.

§921.3 National Estuarine Research Reserve System biogeographic classification scheme and estuarine typologies.

(a) National Estuarine Research Reserves are chosen to reflect regional

differences and to include a variety of ecosystem types. A biogeographic classification scheme based on regional variations in the nation's coastal zone has been developed. The biogeographic classification scheme is used to ensure that the National Estuarine Research Reserve System includes at least one site from each region. The estuarine typology system is utilized to ensure that sites in the System reflect the wide range of estuarine types within the United States.

(b) The biogeographic classification scheme, presented in appendix I, contains 29 regions. Figure 1 graphically depicts the biogeographic regions of the United States.

(c) The typology system is presented in appendix II.

§921.4 Relationship to other provisions of the Coastal Zone Management Act, and to the Marine Protection, Research and Sanctuaries Act.

(a) The National Estuarine Research Reserve System is intended to provide information to state agencies and other entities involved in addressing coastal management issues. Any coastal state, including those that do not have approved coastal management programs under section 306 of the Act, is eligible for an award under the National Estuarine Research Reserve Program (see §921.2(c)).

(b) For purposes of consistency review by states with a federally approved coastal management program, the designation of a National Estuarine Research Reserve is deemed to be a Federal activity, which, if directly affecting the state's coastal zone, must be undertaken in a manner consistent to the maximum extent practicable with the approved state coastal management program as provided by section 1456(c)(1) of the Act, and implementing regulations at 15 CFR part 930, subpart C. In accordance with section 1456(c)(1) of the Act and the applicable regulations NOAA will be responsible for certifying that designation of the Reserve is consistent with the state's approved coastal management program. The state must concur with or object to the certification. It is recommended that the lead state agency for Reserve designation consult, at the

earliest practicable time, with the appropriate state officials concerning the consistency of a proposed National Estuarine Research Reserve.

(c) The National Estuarine Research Reserve Program will be administered in close coordination with the National Marine Sanctuary Program (Title III of the Marine Protection, Research and Sanctuaries Act, as amended, 16 U.S.C. 1431–1445), also administered by NOAA. Title III authorizes the Secretary of Commerce to designate discrete areas of the marine environment as National Marine Sanctuaries to protect or restore such areas for their conservation, recreational, ecological, historical, research, educational or esthetic values. National Marine Sanctuaries and Estuarine Research Reserves may not overlap, but may be adjacent.

Subpart B—Site Selection, Post Site Selection and Management Plan Development

§921.10 General.

(a) A coastal state may apply for Federal financial assistance for the purpose of site selection, preparation of documents specified in §921.13 (draft management plan (DMP) and environmental impact statement (EIS)), and the conduct of limited basic characterization studies. The total Federal share of this assistance may not exceed \$100,000. Federal financial assistance for preacquisition activities under §921.11 and §921.12 is subject to the total \$5 million for which each Reserve is eligible for land acquisition. Notwithstanding the above, when financial assistance is provided from amounts recovered as a result of damage to natural resources located in the coastal zone, such assistance may be used to pay 100 percent of all actual costs of activities carried out with this assistance, as long as such funds are available. In the case of a biogeographic region (see appendix I) shared by two or more coastal states, each state is eligible for Federal financial assistance to establish a separate National Estuarine Research Reserve within their respective portion of the shared biogeographic region. Each separate National Estuarine Research Reserve is eligible for the full complement of

funding. Financial assistance application procedures are specified in subpart I.

(b) In developing a Reserve program, a state may choose to develop a multiple-site Reserve reflecting a diversity of habitats in a single biogeographic region. A multiple-site Reserve allows the state to develop complementary research and educational programs within the individual components of its multi-site Reserve. Multiple-site Reserves are treated as one Reserve in terms of financial assistance and development of an overall management framework and plan. Each individual site of a proposed multiple-site Reserve shall be evaluated both separately under §921.11(c) and collectively as part of the site selection process. A coastal state may propose to establish a multiple-site Reserve at the time of the initial site selection, or at any point in the development or operation of the Reserve. If the state decides to develop a multiple-site National Estuarine Research Reserve after the initial acquisition and development award is made for a single site, the proposal is subject to the requirements set forth in §921.33(b). However, a state may not propose to add one or more sites to an already designated Reserve if the operation and management of such Reserve has been found deficient and uncorrected or the research conducted is not consistent with the Estuarine Research Guidelines referenced in §921.51. In addition, Federal funds for the acquisition of a multiple-site Reserve remain limited to \$5,000,000 (see §921.20). The funding for operation of a multiple-site Reserve is limited to the maximum allowed for any one Reserve per year (see §921.32(c)) and preacquisition funds are limited to \$100,000 per Reserve. Notwithstanding the above, when financial assistance is provided from amounts recovered as a result of damage to natural resources located in the coastal zone, such assistance may be used to pay 100 percent of all actual costs of activities carried out with this assistance, as long as such funds are available.

[58 FR 38215, July 15, 1993, as amended at 63 FR 26717, May 14, 1998]

§921.11 Site selection and feasibility.

(a) A coastal state may use Federal funds to establish and implement a site selection process which is approved by NOAA.

(b) In addition to the requirements set forth in subpart I, a request for Federal funds for site selection must contain the following programmatic information:

(1) A description of the proposed site selection process and how it will be implemented in conformance with the biogeographic classification scheme and typology (§921.3);

(2) An identification of the site selection agency and the potential management agency; and

(3) A description of how public participation will be incorporated into the process (see §921.11(d)).

(c) As part of the site selection process, the state and NOAA shall evaluate and select the final site(s). NOAA has final authority in approving such sites. Site selection shall be guided by the following principles:

(1) The site's contribution to the biogeographical and typological balance of the National Estuarine Research Reserve System. NOAA will give priority consideration to proposals to establish Reserves in biogeographic regions or subregions or incorporating types that are not represented in the system. (see the biogeographic classification scheme and typology set forth in §921.3 and appendices I and II);

(2) The site's ecological characteristics, including its biological productivity, diversity of flora and fauna, and capacity to attract a broad range of research and educational interests. The proposed site must be a representative estuarine ecosystem and should, to the maximum extent possible, be an estuarine ecosystem minimally affected by human activity or influence (see §921.1(e)).

(3) Assurance that the site's boundaries encompass an adequate portion of the key land and water areas of the natural system to approximate an ecological unit and to ensure effective conservation. Boundary size will vary greatly depending on the nature of the ecosystem. Reserve boundaries must encompass the area within which adequate control has or will be established

by the managing entity over human activities occurring within the Reserve. Generally, Reserve boundaries will encompass two areas: Key land and water areas (or "core area") and a buffer zone. Key land and water areas and a buffer zone will likely require significantly different levels of control (see §921.13(a)(7)). The term "key land and water areas" refers to that core area within the Reserve that is so vital to the functioning of the estuarine ecosystem that it must be under a level of control sufficient to ensure the long-term viability of the Reserve for research on natural processes. Key land and water areas, which comprise the core area, are those ecological units of a natural estuarine system which preserve, for research purposes, a full range of significant physical, chemical and biological factors contributing to the diversity of fauna, flora and natural processes occurring within the estuary. The determination of which land and water areas are "key" to a particular Reserve must be based on specific scientific knowledge of the area. A basic principle to follow when deciding upon key land and water areas is that they should encompass resources representative of the total ecosystem, and which if compromised could endanger the research objectives of the Reserve. The term *buffer zone* refers to an area adjacent to or surrounding key land and water areas and essential to their integrity. Buffer zones protect the core area and provide additional protection for estuarine-dependent species, including those that are rare or endangered. When determined appropriate by the state and approved by NOAA, the buffer zone may also include an area necessary for facilities required for research and interpretation. Additionally, buffer zones should be established sufficient to accommodate a shift of the core area as a result of biological, ecological or geomorphological change which reasonably could be expected to occur. National Estuarine Research Reserves may include existing Federal or state lands already in a protected status where mutual benefit can be enhanced. However, NOAA will not approve a site

for potential National Estuarine Research Reserve status that is dependent primarily upon the inclusion of currently protected Federal lands in order to meet the requirements for Reserve status (such as key land and water areas). Such lands generally will be included within a Reserve to serve as a buffer or for other ancillary purposes; and may be included, subject to NOAA approval, as a limited portion of the core area;

(4) The site's suitability for long-term estuarine research, including ecological factors and proximity to existing research facilities and educational institutions;

(5) The site's compatibility with existing and potential land and water uses in contiguous areas as well as approved coastal and estuarine management plans; and

(6) The site's importance to education and interpretive efforts, consistent with the need for continued protection of the natural system.

(d) Early in the site selection process the state must seek the views of affected landowners, local governments, other state and Federal agencies and other parties who are interested in the area(s) being considered for selection as a potential National Estuarine Research Reserve. After the local government(s) and affected landowner(s) have been contacted, at least one public meeting shall be held in the vicinity of the proposed site. Notice of such a meeting, including the time, place, and relevant subject matter, shall be announced by the state through the area's principal newspaper at least 15 days prior to the date of the meeting and by NOAA in the FEDERAL REGISTER.

(e) A state request for NOAA approval of a proposed site (or sites in the case of a multi-site Reserve) must contain a description of the proposed site(s) in relationship to each of the site selection principals (§921.11(c)) and the following information:

(1) An analysis of the proposed site(s) based on the biogeographical scheme/typology discussed in §921.3 and set forth in appendices I and II;

(2) A description of the proposed site(s) and its (their) major resources, including location, proposed bound-

aries, and adjacent land uses. Maps are required;

(3) A description of the public participation process used by the state to solicit the views of interested parties, a summary of comments, and, if interstate issues are involved, documentation that the Governor(s) of the other affected state(s) has been contacted. Copies of all correspondence, including contact letters to all affected landowners must be appended;

(4) A list of all sites considered and a brief statement of the reasons why a site was not preferred; and

(5) A nomination of the proposed site(s) for designation as a National Estuarine Research Reserve by the Governor of the coastal state in which the state is located.

(f) A state proposing to reactivate an inactive site, previously approved by NOAA for development as an Estuarine Sanctuary or Reserve, may apply for those funds remaining, if any, provided for site selection and feasibility (§921.11a)) to determine the feasibility of reactivation. This feasibility study must comply with the requirements set forth in §921.11 (c) through (e).

§921.12 Post site selection.

(a) At the time of the coastal state's request for NOAA approval of a proposed site, the state may submit a request for funds to develop the draft management plan and for preparation of the EIS. At this time, the state may also submit a request for the remainder of the predesignation funds to perform a limited basic characterization of the physical, chemical and biological characteristics of the site approved by NOAA necessary for providing EIS information to NOAA. The state's request for these post site selection funds must be accompanied by the information specified in subpart I and, for draft management plan development and EIS information collection, the following programmatic information:

(1) A draft management plan outline (see §921.13(a) below); and

(2) An outline of a draft memorandum of understanding (MOU) between the state and NOAA detailing the Federal-state role in Reserve management during the initial period of Federal funding and expressing the

state's long-term commitment to operate and manage the Reserve.

(b) The state is eligible to use the funds referenced in §921.12(a) after the proposed site is approved by NOAA under the terms of §921.11.

§921.13 Management plan and environmental impact statement development.

(a) After NOAA approves the state's proposed site and application for funds submitted pursuant to §921.12, the state may begin draft management plan development and the collection of information necessary for the preparation by NOAA of an EIS. The state shall develop a draft management plan, including an MOU. The plan shall set out in detail:

(1) Reserve goals and objectives, management issues, and strategies or actions for meeting the goals and objectives;

(2) An administrative plan including staff roles in administration, research, education/interpretation, and surveillance and enforcement;

(3) A research plan, including a monitoring design;

(4) An education/interpretive plan;

(5) A plan for public access to the Reserve;

(6) A construction plan, including a proposed construction schedule, general descriptions of proposed developments and general cost estimates. Information should be provided for proposed minor construction projects in sufficient detail to allow these projects to begin in the initial phase of acquisition and development. A categorical exclusion, environmental assessment, or EIS may be required prior to construction;

(7)(i) An acquisition plan identifying the ecologically key land and water areas of the Reserve, ranking these areas according to their relative importance, and including a strategy for establishing adequate long-term state control over these areas sufficient to provide protection for Reserve resources to ensure a stable environment for research. This plan must include an identification of ownership within the proposed Reserve boundaries, including land already in the public domain; the method(s) of acquisition which the

state proposes to use—acquisition (including less-than-fee simple options) to establish adequate long-term state control; an estimate of the fair market value of any property interest—which is proposed for acquisition; a schedule estimating the time required to complete the process of establishing adequate state control of the proposed research reserve; and a discussion of any anticipated problems. In selecting a preferred method(s) for establishing adequate state control over areas within the proposed boundaries of the Reserve, the state shall perform the following steps for each parcel determined to be part of the key land and water areas (control over which is necessary to protect the integrity of the Reserve for research purposes), and for those parcels required for research and interpretive support facilities or buffer purposes:

(A) Determine, with appropriate justification, the minimum level of control(s) required [e.g., management agreement, regulation, less-than-fee simple property interest (e.g., conservation easement), fee simple property acquisition, or a combination of these approaches]. This does not preclude the future necessity of increasing the level of state control;

(B) Identify the level of existing state control(s);

(C) Identify the level of additional state control(s), if any, necessary to meet the minimum requirements identified in paragraph (a)(7)(i)(A) of this section;

(D) Examine all reasonable alternatives for attaining the level of control identified in paragraph (a)(7)(i)(C) of this section, and perform a cost analysis of each; and

(E) Rank, in order of cost, the methods (including acquisition) identified in paragraph (a)(7)(i)(D) of this section.

(ii) An assessment of the relative cost-effectiveness of control alternatives shall include a reasonable estimate of both short-term costs (e.g., acquisition of property interests, regulatory program development including associated enforcement costs, negotiation, adjudication, etc.) and long-term costs (e.g., monitoring, enforcement,

adjudication, management and coordination). In selecting a preferred method(s) for establishing adequate state control over each parcel examined under the process described above, the state shall give priority consideration to the least costly method(s) of attaining the minimum level of long-term control required. Generally, with the possible exception of buffer areas required for support facilities, the level of control(s) required for buffer areas will be considerably less than that required for key land and water areas. This acquisition plan, after receiving the approval of NOAA, shall serve as a guide for negotiations with landowners. A final boundary for the reserve shall be delineated as a part of the final management plan;

(8) A resource protection plan detailing applicable authorities, including allowable uses, uses requiring a permit and permit requirements, any restrictions on use of the research reserve, and a strategy for research reserve surveillance and enforcement of such use restrictions, including appropriate government enforcement agencies;

(9) If applicable, a restoration plan describing those portions of the site that may require habitat modification to restore natural conditions;

(10) If applicable, a resource manipulation plan, describing those portions of the Reserve buffer in which long-term pre-existing (prior to designation) manipulation for reasons not related to research or restoration is occurring. The plan shall explain in detail the nature of such activities, shall justify why such manipulation should be permitted to continue within the reserve buffer; and shall describe possible effects of this manipulation on key land and water areas and their resources;

(11) A proposed memorandum of understanding (MOU) between the state and NOAA regarding the Federal-state relationship during the establishment and development of the National Estuarine Research Reserve, and expressing a long-term commitment by the state to maintain and manage the Reserve in accordance with section 315 of the Act, 16 U.S.C. 1461, and applicable regulations. In conjunction with the MOU, and where possible under state law, the state will consider taking appropriate

administrative or legislative action to ensure the long-term protection and operation of the National Estuarine Research Reserve. If other MOUs are necessary (such as with a Federal agency, another state agency or private organization), drafts of such MOUs must be included in the plan. All necessary MOU's shall be signed prior to Reserve designation; and

(12) If the state has a federally approved coastal management program, a certification that the National Estuarine Research Reserve is consistent to the maximum extent practicable with that program. See §§921.4(b) and 921.30(b).

(b) Regarding the preparation of an EIS under the National Environmental Policy Act on a National Estuarine Research Reserve proposal, the state and NOAA shall collect all necessary information concerning the socioeconomic and environmental impacts associated with implementing the draft management plan and feasible alternatives to the plan. Based on this information, the state will draft and provide NOAA with a preliminary EIS.

(c) Early in the development of the draft management plan and the draft EIS, the state and NOAA shall hold a scoping meeting (pursuant to NEPA) in the area or areas most affected to solicit public and government comments on the significant issues related to the proposed action. NOAA will publish a notice of the meeting in the FEDERAL REGISTER at least 15 days prior to the meeting. The state shall be responsible for publishing a similar notice in the local media.

(d) NOAA will publish a FEDERAL REGISTER notice of intent to prepare a draft EIS. After the draft EIS is prepared and filed with the Environmental Protection Agency (EPA), a Notice of Availability of the draft EIS will appear in the FEDERAL REGISTER. Not less than 30 days after publication of the notice, NOAA will hold at least one public hearing in the area or areas most affected by the proposed national estuarine research reserve. The hearing will be held no sooner than 15 days after appropriate notice of the meeting has been given in the principal news media by the state and in the FEDERAL REGISTER by NOAA. After a 45-day

comment period, a final EIS will be prepared by the state and NOAA.

Subpart C—Acquisition, Development and Preparation of the Final Management Plan

§ 921.20 General.

The acquisition and development period is separated into two major phases. After NOAA approval of the site, draft management plan and draft MOU, and completion of the final EIS, a coastal state is eligible for an initial acquisition and development award(s). In this initial phase, the state should work to meet the criteria required for formal research reserve designation; e.g., establishing adequate state control over the key land and water areas as specified in the draft management plan and preparing the final management plan. These requirements are specified in § 921.30. Minor construction in accordance with the draft management plan may also be conducted during this initial phase. The initial acquisition and development phase is expected to last no longer than three years. If necessary, a longer time period may be negotiated between the state and NOAA. After Reserve designation, a state is eligible for a supplemental acquisition and development award(s) in accordance with § 921.31. In this post-designation acquisition and development phase, funds may be used in accordance with the final management plan to construct research and educational facilities, complete any remaining land acquisition, for program development, and for restorative activities identified in the final management plan. In any case, the amount of Federal financial assistance provided to a coastal state with respect to the acquisition of lands and waters, or interests therein, for any one National Estuarine Research Reserve may not exceed an amount equal to 50 percent of the costs of the lands, waters, and interests therein or \$5,000,000, whichever amount is less, except when the financial assistance is provided from amounts recovered as a result of damage to natural resources located in the coastal zone, in which case the assistance may be used to pay 100 percent of all actual costs of activities carrier out

with this assistance, as long as such funds are available.

[58 FR 38215, July 15, 1993, as amended at 62 FR 12540, Mar. 17, 1997; 63 FR 26717, May 14, 1998]

§ 921.21 Initial acquisition and development awards.

(a) Assistance is provided to aid the recipient prior to designation in:

(1) Acquiring a fee simple or less-than-fee simple real property interest in land and water areas to be included in the Reserve boundaries (see § 921.13(a)(7); § 921.30(d));

(2) Minor construction, as provided in paragraphs (b) and (c) of this section;

(3) Preparing the final management plan; and

(4) Initial management costs, e.g., for implementing the NOAA approved draft management plan, hiring a Reserve manager and other staff as necessary and for other management-related activities. Application procedures are specified in subpart I.

(b) The expenditure of Federal and state funds on major construction activities is not allowed during the initial acquisition and development phase. The preparation of architectural and engineering plans, including specifications, for any proposed construction, or for proposed restorative activities, is permitted. In addition, minor construction activities, consistent with paragraph (c) of this section also are allowed. The NOAA-approved draft management plan must, however, include a construction plan and a public access plan before any award funds can be spent on construction activities.

(c) Only minor construction activities that aid in implementing portions of the management plan (such as boat ramps and nature trails) are permitted during the initial acquisition and development phase. No more than five (5) percent of the initial acquisition and development award may be expended on such activities. NOAA must make a specific determination, based on the final EIS, that the construction activity will not be detrimental to the environment.

(d) Except as specifically provided in paragraphs (a) through (c) of this section, construction projects, to be funded in whole or in part under an acquisition and development award(s), may not be initiated until the Reserve receives formal designation (see §921.30). This requirement has been adopted to ensure that substantial progress in establishing adequate state control over key land and water areas has been made and that a final management plan is completed before major sums are spent on construction. Once substantial progress in establishing adequate state control/acquisition has been made, as defined by the state in the management plan, other activities guided by the final management plan may begin with NOAA's approval.

(e) For any real property acquired in whole or part with Federal funds for the Reserve, the state shall execute suitable title documents to include substantially the following provisions, or otherwise append the following provisions in a manner acceptable under applicable state law to the official land record(s):

(1) Title to the property conveyed by this deed shall vest in the [recipient of the award granted pursuant to section 315 of the Act, 16 U.S.C. 1461 or other NOAA approved state agency] subject to the condition that the designation of the [name of National Estuarine Reserve] is not withdrawn and the property remains part of the federally designated [name of National Estuarine Research Reserve]; and

(2) In the event that the property is no longer included as part of the Reserve, or if the designation of the Reserve of which it is part is withdrawn, then NOAA or its successor agency, after full and reasonable consultation with the State, may exercise the following rights regarding the disposition of the property:

(i) The recipient may retain title after paying the Federal Government an amount computed by applying the Federal percentage of participation in the cost of the original project to the current fair market value of the property;

(ii) If the recipient does not elect to retain title, the Federal Government may either direct the recipient to sell

the property and pay the Federal Government an amount computed by applying the Federal percentage of participation in the cost of the original project to the proceeds from the sale (after deducting actual and reasonable selling and repair or renovation expenses, if any, from the sale proceeds), or direct the recipient to transfer title to the Federal Government. If directed to transfer title to the Federal Government, the recipient shall be entitled to compensation computed by applying the recipient's percentage of participation in the cost of the original project to the current fair market value of the property; and

(iii) Fair market value of the property must be determined by an independent appraiser and certified by a responsible official of the state, as provided by Department of Commerce regulations at 15 CFR part 24, and Uniform Relocation Assistance and Real Property Acquisition for Federal and Federally assisted programs at 15 CFR part 11.

(f) Upon instruction by NOAA, provisions analogous to those of §921.21(e) shall be included in the documentation underlying less-than-fee-simple interests acquired in whole or part with Federal funds.

(g) Federal funds or non-Federal matching share funds shall not be spent to acquire a real property interest in which the state will own the land concurrently with another entity unless the property interest has been identified as a part of an acquisition strategy pursuant to §921.13(7) which has been approved by NOAA prior to the effective date of these regulations.

(h) Prior to submitting the final management plan to NOAA for review and approval, the state shall hold a public meeting to receive comment on the plan in the area affected by the estuarine research reserve. NOAA will publish a notice of the meeting in the FEDERAL REGISTER at least 15 days prior to the public meeting. The state shall be responsible for having a similar notice published in the local newspaper(s).

Subpart D—Reserve Designation and Subsequent Operation

§ 921.30 Designation of National Estuarine Research Reserves.

(a) The Under Secretary may designate an area proposed for designation by the Governor of the state in which it is located, as a National Estuarine Research Reserve if the Under Secretary finds:

(1) The area is a representative estuarine ecosystem that is suitable for long-term research and contributes to the biogeographical and typological balance of the System;

(2) Key land and water areas of the proposed Reserve, as identified in the management plan, are under adequate state control sufficient to provide long-term protection for reserve resources to ensure a stable environment for research;

(3) Designation of the area as a Reserve will serve to enhance public awareness and understanding of estuarine areas, and provide suitable opportunities for public education and interpretation;

(4) A final management plan has been approved by NOAA;

(5) An MOU has been signed between the state and NOAA ensuring a long-term commitment by the state to the effective operation and implementation of the area as a National Estuarine Research Reserve;

(6) All MOU's necessary for reserve management (*i.e.*, with relevant Federal, state, and local agencies and/or private organizations) have been signed; and

(7) The coastal state in which the area is located has complied with the requirements of subpart B.

(b) NOAA will determine whether the designation of a National Estuarine Research Reserve in a state with a federally approved coastal zone management program directly affects the coastal zone. If the designation is found to directly affect the coastal zone, NOAA will make a consistency determination pursuant to § 307(c)(1) of the Act, 16 U.S.C. 1456, and 15 CFR part 930, subpart C. See § 921.4(b). The results of this consistency determination will be published in the FEDERAL REG-

ISTER when the notice of designation is published. See § 921.30(c).

(c) NOAA will publish the notice of designation of a National Estuarine Research Reserve in the FEDERAL REGISTER. The state shall be responsible for having a similar notice published in the local media.

(d) The term *state control* in § 921.30(a)(3) does not necessarily require that key land and water areas be owned by the state in fee simple. Acquisition of less-than-fee simple interests (e.g., conservation easements) and utilization of existing state regulatory measures are encouraged where the state can demonstrate that these interests and measures assure adequate long-term state control consistent with the purposes of the research reserve (see also §§ 921.13(a)(7); 921.21(g)). Should the state later elect to purchase an interest in such lands using NOAA funds, adequate justification as to the need for such acquisition must be provided to NOAA.

§ 921.31 Supplemental acquisition and development awards.

After National Estuarine Research Reserve designation, and as specified in the approved management plan, a coastal state may request a supplemental acquisition and/or development award(s) for acquiring additional property interests identified in the management plan as necessary to strengthen protection of key land and water areas and to enhance long-term protection of the area for research and education, for facility and exhibit construction, for restorative activities identified in the approved management plan, for administrative purposes related to acquisition and/or facility construction and to develop and/or upgrade research, monitoring and education/interpretive programs. Federal financial assistance provided to a National Estuarine Research Reserve for supplemental development costs directly associated with facility construction (*i.e.*, major construction activities) may not exceed 70 percent of the total project cost, except when the financial assistance is provided from amounts recovered as a result of damage to natural resources located in the coastal zone, in which case the assistance may be used to pay 100

§ 921.32

percent of the costs. NOAA must make a specific determination that the construction activity will not be detrimental to the environment. Acquisition awards for the acquisition of lands or waters, or interests therein, for any one reserve may not exceed an amount equal to 50 percent of the costs of the lands, waters, and interests therein of \$5,000,000, whichever amount is less, except when the financial assistance is provided from amounts recovered as result of damage to natural resources located in the coastal zone, in which case the assistance may be used to pay 100 percent of all actual costs of activities carried out with this assistance, as long as such funds are available. In the case of a biogeographic region (see appendix I) shared by two or more states, each state is eligible independently for Federal financial assistance to establish a separate National Estuarine Research Reserve within their respective portion of the shared biogeographic region. Application procedures are specified in subpart I. Land acquisition must follow the procedures specified in §§921.13(a)(7), 921.21(e) and (f) and 921.81.

[58 FR 38215, July 15, 1993, as amended at 62 FR 12540, Mar. 17, 1997; 63 FR 26717, May 14, 1998]

§ 921.32 Operation and management: Implementation of the management plan.

(a) After the Reserve is formally designated, a coastal state is eligible to receive Federal funds to assist the state in the operation and management of the Reserve including the management of research, monitoring, education, and interpretive programs. The purpose of this Federally funded operation and management phase is to implement the approved final management plan and to take the necessary steps to ensure the continued effective operation of the Reserve.

(b) State operation and management of the Reserves shall be consistent with the mission, and shall further the goals of the National Estuarine Research Reserve program (see §921.1).

(c) Federal funds are available for the operation and management of the Reserve. Federal funds provided pursuant to this section may not exceed 70 percent of the total cost of operating and

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managing the Reserve for any one year, except when the financial assistance is provided from amounts recovered as a result of damage to natural resources located in the coastal zone, in which case the assistance may be used to pay 100 percent of the costs. In the case of a biogeographic region (see Appendix I) shared by two or more states, each state is eligible for Federal financial assistance to establish a separate Reserve within their respective portion of the shared biogeographic region (see §921.10).

(d) Operation and management funds are subject to the following limitations:

(1) Eligible coastal state agencies may apply for up to the maximum share available per Reserve for that fiscal year. Share amounts will be announced annually by letter from the Sanctuary and Reserves Division to all participating states. This letter will be provided as soon as practicable following approval of the Federal budget for that fiscal year.

(2) No more than ten percent of the total amount (state and Federal shares) of each operation and management award may be used for construction-type activities.

[58 FR 38215, July 15, 1993, as amended at 62 FR 12541, Mar. 17, 1997]

§ 921.33 Boundary changes, amendments to the management plan, and addition of multiple-site components.

(a) Changes in the boundary of a Reserve and major changes to the final management plan, including state laws or regulations promulgated specifically for the Reserve, may be made only after written approval by NOAA. NOAA may require public notice, including notice in the FEDERAL REGISTER and an opportunity for public comment before approving a boundary or management plan change. Changes in the boundary of a Reserve involving the acquisition of properties not listed in the management plan or final EIS require public notice and the opportunity for comment; in certain cases, a categorical exclusion, an environmental assessment and possibly an environmental impact statement may be required.

NOAA will place a notice in the FEDERAL REGISTER of any proposed changes in Reserve boundaries or proposed major changes to the final management plan. The state shall be responsible for publishing an equivalent notice in the local media. See also requirements of §§921.4(b) and 921.13(a)(11).

(b) As discussed in §921.10(b), a state may choose to develop a multiple-site National Estuarine Research Reserve after the initial acquisition and development award for a single site has been made. NOAA will publish notice of the proposed new site including an invitation for comments from the public in the FEDERAL REGISTER. The state shall be responsible for publishing an equivalent notice in the local newspaper(s). An EIS, if required, shall be prepared in accordance with section §921.13 and shall include an administrative framework for the multiple-site Reserve and a description of the complementary research and educational programs within the Reserve. If NOAA determines, based on the scope of the project and the issues associated with the additional site(s), that an environmental assessment is sufficient to establish a multiple-site Reserve, then the state shall develop a revised management plan which, concerning the additional component, incorporates each of the elements described in §921.13(a). The revised management plan shall address goals and objectives for all components of the multi-site Reserve and the additional component's relationship to the original site(s).

(c) The state shall revise the management plan for a Reserve at least every five years, or more often if necessary. Management plan revisions are subject to (a) above.

(d) NOAA will approve boundary changes, amendments to management plans, or the addition of multiple-site components, by notice in the FEDERAL REGISTER. If necessary NOAA will revise the designation document (findings) for the site.

Subpart E—Ongoing Oversight, Performance Evaluation and Withdrawal of Designation

§921.40 Ongoing oversight and evaluations of designated National Estuarine Research Reserves.

(a) The Sanctuaries and Reserve Division shall conduct, in accordance with section 312 of the Act and procedures set forth in 15 CFR part 928, ongoing oversight and evaluations of Reserves. Interim sanctions may be imposed in accordance with regulations promulgated under 15 CFR part 928.

(b) The Assistant Administrator may consider the following indicators of non-adherence in determining whether to invoke interim sanctions:

(1) Inadequate implementation of required staff roles in administration, research, education/interpretation, and surveillance and enforcement. Indicators of inadequate implementation could include: No Reserve Manager, or no staff or insufficient staff to carry out the required functions.

(2) Inadequate implementation of the required research plan, including the monitoring design. Indicators of inadequate implementation could include: Not carrying out research or monitoring that is required by the plan, or carrying out research or monitoring that is inconsistent with the plan.

(3) Inadequate implementation of the required education/interpretation plan. Indicators of inadequate implementation could include: Not carrying out education or interpretation that is required by the plan, or carrying out education/interpretation that is inconsistent with the plan.

(4) Inadequate implementation of public access to the Reserve. Indicators of inadequate implementation of public access could include: Not providing necessary access, giving full consideration to the need to keep some areas off limits to the public in order to protect fragile resources.

(5) Inadequate implementation of facility development plan. Indicators of inadequate implementation could include: Not taking action to propose and budget for necessary facilities, or not undertaking necessary construction in a timely manner when funds are available.

(6) Inadequate implementation of acquisition plan. Indicators of inadequate implementation could include: Not pursuing an aggressive acquisition program with all available funds for that purpose, not requesting promptly additional funds when necessary, and evidence that adequate long-term state control has not been established over some core or buffer areas, thus jeopardizing the ability to protect the Reserve site and resources from offsite impacts.

(7) Inadequate implementation of Reserve protection plan. Indicators of inadequate implementation could include: Evidence of non-compliance with Reserve restrictions, insufficient surveillance and enforcement to assure that restrictions on use of the Reserve are adhered to, or evidence that Reserve resources are being damaged or destroyed as a result of the above.

(8) Failure to carry out the terms of the signed Memorandum of Understanding (MOU) between the state and NOAA, which establishes a long-term state commitment to maintain and manage the Reserve in accordance with section 315 of the Act. Indicators of failure could include: State action to allow incompatible uses of state-controlled lands or waters in the Reserve, failure of the state to bear its fair share of costs associated with long-term operation and management of the Reserve, or failure to initiate timely updates of the MOU when necessary.

§ 921.41 Withdrawal of designation.

The Assistant Administrator may withdraw designation of an estuarine area as a National Estuarine Research Reserve pursuant to and in accordance with the procedures of section 312 and 315 of the Act and regulations promulgated thereunder.

Subpart F—Special Research Projects

§ 921.50 General.

(a) To stimulate high quality research within designated National Estuarine Research Reserves, NOAA may provide financial support for research projects which are consistent with the Estuarine Research Guidelines referenced in § 921.51. Research awards may be awarded under this subpart to

only those designated Reserves with approved final management plans. Although research may be conducted within the immediate watershed of the Reserve, the majority of research activities of any single research project funded under this subpart may be conducted within Reserve boundaries. Funds provided under this subpart are primarily used to support management-related research projects that will enhance scientific understanding of the Reserve ecosystem, provide information needed by Reserve management and coastal management decision-makers, and improve public awareness and understanding of estuarine ecosystems and estuarine management issues. Special research projects may be oriented to specific Reserves; however, research projects that would benefit more than one Reserve in the National Estuarine Research System are encouraged.

(b) Funds provided under this subpart are available on a competitive basis to any coastal state or qualified public or private person. A notice of available funds will be published in the FEDERAL REGISTER. Special research project funds are provided in addition to any other funds available to a coastal state under the Act. Federal funds provided under this subpart may not exceed 70 percent of the total cost of the project, consistent with § 921.81(e)(4) (“allowable costs”), except when the financial assistance is provided from amounts recovered as a result of damage to natural resources located in the coastal zone, in which case the assistance may be used to pay 100 percent of the costs.

[58 FR 38215, July 15, 1993, as amended at 62 FR 12541, Mar. 17, 1997]

§ 921.51 Estuarine research guidelines.

(a) Research within the National Estuarine Research Reserve System shall be conducted in a manner consistent with Estuarine Research Guidelines developed by NOAA.

(b) A summary of the Estuarine Research Guidelines is published in the FEDERAL REGISTER as a part of the notice of available funds discussed in § 921.50(c).

(c) The Estuarine Research Guidelines are reviewed annually by NOAA. This review will include an opportunity

for comment by the estuarine research community.

§ 921.52 Promotion and coordination of estuarine research.

(a) NOAA will promote and coordinate the use of the National Estuarine Research Reserve System for research purposes.

(b) NOAA will, in conducting or supporting estuarine research other than that authorized under section 315 of the Act, give priority consideration to research that make use of the National Estuarine Research Reserve System.

(c) NOAA will consult with other Federal and state agencies to promote use of one or more research reserves within the National Estuarine Research Reserve System when such agencies conduct estuarine research.

Subpart G—Special Monitoring Projects

§ 921.60 General.

(a) To provide a systematic basis for developing a high quality estuarine resource and ecosystem information base for National Estuarine Research Reserves and, as a result, for the System, NOAA may provide financial support for basic monitoring programs as part of operations and management under § 921.32. Monitoring funds are used to support three major phases of a monitoring program:

- (1) Studies necessary to collect data for a comprehensive site description/characterization;
- (2) Development of a site profile; and
- (3) Formulation and implementation of a monitoring program.

(b) Additional monitoring funds may be available on a competitive basis to the state agency responsible for Reserve management or a qualified public or private person or entity. However, if the applicant is other than the managing entity of a Reserve that applicant must submit as a part of the application a letter from the Reserve manager indicating formal support of the application by the managing entity of the Reserve. Funds provided under this subpart for special monitoring projects are provided in addition to any other funds available to a coastal state under the Act. Federal funds provided

under this subpart may not exceed 70 percent of the total cost of the project, consistent with § 921.81(e)(4) ("allowable costs"), except when the financial assistance is provided from amounts recovered as a result of damage to natural resources located in the coastal zone, in which case the assistance may be used to pay 100 percent of the costs.

(c) Monitoring projects funded under this subpart must focus on the resources within the boundaries of the Reserve and must be consistent with the applicable sections of the Estuarine Research Guidelines referenced in § 921.51. Portions of the project may occur within the immediate watershed of the Reserve beyond the site boundaries. However, the monitoring proposal must demonstrate why this is necessary for the success of the project.

[58 FR 38215, July 15, 1993, as amended at 62 FR 12541, Mar. 17, 1997]

Subpart H—Special Interpretation and Education Projects

§ 921.70 General.

(a) To stimulate the development of innovative or creative interpretive and educational projects and materials to enhance public awareness and understanding of estuarine areas, NOAA may fund special interpretive and educational projects in addition to those activities provided for in operations and management under § 921.32. Special interpretive and educational awards may be awarded under this subpart to only those designated Reserves with approved final management plans.

(b) Funds provided under this subpart may be available on a competitive basis to any state agency. However, if the applicant is other than the managing entity of a Reserve, that applicant must submit as a part of the application a letter from the Reserve manager indicating formal support of the application by the managing entity of the Reserve. These funds are provided in addition to any other funds available to a coastal state under the Act. Federal funds provided under this subpart may not exceed 70 percent of the total cost of the project, consistent with § 921.81(e)(4) ("allowable costs"),

except when the financial assistance is provided from amounts recovered as a result of damage to natural resources located in the coastal zone, in which case the assistance may be used to pay 100 percent of the costs.

(c) Applicants for education/interpretive projects that NOAA determines benefit the entire National Estuarine Research Reserve System may receive Federal assistance of up to 100% of project costs.

[58 FR 38215, July 15, 1993, as amended at 62 FR 12541, Mar. 17, 1997]

Subpart I—General Financial Assistance Provisions

§921.80 Application information.

(a) Only a coastal state may apply for Federal financial assistance awards for preacquisition, acquisition and development, operation and management, and special education and interpretation projects under subpart H. Any coastal state or public or private person may apply for Federal financial assistance awards for special estuarine research or monitoring projects under subpart G. The announcement of opportunities to conduct research in the System appears on an annual basis in the FEDERAL REGISTER. If a state is participating in the national Coastal Zone Management Program, the applicant for an award under section 315 of the Act shall notify the state coastal management agency regarding the application.

(b) An original and two copies of the formal application must be submitted at least 120 working days prior to the proposed beginning of the project to the following address: Sanctuaries and Reserves Division Ocean and Coastal Resource Management, National Oceanic and Atmospheric Administration, 1825 Connecticut Avenue, NW., suite 714, Washington, DC 20235. Application for Federal Assistance Standard Form 424 (Non-construction Program) constitutes the formal application for site selection, post-site selection, operation and management, research, and education and interpretive awards. The Application for Federal Financial Assistance Standard Form 424 (Construction Program) constitutes the formal

application for land acquisition and development awards. The application must be accompanied by the information required in subpart B (predesignation), subpart C and §921.31 (acquisition and development), and §921.32 (operation and management) as applicable. Applications for development awards for construction projects, or restorative activities involving construction, must include a preliminary engineering report, a detailed construction plan, a site plan, a budget and categorical exclusion check list or environmental assessment. All applications must contain back up data for budget estimates (Federal and non-Federal shares), and evidence that the application complies with the Executive Order 12372, "Intergovernmental Review of Federal Programs." In addition, applications for acquisition and development awards must contain:

- (1) State Historic Preservation Office comments;
- (2) Written approval from NOAA of the draft management plan for initial acquisition and development award(s); and
- (3) A preliminary engineering report for construction activities.

§921.81 Allowable costs.

(a) Allowable costs will be determined in accordance with applicable OMB Circulars and guidance for Federal financial assistance, the financial assistant agreement, these regulations, and other Department of Commerce and NOAA directives. The term "costs" applies to both the Federal and non-Federal shares.

(b) Costs claimed as charges to the award must be reasonable, beneficial and necessary for the proper and efficient administration of the financial assistance award and must be incurred during the award period.

(c) Costs must not be allocable to or included as a cost of any other Federally-financed program in either the current or a prior award period.

(d) General guidelines for the non-Federal share are contained in Department of Commerce Regulations at 15 CFR part 24 and OMB Circular A-110.

Copies of Circular A-110 can be obtained from the Sanctuaries and Reserves Division; 1825 Connecticut Avenue, NW., suite 714; Washington, DC 20235. The following may be used in satisfying the matching requirement:

(1) *Site selection and post site selection awards.* Cash and in-kind contributions (value of goods and services directly benefiting and specifically identifiable to this part of the project) are allowable. Land may not be used as match.

(2) *Acquisition and development awards.* Cash and in-kind contributions are allowable. In general, the fair market value of lands to be included within the Reserve boundaries and acquired pursuant to the Act, with other than Federal funds, may be used as match. However, the fair market value of real property allowable as match is limited to the fair market value of a real property interest equivalent to, or required to attain, the level of control over such land(s) identified by the state and approved by the Federal Government as that necessary for the protection and management of the National Estuarine Research Reserve. Appraisals must be performed according to Federal appraisal standards as detailed in Department of Commerce regulations at 15 CFR part 24 and the Uniform Relocation Assistance and Real Property Acquisition for Federal land Federally assisted programs in 15 CFR part 11. The fair market value of privately donated land, at the time of donation, as established by an independent appraiser and certified by a responsible official of the state, pursuant to 15 CFR part 11, may also be used as match. Land, including submerged lands already in the state's possession, may be used as match to establish a National Estuarine Research Reserve. The value of match for these state lands will be calculated by determining the value of the benefits foregone by the state, in the use of the land, as a result of new restrictions that may be imposed by Reserve designation. The appraisal of the benefits foregone must be made by an independent appraiser in accordance with Federal appraisal standards pursuant to 15 CFR part 24 and 15 CFR part 11. A state may initially use as match land valued at greater than the Federal share of the acquisition and develop-

ment award. The value in excess of the amount required as match for the initial award may be used to match subsequent supplemental acquisition and development awards for the National Estuarine Research Reserve (see also §921.20). Costs related to land acquisition, such as appraisals, legal fees and surveys, may also be used as match.

(3) *Operation and management awards.* Generally, cash and in-kind contributions (directly benefiting and specifically identifiable to operations and management), except land, are allowable.

(4) *Research, monitoring, education and interpretive awards.* Cash and in-kind contributions (directly benefiting and specifically identifiable to the scope of work), except land, are allowable.

§921.82 Amendments to financial assistance awards.

Actions requiring an amendment to the financial assistance award, such as a request for additional Federal funds, revisions of the approved project budget or original scope of work, or extension of the performance period must be submitted to NOAA on Standard Form 424 and approved in writing.

APPENDIX I TO PART 921— BIOGEOGRAPHIC CLASSIFICATION SCHEME

Acadian

1. Northern of Maine (Eastport to the Sheepscot River.)
2. Southern Gulf of Maine (Sheepscot River to Cape Cod.)

Virginian

3. Southern New England (Cape Cod to Sandy Hook.)
4. Middle Atlantic (Sandy Hook to Cape Hatteras.)
5. Chesapeake Bay.

Carolinian

6. North Carolinas (Cape Hatteras to Santee River.)
7. South Atlantic (Santee River to St. John's River.)
8. East Florida (St. John's River to Cape Canaveral.)

West Indian

9. Caribbean (Cape Canaveral to Ft. Jefferson and south.)
10. West Florida (Ft. Jefferson to Cedar Key.)

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Louisianian

- 11. Panhandle Coast (Cedar Key to Mobile Bay.)
- 12. Mississippi Delta (Mobile Bay to Galveston.)
- 13. Western Gulf (Galveston to Mexican border.)

Californian

- 14. Southern California (Mexican border to Point Conception.)
- 15. Central California (Point Conception to Cape Mendocino.)
- 16. San Francisco Bay.

Columbian

- 17. Middle Pacific (Cape Mendocino to the Columbia River.)
- 18. Washington Coast (Columbia River to Vancouver Island.)
- 19. Puget Sound.

Great Lakes

- 20. Lake Superior (including St. Mary's River.)

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- 21. Lakes Michigan and Huron (including Straits of Mackinac, St. Clair River, and Lake St. Clair.)

- 22. Lake Erie (including Detroit River and Niagara Falls.)

- 23. Lake Ontario (including St. Lawrence River.)

Fjord

- 24. Southern Alaska (Prince of Wales Island to Cook Inlet.)

- 25. Aleutian Island (Cook Inlet Bristol Bay.)

Sub-Arctic

- 26. Northern Alaska (Bristol Bay to Demarcation Point.)

Insular

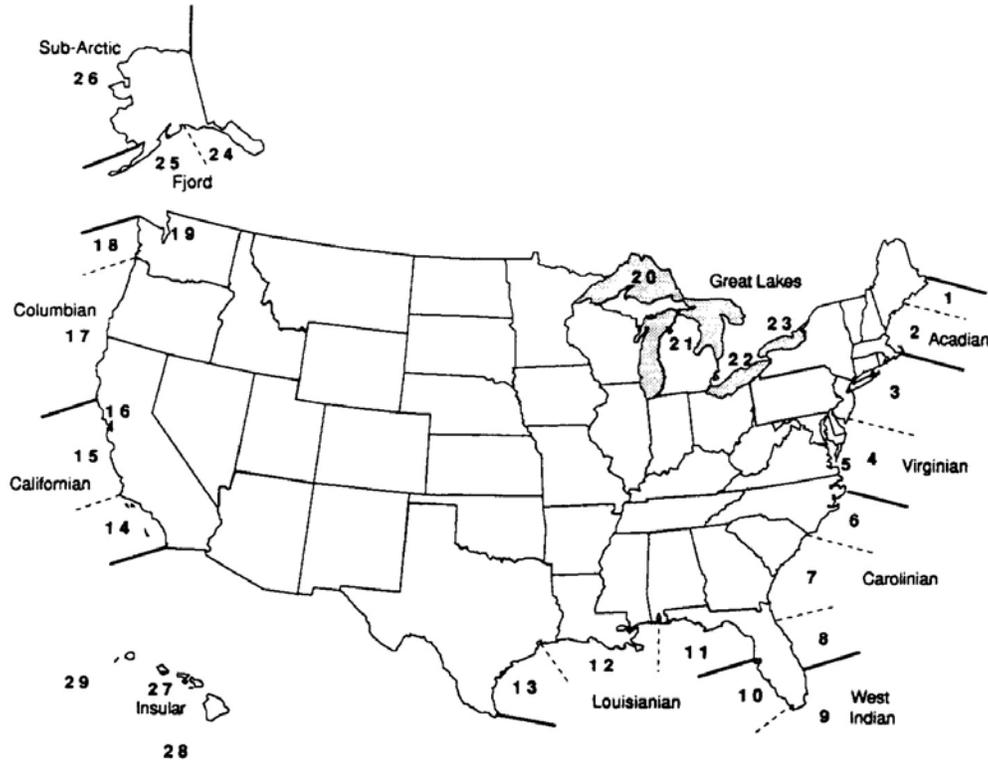
- 27. Hawaiian Islands.

- 28. Western Pacific Island.

- 29. Eastern Pacific Island.

FIGURE 1

**National Estuarine Research Reserve System
Biogeographic Regions of the United States**



APPENDIX II TO PART 921—TYPOLOGY OF NATIONAL ESTUARINE RESEARCH RESERVES

This typology system reflects significant differences in estuarine characteristics that are not necessarily related to regional location. The purpose of this type of classification is to maximize ecosystem variety in the selection of national estuarine reserves. Priority will be given to important ecosystem types as yet unrepresented in the reserve system. It should be noted that any one site may represent several ecosystem types or physical characteristics.

Class I—Ecosystem Types

Group I—Shorelands

A. Maritime Forest-Woodland. That have developed under the influence of salt spray. It can be found on coastal uplands or recent features such as barrier islands and beaches,

and may be divided into the following biomes:

1. Northern coniferous forest biome: This is an area of predominantly evergreens such as the sitka spruce (*Picea*), grand fir (*Abies*), and white cedar (*Thuja*), with poor development of the shrub and herb layer, but high annual productivity and pronounced seasonal periodicity.

2. Moist temperate (Mesothermal) coniferous forest biome: Found along the west coast of North America from California to Alaska, this area is dominated by conifers, has relatively small seasonal range, high humidity with rainfall ranging from 30 to 150 inches, and a well-developed understory of vegetation with an abundance of mosses and other moisture-tolerant plants.

3. Temperate deciduous forest biome: This biome is characterized by abundant, evenly distributed rainfall, moderate temperatures which exhibit a distinct seasonal pattern,

well-developed soil biota and herb and shrub layers, and numerous plants which produce pulpy fruits and nuts. A distinct subdivision of this biome is the pine edible forest of the southeastern coastal plain, in which only a small portion of the area is occupied by climax vegetation, although it has large areas covered by edaphic climax pines.

4. Broad-leaved evergreen subtropical forest biome: The main characteristic of this biome is high moisture with less pronounced differences between winter and summer. Examples are the hammocks of Florida and the live oak forests of the Gulf and South Atlantic coasts. Floral dominants include pines, magnolias, bays, hollies, wild tamarine, strangler fig, gumbo limbo, and palms.

B. Coast shrublands. This is a transitional area between the coastal grasslands and woodlands and is characterized by woody species with multiple stems and a few centimeters to several meters above the ground developing under the influence of salt spray and occasional sand burial. This includes thickets, scrub, scrub savanna, heathlands, and coastal chaparral. There is a great variety of shrubland vegetation exhibiting regional specificity:

1. Northern areas: Characterized by *Hudsonia*, various erinaceous species, and thickets of *Myrica*, *prunus*, and *Rosa*.

2. Southeast areas: Floral dominants include *Myrica*, *Baccharis*, and *Iles*.

3. Western areas: *Adenostoma*, *arcotyphlos*, and *eucalyptus* are the dominant floral species.

C. Coastal grasslands. This area, which possesses sand dunes and coastal flats, has low rainfall (10 to 30 inches per year) and large amounts of humus in the soil. Ecological succession is slow, resulting in the presence of a number of seral stages of community development. Dominant vegetation includes mid-grasses (5 to 8 feet tall), such as *Spartina*, and trees such as willow (*Salix* sp.), cherry (*Prunus* sp.), and cottonwood (*Pupulus deltoides*.) This area is divided into four regions with the following typical strand vegetation:

1. Arctic/Boreal: *Elymus*;

2. Northeast/West: *Ammophla*;

3. Southeast Gulf: *Uniola*; and

4. Mid-Atlantic/Gulf: *Spartina patens*.

D. Coastal tundra. This ecosystem, which is found along the Arctic and Boreal coasts of North America, is characterized by low temperatures, a short growing season, and some permafrost, producing a low, treeless mat community made up of mosses, lichens, heath, shrubs, grasses, sedges, rushes, and herbaceous and dwarf woody plants. Common species include arctic/alpine plants such as *Empetrum nigrum* and *Betula nana*, the lichens *Cetraria* and *Cladonia*, and herbaceous plants such as *Potentilla tridentata* and *Rubus chamaemorus*. Common species

on the coastal beach ridges of the high arctic desert include *Bryas intergrifolia* and *Saxifrage oppositifolia*. This area can be divided into two main subdivisions:

1. Low tundra: Characterized by a thick, spongy mat of living and undecayed vegetation, often with water and dotted with ponds when not frozen; and

2. High Tundra: A bare area except for a scanty growth of lichens and grasses, with underlying ice wedges forming raised polygonal areas.

E. Coastal cliffs. This ecosystem is an important nesting site for many sea and shore birds. It consists of communities of herbaceous, graminoid, or low woody plants (shrubs, heath, etc.) on the top or along rocky faces exposed to salt spray. There is a diversity of plant species including mosses, lichens, liverworts, and "higher" plant representatives.

GROUP II—TRANSITION AREAS

A. Coastal marshes. These are wetland areas dominated by grasses (Poacea), sedges (Cyperaceae), rushes (Juncaceae), cattails (Typhaceae), and other graminoid species and is subject to periodic flooding by either salt or freshwater. This ecosystem may be subdivided into: (a) Tidal, which is periodically flooded by either salt or brackish water; (b) nontidal (freshwater); or (c) tidal freshwater. These are essential habitats for many important estuarine species of fish and invertebrates as well as shorebirds and waterfowl and serve important roles in shore stabilization, flood control, water purification, and nutrient transport and storage.

B. Coastal swamps. These are wet lowland areas that support mosses and shrubs together with large trees such as cypress or gum.

C. Coastal mangroves. This ecosystem experiences regular flooding on either a daily, monthly, or seasonal basis, has low wave action, and is dominated by a variety of salt-tolerant trees, such as the red mangrove (*Rhizophora mangle*), black mangrove (*Avicennia Nitida*), and the white mangrove (*Laguncularia racemosa*.) It is also an important habitat for large populations of fish, invertebrates, and birds. This type of ecosystem can be found from central Florida to extreme south Texas to the islands of the Western Pacific.

D. Intertidal beaches. This ecosystem has a distinct biota of microscopic animals, bacteria, and unicellular algae along with macroscopic crustaceans, mollusks, and worms with a detritus-based nutrient cycle. This area also includes the driftline communities found at high tide levels on the beach. The dominant organisms in this ecosystem include crustaceans such as the mole crab (*Emerita*), amphipods (*Gammeridae*), ghost crabs (*Ocypode*), and bivalve mollusks such

as the coquina (Donax) and surf clams (Spisula and Mactra.)

E. Intertidal mud and sand flats. These areas are composed of unconsolidated, high organic content sediments that function as a short-term storage area for nutrients and organic carbons. Macrophytes are nearly absent in this ecosystem, although it may be heavily colonized by benthic diatoms, dinoflagellates, filamentous blue-green and green algae, and chemosynthetic purple sulfur bacteria. This system may support a considerable population of gastropods, bivalves, and polychaetes, and may serve as a feeding area for a variety of fish and wading birds. In sand, the dominant fauna include the wedge shell Donax, the scallop Pecten, tellin shells Tellina, the heart urchin Echinocardium, the lug worm Arenicola, sand dollar Dendraster, and the sea pansy Renilla. In mud, faunal dominants adapted to low oxygen levels include the terebellid Amphitrite, the boring clam Playdon, the deep sea scallop Placopecten, the Quahog Mercenaria, the echiurid worm Urechis, the mud snail Nassarius, and the sea cucumber Thyone.

F. Intertidal algal beds. These are hard substrates along the marine edge that are dominated by macroscopic algae, usually thalloid, but also filamentous or unicellular in growth form. This also includes the rocky coast tidepools that fall within the intertidal zone. Dominant fauna of these areas are barnacles, mussels, periwinkles, anemones, and chitons. Three regions are apparent:

1. Northern latitude rocky shores: It is in this region that the community structure is best developed. The dominant algal species include Chondrus at the low tide level, Fucus and Ascophyllum at the mid-tidal level, and Laminaria and other kelp-like algae just beyond the intertidal, although they can be exposed at extremely low tides or found in very deep tidepools.

2. Southern latitudes: The communities in this region are reduced in comparison to those of the northern latitudes and possess algae consisting mostly of single-celled or filamentous green, blue-green, and red algae, and small thalloid brown algae.

3. Tropical and subtropical latitudes: The intertidal in this region is very reduced and contains numerous calcareous algae such as Porolithon and Lithothamnion, as well as green algae with calcareous particles such as Halimeda, and numerous other green, red, and brown algae.

GROUP III—SUBMERGED BOTTOMS

A. Subtidal hardbottoms. This system is characterized by a consolidated layer of solid rock or large pieces of rock (neither of biotic origin) and is found in association with geomorphological features such as submarine canyons and fjords and is usually covered with assemblages of sponges, sea fans, bivalves, hard corals, tunicates, and

other attached organisms. A significant feature of estuaries in many parts of the world is the oyster reef, a type of subtidal hardbottom. Composed of assemblages of organisms (usually bivalves), it is usually found near an estuary's mouth in a zone of moderate wave action, salt content, and turbidity. If light levels are sufficient, a covering of microscopic and attached macroscopic algae, such as kelp, may also be found.

B. Subtidal softbottoms. Major characteristics of this ecosystem are an unconsolidated layer of fine particles of silt, sand, clay, and gravel, high hydrogen sulfide levels, and anaerobic conditions often existing below the surface. Macrophytes are either sparse or absent, although a layer of benthic microalgae may be present if light levels are sufficient. The faunal community is dominated by a diverse population of deposit feeders including polychaetes, bivalves, and burrowing crustaceans.

C. Subtidal plants. This system is found in relatively shallow water (less than 8 to 10 meters) below mean low tide. It is an area of extremely high primary production that provides food and refuge for a diversity of faunal groups, especially juvenile and adult fish, and in some regions, manatees and sea turtles. Along the North Atlantic and Pacific coasts, the seagrass *Zostera marina* predominates. In the South Atlantic and Gulf coast areas, *Thalassia* and *Diplanthera* predominate. The grasses in both areas support a number of epiphytic organisms.

Class II—Physical Characteristics

GROUP I—GEOLOGIC

A. Basin type. Coastal water basins occur in a variety of shapes, sizes, depths, and appearances. The eight basic types discussed below will cover most of the cases:

1. Exposed coast: Solid rock formations or heavy sand deposits characterize exposed ocean shore fronts, which are subject to the full force of ocean storms. The sand beaches are very resilient, although the dunes lying just behind the beaches are fragile and easily damaged. The dunes serve as a sand storage area making them chief stabilizers of the ocean shoreline.

2. Sheltered coast: Sand or coral barriers, built up by natural forces, provide sheltered areas inside a bar or reef where the ecosystem takes on many characteristics of confined waters—abundant marine grasses, shellfish, and juvenile fish. Water movement is reduced, with the consequent effects pollution being more severe in this area than in exposed coastal areas.

3. Bay: Bays are larger confined bodies of water that are open to the sea and receive strong tidal flow. When stratification is pronounced the flushing action is augmented by

river discharge. Bays vary in size and in type of shorefront.

4. Embayment: A confined coastal water body with narrow, restricted inlets and with a significant freshwater inflow can be classified as an embayment. These areas have more restricted inlets than bays, are usually smaller and shallower, have low tidal action, and are subject to sedimentation.

5. Tidal river: The lower reach of a coastal river is referred to as a tidal river. The coastal water segment extends from the sea or estuary into which the river discharges to a point as far upstream as there is significant salt content in the water, forming a salt front. A combination of tidal action and freshwater outflow makes tidal rivers well-flushed. The tidal river basin may be a simple channel or a complex of tributaries, small associated embayments, marshfronts, tidal flats, and a variety of others.

6. Lagoon: Lagoons are confined coastal bodies of water with restricted inlets to the sea and without significant freshwater inflow. Water circulation is limited, resulting in a poorly flushed, relatively stagnant body of water. Sedimentation is rapid with a great potential for basin shoaling. Shores are often gently sloping and marshy.

7. Perched coastal wetlands: Unique to Pacific islands, this wetland type found above sea level in volcanic crater remnants forms as a result of poor drainage characteristics of the crater rather than from sedimentation. Floral assemblages exhibit distinct zonation while the faunal constituents may include freshwater, brackish, and/or marine species. EXAMPLE: Aunu's Island, American Samoa.

8. Anchialine systems: These small coastal exposures of brackish water form in lava depressions or elevated fossil reefs have only a subsurface connection in the ocean, but show tidal fluctuations. Differing from true estuaries in having no surface continuity with streams or ocean, this system is characterized by a distinct biotic community dominated by benthic algae such as *Rhizoclonium*, the mineral encrusting *Schizothrix*, and the vascular plant *Ruppia maritima*. Characteristic fauna which exhibit a high degree of endemism, include the mollusks *Theosoxus neglectus* and *Tarionus*. Although found throughout the world, the high islands of the Pacific are the only areas within the U.S. where this system can be found.

B. Basin structure. Estuary basins may result from the drowning of a river valley (coastal plains estuary), the drowning of a glacial valley (fjord), the occurrence of an offshore barrier (bar-bounded estuary), some tectonic process (tectonic estuary), or volcanic activity (volcanic estuary).

1. Coastal plains estuary: Where a drowned valley consists mainly of a single channel, the form of the basin is fairly regular form-

ing a simple coastal plains estuary. When a channel is flooded with numerous tributaries an irregular estuary results. Many estuaries of the eastern United States are of this type.

2. Fjord: Estuaries that form in elongated steep headlands that alternate with deep U-shaped valleys resulting from glacial scouring are called fjords. They generally possess rocky floors or very thin veneers of sediment, with deposition generally being restricted to the head where the main river enters. Compared to total fjord volume river discharge is small. But many fjords have restricted tidal ranges at their mouths due to sills, or upreaching sections of the bottom which limit free movement of water, often making river flow large with respect to the tidal prism. The deepest portions are in the upstream reaches, where maximum depths can range from 800m to 1200m while sill depths usually range from 40m to 150m.

3. Bar-bounded estuary: These result from the development of an offshore barrier such as a beach strand, a line of barrier islands, reef formations a line of moraine debris, or the subsiding remnants of a deltaic lobe. The basin is often partially exposed at low tide and is enclosed by a chain of offshore bars of barrier islands broken at intervals by inlets. These bars may be either deposited offshore or may be coastal dunes that have become isolated by recent sea level rises.

4. Tectonic estuary: These are coastal indentures that have formed through tectonic processes such as slippage along a fault line (San Francisco Bay), folding or movement of the earth's bedrock often with a large inflow of freshwater.

5. Volcanic estuary: These coastal bodies of open water, a result of volcanic processes are depressions or craters that have direct and/or subsurface connections with the ocean and may or may not have surface continuity with streams. These formations are unique to island areas of volcanic origin.

C. Inlet type. Inlets in various forms are an integral part of the estuarine environment as they regulate to a certain extent, the velocity and magnitude of tidal exchange, the degree of mixing, and volume of discharge to the sea.

1. Unrestricted: An estuary with a wide unrestricted inlet typically has slow currents, no significant turbulence, and receives the full effect of ocean waves and local disturbances which serve to modify the shoreline. These estuaries are partially mixed, as the open mouth permits the incursion of marine waters to considerable distances upstream, depending on the tidal amplitude and stream gradient.

2. Restricted: Restrictions of estuaries can exist in many forms: Bars, barrier islands, spits, sills, and more. Restricted inlets result in decreased circulation, more pronounced longitudinal and vertical salinity gradients, and more rapid sedimentation. However, if

GROUP II—HYDROGRAPHIC

the estuary mouth is restricted by depositional features or land closures, the incoming tide may be held back until it suddenly breaks forth into the basin as a tidal wave, or bore. Such currents exert profound effects on the nature of the substrate, turbidity, and biota of the estuary.

3. Permanent: Permanent inlets are usually opposite the mouths of major rivers and permit river water to flow into the sea.

4. Temporary (Intermittent): Temporary inlets are formed by storms and frequently shift position, depending on tidal flow, the depth of the sea, and sound waters, the frequency of storms, and the amount of littoral transport.

D. Bottom composition. The bottom composition of estuaries attests to the vigorous, rapid, and complex sedimentation processes characteristic of most coastal regions with low relief. Sediments are derived through the hydrologic processes of erosion, transport, and deposition carried on by the sea and the stream.

1. Sand: Near estuary mouths, where the predominating forces of the sea build spits or other depositional features, the shore and substrates of the estuary are sandy. The bottom sediments in this area are usually coarse, with a graduation toward finer particles in the head region and other zones of reduced flow, fine silty sands are deposited. Sand deposition occurs only in wider or deeper regions where velocity is reduced.

2. Mud: At the base level of a stream near its mouth, the bottom is typically composed of loose muds, silts, and organic detritus as a result of erosion and transport from the upper stream reaches and organic decomposition. Just inside the estuary entrance, the bottom contains considerable quantities of sand and mud, which support a rich fauna. Mud flats, commonly built up in estuarine basins, are composed of loose, coarse, and fine mud and sand, often dividing the original channel.

3. Rock: Rocks usually occur in areas where the stream runs rapidly over a steep gradient with its coarse materials being derived from the higher elevations where the stream slope is greater. The larger fragments are usually found in shallow areas near the stream mouth.

4. Oyster shell: Throughout a major portion of the world, the oyster reef is one of the most significant features of estuaries, usually being found near the mouth of the estuary in a zone of moderate wave action, salt content, and turbidity. It is often a major factor in modifying estuarine current systems and sedimentation, and may occur as an elongated island or peninsula oriented across the main current, or may develop parallel to the direction of the current.

A. Circulation. Circulation patterns are the result of combined influences of freshwater inflow, tidal action, wind and oceanic forces, and serve many functions: Nutrient transport, plankton dispersal, ecosystem flushing, salinity control, water mixing, and more.

1. Stratified: This is typical of estuaries with a strong freshwater inflow and is commonly found in bays formed from "drowned" river valleys, fjords, and other deep basins. There is a net movement of freshwater outward at the top layer and saltwater at the bottom layer, resulting in a net outward transport of surface organisms and net inward transport of bottom organisms.

2. Non-stratified: Estuaries of this type are found where water movement is sluggish and flushing rate is low, although there may be sufficient circulation to provide the basis for a high carrying capacity. This is common to shallow embayments and bays lacking a good supply of freshwater from land drainage.

3. Lagoonal: An estuary of this type is characterized by low rates of water movement resulting from a lack of significant freshwater inflow and a lack of strong tidal exchange because of the typically narrow inlet connecting the lagoon to the sea. Circulation whose major driving force is wind, is the major limiting factor in biological productivity within lagoons.

B. Tides. This is the most important ecological factor in an estuary as it affects water exchange and its vertical range determines the extent of tidal flats which may be exposed and submerged with each tidal cycle. Tidal action against the volume of river water discharged into an estuary results in a complex system whose properties vary according to estuary structure as well as the magnitude of river flow and tidal range. Tides are usually described in terms of the cycle and their relative heights. In the United States, tide height is reckoned on the basis of average low tide, which is referred to as datum. The tides, although complex, fall into three main categories:

1. Diurnal: This refers to a daily change in water level that can be observed along the shoreline. There is one high tide and one low tide per day.

2. Semidiurnal: This refers to a twice daily rise and fall in water that can be observed along the shoreline.

3. Wind/Storm tides: This refers to fluctuations in water elevation to wind and storm events, where influence of lunar tides is less.

C. Freshwater. According to nearly all the definitions advanced, it is inherent that all estuaries need freshwater, which is drained from the land and measurably dilutes seawater to create a brackish condition. Freshwater enters an estuary as runoff from the

land either from a surface and/or subsurface source.

1. Surface water: This is water flowing over the ground in the form of streams. Local variation in runoff is dependent upon the nature of the soil (porosity and solubility), degree of surface slope, vegetational type and development, local climatic conditions, and volume and intensity of precipitation.

2. Subsurface water: This refers to the precipitation that has been absorbed by the soil and stored below the surface. The distribution of subsurface water depends on local climate, topography, and the porosity and permeability of the underlying soils and rocks. There are two main subtypes of surface water:

a. Vadose water: This is water in the soil above the water table. Its volume with respect to the soil is subject to considerable fluctuation.

b. Groundwater: This is water contained in the rocks below the water table, is usually of more uniform volume than vadose water, and generally follows the topographic relief of the land being high hills and sloping into valleys.

GROUP III—CHEMICAL

A. *Salinity*. This reflects a complex mixture of salts, the most abundant being sodium chloride, and is a very critical factor in the distribution and maintenance of many estuarine organisms. Based on salinity, there are two basic estuarine types and eight different salinity zones (expressed in parts per thousand-ppt.)

1. Positive estuary: This is an estuary in which the freshwater influx is sufficient to maintain mixing, resulting in a pattern of increasing salinity toward the estuary mouth. It is characterized by low oxygen concentration in the deeper waters and considerable organic content in bottom sediments.

2. Negative estuary: This is found in particularly arid regions, where estuary evaporation may exceed freshwater inflow, resulting in increased salinity in the upper part of the basin, especially if the estuary mouth is restricted so that tidal flow is inhibited. These are typically very salty (hyperhaline), moderately oxygenated at depth, and possess bottom sediments that are poor in organic content.

3. Salinity zones (expressed in ppt):

- a. Hyperhaline—greater than 40 ppt.
- b. Euhaline—40 ppt to 30 ppt.
- c. Mixhaline—30 ppt to 0.5 ppt.
 - (1) Mixoeuhaline—greater than 30 ppt but less than the adjacent euhaline sea.
 - (2) Polyhaline—30 ppt to 18 ppt.
 - (3) Mesohaline—18 ppt to 5 ppt.
 - (4) Oligohaline—5 ppt to 0.5 ppt.
- d. Limnetic: Less than 0.5 ppt.

B. *pH Regime*: This is indicative of the mineral richness of estuarine waters and falls into three main categories:

1. Acid: Waters with a pH of less than 5.5.
2. Circumneutral: A condition where the pH ranges from 5.5 to 7.4.
3. Alkaline: Waters with a pH greater than 7.4.

PART 922—NATIONAL MARINE SANCTUARY PROGRAM REGULATIONS

Subpart A—General

Sec.

- 922.1 Applicability of regulations.
- 922.2 Mission, goals, and special policies.
- 922.3 Definitions.
- 922.4 Effect of National Marine Sanctuary designation.

Subpart B—Site Evaluation List (SEL)

- 922.10 General.

Subpart C—Designation of National Marine Sanctuaries

- 922.20 Standards and procedures for designation.
- 922.21 Selection of active candidates.
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- 922.23 Coordination with States and other Federal agencies.
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Conceptual State Lands Management Plan

CONCEPTUAL STATE LANDS MANAGEMENT PLAN

Adopted

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By the Board of Trustees of the Internal
Improvement Trust Fund

Governor Bob Graham
Secretary of State George Firestone
Attorney General Jim Smith
Comptroller Gerald A. Lewis
Treasurer Bill Gunter
Commissioner of Agriculture Doyle Conner
Commissioner of Education Ralph D. Turlington

Prepared by the
Bureau of State Lands Management

Dr. Elton J. Gissendanner, Executive Director
Department of Natural Resources

Richard P. Ludington, Director
Division of State Lands

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PREFACE: A Legal Perspective

Prior to discussing the activities affecting the utilization of lands vested in the Board of Trustees of the Internal Improvement Trust Fund, it is essential to examine the legal concepts surrounding such trust arrangements.

Important concepts warranting definition and discussion include: (1) trust, (2) trustees, (3) cestui que trust, and (4) fiduciary. For the purposes of discussion, Blacks' Law Dictionary has been used for all definitions.

(1) Trust - "A right of property, real or personal, held by one party for the benefit of another." It is also defined as "a fiduciary relation with respect to property subjecting person by whom the property is held to equitable duties to deal with the property for the benefit of another person which arises as the result of a manifestation of an intention to create it."

(2) Trustee - "The person appointed, or required by law, to execute a trust; one in whom an estate, interest, or power is vested, under an express or implied agreement to administer or exercise it for the benefit or the use of another called the cestui que trust."

(3) Cestui que trust - "The person for whose benefit a trust is created or who is to enjoy the income or the avails of it."

(4) Fiduciary - "A person holding the character of a trustee, or a character analogous to that of a trustee, in respect to the trust and confidence involved in it and the scrupulous good faith and candor which it requires. "The "trust", per se, is established pursuant to Chapter 253, Florida Statutes, and generally consists of those state-owned lands in which title is vested in the Board of Trustees of the Internal Improvement Trust Fund. The trust also includes those "fruits" of the trust that have been generated and returned to the trust for administration by the Board. The beneficiary or "cestui que trust" of the trust is the state, which, by extension, is the general citizenry of Florida. "State" has been defined as "a people permanently occupying a fixed territory bound together by common-law habits and custom into one body politic exercising, through the medium of an organized government, independent sovereignty and control over all persons and things within its boundaries... (Emphasis added). Therefore, management of state-owned lands is for the benefit of all the citizens of Florida; and to this end, a fiduciary relationship exists with this general public. The Florida Constitution (Article II, Section 7 and Article IX, Section 11), Chapter 253, Florida Statutes, and certain other statutes provide specific guidance in relation to the trust and fiduciary obligations. Statutory direction such as "The Board of Trustees of the Internal Improvement Trust Fund is hereby authorized and directed to administer all state-owned lands and shall be responsible for the creation of an overall and comprehensive plan of development concerning the acquisition, management and disposition of state-owned lands, so as to insure maximum benefit and use" (Section 253.03(7), Florida Statutes) must, therefore, be executed within the confines of this fiduciary relationship.

In addition to the more commonly recognized obligations imposed upon the Board by its fiduciary relationship with the citizens of Florida, it is also bound by factors delineated by court decisions: To wit: "The relations and duties involved (in a fiduciary relationship) need not be legal, but may be moral, social, domestic, or merely personal" (Trustees of Jesse Parker William Hospital v. Nisbet, 191 Ga. 821, 14 S.E. 2nd 64, 76). The Board of Trustees of the Internal Improvement Trust Fund must necessarily, by virtue of its fiduciary responsibilities, consider a broad array of public interest factors before authorizing activities affecting the trust.

The following narratives, goals, objectives, and policies were drafted with these responsibilities in mind. Professional planning and resource management recommendations have been melded with both the expressed and implied obligations inherent in the management of an active public trust.

I. INTRODUCTION: The Management Concept And Evaluation Process

The Conceptual State Lands Management Plan represents completion of the first phase of the planning effort mandated by Section 253.03(7), Florida Statutes. This conceptual plan is intended as a management overview or outline whereby the Board of Trustees of the Internal Improvement Trust Fund establishes, for the first time, a comprehensive set of policies governing the real properties under its ownership and control.

Acceptance of this document by the Board will set the stage for more specific planning and management, such as the development of administrative rules and parcel-specific management evaluations and recommendations. This multi-faceted planning and management process will provide philosophical direction for the Board's staff, while remaining flexible enough to accommodate future legislative, judicial, or Board directives. The total of the Conceptual State Lands Management Plan, administrative rules, supplemental legislation, and parcel specific management procedures, evaluations, data and recommendations will constitute the overall state lands management program.

The management evaluation process is a staff effort whereby the Board is provided a synopsis of projected effects (both positive and negative) that are anticipated to occur should the Board authorize certain activities involving real property under its ownership and control. It is through this process that the philosophical directions embodied in the Conceptual State Lands Management Plan (hereafter referred to as the Plan) and the resultant procedures established as administrative rules are brought together to develop parcel-specific management evaluations and recommendations pursuant to Section 253.034, Florida Statutes.

The Plan provides basic policy guidance for the formulation of management evaluations and recommendations, but the information in the Plan is far from exhaustive. In fact, most management evaluations involve the use of a series of data collection and assessment steps. These evaluation steps generally fall into the following categories: legal, physical, environmental, recreational, socio-cultural, aesthetic, and economic. Most of the assessment data routinely come from existing sources.

A typical management evaluation would begin with an examination of the degree of title interest held by the Board. This title examination would determine the existence of any restrictive covenants, outstanding title reservations or other encumbrances that may affect the management of a given parcel.

Next, staff would consider any constraints that may have been placed on the property by legislative direction, statutory prohibitions, or executive instructions at acquisition. In addition to revealing the more obvious results of these limitations, such analysis would indicate the possibility of multiple use management of the parcel being evaluated, consistent with Section 253.034, Florida Statutes.

The next step would involve the delineation of the physical, environmental, and cultural features characterizing the property. This information is obtained from a number of available sources such as topographic maps, aerial photographs, soil maps, field inspection reports, and similar aids. In cases where an agency has or will have management responsibility, this information may be provided as part of the management plan.

One of the most significant and readily available sources of parcel-specific physical and cultural data is the Department's computer system. This data system (SLAMIS) must be continually updated to reflect current management conditions of Board-owned and controlled real property.

Once the legal, physical, environmental, and cultural profile of the property is established, staff will consult the policies in the Plan and potential managing agencies and prepare a recommendation encompassing both opportunities and constraints to management. This recommendation will frequently contain references to other federal, state, and local plans and programs potentially affecting anticipated management activities. The final staff recommendation will list those general management actions that

can be accommodated without inordinately detracting from the basic public values of that land and identify whether any of a certain parcel may be surplus to public needs. Any specific intended use for the subject property will be compared with the list of preferred management activities, and rated accordingly.

The Plan, like the ongoing management program, must remain flexible enough to accommodate necessary changes. A static plan would soon become an anachronism as new legislative and administrative directions are implemented. To avoid this problem, provisions must be made to establish an orderly process for continuous updating of the adopted Plan.

The preferred update process would involve placing additions, deletions, or modifications on the normal Board Agenda for policy-level direction and guidance. This would provide the most timely Plan modification system, while maximizing public notice and input. Such modifications could be proposed by either the public, departmental staff, or directly by the Board. Affirmative Board action on such Agenda items would effectively accomplish the required modification.

II. GOALS

A. Achieve full proprietary responsibility for the management of those state-owned lands vested in the Board of Trustees of the Internal Improvement Trust Fund.

Chapter 253.03, Florida Statutes, establishes the legal basis for the Board of Trustees to assume an active role in the administration of those state-owned lands vested in the Board of Trustees. Section 253.03(7), Florida Statutes, directs the Board of Trustees "...to administer to all state-owned lands...so as to insure maximum benefit and use." In a legal context the word "Administer" means "to superintend the execution, use, or conduct of; to manage affairs; to take charge of business.

The Board of Trustees, in meeting its obligations as both title holder and administrator of certain state-owned lands, must assert a proprietary role in the acquisition, management, and disposition of those lands. State-owned lands should be managed with recognition that land is a resource and not a commodity. Consistent with this concept, state-owned lands should be treated with equal or greater proprietary respect than that usually afforded privately owned lands.

B. Achieve internal program consistency in the management of state-owned lands.

One of the essential ingredients of a successful land management program is a high degree of internal consistency between the various management functions. This is especially true when the management evaluations and proposed management activities are predicated upon a resource-based methodology.

The present management authorities of the Board of Trustees do not necessarily ensue from the same statutory directives. As a result, leases of submerged lands, for example, were not evaluated and processed in the same manner as the leases of upland property. This situation resulted from a traditional management bias that attached greater importance to upland property than to submerged land. Consequently, implementing consistent management policies for all state-owned lands will require certain statutory and administrative rule amendments.

All activities affecting title to state-owned lands not directly attributable to, or authorized by the Board of Trustees, are potential encumbrances on title. Therefore, for management consistency, the Board should control all activities affecting title on those lands to which they hold title. In the absence of such a comprehensive management system, the Board of Trustees may find its management authorities curtailed on given parcels by unrecognized but legally defensible encumbrances by other entities.

C. Develop a state lands management program that provides for a parcel-specific determination of "maximum benefit and use"

The statutory phrase "...to insure maximum benefit and use" should set the philosophical direction of the Plan. This directive has been interpreted by some as calling for a determination of the "highest and

best use" of each parcel. Care must be taken, however, to insure that this phrase is not defined in an unnecessarily restrictive manner. Such action could deter the development of a truly comprehensive management plan.

The traditional connotation of "highest and best use" has been associated with market place economics. In this context, a given parcel is categorized according to the highest economic return that can be expected from the use of that property. This narrow interpretation of "highest and best use" is not suited for the management of state-owned lands.

For the purposes of managing state-owned lands, it would appear reasonable to interpret "maximum benefit and use" as "balanced public utilization". The term "balanced public utilization" implies that parcel-specific management decisions are predicated upon a broad array of factors, including environmental constraints, economics, recreation, sociological and aesthetics. The form and funding of acquisition, such as the Chapter 259 and 375 programs, will also influence management decisions.

The fully developed state lands management program should contain sufficient implementation procedures to insure that each parcel of land is managed according to the concept of "balanced public utilization". Conversely, the system should discourage management activities that do not provide "maximum benefit and use", and prohibit incompatible activities, which lack "overriding public value".

III. OBJECTIVES

A. Develop a state land management program that adequately accommodates the scope and directives of existing state law.

Chapter 253, Florida Statutes, requires that the Plan address, at a minimum, "acquisition, management and disposition of state-owned lands so as to insure maximum benefit and use".

This statute also establishes a number of management responsibilities and processes for state-owned lands vested in the Board of Trustees. It is imperative that the state lands management program address fully the statutory constraints and directives outlined in Chapters 197, 270, 258, and 259, Florida Statutes, as well as Chapter 253, Florida Statutes, and other appropriate statutes.

B. Encourage the identification and resolution of statutory conflicts affecting the management of state-owned lands.

Over the years, a number of special-purpose legislative actions affecting state-owned lands have become law and influence the management of those lands. Murphy Act Lands, for instance, have to be treated somewhat different than other state lands because of differing statutory requirements. In the interest of updating and improving the statutory basis for state land management decisions, the statutes should be reviewed periodically and brought into conformity with current public attitudes and professional management criteria.

C. Formulate a general planning approach that will accommodate a large amount of parcel-specific data.

Although state-owned lands should be managed under a generalized approach, day-to-day management decisions involving the use of state-owned lands should be predicated upon parcel-specific data. Development of a parcel-specific database that includes the physical/cultural profile of the state-owned property is under way. The adequacy of the parcel-specific database is the most important facet of the state lands management program. The database covers past and present land use, physiography, environmental factors, and current encumbrance information. This information is the basis for an initial recommendation of management practices for parcels of state-owned lands.

The Board must evaluate the proprietary constraints of each parcel as well as the more traditional management factors. These constraints arise from such things as prior leases and/or easements, legislative

and/or executive directives, and statutory limitations. These management constraints do not occur in any uniform manner, nor are they predictable.

Development of the parcel-specific database involves the implementation and maintenance of a computerized data storage and retrieval system, including the continuous update of the state-lands inventory. New entries are documented on coding forms in preparation for computer input. Information regarding leases, easements, mineral rights, submerged lands, and uplands is a part of the parcel-specific management data.

D. Structure the planning process to provide direction for state lands management decisions.

The Plan must reflect a fully integrated management system that encompasses all program areas affecting the use and protection of state lands. The management evaluation process has been ongoing concurrent with the planning program. As part of the overall management process, a procedural and organizational framework is being established to improve the existing procedures.

E. Adopt a planning framework that will accommodate policies contained in the State Comprehensive Plan and other Legislatively mandated Plans to minimize potential management conflicts.

One of the most important objectives of the Plan is to avoid duplication. Therefore, it is important that all staff planning activities be conducted with the full knowledge of, and coordinated with, other public agencies planning efforts.

It is desirable to utilize, to the extent practicable, general natural systems data and recommended policies developed by other state programs. The rationale behind this proposal includes a desire to economize on staff expertise and time, and to produce a plan that is philosophically compatible with other legislatively mandated plans.

F. Use a planning process that allows for input from affected state agencies, local government, and the general public.

The development and implementation of the Plan will have broad implications. To avoid many of the potential problems associated with programs of this type, the Board must be committed to program coordination on several distinct, but interrelated levels. Where compatible and appropriate, state lands management should help to accomplish other statutory objectives of the State.

There are several reasons for including state agencies in a coordination program. First, state agencies such as the Department of Agriculture and Consumer Services, and the Department of General Services originally acquired many of the lands to which the Board presently holds title, or are actively engaged in some type of management arrangement with the Board. Also, many agencies have broad planning and/or management responsibilities that need to be considered during the development of the Plan. These agencies include the Department of Environmental Regulation, the Division of Archives, History and Records Management, and the Executive Office of the Governor/Planning and Budgeting. State agency coordination has been achieved through an inter-agency work group established by the Division of State Lands staff.

On January 22, 1980, the Board authorized staff to submit the draft Plan to the public for review and comment. Staff sent twenty copies of the draft Plan to each of the eleven regional planning councils and requested that these regional planning councils make the Plan available to those local governmental bodies and other local interests that would be affected by the eventual finalization of the Plan. Public workshops were held in Miami, Panama City, Jacksonville, and Orlando, to maximize geographical equality and public input.

Additionally, the staff provided each of the State's 67 County Commissions with review copies of the Plan. These commissions were requested to review the Plan and to provide comments, observations, and

recommendations. Other review copies were made available to various special interest such as conservation and development groups.

G. Develop a plan that will result in consistent management decisions and greater predictability of governmental action.

The Plan will provide the overall program superstructure for the protection and management of state-owned lands.

The state-owned lands management program encourages those activities that will provide a net return to the public while maintaining the basic values and functions of the natural environmental systems.

The Plan establishes clearly discernable management processes that are, to the extent practicable, internally consistent in their approach. The end result is a greater public awareness of the management process conducted in the stewardship of state lands.

IV. RESOURCE AND PROGRAM ELEMENTS

The evaluation of proposed management activities on state-owned land must consider the existing natural conditions and potential program impacts. In keeping with this concept the following categories have been established. These categories are intended to highlight certain public values associated with the physical situation of many parcels of state-owned land, and applicable program elements. In numerous cases, these public values have been formally recognized by legislative and executive action.

The following categories and policies are intentionally general, and are designed to provide an overall philosophical direction to state lands management. The categories are not exhaustive, nor are they inherently suited to parcel-specific decision making. They are, however, suitable for the establishment of state-wide consistency in the management of state-owned lands, regardless of geographic location, natural conditions, or intended use.

It is envisioned that these broad categories will form the framework into which will be inserted more detailed parcel-specific policies and recommendations. These site-specific evaluations and recommendations will be tailored to meet the individual characteristics of each parcel of land, and will provide the basis for determining the advisability of committing public resources.

V. RESOURCE ELEMENT POLICIES

A. Upland Vegetation

Upland vegetation is, to a great extent, determined by the underlying soils and prior land uses. It represents a changing and often overlooked resource that must be managed to insure its perpetuation in a desirable condition.

Based upon inventory information and projected utilization of specific parcels, a direction should be established to manage vegetation for a variety of benefits (aesthetics, wildlife habitat improvement, watershed management, recreation, forage, and timber management). Where appropriate in single and multiple-use management, agencies will be encouraged to incorporate all of the above disciplines into one management philosophy--management that will be of the greatest benefit, to the largest number of people, over the longest period of time.

Policies

1. Manage state-owned lands in a manner that maintains a desirable vegetation cover while providing multiple-use benefits to the citizens of the State of Florida.

2. Require multiple-use management of all state-owned land where appropriate.
3. Encourage, when appropriate, the use of silvicultural activities, which maintain a healthy, stable vegetative cover, (prescribed burning, tree planting, removal of diseased trees, etc.).
4. Prohibit the use of off-road vehicles on all state-owned lands, except in such areas specifically designated in approved agency land use plans or by administrative rules adopted by the Board for use by such vehicles.
5. Encourage the harvesting and sale of timber products from appropriate state-owned timberlands, whenever such harvesting and sale are compatible with program priorities and the provisions of Section 253.034, Florida Statutes.
6. Encourage the use of management practices on state-owned land, which are endorsed as Best Management Practices for minimizing non-point source pollution.
7. Encourage the establishment or reestablishment and management of plant species that are indigenous to specific sites (i.e., emphasize hardwood management on hardwood sites; manage for pines on areas where fire would normally retard hardwoods; encourage both hardwoods and conifers on suitable sites)
8. Encourage the protection of endangered and threatened plants, and plants and plant communities which serve as important food sources and habitat for endangered and threatened animal species.
9. Encourage the location and removal of noxious exotic plant species.

B. Soils

Soils are a resource having tremendous influence over the active management of state-owned lands. As such, it is important that the parcel-specific database contain as much up-to-date soils information as is available.

Soil types and associations physically and economically affect various types of management activities, ranging from agricultural uses to the construction of public buildings. Therefore, each parcel-specific management evaluation and recommendation should rely heavily upon inherent characteristics, suitabilities, and limitations.

Due to their public significance, soils categorized as "prime" or "unique" agriculture lands should receive special consideration. The state lands management program should discourage those management activities that would preempt future agricultural use of state-owned parcels containing "prime" or "unique" agricultural soils.

Policies

1. Encourage the use of detailed soils surveys and interpretations in determining parcel-specific management recommendations.
2. Encourage management activities that recognize natural topographic features and avoid extreme slope and site modification.
3. Encourage conservation practices in all management activities that will minimize erosion and sedimentation.
4. Maintain water levels as high as feasible on organic soils to reduce oxidation, consistent with balanced management programs.
5. Prohibit off-road vehicular traffic in areas sensitive to damage.

6. Discourage activities that will effectively preclude future agricultural use of "prime" and/or "unique" soils on state-owned lands.

C. Archeological and Historical Resources

Archaeological and historical resources represent tangible links with our past. Florida, due to its environmental amenities and colorful history, contains numerous archaeological and historical sites of public importance. Each of these sites contains unique and irreplaceable information concerning our cultural heritage.

Sites on state-owned lands should be managed as valuable public resources. Adequate protection of these resources can be best achieved through a coordinated effort between the Board and the Department of State, Division of Archives, History and Records Management.

Policies

1. Coordinate all proposals for changes in the character or use of state lands, with the Division of Archives, History and Records Management, in order to mitigate potential damage or disturbance of, or to preserve, archaeological and historical sites and properties.
2. Encourage the systematic location and evaluation of all significant archaeological and historical sites on state-owned lands.
3. Prohibit the disturbance of archaeological and historical sites on state-owned lands, unless prior authorization has been obtained from the Division of Archives, History and Records Management.

D. Water Resources (Quality and Quantity)

In Florida, the availability and quality of water often influence the type and number of management options available for a parcel of land. In recognition of this situation, the state lands management program should fully consider potential impacts upon water resources prior to making a parcel-specific determination of "maximum benefit and use".

The management evaluation process must address water resources from at least two perspectives. The first consideration should delineate those natural systems that require a certain quantity, and/or periodicity of water for their control existence and productivity. (Examples of this type of natural system would include coastal estuarine and riverine wetlands).

The second consideration is an evaluation of the sustained availability of water for water-consumptive management activities such as agricultural irrigation and certain mining operations. The amount of water available for such activities is difficult to quantify, but it is a valid management criterion that should be considered.

Water quality classifications also must be included in the determination of all management recommendations. These classifications often represent potential constraints for management, especially when Class I, Class II, and Outstanding Florida Waters are involved. Management activities on state-owned lands should comply with State water quality standards and classifications and their intent.

Policies

1. Coordinate state lands acquisition, planning and management with water management programs to insure the long-range maintenance and improvement of water quantity and quality.
2. Encourage the retention and storage of surface water in naturally occurring storage areas, such as lakes and wetlands, consistent with the maintenance of the area's long-term productivity and stability.

3. Utilize management practices, which prevent the over-drainage of land and soils.
4. Require agricultural and industrial users of state-owned lands to conduct their activities in a manner consistent with sound water management and conservation practices.
5. Encourage the provision of sufficient water and maintenance of natural hydroperiods to insure the long-term productivity and stability of self-maintaining natural ecosystems on state-owned lands.
6. Manage state-owned lands in a manner that provides maximum protection for the waters of the State especially those used for public drinking water supply, shellfish harvesting, public recreation, fish and wildlife propagation and management.
7. Encourage waste water re-use wherever possible to relieve pressure on water resources.
8. Encourage the use of nonstructural water management strategies for flood control and water supply to protect and enhance natural resources and conserve energy.
9. Require, at a minimum, that management activities on state-owned land comply with State water quality standards and classifications and their intent.

E. Fish and Wildlife Resources

Fish and wildlife are important components of Florida's appeal as a tourist state and as a place to live. Fish and wildlife habitat is diminishing in quantity and quality due to the direct and indirect effects of urbanization, and also due to land and water management activities, which do not adequately address this resource. state-owned lands will play an increasingly important role as enclaves of habitat diversity and as public outdoor recreational areas.

Policies

1. Where significant fish and wildlife habitat exists, encourage those management activities, which maintain a natural diversity of habitats and balanced fish and wildlife population.
2. Coordinate proposed management activities potentially affecting significant tracts of fish and wildlife habitat with the Game and Fresh Water Fish Commission.
3. Encourage the public use, either consumptive or non-consumptive, of the fish and wildlife resources on state lands where compatible with management goals.
4. Continue and, where possible, accelerate the inventory of fish and wildlife habitats on state-owned lands.

F. Endangered Species

In the recent past, many of Florida's indigenous plants and animals have seriously diminished in number and in some cases have disappeared completely. In most cases, the elimination of these plants and animals has resulted from the unintentional side-effects of increased urbanization and associated changes in land use and land cover.

As population growth continues in Florida, the availability of natural habitat for many plants and animals is reduced. In light of this situation state-owned lands, especially large acreage tracts, are increasing in importance as enclaves and refuges for endangered species. Consequently, management of state-owned lands should be conducted in a manner that recognizes the importance of maintaining endangered species habitat.

Policies

1. Provide for the continued protection of threatened and endangered species habitat on state-owned lands.
2. Encourage the location, identification, and protection of presently unknown areas of threatened and endangered species habitat located on state-owned lands.
3. To minimize adverse effects, coordinate proposed management activities involving endangered plants and animals with the Division of Forestry and Plant Industry, Florida Department of Agriculture and Consumer Services and the Game and Fresh Water Fish Commission.
4. Encourage the re-establishment and restoration of endangered species and habitat.

G. Beaches and Dunes

Florida's beaches and dunes are important economic and environmental assets. They serve dual purposes as sources of recreational activity and as protective barriers from storms.

Beaches and dunes play a prominent role in creating and maintaining the "tourism image" Florida enjoys. The tourist industry forms one of the cornerstones of the state's economy and a majority of these tourists visit beaches.

From an environmental perspective, beaches and their associated dune systems are vital to the well-being and integrity of Florida's coastal areas. These systems, under natural conditions, provide for sand transport, depletion, and accretion, which is essential to the maintenance of these beaches and dunes. In addition to the primary function of shoreline stabilization, beaches and dunes provide a protective buffer against storm tides and winds.

In some areas, the beaches and associated dune systems are experiencing severe erosion. These erosion problems are the result of man-made modifications to the beach and dune system and natural erosion such as hurricanes. The Department of Natural Resources has the statutory responsibility to remove unnecessary structures that adversely affect Florida's beach and dune systems, to control construction of all new structures affecting these systems, and to assist in beach nourishment and coastal protection programs designed to return beach and dune systems to their natural equilibrium. Management of state-owned lands should recognize these statutory responsibilities and ensure the future protection and enhancement of state-owned beaches and dunes.

Policies

1. Encourage management activities that will ensure that continued protection of the physical and environmental integrity of state-owned beaches and dunes.
2. Encourage the non-structural use of state-owned beaches and dunes for purposes such as public recreation (protection structures such as sand, fences and dune walkovers excepted)
3. Support, when justified by comprehensive analysis, dune stabilization and beach protection and restoration projects in areas where significant erosion and damage have occurred.
4. Require placement of all beach compatible dredge materials on beaches, whenever possible.

H. Natural Hazard Areas

Throughout the State of Florida, certain areas contain natural conditions that constrain development. Additionally, these areas, if improperly utilized, may adversely affect human health and welfare.

Examples of natural hazard areas include river flood plains, the 100-year hurricane flood zone, barrier islands, and areas with active sinkhole potential. State-owned lands classified as natural hazard areas should be managed in a manner that discourages structural development, unless such structures are specifically designed and built to compensate for the hazard factors. It is especially important to discourage permanent or semi-permanent human habitation in such areas, and the use of state lands for such purposes should generally be prohibited. Allowable management activities within natural hazard areas may include, consistent with other natural and institutional factors, agricultural and timber production, outdoor recreation, and other nonstructural uses.

Policies

1. Control the use and construction of public buildings and other structures within state-owned natural hazard areas to insure structural integrity, resource protection, and public safety.
2. Encourage the utilization of natural hazard areas for nonstructural purposes (e.g. timber production, recreation).

I. Submerged Grass Beds

Submerged native grasses are valuable public resources. They occur throughout the state's marine, estuarine, and fresh water bodies.

Submerged grasses perform a number of "free" environmental services of public benefit, including water quality maintenance, natural turbidity control, bottom stability, and they offer habitat for aquatic organisms. Due to their location, they are also one of the most difficult resources to inventory and protect.

Submerged grasses are fairly fragile and are easily adversely impacted by man's activities. Changes in water quality, quantity, and periodicity, increased turbidity, and competition from non-native aquatic vegetation, can significantly affect this resource.

Management of state-owned lands should recognize the natural values associated with submerged grass beds. Proposed activities requiring a commitment of submerged lands and upland development activities on state-owned lands that will potentially impact water bodies containing submerged grasses, should be strongly discouraged. Projects that will adversely impact significant submerged grass beds should be prohibited unless the project is determined to be of overriding public importance with no reasonable alternatives and adequate mitigation measures are included.

Policies

1. Encourage the location and evaluation of submerged grass beds in state ownership.
2. Control the use of submerged lands to maintain essentially natural conditions and protect the values and functions of submerged grass beds.
3. Prohibit development activities that adversely impact significant beds of submerged grasses, unless determined to be of overriding public importance with no reasonable alternatives, and adequate mitigation measures are included.
4. Encourage the continuation of control programs for noxious and non-native species of aquatic vegetation.
5. Encourage, whenever practical, the use of physical and biological removal techniques rather than chemical applications in aquatic weed control programs.

J. Swamps, Marshes, and Other Wetlands

In recent years, environmental researchers have become increasingly aware of the values associated with swamps, marshes, and other wetlands. These wetlands function as natural filtration for upland run-off, natural water storage areas, and natural hydroperiod control devices. They also provide shoreline stability and protection, and are excellent wildlife habitat. The detrital production of these wetlands are a major component of riverine and estuarine food chains.

Historically, wetlands have been viewed as wastelands', useful only for filling, ditching, and draining for development. Such treatment of wetlands is no longer acceptable. Management of state-owned lands must recognize the functions and public values associated with the protection and maintenance of wetlands.

Policies

6. Require management activities on state-owned lands to protect wetlands and to maintain essentially natural conditions.
7. Encourage the re-establishment of previously modified wetlands in state ownership, where practical.
8. Prohibit the draining of wetlands on state-owned lands for agricultural, forestry, and other purposes.
9. Discourage the removal of natural shoreline vegetation.

K. Mineral Resources

The State of Florida contains quite a diversity of mineral resources that make a significant contribution to the state's economy. The most notable resources, insofar as revenue potential is concerned, include oil and gas, phosphate, clays and limestone. Other minerals present include dolomite, sand, gravel, aggregates, and heavy minerals (zircon, ilmenite, rutile, monazite).

Management of state-owned mineral resources should be subject to more careful scrutiny than is normally the case for the other types of natural resources. The stewardship of these nonrenewable resources must insure that their extraction and utilization serves the best long-range public purposes. Additionally, active extraction of many types of minerals often results in drastic changes to the physical integrity of a parcel of land. A decision to mine must be made with the full realization that most future management options available for that parcel of property will be eliminated.

State-owned mineral resources should be treated as public reserves, and should not be necessarily subject to general market considerations. This is especially true for oil, gas, and phosphate, which are essential for the production of food and fiber. Extraction and utilization of the public mineral resources should attempt to insure their availability for essential products such as pharmaceutical supplies, fertilizers, and pesticides.

Policies

1. Encourage detailed inventories and evaluation of state-owned mineral resources.
2. Control management activities on state-owned land that would preclude or seriously impair the ability to extract significant mineral resources.
3. Allow extraction of state-owned mineral resources in environmentally sensitive areas only upon demonstration that the extraction is of overriding public importance, that all reasonable steps will be taken to minimize adverse environmental impacts, and that there are no reasonable alternatives.
4. Discourage all future releases of state-owned mineral reservations, excepting right-of-entry and exploration.

5. Require that all state-owned lands subjected to mining be reclaimed or restored and left in such condition so as to maximize future public uses and values.

L. Unique Natural Features

This is a generalized resource category designed to accommodate certain natural areas and features. The primary public significance of these features is that they are uncommon in Florida.

Unique natural features include such things as coral reefs, natural springs and their associated runs, caverns and large sinkholes, virgin timber stands, scenic vistas, exceptional vegetation and habitat areas, scenic natural rivers and streams, coquina outcrops, and bird rookeries. The management of state-owned lands should recognize the public values associated with these unique resources and seek to protect their integrity.

Policies

1. Encourage the location and evaluation of unique natural features on state-owned lands.
2. Discourage management activities on state-owned land that will adversely impact unique natural features.
3. Encourage public utilization of unique natural areas consistent with the protection of the natural values and functions.

M. Ecological Reserves

Ecological Reserves are designated as outstanding examples of native Florida landscapes. They contain relatively unaltered flora, fauna, and geologic conditions, and preservation from the adverse influences of human activity will permit the biophysical systems to function and interact naturally. The primary value and present use of ecological reserves is the preservation of the systems and their functions, leaving all options open for future use of resources and research.

The components of ecological reserves are:

Research Natural Areas where natural processes are allowed to dominate, and the only management is to preserve a given ecosystem or feature, or to allow natural succession. Such areas must be protected against activities that directly or indirectly modify ecological processes or alter the ecosystem being preserved. The only activities allowed in these areas would be collection of baseline data and monitoring of ecosystem function.

Experimental Ecological Areas where experiments or management techniques can be carried out on wildland ecosystems to provide new scientific knowledge of those systems. Research and management must be essentially non-disruptive.

During the management evaluation process, state lands would be assessed for potential as ecological reserves, using these criteria:

*Ecological reserves must contain outstanding, or the only remaining, examples of Florida landscapes.

Recognizing that very little of Florida can be considered pristine, ecological reserves must be areas where natural systems predominate or where restoration of the native systems is economically and ecologically feasible.

*Ecological reserves should be of a size and configuration that allow natural processes to be the dominant management tools. Ideally, it should be possible to buffer them from intensive land use areas.

Policies

1. Preserve examples of natural ecosystems on state-owned land.
2. Preserve the full range of genetic diversity in native plant and animal populations.
3. Encourage collection of baseline data on natural ecosystems, which will aid in detecting environmental changes that result from human activity.
4. Provide research and educational opportunities for scientists and advanced students within the framework of a planned research program on applicable state-owned land.

VI. PROGRAM ELEMENT POLICIES

A. State Land Acquisition

Section 253.03(7), Florida Statutes requires that acquisition of state-owned lands be specifically addressed in the plan. Under most circumstances, other state agencies purchase or otherwise obtain lands for various purposes, and title is taken in the name of the Trustees, consistent with the provisions of Section 253.025, Florida Statutes.

Upon completion of acquisition, the original deed and title insurance policy are transmitted to the Bureau of State Lands Management for permanent filing. When this information is received, the new acquisition is entered upon the State-Owned Lands Inventory, and documents are prepared to assign the newly acquired property to the appropriate management agency or agencies.

Effective October 1, 1979, voluntary negotiated acquisitions of land, title to which will vest in the Board of Trustees of the Internal Improvement Trust Fund, became subject to specific acquisition and review procedures established pursuant to Chapter 79-255, Laws of Florida (Section 253.025, Florida Statutes)¹. This law strengthens the Board's administrative supervision over title acquisition, and provides an opportunity for all interested and affected parties to coordinate their land needs and intended management activities with the Division of State Lands, acting for the Board.

Policies

1. Establish and implement an evaluation process to determine relative assets and liabilities of each parcel of property to be obtained by state agencies prior to acquisition and formal acceptance of title by the Board of Trustees.
2. Require that future state agency acquisition of lands, to which title will be vested in the Board, be for specific public purposes as outlined by Legislative Act, executive directive, and/or formally approved work programs and plans.
3. Require state agencies to coordinate projected land needs with the Board to insure that these needs are adequately considered in the acquisition process.
4. Require state agencies to meet their land needs, whenever practical, through the use of existing state-owned lands where the intended use is compatible with the approved uses and natural characteristics of the land.

¹ Florida Statutes have been revised substantively since 1979. See chapters 253 and 259, F.S., for current acquisition, management and administrative procedures for lands titled to the Board of Trustees.

B. Dispositions

Public land sales may be initiated by the Board either upon its own initiative or pursuant to application. Sales are accomplished by negotiation between a prospective purchaser and the Board, or by sealed bids to the highest qualified bidder.

Murphy Act land sales may also be initiated either upon the Board's own initiative or pursuant to application. All such sales are to the highest bidder by sealed bids, except the cases where an applicant qualifies as a hardship applicant.

Before a sale is consummated, all state agencies and the appropriate county and municipal bodies are notified to determine if there is a public need for the subject parcel.

The sale of sovereignty submerged lands falls into two categories: lands riparian to uplands, and lands not riparian to uplands. Purchase of sovereignty lands riparian to uplands is normally by the upland owner. Sale of non-riparian sovereignty lands, including sovereignty islands, sand bars, and exposed tidal flats, must be by competitive bid. All sales of sovereignty lands must be determined by the Board to be in the public interest, and upon such terms, prices, and conditions, as the Board deems appropriate. In addition, the Board will determine to what extent a sale of sovereignty land will interfere with normal marine activity and the maintenance of essentially natural conditions, and will consider any other factors, immediate or long-range, affecting the public interest.

In all land sales by the Board, excepting those transactions referenced in Section 253.62, Florida Statutes, there shall be reserved for the Board and its successors, an undivided three-fourths interest in, and title to all the phosphate, minerals, and metals that are or may be in, on, or under the said land, and an undivided one-half interest in all the petroleum that is or may be in, or under the said land with the privilege to mine and develop the same (Section 270.11, Florida Statutes).

Exchanges

Exchanges of public land may be initiated by the Board, either upon its own initiative or pursuant to application. The Board is authorized to pay or receive a sum of money in order to equalize an exchange. Exchanges, like other public conveyances, must satisfy the applicable public interest requirements, and the Board must receive, at a minimum, properties and/or other considerations, worth no less than the property relinquished in the exchange.

In all disposition transactions, the Board should assume a positive negotiating posture and exercise its proprietary responsibilities in regard to accepting or setting the terms and conditions of each transaction affecting state land. Since it is counter to present disposition policy to sell state lands for the purpose of generating revenue, it should be demonstrated that all dispositions of state lands are in the public interest.

As a method for disposition, land exchanges are usually preferred and should be the first option explored. The state benefits by such transactions and does not diminish its capital assets because of the equal-terms minimum requirement. Land exchanges also provide a viable management vehicle for the consolidation and enhancement of the state-owned land inventory. For example, many small or otherwise unmanageable parcels can be offered in exchange for tracts adjacent to existing state landholdings.

Sales of state-owned lands should be considered only after all possible land exchange proposals have been exhausted, and the Board is satisfied that the sale is not contrary to the public interest, or in the case of sovereignty lands, that the sale is in the public interest. Historically, the Board, in the interest of internal improvement, has sold millions of acres of state land to private citizens, railroads, and other corporations. This effort to attract new citizens and to develop the State of Florida by the sale of public land is no longer necessary or desirable. Under certain conditions, land sales can prove beneficial by reducing the management liabilities of the Board, while supplementing a county tax roll. Also, situations may occur in which the disposition or leasing of land for institutional, industrial and research and development parks would further such State objectives as creating and building Florida industries and

encouraging permanent employment for citizens. When considering a land sale, the Board should regard the appraised value of the parcel as the base bid or negotiable price, and agree only to those transactions that benefit the people of Florida.

Policies

1. Land exchanges shall be the first disposition option considered by the Board so as to consolidate the state-owned land inventory and to protect the public's proprietary interests.
2. Outright sales of state land should be directed at reducing the management liabilities of the state-owned land inventory, and utilized only after the land exchange option has been exhausted.
3. In all disposition transactions, the appraised value of the subject state land parcel shall constitute the base price of any bidding or negotiating procedure.
4. In all dispositions of state land, the Board shall endeavor to retain 100% interest in, and title in and to, all of the minerals and petroleum products that are or may be in, on, or under said land with right of ingress and egress and the privilege to mine and develop the same.

C. Sale or Release of Reserved Title Interest

(minerals, road rights-of-way, canal rights-of-way)

Reserved title interests are commodities of value. Section 253.02(7), Florida Statutes calls for a management plan for state-owned lands that will "insure maximum benefit and use" of each parcel of land. A shift from the traditional situation of releasing mineral reservations for a set fee to a process of acquisition and/or subordination based upon potential mineral value more appropriately reflects the statutory directives of Section 253.02(7), Florida Statutes. The Board now issues releases of rights-of-entry and exploration instead of granting full releases. Provisions for the outright purchase of reserved mineral interest are available should the release of rights-of-entry and exploration be insufficient for the surface owners' purpose.

Procedures for releasing reserved road and canal rights-of-way are being evaluated to determine if any changes should be made. The primary areas of evaluation center around existing statutory authorities and ensuring that the procedures adequately reflect sound management principles, and are not counter to the public interest (i.e. achieve "maximum benefit and use")

Policies

1. Encourage public recognition of the fact that reserved title interests in real property represent commodities of value.
2. Discourage future releases or subordinations of reserved title interests held by the Board, unless determined to be not contrary to the public interest and in exchange for just compensation.
3. Encourage the inclusion of reserved title interests (i.e. reserved mineral interests) in the state lands management program, and subject these reserved interests to the same management criteria applicable to state-owned lands, consistent with the degree of state title control.

D. Murphy Act Lands

Murphy Act lands are those having outstanding tax certificates that, by virtue of Chapter 18296, Laws of Florida 1937, became absolutely vested in the State of Florida on June 9, 1939. The provisions of the Murphy Act specifically provide for those management activities that also pertain to other categories of state land, such as selling, leasing, exchanging, granting of easements, and withdrawing from public sale. In addition, the Board of Trustees is vested and charged with the administration, management, control,

supervision, conservation, and protection of these lands and the products on, under, and growing out of, or connected with Murphy Act lands, and laws relating to the lands of the Board shall be applicable. However, due to the perceived "uniqueness" of Murphy Act lands at its inception, this category of lands historically has been handled differently than other state-owned lands.

The primary activity since the early 1940' has been to sell these lands. Since that time, approximately 78,000 Murphy Act deeds have been issued, as well as a great number of releases on the conveyed parcels. There are approximately 8,500 parcels currently on the Murphy Act inventory.

The problem with Murphy Act lands that prevents their assimilation into the inventory of all state-owned lands is essentially a question of title, and as these questions are resolved, the Murphy Act lands should be managed in a manner consistent with other state lands under the state lands management program.

Policies

1. Establish a process whereby existing private claims to Murphy Act lands can be equitably settled without resorting to the judicial system. (Note Section 197.387, Florida Statutes in Appendix F).
2. Eliminate all special management considerations for those Murphy Act lands not subject to private ownership claims, and integrate these lands into the general state lands management program.
3. Develop a process whereby small, isolated parcels of Murphy Act land that have no unique public values and are determined to be surplus, are sold, exchanged, or disposed of by other means.
4. Utilize small Murphy Act parcels as exchange items to consolidate larger holdings of state-owned lands that possess good management opportunities.

E. Management Agreements and Leases

In the past, long-term leases have been extensively utilized in the management of state-owned lands. Leases to state agencies, for example, have traditionally been for 99 years. Over the years, the cumulative effect of this practice has been the removal of a sizable percentage of state-owned upland property from active management consideration by the Board of Trustees.

While long-term (e.g. 99 years) leases have allowed many state agencies to successfully engage in their own management programs, they have also created problems for the Board. Due to changing public attitudes, some parcels of state-owned land under long-term leases are not being utilized to their maximum public advantage. It is, in fact, impractical to commit the use of public lands for long periods of time without risking preemption of some future uses of greater public importance.

In the interest of insuring "maximum benefit and use" of state-owned lands, all future leases for nonstructural purposes shall be specifically related to the existing or planned life cycle or amortization of the improvements. The intent of this proposal is not to interfere with existing agency programs or responsibilities, but to ensure that the Board exercises its responsibilities as owner and administrator. A reduction in the standard lease period, accompanied by specific renewal options, should allow the uninterrupted continuation of those agency programs requiring the use of state-owned land. It will also provide specific opportunities for the evaluation of public benefits associated with lease renewal. In the event that the lease renewal evaluation demonstrates a significant departure in use and/or public benefits from the original lease agreement, renewal will be allowed only upon a determination that the modified use is consistent with the concept of "maximum benefit and use" (Section 253.03(7) and 253.034(2), Florida Statutes).

Policies

1. Prohibit the issuance of 99-year or other long-term leases on state-owned lands, unless a specific need can be demonstrated for such duration.

2. Limit the duration of leases, agreements or other instruments authorizing the use of state-owned land to a period that is no greater than is necessary to provide for the reasonable use of the land for the existing or planned life cycle or amortization of the improvements.
3. Limit the duration of leases on state-owned lands that are proposed for use as building sites or for other structural improvements, to a time not exceeding the projected useful life of the building or structure.
4. Require thorough management evaluations of all state-owned lands that are subject to lease requests, prior to issuance of leases or other similar instruments.
5. Encourage the use of management agreements in lieu of leases, whenever practical.
6. Require the inclusion of specific management requirements and responsibilities in each management agreement, lease or similar instrument issued by the Board.
7. Actively pursue the termination of all outstanding leases that do not conform to the original management objectives contained in these leases.
8. Prohibit the lessee of state-owned lands from issuing sub-leases, easements, assignments, and other instruments affecting condition of title, without prior approval of the Board.
9. Ensure that all financial, structural and other liabilities accruing to a parcel of state-owned land during the lease period become the sole responsibility of the lessee, unless it is determined that said liabilities are unrelated to the actions of the lessee.
10. Encourage the identification and marking of boundaries of all upland parcels of state-owned lands to allow orderly and effective management.

F. Submerged Land Leases

Leases on those submerged lands in which title is vested in the Board of Trustees of the Internal Improvement Trust Fund fall into six categories:

1. Commercial/Industrial docking facility
2. Aquaculture
3. Oyster and shellfish
4. Dead shell
5. Oil and Gas
6. Campsite (stilt houses)

All commercial/industrial docking facilities located on or over sovereign submerged lands, except those in existence prior to March 10, 1970, are required to obtain leases from the Board. These leases are available to the upland riparian owner only, for a maximum term of five years, and are subject to renewal. The annual fee on the leased area is currently \$.037 per square foot or \$187.00 whichever is greater.

Aquaculture leases may be for experimental or commercial activities on submerged lands. Applications for aquaculture leases must include a statement indicating the said lease is in the public interest, and a statement outlining the impact of the proposed use of the subject parcel on the ecology of the area. The leased parcel shall be identified, well marked, and shall provide for reasonable public access for boating, swimming, and fishing, except where said activities will interfere with the development of plant and animal life being cultivated by the lessee. Any limitations on the public use of the subject parcel as proposed in the lease shall be clearly posted in conspicuous places by the lessee. The lessee shall also

comply with all rules and regulations of the Department of Natural Resources, Department of Environmental Regulation, U.S. Coast Guard, and U.S.A. Corps of Engineers.

Oyster and shellfish leases are presently processed by the Division of Marine Resources, D.N.R., pursuant to Section 370.16, Florida Statutes. Leases are issued subject to the rules and regulations of the Division. The lessee is required to stake off and otherwise identify the leased property. Dredging for dead shells in live oyster beds is prohibited and the D.N.R. is empowered to prohibit any and all dredging of dead shells when it is determined that said dredging will adversely affect the oyster industry.

Oil and gas leases on submerged lands may be issued to the highest bidder after receipt of sealed bids by applicants pursuant to public advertising by the Board. The term of said leases shall be for a maximum of ten years, and for a fee and royalty schedule as decided upon by the Board. The lessee is required to submit to the Board the percentage of mineral interest held by the Board and a list of all other state oil and gas leases held by the lessee. Such leases processed within the corporate limits of a municipality or within three miles thereof, or within three miles of an improved beach cannot be issued without prior consent of the applicable public body.

Campsite leases on submerged lands are also referred to as stilt house leases. New leases of this type are no longer being issued by the Board, which has adopted a policy of phasing out existing stilt houses. All existing stilt houses are subject to lease provisions and local building and health codes.

There are specific constitutional, judicial and legislative requirements, which must be considered in the leasing of submerged (sovereignty) lands. These include:

1. Florida Constitution, Article IX, Section 11. "Sovereignty lands. The title to lands under navigable waters, within the boundaries of the state, which have not been alienated, including beaches below mean high water lines, is held by the state, by virtue of its sovereignty, in trust for all the people. Sale of such lands may be authorized by law, but only when in the public interest. Private use of portions of such lands may be authorized by law, but only when not contrary to the public interest."
2. Hayes V. Bowman (Florida, 91 So.2d795) "it is well settled in Florida that the State holds title to lands under tidal navigable waters and the foreshore thereof (land between high and low water marks). As at common law, this title is held in trust for the people for purposes of navigation, fishing, bathing and similar uses. Such title is not held primarily for purposes of sale or conversion into money. Basically it is trust property and should be devoted to the fulfillment of the purposes of the trust, to wit: the service of the people."
3. Section 258.42(1), Florida Statutes, "No further sale, lease, or transfer of sovereignty submerged lands shall be approved or consummated by the trustees except when such sale, lease, or transfer is in the public interest."
4. Section 253.034(1) (a), Florida Statutes, in part - "All submerged lands shall be considered single use lands, and shall be managed primarily for the maintenance of essentially natural conditions, the propagation of fish and wildlife, and public recreation; including hunting and fishing where deemed appropriate by the managing agency." The public's interests in the areas of navigation, recreation, and riparian rights, as well as the ecological importance and aesthetic appeal of the subject parcel should also be considered by the Board prior to issuance of the lease.

Policies

1. All submerged lands shall be considered single-use lands and shall be managed primarily for the maintenance of essentially natural conditions, the propagation of fish and wildlife and public recreation, including hunting and fishing where deemed appropriate by the managing agency.

2. Require that all proposed private or public uses of state-owned submerged land for profit be subject to Board action, and that just compensation be paid in return for this exclusionary privilege, using economic principles such as percentages of the assessed unimproved upland property value.
3. Require management consistency evaluations prior to Board action on any state-owned submerged land leases.
4. Discourage, to the extent practicable, all private, exclusionary uses of state-owned submerged lands.
5. Issue oil, gas, and other petroleum drilling leases on state-owned submerged lands only when the proposed lease area is at least one mile seaward of the outer coastline of Florida as defined in *United States v. Florida*, 425 U.S. 791, 48 L. Ed., 2nd 388, 96 S. Ct. 1840, upon adequate demonstration that the proposed activity is in the public interest, that the impact upon aquatic resources has been thoroughly considered, and that every effort has been made to minimize potential adverse impacts upon sport and commercial fishing, navigation and national security.
6. Maintain an inventory of all state-owned submerged land title encumbrances.
7. Require that the use of state-owned submerged lands be restricted to water-dependent activities, unless the Board specifically determines that a greater public purpose would be served by allowing exceptions to the contrary, as determined by a case-by-case evaluation.
8. Prohibit all future state-owned submerged land leases for the construction and maintenance of stilt houses ("campsite leases")
9. Actively pursue the termination of all unauthorized activities on state-owned submerged lands.
10. Require that specific management consideration be given to the use of state-owned submerged lands within aquatic preserves, as defined by Chapter 258, Florida Statutes.
11. Ensure that all activities on state-owned submerged lands avoid adverse impacts upon other authorized uses of submerged lands.
12. Develop a uniform system of subdividing the state-owned submerged lands into easily described parcels to allow the development of an inventory and provide for the management of such activities as offshore oil and gas leasing.

G. Marinas ²

The Board recognizes the tremendous values of the submerged lands of the state and the enjoyment and economic benefit that is derived from or depended upon these valuable lands by the boating public. Therefore, it is the policy of the board to preserve the ability of the state's land to meet the public demands for food, recreation, and transportation. Environmental and aesthetic values must continue to be assured prior to the state authorizing encroachment and development.

The Board encourages proper public use of these valuable natural resources, but demands that environmental integrity be maintained to the fullest extent of the laws of the state. Preemptive uses shall only be granted on a fair and equitable basis with riparian rights considered.

Policies

1. Water dependent uses such as marinas and boating shall take precedence over non-water dependent uses. Extra caution and consideration shall be given prior to authorizing uses of areas with high

² *The Board of Trustees adopted paragraph "G" on March 15, 1983 (Agenda Item #9).*

environmental values such as aquatic preserves, Outstanding Florida Waters, and marine and estuarine sanctuaries, and important archaeological sites.

2. Locations which are currently or have historically been used for water access or boating related activities should be maintained for such uses. New sites should be located near well-flushed deep waters with reasonable access and sufficient public demand where possible. The Board shall not allow significant degradation of its waters and shall recognize that each body of water is different in natural quality and strive to maintain proper balance of allowable uses against the ability of the resource to continue to support such uses.
3. Priority should be given to the expansion of existing facilities, if environmentally sound, over new facilities. Location of marinas in previously disturbed areas that have historically been used for marine related activities should be encouraged.
4. Marinas should be located as close as possible to demand.
5. Marina development should be encouraged where adequate uplands are available to develop related support activities and allow for future expansion.
6. Hurricane protection needs for marinas should be considered.
7. Input from local government should be considered in evaluating lease requests.
8. Location of marinas in highly productive habitat should be discouraged.
9. Location of marinas in or near well-flushed, deep water areas should be encouraged.
10. Piling construction and other non-dredge and fill techniques should be utilized where possible to minimize habitat destruction.
11. Pollution prevention including sanitation and spill containment needs should be assessed and safeguards required as appropriate.
12. Impact upon the endangered manatee should be considered, particularly marina locations, or design features which threaten manatees should be considered.

H. Spoil Islands

Spoil islands are formed from the deposition of material from dredge and fill operations. These islands are generally not for sale, except where an overriding public need will be satisfied by such a conveyance.

Spoil islands should be left in their natural state unless a greater public purpose would be served by either development or the reuse for spoil deposition. Proposals for public development of spoil islands may be authorized after comments have been solicited and received from the appropriate public agencies determining that the public interest would be served by the development. Upon such authorization, said development will be administered by management agreement, lease, or other similar instrument from the Trustees, rather than sale of the spoil island. The instrument will be consistent with the guidelines set forth in Section 253.111, Florida Statutes. In addition, instruments for development of spoil islands should be granted only for water dependent and recreational activities, except where the public would be better served by other types of development, preferably nonstructural.

Dwellings and other structures not owned or authorized by the Board that have been constructed on spoil islands, as on other state-owned land, should be removed, either by the individuals claiming a possessory interest in the structures within a reasonable period of time or by appropriate state agencies with assistance from local government officials. Permanent human habitation of any spoil island under the management control of the Board should be prohibited.

Policies

1. No sale, lease, or transfer of spoil islands, title to which is vested in the Board of Trustees, shall be allowed, unless there is a demonstrable public need and the proposal is in the public interest.
2. Development of state-owned spoil islands shall be limited to water dependent and recreational activities, except as provided by the Board to accommodate overriding public interest factors.
3. Where practical, and when in the public interest, encourage the reuse of existing spoil islands rather than the creation of new ones.
4. No unauthorized structures shall be allowed to exist on state-owned spoil islands.
5. There shall be no permanent human habitation of any state-owned spoil islands, except for public purposes.
6. Authorization to conduct activities on state-owned spoil islands shall, to the extent practicable utilize leases, management agreements, and other similar instruments rather than outright sales.
7. Actively pursue the immediate termination of all unauthorized uses of state-owned spoil islands.

I. Leasing of the State's Mineral Interest

The leasing of the State's mineral interest has traditionally been limited to oil and gas exploration and drilling. Although numerous reservations have been retained on many prior conveyances, very few mining leases have been issued. This could partly be attributed to the fact that the leasing of the state's exploitable resources traditionally has been initiated by private citizens interested in particular parcels of lands. Presently, all oil and gas drilling leases granted by the state originated from an applicant (usually an oil exploration company or a speculator) requesting the Board to put up certain acreage for lease.

A second factor which has hindered the widespread leasing of the state's mineral interest has been the lack of a correct, updated mineral interest inventory. As a result, the state has been dependent upon the information provided by the individual applicants. At times, oversights have occurred and revenues lost due to the state's passive leasing policy. Every effort should be made to complete and maintain state-owned lands mineral inventory.

By encouraging the development of a planned program for assessing mineral exploration and recovery the state can realize numerous benefits. Improved inventories can aid in determining the optimum distribution in terms of rate and location of activity allowable in the interests of both the public and the resource. Factors such as the environmental sensitivity of a proposed exploration/recovery site should be weighed with the restorative potential and resource availability as well as other economic and social considerations. On one hand, there may be some areas where other considerations may override the desirability of recovery; while on the other hand, the desirability of maintaining the future recovery potential may dictate interim uses that would not foreclose such an option.

Policies

1. Encourage the timely development of accurate mineral resource inventories and evaluations for all state-owned lands.
2. Encourage the establishment of an exploration lease program, covering all minerals that will assist the Board in assessing future management directions and needs.
3. Consider the active exploitation of mineral resources on state-owned lands when determined to be consistent with market economics, projected mineral reserve requirements, present and projected public land use needs, environmental acceptability, and other public interest factors.

4. Encourage public recognition that state-owned mineral interests and resources are commodities of value, and should be managed accordingly.
5. Require land reclamation plans in advance of issuance of hard mineral mining leases that would involve substantive surface disturbance of state-owned lands.
6. Discourage extensive, permanent structural development on state-owned lands possessing known commercial mineral potential so as not to unnecessarily preempt recovery and utilization of the mineral resource.

J. Leases for Sanitary Landfills

In the past, the Board has issued leases allowing placement of sanitary landfills on state-owned lands. Future management of state-owned lands should strongly discourage placement of sanitary landfills or other similar facilities on state-owned lands. Activities of this nature often preclude or severely restrict management options. Additionally, use of state-owned property for purposes such as sanitary landfills rarely benefits the public at large. Instead, such uses usually benefit only a very limited segment of the population. It is questionable whether using state-owned lands for sanitary landfills meet the statutory test of "maximum benefit and use".

Policies

1. Discourage use of state-owned lands for sanitary landfills and similar facilities and uses.
2. Consider use of state-owned lands for sanitary landfills, or similar activities, only when no alternative locations are available. Such instances will require a detailed land reclamation plan acceptable to the Board.
3. Phase out existing sanitary landfill leases as expeditiously as possible.
4. Prohibit non-state agency sanitary landfills and similar facilities on state-owned lands.

K. Easements

The request for and issuance of easements has been and continues to be, a major component of the management program for state-owned lands. As part of the management program, it is important that the current procedures covering easements be thoroughly evaluated and modified.

"Easements in gross" comprise the majority of requests received by the Board. An easement in gross is defined as an easement "not appurtenant to any estate in land (or not belonging to any person by virtue of his ownership of an estate in land) but mere personal interest in, or right to use, the land of another". Examples of easements of this type normally processed by the Bureau of State Lands Management include public utility corridors, pipeline crossings, and public road rights-of-way.

Investigations into an appropriate fee schedule for easements across lands titled to the Board indicate that certain types of easements should be exempted from such charges. Easements requested by public entities for public purposes are examples of easements that should be exempted from charges.

Charges for easements other than these specifically exempted appear to be very much in order. It is recommended, however, that the Board reserve the right to waive the fee requirement for those non-exempt easement requests that are determined to be in the public interest and will result in a benefit to the public at large.

Proposed easements that will be subject to charges or fees should be categorized according to the degree and type of impact the easements will have on current, future, and/or traditional management activities or uses. In general, such easements can be described as either exclusionary or non-exclusionary.

Exclusionary easements are those easements that, due to their nature, preclude in whole or in part, current or traditional uses (usually by the public) of the land for which the easement is sought. Non-exclusionary easements will have little or no effect upon the traditional or current uses. It is recommended that the easement fee schedule recognize a distinction between exclusionary and non-exclusionary easements.

Policies

1. Encourage the elimination of the granting of perpetual easements across state-owned lands.
2. Establish a realistic fee schedule applicable to all "easements in gross" that reflects a distinction between exclusionary and non-exclusionary uses.
3. Discourage the granting of "easements in gross" that will significantly affect the Board's ability to manage state-owned lands in a manner that achieves "maximum benefit and use."
4. Establish a procedure whereby the Board may, at its discretion, waive the fee requirements for "easements in gross" that are determined to be in the public interest and will result in a benefit to the public at large.

L. Artificial Reefs

In most cases, the construction of artificial reefs involves the use of state-owned lands. In such cases, the agency, organization, or individual desiring to construct an artificial reef must obtain permission from the Board.

Artificial reefs are normally built to enhance the submerged bottom habitat so as to attract increased numbers of marine organisms. These organisms in turn, attract various species of fish, resulting in an increase in the exploitable productivity of fishing areas.

Reasons for constructing artificial reefs usually fall within two general categories. The first category would include construction for limited scientific research and exclusionary purposes. One of the basic factors of this type of construction is the need and/or desire to restrict access to and use of the reef area. Requests falling into this category should be handled under lease or easement, and subject to the same management requirements as aquaculture leases.

The second category includes construction of artificial reefs strictly for the enhancement of fishing habitat, and access and use of the completed reef is open to the general public. This type of proposal could effectively be handled by issuance of a letter of consent, rather than a lease or easement. The letter of consent would be valid only during the original construction period and would constitute permission to trespass. Upon completion of the reef, the letter of consent would expire. All right to the completed reef would vest in the Board and the reef would be open to the public for recreational use.

Policies

1. Encourage placement of artificial reefs seaward of the near-shore areas in order to avoid potential conflicts with the riparian rights of upland owners.
2. Encourage full public access to and enjoyment of the benefits resulting from artificial reefs.
3. Minimize administrative requirements and processing time for the construction proposals that benefit the general public.
4. Require that the construction of artificial reefs recognize and avoid long-term water quality and navigation problems.
5. Insure that the artificial reef construction does not adversely impact environmentally fragile areas or infringe upon areas under active lease (e.g. oyster leases), or active potentially conflicting public use.

6. Insure that reefs are constructed in a manner that minimizes safety hazards.

M. Aquatic Preserves

During 1975, the Legislature recognized the importance and value of state-owned submerged lands by setting aside certain areas of exceptional biologic, scientific, or aesthetic values as aquatic preserves for the benefit of future generations. These submerged lands and the water over them offer economic and environmental to the present and future generations. They provide natural beauty in settings suited to recreation for residents and tourists. Unique plant and animal communities in the preserves are not only of interest to scientists but are the breeding grounds for important fin and shellfish.

Some preserves are virtually natural. In others, man's activities have altered natural conditions to varying degrees. Some alterations have been so great as to threaten the natural benefits that attracted man.

The responsibility for the land management within the preserves was delegated by statute to the Board of Trustees of the Internal Improvement Trust Fund. Rules to regulate human activities within the preserves have been adopted by the Board (CH. 16Q-18, and 20, F.A.C.). Management of aquatic preserves will be consistent with both the legislative intent of the Aquatic Preserve Act and with the overall goals, objectives and policies of the State Lands Management Plan.

Policies

1. No sale, lease or transfer of state-owned submerged lands within aquatic preserves shall be approved unless it is in the public interest.
2. No bulkhead line shall be located or relocated waterward of the mean high water line in an aquatic preserve unless necessitated by a road or bridge construction project where no reasonable alternative exists and the project is not contrary to the public interest.
3. There shall be no drilling of gas or oil wells within any aquatic preserve.
4. There shall be no excavation of minerals within aquatic preserves except the dredging of dead oyster shells as approved by the Department of Natural Resources.
5. (a) There shall be no dredging of state-owned lands within aquatic preserves for the purpose of providing upland fill.
(b) There shall be no dredging or filling of submerged lands within aquatic preserves except minimum dredging and spoiling as may be necessary for the following activities: -
 - i) public navigation projects
 - ii) maintenance of existing navigation channels
 - iii) creation and maintenance of marinas, piers, docks and their attendant navigation channels
 - iv) public utility installation or expansion
 - v) installation and maintenance of fuel transportation facilities
 - vi) alterations necessary to enhance the quality or utility of the preserve or the public health generally
6. No structures shall be erected within a preserve except:
 - (a) Private docks for reasonable ingress or egress of riparian owners.
 - (b) Commercial docking facilities shown to be not contrary to the use or management criteria of the preserve.

- (c) Shore protection structures, approved navigational aides, or public utility crossings authorized under policy #5b.
7. No wastes or effluents which substantially inhibit the accomplishment of the purposes of the Aquatic Preserve Acts shall be discharged into an aquatic preserve.
 8. Management of human activities within aquatic preserves will not unreasonably interfere with traditional public uses such as fishing, boating and swimming.
 9. Management of aquatic preserves shall not infringe upon the traditional rights of riparian landowners within or adjacent to an aquatic preserve.
 10. Other uses of an aquatic preserve may only be approved subsequent to a formal finding of compatibility with the purpose of the Aquatic Preserve Acts and rules, and of the type designation of the preserve in question.

N. Erosion Control Lines and Beach Restoration

Erosion control lines are established by the Board in conjunction with publicly financed beach nourishment or restoration programs permitted by the Department of Natural Resources. Such lines represent the landward extent of claim of the state in its capacity as sovereign titleholder of the submerged bottoms and shores of the Atlantic Ocean, the Gulf of Mexico, and the bays, lagoons, and other tidal reaches. Such line becomes effective on the date of the recording of the survey showing the area of the beach to be nourished or restored and the location of the erosion control line.

An erosion control line can be established only upon the recommendation and certification of the Department of Natural Resources, customarily through its Bureau of Beaches and Shores, and upon the written consent of the owners of a majority of the lineal feet of contiguous riparian property which either abuts the erosion control line or would abut such line if established at the mean high water line.

Policies

1. Ensure that proposed erosion control lines do not adversely affect title interests to state-owned lands.
2. Ensure that erosion control projects do not infringe upon the private property rights of riparian landowners.
3. Ensure that sources of beach nourishment material containing environmentally fragile resources or located in or adjacent to areas frequently utilized by sports and/or commercial fishermen are avoided to the extent practicable.
4. Erosion control lines shall be set at or as near as practicable to the existing mean high water line. However, based upon assurances and fiscal commitments by a local government sponsor such as periodic maintenance and renourishment of the beach, reconstruction and protection of dunes, conservation easements, and increased public access, the Board may consider setting the line waterward of the existing mean high water line.

O. Conservation and Recreation - Environmentally Endangered Lands

Public concern that Florida's unique natural systems were rapidly being destroyed resulted in the Land Conservation Act of 1972 (Chapter 259, Florida Statutes), commonly known as the Environmentally Endangered Lands (E.E.L.) acquisition program, funded through a \$200 million statewide bond issue overwhelmingly passed by the voters of Florida. In 1979, the Conservation and Recreation Lands (C.A.R.L.) Program and Trust Fund were created by legislative action as a continuation of the E.E.L. program, with expanded authority to acquire various types of land in the public interest. Annual funding of up to \$20 million is provided from a portion of the severance taxes on solid minerals, oil and gas.

The Division of State Lands is charged with the administration of the C.A.R.L. Program. Following the compilation of a priority list by the Land Selection Committee and approval of the list by the Board, money may be allocated for acquisition on an annual basis in each of the following categories and proportions:

- 1) Up to seventy percent for lands qualified as environmentally endangered as defined in Chapter 259, Florida Statutes, or
- 2) Up to seventy percent for other lands in the public interest.
- 3) Also, up to ten percent of the annual allotment may be spent for management of lands purchased and up to five percent for the compilation of a statewide natural areas inventory.

Under the Land Conservation Act, the purchase of 22 environmentally endangered land projects was initiated between 1972 and 1979, with acquisition completed on ten. Following the first year of activities through the C.A.R.L. Program, a priority list of 27 projects was approved in December 1980.

Policies³

1. Encourage the continuation of state interagency and general public involvement in all facets of the C.A.R.L./ Environmentally Endangered Lands Program.
2. Encourage the refinement of evaluation and selection procedures for C.A.R.L./Environmentally Endangered Lands projects, which will help ensure the acquisition of the most vital, sensitive, and important areas for public enjoyment and long-term environmental protection.
3. Minimize the acquisition of C.A.R.L./Environmentally Endangered Lands with outstanding title reservations and/or other management encumbrances.
4. Encourage multiple-use management of C.A.R.L./Environmentally Endangered Lands where compatible and consistent with statutory and natural resource limitations and the purposes of acquisition.
5. Manage C.A.R.L./Environmentally Endangered Lands by management agreements rather than long-term, blanket leases.
6. Actively discourage any request for leases, easements, or other forms of approval to use state owned E.E.L or C.A.R.L. lands for any purpose not specifically authorized by Ch. 259, F.S. Such requests may be considered by the Board only if no reasonable alternative exists. Additionally such requests may be approved only if the Board determines and is assured that there will be adequate mitigation, compensation, or other consideration that will result in a net positive benefit to the affected parcel.
7. Any request for approval to use E.E.L. or C.A.R.L. parcel shall be subject to a thorough management evaluation using the criteria listed in Appendix A.

P. Compensation for the Use of State-Owned Lands

Many activities involving state-owned land do not directly benefit the general public as a whole. In such cases, the Board should obtain compensation in some form, for the private use and/or preemption of portions of the public domain. To the extent practicable, the Board should rely on principles of private enterprise to establish fee schedules or other rates of compensation.

Traditionally, fee appraisals have been used by the Board to establish reasonable rates of compensation in exchange for private uses of state-owned land. This is especially true for those activities with private

³ The Board of Trustees adopted policies #6 and #7 of Paragraph "O" on July 7, 1981 (Agenda Item #14).

counterparts, such as grazing leases or private easements. Due to the staff limitations, however, individual appraisals are not generally suitable in establishing user fees for those activities normally restricted to state-owned lands (i.e. submerged land leases) or when the number of applications is so great as to render individual appraisals unworkable.

Specific fee criteria that are not established by individual fee appraisals are now established through administrative rule making. This appears to be the most appropriate way to establish or modify fee schedules for certain uses of state-owned land. Use of the administrative rule format permits individualized attention to the compensation question without depending entirely on fee appraisals or other similar approaches.

Policies⁴

1. The Board shall require equitable compensation when the use of state-owned lands by private or public entities, except for state agencies exempted by law, generates revenue or profits for the user, or general public use is limited or preempted.
2. To the extent practical, the Board should use principles of private enterprise in establishing fee schedules or other methods for ensuring just compensation.
3. The Board shall require a reasonable return for any private use authorized by lease, easement or other use agreement. The structure for the formula for assuring a reasonable return may vary depending on circumstances and may include a flat fee per time unit, per area of quantity unit, a percentage of the assessed upland property value, a royalty fee or some other form of compensation or combination thereof.
4. The Board shall require the periodic reassessment of the terms and conditions of all leases, easements and use agreements that exceed one year to insure a continued equitable rate of compensation.
5. The Board may consider a waiver of fees if the use of state-owned land does not generate revenues or profits and the land is open to the general public without charge.
6. Any request to use E.E.L., C.A.R.L., or other state lands that are managed primarily for the conservation and protection of natural resources, such as state parks, preserves, forests, wilderness areas, and wildlife management areas, which would preclude or affect in whole or in part, current or future uses, shall be required to provide a net positive benefit to the affected parcel. Net positive benefit shall not be solely monetary compensation, but shall include mitigation and other consideration related to environmental or management benefits. Any compensation/mitigation proposal shall be related to the affected parcel.

Q. Surplus Lands

The state land acquisition and management programs would benefit from the development and implementation of a surplus lands program. Such a program would contain a procedure for defining and identifying surplus lands. However, land would not be labeled surplus nor disposed of in a manner that would reduce the value of the land inventory of the state, which is the corpus of the Trust. Land is a valuable fixed capital asset.

Surplus lands should first be used in land exchanges to obtain inholdings and other parcels which would enhance the management and value of existing state-owned lands. Some parcels, such as Murphy Act lots, may be too small or scattered to be effectively used in land exchanges. These should be disposed of through competitive bidding after the minimum bid has been set by the fee appraisals.

⁴ The Board of Trustees adopted policy #6 of Paragraph "P" on July 7, 1981 (Agenda Item #14).

In addition to Murphy Act and other remnant parcels, the purchase of large acreages through the E.E.L. and C.A.R.L. acquisition program may result in the acquisition of parcels which are not essential to the original project boundary design. However, because of common ownership it may have been necessary to acquire those with the parcels essential to manageable boundary configuration. Such remnant parcels should be identified in a process of developing management plans for the newly acquired parcels, on the front end prior to acquisition.

All proceeds from the sales of state lands should be used to acquire additional state lands. This would insure that the state land inventory would never be reduced in value.

The management evaluation criteria (see Appendix A) would be used to identify surplus lands. Individual parcels would be evaluated to determine whether the legal, physical, environmental and other factors are positive or negative in terms of their management potential. Basically, the process for identifying surplus lands is the same as the process for developing management recommendations and plans. Except in the case of surplus lands, the analysis would show that there are encumbrances, physical restrictions or liabilities that make it difficult or impossible to effectively manage or use the parcel for maximum public benefit.

Section 253.034(5), Florida Statutes, requires the Board and each state agency managing state-owned lands to identify those lands surplus to their needs every five (5) years. The most effective way to implement the surplus lands program would be in conjunction with the development and review of land management plans required by Section 253.034(3), Florida Statutes. Since every state agency managing lands owned by the Board must submit a land management plan to the Board at least every five (5) years, and the criteria used to prepare management plans is essentially the same as the criteria for determining surplus lands, the two requirements should be accomplished simultaneously. Such a surplus land review would logically occur simultaneously with all state land acquisitions.

Policies

1. A surplus lands program shall be developed and implemented in conjunction with the review and approval of land management plans under 253.034(3), Florida Statutes.
2. Surplus lands should first be used in land exchange to obtain inholdings and other parcels which would enhance the management of existing state-owned lands.
3. Sales of surplus land shall be by competitive bid with the appraised market value as the minimum bid.
4. All proceeds from the sales of state lands should be placed in state land acquisition funds.

VII. Appendix

A. Management Evaluation Criteria

Legal

1. Type and degree of state title interest
2. Outstanding leases, easements, reverter clauses or other legal encumbrances or liabilities
3. Legislative or executive designations or directives
4. Relationship to local government comprehensive plans adopted pursuant to Chapter 163, Florida Statutes

Physical

1. Size and configuration
2. Location and access
3. Encroachments/recognized and unrecognized
4. Proximity to public lands, population centers

Environmental

1. Wetlands
2. Beaches and dunes
3. Unique, threatened and endangered species and habitat
4. Unique features (caves, sinkholes, springs)
5. Water resources (quality and quantity)
6. Submerged lands (grass beds, coral, shellfish areas)
7. Natural hazard areas (hurricane and other flood zones)
8. Soils (prime and unique agricultural land, development suitability)
9. Fish and wildlife resources
10. Areas of special environmental concern (aquatic preserve, ecologic reserve, and E.E.L. and C.A.R.L. lands)

Cultural

1. Archaeological and/or historical resources (Indian mounds)
2. Recreational resources (canoe trails, picnicking, public hunting)
3. Aesthetic resources (scenic vista, wilderness)

Economic

1. Oil, gas and mineral resources
2. Agricultural resources
 - a. timber
 - b. prime and unique agricultural lands
 - c. grazing
3. Prime development areas (institutional, industrial, research and development park)
4. Aquaculture (oyster leases)
5. Public transportation facilities
6. Exchange potential/sale to acquire more desirable parcels

B. Walk-Through Example #1: Specific Purpose Acquisition

1. Agency inquiries as to the availability of existing state-owned lands.
2. Board accepts title to property acquired by the Division of Forestry for the purpose of constructing a fire tower.
3. Division of Forestry requests management control of subject property from the Board.
4. Staff conducts a management evaluation of the subject property and determines that the land can properly accommodate the intended management use.
5. Staff processes appropriate management instrument for Board consideration and action.
6. Board approves Management Agreement, and Division of Forestry initiates intended management action.
7. Division of Forestry determines that their management interest in the subject property is no longer necessary for their program continuity.
8. Division of Forestry releases their management interest in the subject property back to the Board.
9. Staff to the Board subjects property to a management evaluation, and determines that due to limited size, parcel isolation, and the absence of unique or significant environmental, cultural, recreational, or economic resources, the property should be disposed of by either exchange or outright sale.
10. Application for a land exchange is received by the Board as a result of public advertisements initiated by staff.
11. Staff successfully negotiates a value-for value exchange whereby the Board will receive title to an inholding within the Blackwater River State Forest in return for title to the subject property.
12. Board approves the proposed exchange based upon improved management capability and positive economic considerations.
13. Application is made to the Board by the Division of Forestry for the addition of the recently acquired inholding into their current management lease agreement covering the Blackwater River State Forest.
14. Board approves requested lease amendment based upon favorable staff recommendations and public interest factors.
15. Division of Forestry extends their active management practices into the recently acquired inholding.

Walk-Through Example #2: Unspecified Purpose Acquisition

1. The Board accepts title to a section of land (640 acres) donated to the State of Florida without use restrictions.
2. Staff conducts a physical and cultural assessment of the subject property. The public land inventory is searched for other state property in the area.
3. The result of the assessment indicates several unique physical features on the property, as well as an Indian mound. Also, the soil types and overall topographical features of the parcel appear to be ideal for recreational activities. The public land inventory indicates no other state land within 10 miles.
4. Staff contracts the Division of Recreation & Parks, DNR⁵ about the subject parcel, and provides full documentation from the physical/cultural assessment. Similarly, the Division of Archives, History & Records Management⁶, Department of State is coordinated with regarding the possibility of archaeological remains on the subject property.
5. Recreation & Parks evaluates the property further and indicates a desire to manage the parcel within the state parks system.
6. Archives & History evaluates the Indian mound evidence, and finds that the site is listed in their site inventory and should be preserved.
7. Staff processes appropriate management instrument for Board consideration and action.
8. Board approves Management Agreement with Recreation & Parks to manage the parcel as a state park, and recognizes the titular interest held by Archives & History for any cultural resources that may be present on the property.
9. Recreation & Parks initiates management action specified in approved management agreement.

⁵ Now the DEP (Department of Environmental Protection).

⁶ Now the Division of Historical Resources.

C. Glossary

Appraisal – An estimation of value of real property.

Assignment – A transfer of one's rights to another.

Conveyance – An instrument or transfer of title of land from one person to another.

Easement – The legal right to enter on another's property, which creates an interest in the real property.

Encroachment - A physical intrusion onto the property of another, resulting in an infringement on the other party's rights.

Encumbrance – A liability to and/or restriction of title rights to real property.

Inventory – A detailed list or schedule of property, containing a designation or description of each specific article.

Lease – A contract between owner and tenant establishing terms and conditions for the use and occupancy of real property.

Management Agreement – A contractual agreement between the board and two or more parties, which does not create an interest in real property but merely authorizes conduct of certain management activities on lands held by the board.

Plan – A recommended course of action that, when adhered to, will produce specific results.

Policies – Guidelines for the decision-making process whereby programs, services, and actions of the State are implemented, consistent with existing law.

Proprietary rights – Those rights which an owner of property has by virtue of his ownership.

Real Property – Land and permanent improvements that are located, thereon/and/or affixed thereto.

Right-Of-Way – The right of passage over the property of another.

Riparian Rights – The rights of the owners of lands on the banks of watercourses, relating to the water, its use, ownership of soil under the stream, accretions, etc.

State Lands Management Program – The Combined total of the Conceptual State Lands Management Plan, administrative rules, legislation, and parcel-specific management procedures, evaluations, data and recommendations.

Subordinate – Placed in a lower class, order or rank, such as causing a first mortgage to become a second mortgage.

Title – The evidence of right, which a person has to the possession of property.

D. CHAPTER 79-255

*The original plan included in this appendix the Committee Substitute for Senate Bill 793 as enacted by the 1979 Legislature and incorporated as Chapter 79-255 in the Laws of Florida. Chapter 79-255 established: (1) the Division of State Lands within the Department of Natural Resources, which has since been reorganized under the Department of Environmental Protection; (2) acquisition, management, and administration procedures for lands titled to the Board of Trustees of the Internal Improvement Trust Fund; (3) a new land acquisition program -- the Conservation and Recreation Lands program -- to succeed and incorporate the Environmentally Endangered Lands and Outdoor Recreation and Conservation Lands programs; and (4) the interagency Land Acquisition Selection Committee. Florida Statutes have been revised substantively since 1979. Thus, the relevance of this bill to this plan has been diminished and is supplanted by current statutes. Therefore, Chapter 79-255, Laws of Florida, has been **intentionally omitted**. See chapters 253 and 259, Florida Statutes, for current acquisition, management and administrative procedures for lands titled to the Board of Trustees.*

E. CHAPTER 80-280

*The original plan included in this appendix House Bill 715 as enacted by the 1980 Legislature and incorporated as Chapter 80-280 in the Laws of Florida. Chapter 80-280 established section 253.034, Florida Statutes, which provided land management definitions and land management planning, disposition and administration procedures for lands titled to the Board of Trustees of the Internal Improvement Trust Fund. Florida Statutes have been revised substantively since 1980. Thus, the relevance of this bill to this plan has been diminished and is supplanted by current statutes. Therefore, Chapter 80-280, Laws of Florida, has been **intentionally omitted**. See chapters 253 and 259, Florida Statutes, for current management planning, disposition and administrative procedures for lands titled to the Board of Trustees.*

F. Section 197.387 from 1980 Supplement To Florida Statutes 1979

*The original plan included in this appendix section 197.387 from the 1980 Supplement to the 1979 Florida Statutes, which addressed conveyance issues for Board of Trustees lands that were acquired under the provisions of the Murphy Act – Chapter 18296, Laws of Florida, 1937. This section of statutes has been repealed and is no longer applicable. Therefore, s. 197.387, F.S., has been **intentionally omitted**. Relevant language similar to what appeared in s. 197.387 now is located in s. 253.82, F.S.*

G. State Lands Management Plan Interagency Advisory Committee⁷

PURPOSE: To assist the Division of State Lands in the development and acceptance of the conceptual State Lands Management Plan.

MEETINGS: On call, as needed, depending on development status of the State Lands Management Plan.

EXPENSES: Non-paid

MEMBERS:

Mr. Daniel T. Penton
Bureau of State Lands
Department of Natural Resources
3900 Commonwealth Boulevard
Tallahassee, Florida 32303
904/488-2291

Mr. George W. Percy
Division of Archives, History and
Records Management
Department of State
R.A. Gray Building
Tallahassee, Florida 32304
904/487-2333

Mr. W. R. Helm, Jr. (Jim Grubbs)
Division of Forestry
Department of Agriculture and
Consumer Services
Collins Building
Tallahassee, Florida 32304
904/488-6611

Mr. George Reinert
Division of Forestry
Department of Agriculture and
Consumer Services
Collins Building
Tallahassee, Florida 32304
904/488-6358

Mr. Estus Whitfield
Office of the Governor
404 Carlton Building
Tallahassee, Florida 32304
904/488-5551

Mr. Brad Hartman
Florida Game and Freshwater Fish
Commission
620 South Meridian Street
Tallahassee, Florida 32304
904/488-6661

Mr. Bill White (George Willson)
Dept. of Environmental Regulation
Twin Towers Office Building
2600 Blainstone Road
Tallahassee, Florida 32301
904/488-9730

Mr. Frank McClain (Percy Folsom)
Facility Services
Department of Corrections
Tallahassee, Florida 32301
904/487-1330

Mr. Angus Franklin
Florida Correctional Industries
Department of Corrections
Tallahassee, Florida 32301
904/488-8932

Mr. Jesse Palmer (Cindy Olsen)
Facility Services
Dept. of Health & Rehab. Services
Building 3, Winewood
Tallahassee, Florida 32301
904/488-3871

Mr. James W. Mayne
Facilities Services
Dept. of Health & Rehab. Services
Building, 3 Winewood
Tallahassee, Florida 32301
904/488-3871

Mr. Wayne Nesmith
Planning and Budgeting
Board of Regents
Collins Building
Tallahassee, Florida 32304

Mr. Paul O'Connell
Bureau of Construction
Department of General Services
Larson Building
Tallahassee, Florida 32304
904/488-6754

Mr. Ney Landrum
Division of Recreation and Parks
Department of Natural Resources
3900 Commonwealth Boulevard
Tallahassee, Florida 32304
904/488-6131

Mr. Steve Windham
Bureau of Geology
Department of Natural Resources
Gunter Building
Tallahassee, Florida 32304
904/488-3636

Mr. Fred Breeze
House Natural Resources
Committee
Room 214, House Office Building
Tallahassee, Florida 32304
904/488-1564

Mr. Edwin A Joyce
Division of Marine Resources
Department of Natural Resources
3900 Commonwealth Boulevard
Tallahassee, Florida 32304
904/488-6058

Mr. James A. Stidham
Water Resources Division
North West Florida Water
Management District
Quincy, Florida 32351

Mr. Dan Fernandez
Senate Natural Resources
Committee
Room 416, Senate Office Building
Tallahassee, Florida 32304
904/488-1710

⁷ Original participants, agencies, addresses & telephone numbers no longer applicable.

A.4 / Aquatic Preserve Resolution

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

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

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

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

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

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

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

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

- (1) An aquatic preserve is intended to set aside an exceptional area of state-owned land and its associated waters for preservation essentially in their natural or existing condition by reasonable regulation of all human activity which might have an effect on the area.
- (2) An aquatic preserve shall include only lands or water bottoms owned by the State of Florida, and such private lands or water bottoms as may be specifically authorized for inclusion by appropriate instrument from the owner. Any included lands or water bottoms to which a private ownership claim might subsequently be proved shall upon adjudication of private ownership be automatically excluded from the preserve, although such exclusion shall not preclude the State from attempting to negotiate an arrangement with the owner by which such lands or water bottoms might be again included within the preserve.
- (3) No alteration of physical conditions within an aquatic preserve shall be permitted except: (a) minimum dredging and spoiling for authorized public navigation projects, or (b) other approved activity designed to enhance the quality or utility of the preserve itself. It is inherent in the concept of the aquatic preserve that, other than as contemplated above, there be: no dredging and filling to create land, no drilling of oil wells or excavation for shell or minerals, and no erection of structures on stilts or otherwise unless associated with authorized activity, within the confines of a preserve - to the extent these activities can be lawfully prevented.
- (4) Specifically, there shall be no bulkhead lines set within an aquatic preserve. When the boundary of a preserve is intended to be the line of mean high water along a particular shoreline, any bulkhead line subsequently set for that shoreline will also be at the line of mean high water.
- (5) All human activity within an aquatic preserve shall be subject to reasonable rules and regulations promulgated and enforced by the State of Florida Board of Trustees of the Internal Improvement Trust Fund and/or any other specifically designated managing agency. Such rules and regulations shall not interfere unduly with lawful and traditional public uses of the area, such as fishing (both sport and commercial), hunting, boating, swimming and the like.
- (6) Neither the establishment nor the management of an aquatic preserve shall infringe upon the lawful and traditional riparian rights of private property owners adjacent to a preserve. In furtherance of these rights, reasonable improvement for ingress and egress, mosquito control, shore protection and similar purposes may be permitted by the State of Florida Board of Trustees of the Internal Improvement

Trust Fund and other jurisdictional agencies, after review and formal concurrence by any specifically designated managing agency for the preserve in question.

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

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

CLAUDE R. KIRK, JR, Governor TOM ADAMS, Secretary of State

EARL FAIRCLOTH, Attorney General FRED O. DICKINSON, JR., Comptroller

BROWARD WILLIAMS, Treasurer FLOYD T. CHRISTIAN, Commissioner of Education

DOYLE CONNER, Commissioner of Agriculture

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



A.5 / Florida Statutes

Florida Statutes, Chapter 253: State Lands

http://www.leg.state.fl.us/Statutes/index.cfm?App_mode=Display_Statute&URL=0200-0299/0253/0253.html

Florida Statutes, Chapter 258: State Parks and Preserves

http://www.leg.state.fl.us/Statutes/index.cfm?App_mode=Display_Statute&URL=0200-0299/0258/0258.html

Part II (Aquatic Preserves):

http://www.leg.state.fl.us/Statutes/index.cfm?App_mode=Display_Statute&Search_String=&URL=0200-0299/0258/0258PARTIIContentsIndex.html

Florida Statutes, Chapter 259: Land Acquisitions for Conservation or Recreation

http://www.leg.state.fl.us/Statutes/index.cfm?App_mode=Display_Statute&URL=0200-0299/0259/0259.html

Florida Statutes, Chapter 379: Fish and Wildlife Conservation

http://www.leg.state.fl.us/statutes/index.cfm?App_mode=Display_Statute&URL=0300-0399/0379/0379.html

Florida Statutes, Chapter 403: Environmental Control

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

http://www.leg.state.fl.us/Statutes/index.cfm?App_mode=Display_Statute&URL=0400-0499/0403/0403.html

Florida Statutes, Chapter 597: Florida Aquaculture Policy Act

http://www.leg.state.fl.us/Statutes/index.cfm?App_mode=Display_Statute&URL=0500-0599/0597/0597.html

A.6 / Florida Administrative Code (F.A.C.)

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

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

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

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

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

Florida Administrative Code, Chapter 18-23: State Buffer Preserves

<http://www.dep.state.fl.us/legal/Rules/shared/18-23.pdf>

Florida Administrative Code, Chapter 62-302: Surface Water Quality Standards

(Rule designating Outstanding Florida Waters is at 62-302.700)

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

Management Agreement for Certain Lands In Collier County

WHEREAS, the State of Florida, hereinafter referred to as the "State," and the United States Fish and Wildlife Service, hereinafter referred to as the "Service," own and manage adjacent tracts of land in Collier County, namely, the Service manages the Ten Thousand Islands National Wildlife Refuge, hereinafter referred to as the "Refuge," and the Florida Department of Environmental Protection, manages the Cape Romano-Ten Thousand Islands and Rookery Bay Aquatic Preserves. In addition, the State claims sovereignty over certain submerged lands, some of which are within the boundary of Ten Thousand Island National Wildlife Refuge; and

WHEREAS, the Board of Trustees of the Internal Improvement Trust Fund of the State of Florida, hereinafter referred to as the "Board," holds title to certain sovereignty submerged lands, which are located within the boundary of the Refuge hereinafter referred to as "State lands," in Collier County, Florida and

WHEREAS, the Board may authorize the management of said State lands by virtue of Section 253.03, Florida Statutes; and

WHEREAS, the Service desires to manage State lands which may be located within the boundaries of the Refuge for public purposes as outlined in the Comprehensive Conservation Plan/Environmental Assessment for the Refuge, hereinafter referred to as the "Plan," and specified on the "Map of Co-Managed Submerged Lands and Waters" attached hereto; and

WHEREAS, the Board has determined that it would be appropriate for the Service to manage the certain State lands for public purposes as outlined in the Plan.

NOW THEREFORE, the Board hereby grants to the Service the right to co-manage for public purposes all lands and waters thereon titled in the Board and all submerged lands for which the State claims sovereignty which are located within the boundaries of the overlying jurisdictional areas, hereinafter referred to collectively as the "subject lands," as described in the Plan, which is attached hereto and made a part hereof, for a period of 25 years from the effective date of this Agreement, on the following terms and conditions:

1. The Service will manage the subject lands as provided for in the Plan in a manner which will not conflict with the conservation, protection and enhancement of said lands and will not interfere with the maintenance of public navigation projects or other public works projects authorized by the United States Congress, provided that, the Plan will set forth which regulations contained in Title 50 Code of Federal Regulations, if any, will not be enforceable by the Service on the State lands included in the Plan.
2. The service will co-manage the subject lands as part of the Refuge in accordance with: 1) the Plan; 2) the National Wildlife Refuge System Administration Act of 1966, as amended, 16 U.S.C. ss 668dd; 3) other acts of general applicability to the National Wildlife Refuge System; and 4) state law, regulations and the aquatic preserve management plan.
3. The Plan will be reviewed jointly by the Board and the Service at no greater that 5-year intervals and updated as necessary. The Service will not alter the subject lands or engage in any activity including restrictions on public access or commercial or recreational activities except as currently provided for in the Plan without the prior written approval of the Board.

4. Upon execution of this Agreement, the Service will have the right to enter and occupy the subject lands for the purpose of fulfilling the activities designated under "implementation" in said Plan subject to existing State laws, rights and interests.

5. The Board retains the right to enter the subject lands and to engage in compatible management activities other than those provided for herein following notification and consultation with the Service. The Service retain the right to affirm or deny any further management activities by third parties, and determine if such activities are compatible for lands incorporated into the National Wildlife Refuge System. Upon such affirmation by the Service, the Board may grant approval to third parties for compatible management activities under the terms of the Agreement.

6. Upon the request of the Board, the Service will provide information regarding Service operations within the subject lands that in any manner relate to this Agreement.

7. Section 267.061(1)(b), Florida Statutes, specifies that all treasure trove, artifacts, and such objects or antiquity having intrinsic, scientific or historical and archaeological value, which have been abandoned on state-owned lands or state-owned sovereignty submerged lands, belongs to the State of Florida with the title thereto vested in the Division of Historical Resources of the Department of State, for the purpose of administration and protection. The execution of this Agreement in no way affects any of the parties' obligations pursuant to Chapter 267, Florida Statutes. The disturbance of archaeological and historical sites on state-owned lands and state owned sovereignty submerged lands is prohibited unless prior authorization has been obtained from the Division of Historical Resources in order to mitigate potential damage or disturbance of, or to preserve, archaeological and historical sites and properties.

8. This Agreement does not convey any title interest from the Board or the Service in the areas described in, "Map of Co-Managed Submerged Lands and Waters" (13,457 acres) of the Refuge.

9. This Agreement may be unilaterally terminated by either party with or without cause, by providing written notice of the intent to the other party at least 60 days prior to the proposed date of termination.

10. The Agreement may be renewed for succeeding additional 10-year terms by mutual agreement of the parties. This option to renew if exercised, together with all additions, deletions, and modifications to this Agreement, shall be affixed hereto.

11. This Agreement and any right and privileges relative to the subject lands contained herein are for the sole use of the Service and shall not be assigned or transferred in whole or in part to any other party without the prior written consent to the Board.

12. The Service agrees to assist in the investigation of injury or damage claims either for or against the Board or State of Florida pertaining to the Service's area of responsibility or arising out of the Service's management programs hereunder and to contact the Board regarding whatever legal action the Service deems appropriate to remedy same.

13. The liability of the Service for the acts and omissions of its employees pursuant to this instrument shall be governed by the Federal Tort Claims Act.

14. The Service agrees that it will not discriminate against any individual based on race, color, religion, sex, national origin, age, handicap, or marital status with respect to any activity occurring within the area subject to the Agreement or upon lands adjacent to and used as an adjunct area.

15. Unless specified herein to the contrary, this Agreement will be governed and interpreted by applicable Federal and State laws.

16. All notices given under this Agreement must be in writing and mailed to the address of the party to whom notice is to be given, as designated by such party in writing. The Board and the Service hereby designate their respective address as follows:

Board: Director
Division of State Lands
Bureau of Public Land Administration
3900 Commonwealth Boulevard
Mail Station 100
Tallahassee, Florida 32399

Director
Division of Land and Recreation
Office of Coastal and Aquatic Managed Areas
3900 Commonwealth Boulevard
Mail Station 235
Tallahassee, Florida 32399

Service: Regional Director
U. S. Fish and Wildlife Service
1875 Century Boulevard
Atlanta, Georgia 30345

IN TESTIMONY WHEREOF, witnesseth the signature of the Regional Director, Fish and Wildlife Service, on behalf of the United States of America, and the signature of the legally designated agent the Board of Trustees of the Internal Improvement Trust Fund of the State of Florida, this 25th day of October, 2003.

UNITED STATES OF AMERICA - Department of the Interior

By: [Signature] [Signature] [Signature]
Regional Director Witness Witness
Fish and Wildlife Service
Southeast Region

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

By: [Signature] [Signature] [Signature]
Director Witness Witness
Division of State Lands
Department of Environmental Protection

By: [Signature] [Signature] [Signature]
Director Witness Witness
Office of Coastal and
Aquatic Managed Areas
Department of Environmental Protection

APPROVED AS TO FORM AND LEGALITY
By: [Signature]
DEP Attorney
Date: 11/14/03



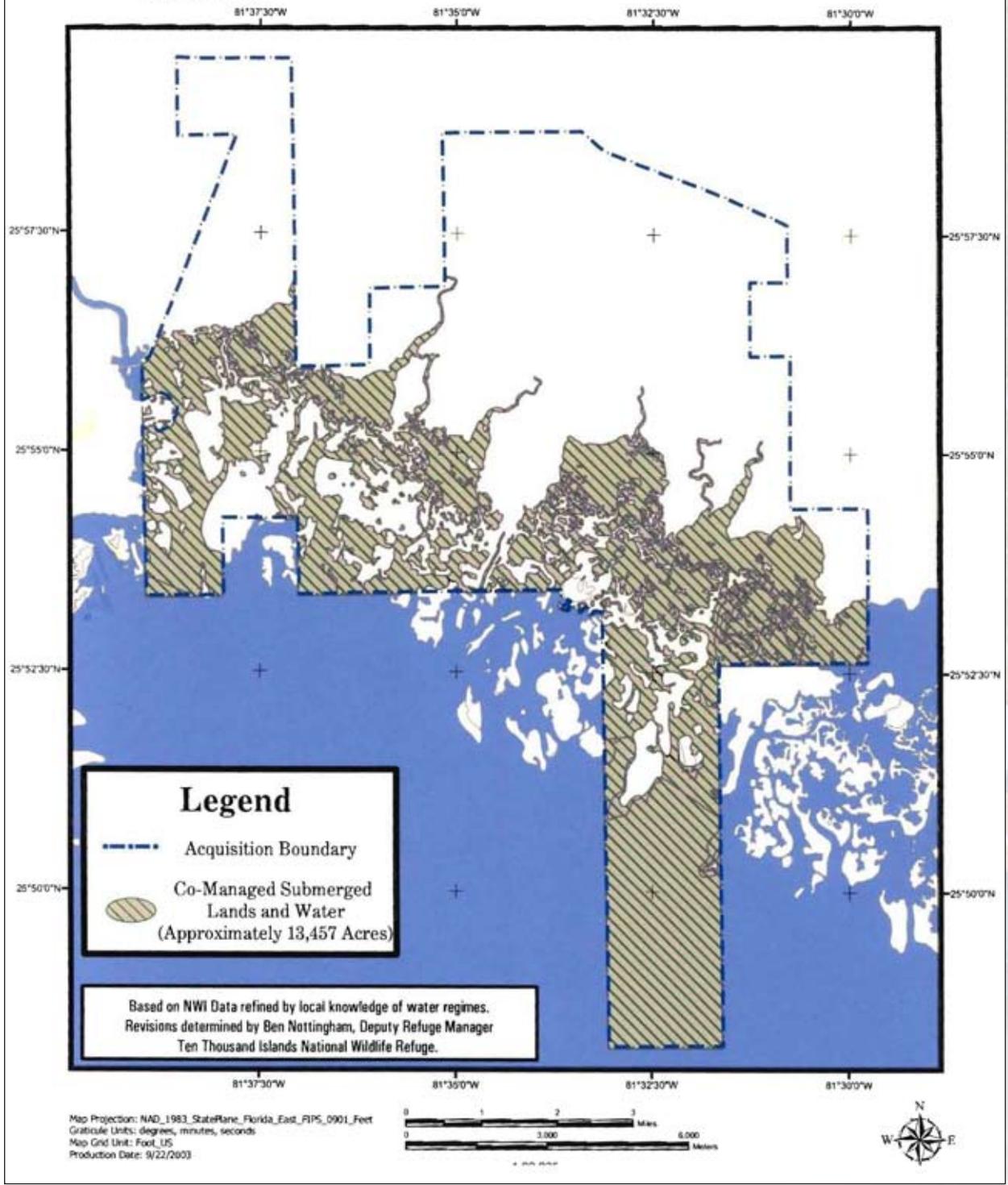
U.S. Fish and Wildlife Service

Ten Thousand Islands

National Wildlife Refuge

Collier County, Florida

Map of Co-Managed Submerged Lands and Water



A.8 / Trustees Lease Agreement and Related Documents

The Trustees lease agreement for Lease 3819, including the legal description, can be obtained by contacting the Office of Coastal and Aquatic Managed Areas.

Resource Data

B.1 / Acronym List

Acronym	Description	Acronym	Description
ACSC	Area of Critical State Concern	FWC	Florida Fish & Wildlife Conservation Commission
ATV	all-terrain vehicle	GIS	geographic information system
BMP	Best Management Practice	HAB	harmful algal bloom
CAMA	Office of Coastal and Aquatic Managed Areas	LATF	Land Acquisition Trust Fund
CARL	Conservation and Recreation Lands	m	meter
CCPS	Collier County Public Schools	MFP	Master Facilities Plan
CERP	Comprehensive Everglades Restoration Plan	NAS	National Audubon Society
C.F.R.	Code of Federal Regulations	NERR	National Estuarine Research Reserve
CRCP	Coral Reef Conservation Program	NOAA	National Oceanic & Atmospheric Administration
CSF	Conservancy of Southwest Florida	NPS	National Park Service
CTP	Coastal Training Program	NWR	National Wildlife Refuge
CWA	Critical Wildlife Area	OCRM	Office of Ocean & Coastal Resource Management
CZMA	Coastal Zone Management Act of 1972	OFW	Outstanding Florida Waters
DCA	Florida Department of Community Affairs	OPS	Other Personal Services
DEP	Florida Department of Environmental Protection	ppt	parts per thousand
DHR	Florida Division of Historical Resources	RBNERR	Rookery Bay National Estuarine Research Reserve
EEL	Environmentally Endangered Lands	SFWMD	South Florida Water Management District
EIS	Environmental Impact Statement	SOC	Save Our Coast
ELC	Environmental Learning Center	SOTR	State of the Reserve
ERD	Estuarine Reserves Division	S.R.	State Road
ESC	Edison State College	SWFFS	Southwest Florida Feasibility Study
F.A.C.	Florida Administrative Code	SWMP	System-Wide Monitoring Program
FGCU	Florida Gulf Coast University	TNC	The Nature Conservancy
FNAI	Florida Natural Areas Inventory	TPL	Trust for Public Land
FORB	The Friends of Rookery Bay, Inc.	USFWS	United States Fish and Wildlife Service
F.S.	Florida Statute	WMD	Water Management District

B.2 / Glossary

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

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

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

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

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

diversity - a measure of the number of species and their relative abundance in a community. (Lincoln et al., 2003)

drainage basin (catchment) - the area from which a surface watercourse or a groundwater system derives its water; watershed. (Allaby, 2005)

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

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

emergent - an aquatic plant having most of the vegetative parts above water; a tree which reaches above the level of the surrounding canopy. (Lincoln et al., 2003)

endangered species - an animal or plant species in danger of extinction throughout all or a significant portion of its range. (U.S. Fish and Wildlife Service [FWS], 2005)

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

estuary – expanse of brackish water, water in which fresh water off the land mixes with the sea’s salt water (Whitney et al., 2004)

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

exotic – species that have been introduced into Florida from other parts of the world where they are native. (Whitney et al., 2004)

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

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

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

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

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

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

listed species - a species, subspecies, or distinct population segment that has been added to the Federal list of endangered and threatened wildlife and plants. (FWS, 2005)

mandate - an order or command; the will of constituents expressed to their representative, legislature, etc. (Neufeldt & Sparks, 1990)

mesic - pertaining to conditions of moderate moisture or water supply; used of organisms occupying moist habitats. (Lincoln et al., 2003)

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

native species – populations has existed here for a long time and it adapted to local conditions, including the presence of other native species (Whitney et al., 2004)

population - all individuals of one or more species within a prescribed area. A group of organisms of one species, occupying a defined area and usually isolated to some degree from other similar groups. (Lincoln et al., 2003)

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

ruderal - pertaining to or living amongst rubbish or debris, or inhabiting disturbed sites. (Lincoln et al., 2003) (FNAI describes ruderal as areas impacted by development measures such as roadways, drainage ditches, navigational channels or are considered hydrological alterations.)

runoff - part of precipitation that is not held in the soil but drains freely away. (Lincoln et al., 2003)

salinity - a measure of the total concentration of dissolved salts in seawater. (Lincoln et al., 2003)

sessile - non-motile; permanently attached at the base. (Lincoln et al., 2003)

species - a group of organisms, minerals or other entities formally recognized as distinct from other groups; the basic unit of biological classification. (Lincoln et al., 2003)

species of concern - an informal term referring to a species that might be in need of conservation action. This may range from a need for periodic monitoring of populations and threats to the species and its habitat, to the necessity for listing as threatened or endangered. Such species receive no legal protection and use of the term does not necessarily imply that a species will eventually be proposed for listing. “Imperiled species” is another general term for listed as well as unlisted species that are declining. (FWS, 2005)

stakeholder - any person or organization who has an interest in the actions discussed or is affected by the resulting outcomes of a project or action. (FWS, 2005)

subtidal - environment which lies below the mean low water level. (Allaby, 2005)

supratidal - the zone on the shore above mean high tide level. (Lincoln et al., 2003)

threatened species - an animal or plant species likely to become endangered within the foreseeable future throughout all or a significant portion of its range. (FWS, 2005)

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

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

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

water column - the vertical column of water in a sea or lake extending from the surface to the bottom. (Lincoln et al., 2003)

watershed - an elevated boundary area separating tributaries draining in to different river systems; drainage basin. (Lincoln et al., 2003)

wetland - an area of low lying land, submerged or inundated periodically by fresh or saline water. (Lincoln et al., 2003)

wildlife - any undomesticated organisms; wild animals. (Allaby, 2005)

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

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B.4 / Species List

B.4.1 / Listed Species

Common Name	Species Name	FNAI		Status	
		State	Fed	State	Fed
Legend: T = Threatened • E = Endangered • SSC = Species of Special Concern					
Plants					
Dilldoe (Barbwire) cactus	<i>Acanthocereus tetragonus</i>	N	N	T	N
Golden leather fern	<i>Acrostichum aureum</i>	N	N	T	N
Curtiss' milkweed (sandhill)	<i>Asclepsia curtissii</i>	N	N	E	N
Many-flowered grasspink	<i>Calopogon multifloirus</i>	S3	G2	E	N
Sand dune spurge	<i>Chamaesyce cumulicola</i>	N	N	E	N
Southern lip fern	<i>Cheilanthes microphylla</i>	N	N	E	N
Satinleaf	<i>Chrysophyllum oliviforme</i>	N	N	T	N
Sweetscented Pigeonwings	<i>Clitoria fragrans</i>	S3	G3	E	T
Shell (clamshell) orchid	<i>Encyclia cochleata</i>	N	N	E	N
Butterfly orchid	<i>Encyclia tampensis</i>	N	N	CE	N
Clamshell orchid	<i>Encyclia cochleata</i>	S2	G2	E	N
Dingy flowered epidendrum	<i>Epidendrum anceps</i>	N	N	E	N
Rigid epidendrum	<i>Epidendrum rigidum</i>	N	N	E	N
Redberry ironwood	<i>Eugenia confusa</i>	S2	G4	E	N
Wild cotton	<i>Gossypium hirsutum</i>	N	N	E	N
Nodding (drooping/scrub) pinweed	<i>Lechea cernua</i>	N	N	T	N
Nodding clubmoss	<i>Lycopodiella cernuum</i>	N	N	CE	N
Simpson stopper	<i>Myrcianthes fragrans</i>	N	N	T	N
Hand fern	<i>Ophioglossum palmatum</i>	S2	G4	E	N
Shell mound prickly pear cactus	<i>Opuntia stricta</i>	N	N	T	N
Cinnamon fern	<i>Osmunda cinnamonea</i>	N	N	CE	N
Blackbead	<i>Pithecellobium keyense</i>	N	N	T	N
Inkberry	<i>Scaevola plumieri</i>	N	N	T	N
West Indian mahogany	<i>Swietenia mahogani</i>	N	N	T	N
Florida thatch palm	<i>Thrinax radiata</i>	N	N	E	N
Inflated (reflexed) wild pine	<i>Tillandsia balbisiana</i>	N	N	T	N
Common (stiff-leaved) wild pine	<i>Tillandsia fasciculata</i>	N	N	E	N
Twisted and banded air plant	<i>Tillandsia flexuosa</i>	N	N	T	N
Fuzzy-wuzzy (hoary) air plant	<i>Tillandsia pruinosa</i>	S1	G3	E	N
Giant wild pine; giant air plant	<i>Tillandsia utriculata</i>	N	N	E	N
Florida tripsacum	<i>Tripsacum floridanum</i>	N	N	T	N
Simpson's zephyr lily	<i>Zephyranthes simpsonii</i>	N	N	T	N

Common Name	Species Name	FNAI		Status
		State	Global	
Legend: FE = Federally-designated Endangered • FT = Federally-designated Threatened • FT(S/A) = Federally-designated Threatened species due to similarity of appearance • ST = State-designated Threatened • SSC = State Species of Special Concern				
Birds				
Florida grasshopper sparrow	<i>Ammodramus savannarum floridanus</i>	S1	G1	FE
Florida scrub jay	<i>Aphelocoma coerulescens</i>	S2	G2	FT
Limpkin	<i>Aramus guarana</i>	S3	G5	SSC
Florida burrowing owl	<i>Athene cunicularia floridana</i>	S3	G3	SSC
Snowy plover	<i>Charadrius alexandrinus</i>	S1	G4	ST
Piping plover	<i>Charadrius melodus</i>	S2	G3	FT

Common Name	Species Name	FNAI		Status
		State	Global	
Legend: FE = Federally-designated Endangered • FT = Federally-designated Threatened • FT(S/A) = Federally-designated Threatened species due to similarity of appearance • ST = State-designated Threatened • SSC = State Species of Special Concern				
Little blue heron	<i>Egretta caerulea</i>	S4	G5	SSC
Reddish egret	<i>Egretta rufescens</i>	S2	G4	SSC
Snowy egret	<i>Egretta thula</i>	S3	G5	SSC
Tricolored heron	<i>Egretta tricolor</i>	S4	G5	SSC
White ibis	<i>Eudocimus albus</i>	S4	G5	SSC
Southeastern American kestrel	<i>Falco sparverius paulus</i>	S3	G4	ST
Florida sandhill crane	<i>Grus canadensis pratensis</i>	S2	G2	ST
American oystercatcher	<i>Haematopus palliatus</i>	S2	G5	SSC
Wood stork	<i>Mycteria americana</i>	S2	G4	FE
Brown pelican	<i>Pelecanus occidentalis</i>	S3	G4	SSC
Roseate spoonbill	<i>Platalea ajaja</i>	S2	G5	SSC
Everglade snail kite	<i>Rostrhamus sociabilis plumbeus</i>	S2	G2	FE
Black skimmer	<i>Rynchops niger</i>	S3	G5	SSC
Least tern	<i>Sterna antillarum</i>	S3	G4	ST
Roseate tern	<i>Sterna dougallii dougallii</i>	S1	G4	FT
Mammals				
Florida mastiff bat	<i>Eumops glaucinus</i>	S1	G5	ST
Florida panther	<i>Puma concolor coryi</i>	S1	G1	FE
Mangrove fox squirrel	<i>Sciurus niger avicennia</i>	S2	G2	ST
West Indian manatee	<i>Trichechus manatus</i>	S2	G2	FE
Florida black bear	<i>Ursus americanus floriddanus</i>	S2	G2	ST
Amphibians				
Florida gopher frog	<i>Rana capito</i>	S3	G3	SSC
Fishes				
Smalltooth sawfish	<i>Pristis pectinata</i>	N	N	FE
Mollusks and Crustaceans				
Florida tree snail	<i>Liguus fasciatus septentrionalis</i>	S1	G2	SSC
Reptiles				
American alligator	<i>Alligator mississippiensis</i>	S4	G5	FT(S/A)
Loggerhead sea turtle	<i>Caretta caretta</i>	S3	G3	FT
Green sea turtle	<i>Cheolonia mydas</i>	S2	G3	FE
American crocodile	<i>Crocodylus acutus</i>	S1	G2	FT
Eastern indigo snake	<i>Drymarchon couperi</i>	S3	G3	FT
Hawksbill sea turtle	<i>Eretmochelys imbricata</i>	S1	G3	FE
Gopher tortoise	<i>Gopherus polyphemus</i>	S3	G3	ST
Kemp's ridley sea turtle	<i>Lepidochelys kempii</i>	S1	G1	FE

B.4.2 / Invasive Non-native Species List

Common Name	Species Name	FLEPCC cat.
Plants		
Rosary pea	<i>Abrus precatorius</i>	I
Earleaf Acacia	<i>Acacia auriculiformis</i>	I
Sisal hemp	<i>Agave sisilana</i>	II
Mimosa	<i>Albizia Julibrissin</i>	I
Woman's tongue	<i>Albizia lebbbeck</i>	I

Common Name	Species Name	FLEPCC cat.
Coral Vine	<i>Antigonon leptopus</i>	II
Shoebuttan ardisia	<i>Ardisia elliptica</i>	I
Asparagus fern	<i>Asparagus aethiopicus</i>	I
Orchid tree	<i>Bauhinia variegata</i>	I
Bishopwood	<i>Bischofia javanica</i>	I
Paper mulberry	<i>Broussonetia papyifera</i>	II
Australian pine	<i>Casurina equisetifolia</i>	I
Lather leaf	<i>Colubrina asiatica</i>	I
Carrotwood	<i>Cupaniopsis anacardioides</i>	I
Air potato	<i>Dioscorea bulbifera</i>	I
Pothos	<i>Epipremnum pinnatum</i>	II
Surinam cherry	<i>Eugenia uniflora</i>	I
West Indian marsh grass	<i>Hymanache amplexicaulis</i>	I
Cogon grass	<i>Imperata cylindrica</i>	I
Life Plant	<i>Kalanchoe pinnata</i>	II
Lantana	<i>Lantana camara</i>	I
Lead tree	<i>Leuceana leucocephala</i>	II
Old world climbing fern	<i>Lygodium microphyllum</i>	I
Cat's claw vine	<i>Macfadyena unguis-cati</i>	I
Melaleuca	<i>Melaleuca quinquenervia</i>	I
Chinaberry	<i>Melia azedarach</i>	II
Natal grass	<i>Milinis repens</i>	I
Cat claw mimosa	<i>Mimosa pigra</i>	I
Ground orchid	<i>Oeceoclades maculata</i>	
Guinea grass	<i>Panicum maximum</i>	II
Torpedo grass	<i>Panicum repens</i>	I
Elephant grass	<i>Pennisetum purpureum</i>	I
Fountain grass	<i>Pennisetum setaceum</i>	I
Water-lettuce	<i>Pistia stratiotes</i>	I
Guava	<i>Psidium guajava</i>	I
Downy rose-myrtle	<i>Rhodomyrtus tomentosa</i>	I
Oyster plant	<i>Tradescantia spathacea</i>	II
Castorbean	<i>Ricinus communis</i>	II
Bowstring hemp	<i>Sansevieria hyacinthoides</i>	II
Inkberry/Beach naupaka	<i>Scaevola taccada var. sericea</i>	I
Schefflera	<i>Schefflera actinophylla</i>	I
Brazilian pepper	<i>Schinus terebinthifolius</i>	I
Climbing cassia	<i>Senna pendula var. glabrata</i>	I
Rattlebox	<i>Sesbania punicea</i>	II
Twinleaf nightshade	<i>Solanum diphyllum</i>	II
Tropical soda apple	<i>Solanum viarum</i>	I
Wedelia	<i>sphagneticola trilobata</i>	II
Arrowhead vine	<i>Syngonium podophyllum</i>	I
Java plum	<i>Syzygium cumini</i>	I
Mahoe	<i>Talipariti tiliaceus</i>	II
Tropical almond	<i>Terminalia catappa</i>	II
Seaside mahoe	<i>Thespesia populnea</i>	I
Puncture weed	<i>Tribulus cistoides</i>	II
Caesar's weed	<i>Urena lobata</i>	II

Common Name	Species Name	FLEPCC cat.
Para grass	<i>Urochloa mutica</i>	I
Birds		
Ring-necked dove	<i>Streptopelia risoria</i>	
Scarlet macaw	<i>Ara macao</i>	
Rose-ringed parakeet	<i>Psittacula krameri</i>	
African grey parrot	<i>Psittacus erithacus</i>	
Monk parakeet	<i>Myiopsitta monachus</i>	
Mammals		
Nine-banded armadillo	<i>Dasypus novemcinctus</i>	
Feral cat	<i>Felis catus</i>	
Coyote	<i>Canis latrans</i>	
Feral hogs	<i>Sus scrofa</i>	
Amphibians		
Cuban treefrog	<i>Osteopilus septentrionalis</i>	
Greenhouse frog	<i>Eleutherodactylus planirostris</i>	
Marine toad	<i>Bufo Marinus</i>	
Fishes		
Mayan Cichlid	<i>Cichlasoma urophthalmus</i>	
Spotted tilapia	<i>Tilapia mariae</i>	
Walking catfish	<i>Clarias batrachus</i>	
Pike killifish	<i>Belonesox belizanus</i>	
Florida pompano	<i>Trachinotus carolinus</i>	
Brown hoplo (armored catfish)	<i>Hoplosternum littorale</i>	
Black acara	<i>Cichlasoma nigrofasciatum</i>	
Convict cichlid	<i>Cichlasoma bimaculatum</i>	
Mozambique tilapia	<i>Oreochromis mossambicus</i>	
Blue tilapia	<i>Oreochromis aureus</i>	
Spotted tilapia	<i>Tilapia mariae</i>	
Pike killifish	<i>Belonesox belizanus</i>	
Oscar	<i>Astronotus ocellatus</i>	
Insects		
Prickly pear caterpillar	<i>Cactoblastis cactorum</i>	
Lobate lac scale	<i>Paratachardina pseudolobata</i>	
Fire ants	<i>Solenopsis invicta</i>	
Mollusks and Crustaceans		
Chinese mitten crab	<i>Eriocheir sinensis</i>	
Asian swimming crab	<i>Charybdis helleri</i>	
Golden orb crab	<i>Quadrula aurea</i>	
Green mussel	<i>Perna viridis</i>	
Zebra Mussels	<i>Dreissena polymorpha</i>	
Reptiles		
Cuban brown anole	<i>Anolis sagrei sagrei</i>	
Mexican spinytail iguana	<i>Ctenosaura pectinata</i>	

Common Name	Species Name	FLEPCC cat.
Green Iguana	<i>Iguana iguana</i>	
Burmese python	<i>Python molurus bivittatus</i>	
African spur thigh tortoise	<i>Geochelone sulcata</i>	
Brown tree snake	<i>Boiga irregularis</i>	
Knight anole	<i>Anolis equestris equestris</i>	

B.4.3 / Problem Species List

Common Name	Species Name
Mammals	
Nine-banded armadillo	<i>Dasyopus novemcinctus</i>
Feral cat	<i>Felis catus</i>
Coyote	<i>Canis latrans</i>
Feral hogs	<i>Sus scrofa</i>
Raccoons	<i>Procyon lotor</i>
Insects	
Fire ant	<i>Solenopsis invicta</i>

B.5 / Coastal Training Program Advisory Committee

Name	Affiliation
Gary Lytton, Environmental Administrator	Rookery Bary National Estuarine Research Reserve / FDEP
Tina Ottman, Biology Professor	Edison State College, Collier Campus
Dr. Mike Bauer, Natural Resources Manager	City of Naples, Department of Natural Resources
Robert Halman, Director	Collier County Extension Service
Nancy Richie, Environmental Specialist	City of Marco Island
Brad Cornell, Environmental Policy	Audubon of Florida

B.6 / Summary of Florida Natural Areas Inventory Descriptions

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

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

Levels of Natural Communities

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

Natural Community Categories

1. Terrestrial Natural Communities - upland habitats dominated by plants which are not adapted to anaerobic soil conditions imposed by saturation or inundation for more than 10% of the growing season.
2. Palustrine Natural Communities - freshwater wetlands dominated by plants adapted to anaerobic substrate conditions imposed by substrate saturation or inundation during 10% or more of the growing season.
3. Lacustrine Natural Communities - non-flowing 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 Rookery Bay National Estuarine Research Reserve

TERRESTRIAL

Xeric Uplands - very dry, deep, well-drained hills of sand with xeric-adapted vegetation.

Scrub - characterized as a closed to open canopy forest of sand pines with dense clumps or vast thickets of scrub oaks and other shrubs dominating the understory.

Coastal Uplands - substrate and vegetation influenced primarily by such coastal (maritime) processes as erosion, deposition, salt spray, and storms.

Beach Dune - characterized as a wind-deposited, foredune and wave-deposited upper beach that are sparsely to densely vegetated with pioneer species, especially sea oats.

Coastal Strand - characterized as stabilized, wind-deposited coastal dunes that are vegetated with a dense thicket of salt-tolerant shrubs, especially saw palmetto.

Maritime Hammock - characterized as a narrow band of hardwood forest lying just inland of the coastal strand community.

Mesic Flatlands - flat, moderately well-drained sandy substrates with a mixture of organic material, often with a hard pan.

Mesic Flatwoods - characterized as an open canopy forest of widely spaced pine trees with little or no understory but a dense ground cover of herbs and shrubs.

Mesic Hammock - characterized as a hardwood forest community of open or closed canopy dominated by live oak, with cabbage palm often present in the canopy and subcanopy.

Scrubby Flatwoods - characterized as an open canopy forest of widely scattered pine trees with a sparse shrubby understory and numerous areas of barren white sand.

PALUSTRINE

Floodplain Wetlands - flat, alluvial sand or peat substrates associated with riverine natural communities and subjected to flooding but not permanent inundation.

Strand Swamp - shallow, forested, usually elongated depressions or channels dominated by bald cypress. They are generally situated in troughs in a flat limestone plain.

Basin Wetlands - shallow, closed basin with outlet usually only in time of high water; peat or sand substrate, usually inundated; wetland woody and/or herbaceous vegetation.

Basin Marsh - characterized as an herbaceous or shrubby wetland situated in a relatively large and irregularly shaped basin.

Basin Swamp - generally characterized as a relatively large and irregularly shaped basin that is not associated with rivers, but is vegetated with hydrophytic trees and shrubs that can withstand an extended hydroperiod.

Coastal Interdunal Swale - associated with the large barrier islands on the Florida coasts, most commonly in the panhandle. They appear as a mix of grasslands, small ponds, and depression marshes.

Depression Marsh - characterized as a shallow, usually rounded depression in sand substrate with herbaceous vegetation often in concentric bands. Depression marshes are similar in vegetation and physical features to, but are generally smaller than, basin marshes.

MARINE AND ESTUARINE

Faunal Based - communities which occur in subtidal zones.

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

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

Seagrass Bed - characterized as expansive stands of vascular plants. This community occurs in subtidal (rarely intertidal) zones, in clear, coastal waters where wave energy is moderate. Seagrasses are not true grasses.

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

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

FNAI Natural Communities Rankings

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

TERRESTRIAL

Xeric Uplands

G2 S2 Scrub

Coastal Uplands

G3 S2 Beach Dune

G3 S2 Coastal Strand

G3 S2 Maritime Hammock

Mesic Flatlands

G4 S4 Mesic Flatwoods

G3 S3 Scrubby Flatwoods

PALUSTRINE

Floodplain Wetlands

G4 S4 Strand Swamp

Basin Wetlands

G4 S4 Basin Marsh

G4 S3 Basin Swamp

G4 S4 Depression Marsh*

MARINE & ESTUARINE

Faunal Based

G3 S3 Mollusk Reef

Floral Based

G2 S2 Seagrass Bed

G4 S4 Tidal Marsh

G3 S3 Tidal Swamp

Composite Substrate

*G3 S2 Coastal Interdunal Swale

*G3 S3 Mesic Hammock

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., less than 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., less than 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 factor(s) making it vulnerable to extinction throughout its range, 21-100 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 its range;
- S3** = Rare or uncommon in state (on the order of 21-100 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.

B.7 / Summary of Rookery Bay National Estuarine Research Reserve Policies

B.7.1 / Gun Policy

State of Florida
 Department of Environmental Protection
 Office of Coastal and Aquatic Managed Areas

CAMA 001
 Effective: July 22, 2008
 Approved by: Ellen McCarron

USE AND POSSESSION OF GUNS ON CAMA-MANAGED LANDS

Purpose:

The purpose of this internal policy is to provide procedures for the possession and use of guns by employees on CAMA-managed lands throughout Florida. This policy and its effectiveness shall be reviewed on an annual basis by the CAMA Senior Management Team, and amended as necessary.

Definitions:

Employee - For purposes of this policy an employee is anyone serving in a permanent, contract, or OPS position with the Department of Environmental Protection and any of its offices and bureaus. Employee also includes any employee of the State of Florida or federal or local government who is housed or maintains an office in or on CAMA-managed lands. This includes but is not limited to employees of universities or other government agencies who are under contract to or with any CAMA office for specific work on those lands. Other agencies may have policies that also govern their use of guns. When there is conflict between the two, the most restrictive policy controls.

Volunteer - A volunteer is any person who has formally completed a volunteer application form and is actively working with staff of any CAMA-managed facility. A volunteer may also include partners with non-governmental organizations working on CAMA-managed lands who are authorized by the Site Manager or designee to carry and use guns on those lands.

Gun - For purposes of this policy a gun is defined as any weapon that propels a metal projectile by either the burning of gunpowder or the release of compressed air or gas.

The types of guns and ammunition approved for the management of nuisance and exotic animals on CAMA-managed lands are described as follows:

Compressed air gun - Any weapon that propels a metal projectile by the release of compressed gas. This includes but is not limited to pellet guns, BB guns, and similarly operating guns.

Rifle - Any weapon that propels a projectile through the burning of gunpowder.

Shotgun - A gun that fires shot or rifled slugs.

The list of types of guns acceptable and allowed for use on CAMA-managed lands includes:

- Caliber 22 rifle
- Caliber 22 magnum rifle
- Caliber 300 rifle
- Caliber 308 rifle

Caliber 30-30 rifle
Caliber 30-06 rifle
12 Gauge shotgun
Any of the standard compressed-air BB guns
Any of the standard pellet guns.

Note that any modifications (including shortening) to the barrel of a rifle or a shotgun is not permitted.

Background:

Guns are used for the occasional control of nuisance and/or invasive animals whose presence is in conflict with the management of lands under CAMA control. Although the safe capture and transport of nuisance animals may be an option in some cases, the transport of feral hogs is not desirable because of the risk of transmission of brucellosis and pseudorabies to locales offsite, so there will be instances where it may be necessary to control these animals. This policy also applies to the control of predators of listed species.

Policy:

Use of Guns

The Site Manager or designee shall maintain an active inventory of all of the guns housed or used on CAMA property. The inventory shall contain the serial number, make, and model of the gun. The Site Manager shall also maintain and periodically update a list of staff authorized to use each gun.

No gun covered by this policy shall be used at a distance close enough to offend, alarm, or endanger the public.

All employees and volunteers authorized to use a gun on CAMA-managed lands shall attend and complete a Department of Environmental Protection firearms safety course (where available) that includes on-range firing instruction. Where this course is not available, employees and volunteers must demonstrate to the Site Manager their proficiency in gun use and gun safety (including safe handling, loading, discharging, unloading and cleaning) before being allowed to use specific guns on CAMA-managed lands.

All CAMA guns shall be cleaned following each use in a manner that provides for long-term preservation.

Guns must be unloaded during transport, cleaning, and storage.

Designated employees and volunteers may use only guns owned by CAMA. Trappers licensed through the Florida Fish and Wildlife Conservation Commission who are authorized to assist with nuisance animal control on CAMA-managed lands shall be permitted to use their personally owned guns for that specific purpose. Employees of other agencies authorized by CAMA who are engaged in nuisance animal control on CAMA-managed lands are permitted to use their agency-approved guns for this purpose.

The Site Manager or designee shall be notified each time a gun or ammunition is checked out for use.

Use of guns shall require prior planning by the user(s) and their supervisor to take into consideration 1) absence of visitors in the targeted areas, and 2) safety of user(s). The use of guns for the control of any animals on CAMA-managed lands shall be allowed only with the prior approval of the Site Manager or designee. Any onsite manager or supervisor has the authority to terminate the use of a gun at any time.

While in the field using a gun, all employees and volunteers shall wear clothing that displays a Department of Environmental Protection logo.

The Site Manager or designee shall be responsible for notifying local law enforcement officials about anticipated use of guns by employees. Where an urban interface exists, local law enforcement should be given at least 12 hours notification of guns being used on CAMA-managed lands.

Where guns are in use, information on their presence on CAMA-managed lands shall be included in the employee orientation for each new employee or volunteer regardless if they will be using guns or not.

To maintain their efficacy, guns needing to be "sighted in" shall be taken to a local shooting range at least once yearly where they shall be sighted in.

The Site Manager or designee shall maintain all gun records.

Storage of Guns

All CAMA-owned guns shall be stored in a locked gun safe that shall remain in a locked safe room or the office of the Site Manager or designee when the guns are not in use pursuant to CAMA policy for the control of nuisance, exotic, or dangerous animals. This policy includes a reasonable amount of time for the transport to and from sites from which animals are controlled, and for the sighting-in or cleaning of the guns.

The key(s) to the locked gun safe shall be in the possession of the Site Manager or designee. A log shall be kept of when and to whom the keys are assigned for immediate use. Additionally, the log shall identify each time a gun is

checked out, to whom, for what purpose and when it was returned. The Site Manager or designee must agree and concur each time a gun is removed from the gun safe.

All guns shall be unloaded while in CAMA-managed buildings and they shall be transported in covered cases in which they shall remain unloaded until they are to be used for specific purposes.

Transportation and possession of guns shall be handled with discretion at all times regarding staff and visitors.

Any owner's manuals that were included with the gun at the time of acquisition shall be maintained in or near the locked gun safe where the appropriate gun is stored.

Guns shall be cleaned twice yearly in addition to the cleaning immediately after each use.

Ammunition

Ammunition (including pellets or BBs) shall be stored in a locked cabinet separate and apart from the cabinet used to store guns.

The Site Manager or designee shall ensure that ammunition is fresh and in good condition before each use.

The following ammunition is approved for use on CAMA-managed lands for the control of feral hogs:

Rifle ammunition for use on feral hogs should be of adequate bullet weight and have enough energy to successfully take the animal with one shot. Although there are many cartridges that accomplish that goal, heavier, slower bullets provide more downrange safety than high-speed bullets of less weight. Also, they are more suitable for taking larger pigs having dense skeletal structure as they have the ability to penetrate more effectively. Heavier bullets are less apt to deflect or ricochet. The downrange trajectory drop for these rounds is generally between 5 to 10+ feet at 500 yards. Examples of suitable and common commercially available calibers and cartridges for safe use on large feral pigs include:

- Caliber 300 Savage: 150 to 180 grain (bullet weight) Remington "Core-Lokt" "Pointed Soft Point" or Winchester "Super-X" "SilverTip" ammunition.
- Caliber 308 Winchester: > 180 grain (bullet weight) Remington "Core-Lokt" "Pointed Soft Point" or Winchester "Super-X" "SilverTip" ammunition.
- Caliber 30-30 Winchester: 150 to 200 grain (bullet weight) Remington "Core-Lokt" "Pointed Soft Point" or Winchester "Super-X" "SilverTip" ammunition.
- Caliber 30-06 Springfield: 180 to 220 grain (bullet weight) Remington "Core-Lokt" "Pointed Soft Point" or Winchester "Super-X" "SilverTip" ammunition.

Procedures:

This policy shall be implemented on CAMA-managed lands by the Site Manager or designee for those lands.

Visitor Information

Visitors to CAMA-managed sites shall be provided with interpretive information via posting signs, disseminating brochures or verbal instruction on when, where and why guns are used on CAMA-managed lands. All participants in this program will follow general safety precautions involving the use of guns, and they will maintain awareness of public sensitivities at all times.

This policy adopted by  on 
Director, Office of CAMA (Date)

RBNER FIREARMS HANDLING PROTOCOL

This policy is to augment and clarify the FDEP / OCAMA Internal Policy for the Control of Nuisance Animals specifically at the RBNER.

The implementation of the RBNER nuisance animal control program will require the occasional use of lethal weapons by designated staff and appointees. As required by OCAMA's Internal Policy for the Control of Nuisance Animals, staff and appointees involved in the use of lethal weapons must have completed basic firearms safety training, such as the FWC Hunter Safety Course or military firearms training.

RBNER currently owns .223 rifle, 22 rifle, 12 gauge shotgun, and 2 pellet rifles purchased for use exclusively for the control of feral swine and other nuisance wildlife, such as raccoons and iguanas. These are stored in a locked gun safe in the Stewardship Coordinators office. The ammunition is stored and locked in Resource Management office 206 along with cleaning supplies.

In order to insure staff and visitor safety, the following measures are to be followed:

- Firearms are to be stored unloaded in the gun safe when not in use
- Firearms are to remain unloaded during transport

- Firearms are to be transported in a covered case or locked case and never in view of the public
- Firearms will not be loaded until arrival at the site of shooting
- All hunting activities are to be conducted during non-public hours (except for sanctioned hunts)
- All guns and ammunition will need to be signed out and signed back in
- The hunters will carry a mobile phone on all excursions
- All hunting activities will need to be called in to RBNERR rep, FWC and CCSO dispatch, with location and type of hunting.
- A copy of the OCAMA – IPCNA, RBNERR Memo, and FWC permits must accompany hunter
- The hunter must complete general size, sex, and the FDEP Disposition of Feral Swine form
- Firearms will be cleaned after all trips on barrier islands and after 20 rounds

All participants in this program will follow general safety precautions involving the use of firearms and maintain awareness of the public sensitivities at all times.

B.8 / Prescribed Fire Plan

Fire Management Plan for Rookery Bay National Estuarine Research Reserve Collier County, Florida Summer 2010

Introduction

Fire is an integral component of the ecology of most herbaceous habitats in North America. Accordingly many plant and animal species have evolved under a regime of habitat disturbance and regrowth brought on by periodic fire.

Prescribed fire can be one of the most cost effective and versatile tools for land managers. In the Reserve, prescribed fire is used to:

- reduce hazardous fuel buildup
- improve habitat for wildlife
- enhance ecosystem biodiversity
- preserve endangered plants and animals including the Florida panther (*Puma concolor coryi*), Gopher tortoise (*Gopherus polyphemus*), indigo snake (*Drymarchon corais couperi*), and the fuzzy-wuzzy air plant (*Tillandsia pruinosa*).
- maintain fire dependent ecosystems
- control invasive plants
- protect life, property, and cultural and other resources from wildfire

Fire in the History of South Florida

For the last 50,000 years, fire has been a recurring part of the Florida landscape as observed in charcoal deposits from lake sediments (Watts and Hansen 1988). Watts and Hansen (1988) also report that for the last 5,000 years the climate was similar to that of today. This leads to the conclusion, that most historical fires were the result of lightning strikes during the summer thunderstorms. These summer months probably composed the rainy season which lasted from late spring through early October (USFWS 2006).

Prior to the introduction of European settlers, the aboriginal people of the southeast used fire for communication and warfare and to clear fields and drive game (Robbins and Meyers 1992). The use of fire to as a management tool was continued by the early settlers who used fire to improve forage and drive game (USFWS 2006). Although the fires set by the aboriginals were conducted in the non-growing period, the European settlers used fires throughout the year. These fires occurred as natural summer fires, spring and summer fires for hunter and cattlemen, and winter fires for turpentine productions (USFWS 2006).

In the first half of the 20th century, water level control in the Everglades severely impacted the fire regimes of South Florida. This water alteration increased the length and severity of the dry season, lead to more destructive wildfires, and steeply increased fire control costs. Under these altered hydrologic conditions, fire consumed more organic soil and killed the root system of fire dependent and fire sensitive plants. The drainage ditches and canals created one of the highest fire potentials in the US. In general, fire destroyed the resources that the land was drained to protect (Wade et al. 1980).

From the early settler period until the early 1970's fire was viewed as a destructive entity which had to be controlled and extinguished upon ignition, although burning for pine management had been utilized in the Florida Everglades since 1958 (Bancroft 1977). It was not until the Yellowstone fires of 1988 that prescribed burning re-emerged as a land management tool. In 2001, the iconic Smokey Bear campaign changed from prevention of "forest fires" to the prevention of "wildfires" in conjunction with this new train of thought (Smokey 2008). Currently, prescribed fire is used as a tool by most land managers throughout the United States.

Fire Management Plan Objectives

To restore and maintain fire as a viable ecological process

To use fire to accomplish upland resource management objectives such as control of exotic vegetation and suppression of successional changes of ecosystems

To protect life, property and cultural other resources from wildfire

To protect life and property, as well as, cultural resources from destructive wildfire

Fire Effects

Fire accomplishes many functions vital to the South Florida ecosystem. They include: influencing the physical and chemical environment; regulation of dry-matter production and accumulation; control of plant species and communities; determining wildlife habitat patterns and populations; influencing insects, parasites, and fungi populations; regulation of the number and kinds of soil organisms; and affecting evapotranspiration patterns and waterflow (Wade et al. 1980).

Fire exclusion can have a profound effect on the soil nutrients. For example, fire exclusion can lead to a change in the amount, distribution, and availability of ecosystem carbon and nutrient pools (namely nitrogen). In the presence of a prescribed fire regime, ecosystem health is improved and reestablished the N-cycle which exists in unavailable forms in the absence of fire.

To obtain the optimal results of a prescribed burn, the desired ecosystem condition or desired outcome of prescribed fire must be considered. These desired ecosystem conditions can be classified into four (4) general types (Vose 2000)

1. Pristine or pre-European settlement
2. Alteration of structure and function of the ecosystem to achieve a higher level of health and sustainability
3. Creation and maintenance of unique habitats and species
4. Increased value of commercially important species (timber, wildlife, etc.)

The correct combination of: utilization of current ecosystem conditions, prescribed fire techniques, desired conditions, and short and long term monitoring to determine if post burn conditions have been reached without compromising ecosystem health and sustainability must be utilized to obtain the desired ecosystem condition.

Vegetation Habitat Types at Rookery Bay and How They Respond to Fire

Twelve (12) major habitat types exist within the Reserve's burn units. These habitats, as outlined by FNAI include the upland communities of: mesic hammock, scrub, mesic flatwoods, scrubby flatwoods, beach dune, coastal strand, and maritime hammock, and the wetland communities of: basin marsh, dome swamp, strand swamp, tidal marsh, and tidal swamp. A description of each habitat and their corresponding fire return intervals are provided below.

Mesic Hammock

This community, also known as Prairie Hammock or palm/oak hammock, usually occurs in areas with seasonal ponding or wet depressions and is closely associated with mesic flatwoods. The dominant overstory species is a mix of cabbage palms (*Sabal palmetto*) and live oak (*Quercus virginiana* var.). The percentage of each tree species is variable and the canopy cover ranges from sparse to dense cover. South Florida slash pines (*Pinus elliottii* var. *densa*) are occasionally present and become dominant in the ecotone between this hammock and surrounding flatwoods.

Fires in the mesic hammock occur infrequently (20-80 years), but when they occur, burn completely and vigorously requiring 2-3 years for complete ecosystem recovery. In general, cabbage palms are highly resistant to fire but produce flammable litter that could facilitate fire under dry conditions. If fire is intense or too frequent, this habitat could change into pine/palm hammock as pines may regenerate in open areas left by the frequent or intense fire. High intensity fires have also been observed to change mesic hammocks into mesic flatwoods. This change is also observed if frequent ground fire occurs.

Fire that burn into the mesic hammock from a neighboring habitat, possibly pineland, may be hot enough to ignite the cabbage palm (*Sabal palmetto*) and ferns to produce an understory and, possibly, an overstory burn. In this scenario, less fire sensitive species such as the laurel oak (*Quercus hemisphaerica*) and tropical hammock species will be killed while fire sensitive species such as live oak (*Q. virginiana*) will resprout.

Scrub

This community of evergreen shrubs is found on higher elevations and excessively well-drained soils, is rarely inundated, and includes oak scrub and rosemary scrub. The overstory is dominated by a mix of scrub oaks (*Quercus geminata*, *Q. myrtifolia*, and *Q. chapmanii*) and/or rosemary bushes (*Ceratiola ericoides*). There is usually a dense understory of gallberry (*Ilex glabra*), rusty lyonia (*Lyonia ferruginea*), saw palmetto (*Serenoa repens*), lichens (*Cladonia* spp.), and spike moss (*Selaginella arenicola*).

Scrub is maintained by high intensity, infrequent fires (known as catastrophic or stand replacing fires) every 4-20 years and is populated by fire-adapted flora and fauna. A regular series of events occur in this burn period:

1. A lengthy fire free period
2. Intense fire occurs. A high heat of ignition is required as scrub is not particularly flammable or easy to ignite.

3. Overstory pines, if present, are killed outright
4. A shrub layer is killed back to ground level
5. Sand pine regenerates from release of seeds
6. Some species, especially Florida rosemary (*Ceratiola ericoides*), regenerate from seeds.
7. Slow accumulation of fuel which decreases the likelihood of reburn for several years (decade to century).

Different scrub types respond to differently to frequent fires. Frequent fires in oak scrub will lead the system into succession towards pine scrub while frequent fires in rosemary scrub will leave large, long-term gaps in the vegetation.

Mesic Flatwood

This community, also known as pine flatwoods, is the most prevalent upland community within the Reserve, and is characterized by an open canopy of tall, widely spaced pines, flat topography, and poorly drained soils. The dominant canopy is south Florida slash pine (*Pinus elliottii* var. *densa*) with few, if any oak (*Quercus*) species present. The common understory is saw palmetto (*Serenoa repens*), gallberry (*Ilex glabra*), wax myrtle (*Myrica cerifera*), and wire grass (*Aristida stricta*). Although this community is located on higher, drier land, standing water may be present for several weeks at a time. The density and type of species is dependent on the level of moisture and fire frequency present.

Fire is frequent in mesic flatwoods, occurs every 1-4 years, and burns vigorously and completely consuming everything but pines. Some species within this habitat possess flammable properties which contribute to the fire maintenance regime.

In mesic flatwoods, frequent fires (1) reduce competition from hardwoods; (2) create soil conditions necessary suitable for germination of seeds of some species; (3) turnover litter, humus and nutrients; and (4) increase the vigor of populations of some species. Nearly all flora and fauna in this habitat depend, at least during some portion of their life cycle, on fire. Although most southern mesic flatwoods contain long leaf pine (*Pinus palustris*), the dominant pine in south Florida pine flatwoods is the slash pine (*Pinus elliottii*). The south Florida variety of this slash pine (*Pinus elliottii* var. *densa*) is more fire and drought tolerant than that of its northern relatives.

Without fire, mesic flatwoods will become hardwood dominated and lead to heavy build up of pine litter. This dense litter may retard pine reproduction encouraging succession to hardwoods. If fire is too frequent or too hot, it may eliminate pine recruitment leading to succession to dry prairie.

Scrubby Flatwood

Scrubby flatwoods, also known as pine scrub, xeric flatwoods, or dry flatwoods, consists of an open canopy of widely spaced slash pines (*Pinus elliottii*), with a low shrubby understory, and patches of barren, white sand. The shrub layer is comprised of scrub oaks (*Quercus geminata*, *Q. iopina*, *Q. myrtifolia*, and *Q. chapmanii*), and saw palmetto (*Serenoa repens*). The shrubby layer may not be all oaks but may also contain grasses, such as wire grass (*Aristida stricta* var. *beyrichiana*) and broomsedge bluestem (*Andropogon virginicus*).

Scrubby flatwoods occur as slight rises within mesic flatwoods or as an ecotone between scrub and mesic flatwoods. Scrubby flatwoods, like scrub, are mainly found within Florida and contain roughly the same flora and fauna of scrub. Unlike mesic flatwoods in which standing water for periods of time is common, scrubby flatwoods normally do not flood even under extreme weather conditions.

As scrubby flatwoods are often found between scrub and mesic flatwoods, the fire return interval of 3-14 years is that intermediate between the return interval for scrub (4-20) and mesic flatwoods (3-7). A fire interval of 3 years in scrubby flatwoods may be required if regrowth is rapid.

Beach Dune

This community, also known as sand dune or upper beach, is characterized by areas of shifting sand and beach grasses. The most common ground cover is sea purslane (*Sesuvium maritime*), sandspur (*Cenchrus* spp.), spurges (*Chamaesyce* spp.), and morning glory vine (*Ipomoea pes-caprae*) but may also contain sea oats (*Uniola paniculata*). Beaches are subject to constant migration from offshore and channel currents, as well as from downstream effects of dredging and structures, such as jetties and seawalls.

Fire in beach habitat is extremely rare to non-existent and is therefore considered to be non-fire dependent.

Coastal Strand

This community, also known as coastal scrub or maritime thicket, is a xeric area located landward of some, but not all coastal dunes. The community is characterized by sandy, raised elevations with a mix of cactuses (*Cereus pentagonus* and *Optunia* spp.), dune plants, including sea grape (*Coccoloba uvifera*) and nickerbean (*Caesalpinnia bonduc*), and an occasional gumbo limbo (*Bursera simaruba*). The coastal strand is actually an ecotone between beach dune and maritime hammock.

Fire in the coastal strand is very infrequent (4-15 yrs) and depends on local conditions and management objections. Although in the absence of any fire, coastal strand may change into hammock (xeric or maritime).

Maritime Hammock

This community, also known as tropical hardwood hammock, is characterized as a narrow band of hardwood forest lying just inland of the coastal strand community. In the Reserve, this community exists on sand and shell ridges, limestone outcroppings, and some shell mounds. The dominant canopy species are gumbo limbo (*Bursea simaruba*), live oak (*Quercus virginiana*), and cabbage palm (*Sabal palmetto*). The understory is diverse with high presence of epiphytes. Plants that favor alkaline conditions thrive in this rarely inundated area.

Fire in maritime hammocks is rare and occurs every 26-100 years. Fire is rare in this habitat as the habitat is often protected by a “moat” of wetter habitats, the soil has higher moisture content, the closed canopy has high humidity content, and habitat lacks an understory to carry fire. Fire may occur in a maritime hammock under severe drought if soil moisture levels within the stand for remain low for three (3) months or longer. Fire will damage the gumbo limbo (*Bursea simaruba*) seedlings and the understory vegetation but will probably not carry into the overstory. As many maritime hammocks are ringed with Brazilian pepper (*Schinus terebinthifolius*), a fire on the edge of the system, may help control the spread of the invasive into the interior of the hammock.

Depression Marsh

Depression marshes, also known as isolated wetlands, flatwood ponds, ephemeral ponds, or seasonal marshes, are small, isolated, often round, depressions with peat accumulation increasing towards the center. These marshes are largely herbaceous with vegetation in concentric bands corresponding to their hydroperiod. The driest, outer bands consist of longleaf threeawn (*Aristida palustris*), beaksedges (*Rhynchospora* spp.), Elliott’s yellow-eyed grass (*Xyris elliottii*), St. John’s wort (*Hypericum myrtifolium*), and patches of blue maidencane (*Amphicarpum muhlenbergianum*), while the inner, wetter bands may contain maidencane (*Panicum hemitomon*), saw-grass (*Cladium jamaicense*), and pickerelweed (*Pontederia cordata*).

Depression marshes are seasonally inundated, but periodic drying is essential to maintain the community. These marshes are shallow (< 1 m), small (4-300 m across) and often occur within larger ecosystems. Within the Reserve, these marshes are found adjacent to mesic flatwoods.

Fire is an important element in the maintenance of depression marshes which usually surrounded by fire dependent communities. Although fire is rare within the wetter interior region of the marsh, fire in the outer bands with a return interval of 5-25 years is necessary to restrict the invasions of shrubs and trees and to formation of peat. The return interval of the outer bands should coincide with the adjacent community that needs most frequent fire.

Basin Marsh

This community, also known as freshwater marsh or wet prairie, is a seasonally inundated largely herbaceous community, characterized by saw grass (*Cladium jamaicense*), cattail (*Typha* spp.), and maidencane (*Panicum hemitomon*) which lies adjacent to scrub, mesic flatwoods, or tidal marsh. Even though the community appears to be monospecific, the tall grass-like species support a high diversity of true grasses, sedges, ferns, vines, and deeper water marsh plants.

Both fire and hydrology are very important within the basin marsh. A fire return period of 2-10 years and a hydroperiod of 50-100 days/year are required for maintenance of the basin marsh. This ecosystem is vulnerable to alterations of the fire and hydrologic regime, and requires frequent fires to recycle nutrients. Recovery from such a regime change is often poor and slow. Therefore, prescribed burning is discouraged during periods of drought. Without fire, the wet prairie is susceptible to invasion by wax myrtle (*Myrica cerifera*). For the greatest environmental lift to listed species, burning in mosaic pattern is recommended.

Dome Swamp

Dome swamps, also known as cypress domes or cypress ponds, are isolated, forested depressional wetlands occurring within a fire-maintained community. As their name suggests, dome swamps have a characteristic dome shape with smaller trees on the edge and bigger trees in the center. Dome swamps may have a depression in the middle giving it a donut-shaped appearance when viewed from above.

Pond cypress (*Taxodium ascendens*) often dominates, but red maple (*Acer rubrum*), slash pine, or dahoon holly (*Ilex cassine*), among others, may be present. A shrub layer of lyonia (*Lyonia lucida*) and wax myrtle (*Myrica cerifera*) is moderate to sparse and may be absent if the fire frequency is high. The herbaceous layer varies from dense to absent and consists of ferns, graminoids, and herbs.

Fire is essential to the dome swamp to maintain its structure and species composition. The recommended fire return interval is based upon the adjacent community that needs the most frequent fire. Without fire, cypress is less dominant and the hardwood or bay canopy increases.

Strand Swamp

This community, also known as cypress strand, is a forested wetland associated with slow-flowing water on sandy substrates, creating a characteristic winding stream, or strand, landscape pattern. The dominant overstory species in pond cypress (*Taxodium ascendens*), but hardwoods such as red maple (*Acer rubrum*) and red bay (*Persea borbonia*) may also be present. Strand swamps have a connection to the surficial aquifer but experience seasonal water fluctuations.

Fire is essential to this community which without fire hardwood invasion and peat accumulation may occur. The 30-200 year fire return interval is highly variable as the plants on the outer limits will experience fires more frequently than the wetter interior plants and trees.

Tidal Marsh

This community is composed of non-woody, salt-tolerant plants occupying the intertidal zone that is at least occasionally inundated with salt water. In the Reserve, the salt marsh is almost always intermixed with buttonwood (*Conocarpus erectus*) and black mangrove (*Avicennia germinans*). The high marsh is dominated by needle rush (*Juncus roemerianus*) with a mix of salt grass (*Distichlis spicata*) and sea purslane (*Sesuvium* spp.). Low marsh in the Reserve is rare as the ocean edge is dominated by mangroves.

This community is not fire dependent but may see a moderately intense fire every 1-5 years which may help control the spread of exotic vegetation and slow encroachment of woody plants, in particular, mangroves.

Tidal Swamp

This community, also known as a mangrove forest, mangrove swamp or mangrove islands, encompasses the three mangrove species: red mangrove (*Rhizophora mangle*), black mangrove (*Avicennia germinans*), and white mangrove (*Laguncularia racemosa*) as well as the mangrove associate, buttonwood (*Conocarpus erectus*). Despite the closed canopy, several groundcover plants can be found in this community including sea purslane (*Sesuvium* spp.), saltwort (*Batis maritima*), glasswort (*Salicornia* spp.) and leatherfern (*Acrosticum* spp.). This system is the most extensive vegetated habitat within the Reserve.

Fire within mangroves is rare to non-existent. If fuel load within a mangrove stand is high due to storm damage and/or freezes, lightning strike induced fires can lead to further losses of mangrove from fire. Most often, mangrove is used as a natural fire break during prescribed burns.

Information for the above section was taken from DEP (2010), FNAI (1990), FNAI (2010), Myers and Ewel (1990) and Shirley and Brandt-Williams (2003).

Invasive, Non-Native Vegetation at Rookery Bay and How They Respond to Fire

In the Reserve, almost all of the above described habitats have been affected to some extent by the presence of invasive, non-native (“exotic”) vegetation. Some of the predominate invasive, exotics include, Melaleuca (*Melaleuca quinquenervia*), Brazilian pepper (*Schinus terebinthifolius*), Australian pine (*Casuarina equisetifolia*), Old World climbing fern (*Lygodium microphyllum*), Downy rosemyrtle (*Rhodomyrtus tomentosa*), earleaf acacia (*Acacia auriculiformis*), air potato (*Dioscorea bulbifera*), carrotwood (*Cupaniopsis anacardioides*), Caesar weed (*Urena lobata*), and Wedelia (*Sphagneticola trilobata*).

One of the most significant ways that a plant invasion can affect the ecosystem is through the alteration of the fire regime (Zouhar 2008). This can occur through either direct effects, such as competitive interference, or through indirect effects, such as changes in habitat, biogeochemical cycle, or disturbance regime. Additional indirect effects of fire that can lead to an increase in invasive, exotic vegetation include: that fire:

- increases light availability by reducing cover (note most invasive plants are shade-intolerant);
- increases the water available to the invasive by killing of natives;
- increases nutrient availability by killing natives and converting nutrients to from storage in biomass to useable forms; and
- increases exposed mineral soil which affects post fire regeneration.

The interaction between fire and exotic is complicated. Fire can increase the abundance of exotic vegetation through disturbance but the lack of fire, by exclusion, can also give exotic vegetation an opportunity to establish and grow (Zouhar 2008). If fire is used as a tool for the control of these invasives, the burning should utilize their known phenological characteristics such as timing of seed or flower production and the stages of development such as seedling or sapling stage.

The affects of fire ecology on invasive management is a new and growing field. The effects of fire to many species have yet to be completely understood, although two species, Melaleuca, and Brazilian pepper have received some recent attention. Each is discussed in further detail below. Research has only begun on the two species of climbing fern but it has been established that climbing ferns alter the fire regime by acting as ladders for burns into canopies which may not be canopy burn-adapted (Munger 2005a) and that climbing ferns will spread after fire (Zouhar 2008).

Melaleuca (*Melaleuca quinquenervia*)

It has been stated that there may not be a better fire adapted species in the world than Melaleuca, which has been nicknamed the “Australian Fireproof Tree” (Zouhar 2008). Melaleuca produces serotinous cones which release seeds following fire, mechanical injury, radial growth, frost, shade dominance, age, and possibly herbicide treatment (Munger 2005b). Following fire, Melaleuca is known to produce over 20 million seeds per tree (Zouhar 2008).

Along with seed production following fire, *Melaleuca* has adaptation to fire that includes moisture in the bark for protection, shagginess in the bark to allow fire to ladder into the canopies in habitats adapted for surface fire, and volatile leaves (Munger 2005b). The rapid resprouting of these seeds grants a competitive five to eight month advantage to *Melaleuca* over natives (Munger 2005b, Zouhar 2008). Fire affects on *Melaleuca* are reported to have a positive feedback loop. Fire promotes *Melaleuca* while *Melaleuca* promotes fire (Zouhar 2008).

Melaleuca seedlings are very slow growing and can be one of the effective methods to control it. 100% mortality has been observed on *Melaleuca* but only on seedlings less than 12 inches in height (Zouhas 2008). Survival increases with increase in height and has been documented not to kill saplings above 6.6 ft. (Zouhar 2008). No long term study of repeated burning on saplings has been completed.

Brazilian pepper (*Schinus terebinthifolius*)

Brazilian pepper is well known for its ability to establish in disturbed areas and may establish from sprouts or seed on a recently burned site (Meyer 2005). Fire may be a deterrent to invasion only through the possible suppression of germination following fire though Brazilian pepper may establish from sprouts or seeds not exposed to burning. Fire retardant characteristics of Brazilian pepper include a decrease in the herbaceous cover and the moist conditions in which is plant is often found (Meyer 2005, Zouhar 2008).

Plant size appears to be the most important aspect to survival following fire. Mortalities of up to 100% have been recorded in plants less than 20 inches but decreases rapidly to a mortality of only 25% in saplings 24 inches (Meyer 2005). As Brazilian pepper may grow up to 3 feet over a 6 month period following burning (average of 5 inches), this may not be an effective control strategy. Timing of burning may also be important. One study found that the greatest mortality of cut pepper occurred June – October which is coincident with the normal fire regime, wet conditions during this time, will slow/stop burns and, therefore, nullify the effect of this timing. (Meyer 2005).

Effects of Fire on Fauna

While fire may directly affect wildlife, fire affects fauna mainly in the ways that it affects their habitats. In the 1988 Yellowstone fires, only 1% of the elk fatalities occurred directly while habitat loss accounted for the greatest toll, which in some populations, killed over 40% of the local elk populations (Smith 2000). Fauna's response to fire can be broken into two phases: immediate and long term. The immediate response is either mortality or movement. The response is influenced by fire intensity, severity, rate of spread, uniformity, and size. The long term response is determined by habitat change which influences feeding, movement, reproduction, and availability of shelter (Smith 2000).

Despite the public perception of fatal effects of fire on wildlife, fire generally kill and injure a relatively small proportion of the animal population. (Smith 2000) Most small mammals will seek refuge during a burn, and large mammals will move out of the path of the fire. In general, survivability is dependent on the degree of mobility of the animal, season in which the burn occurs, and the uniformity, severity, size, and duration of the fire. Animals with limited aboveground mobility appear to be the most vulnerable to fire while large mammal mortality may transpire if the front of the fire is wide, fast moving, actively crowning, and there is thick ground smoke. Very little fire cause injury has been reported in herpetofauna.

The fire regime (frequency, season, and size) can occur as

1. Understory burns that are not lethal to the dominant vegetation and do not substantially change the structure of the dominant vegetation;
2. Stand replacement burns that topkill aboveground parts of the dominant vegetation which substantially changing it;
3. Mixed-severity burns that causes selective mortality; or
4. Nonfire, which will not be discussed.

Though effects to wildlife can be observed in any of the above fire regimes, the most drastic and cascading effects occur in stand replacement burns within forests and woodlands. In this fire regime which leads to a major transformation of the habitat, surface vegetation is removed, cover is reduced, but the habitat as a whole is not destroyed. The tree that are killed become food for insect larvae and perches for raptors while the trees with decay before the fire become nest sites for woodpeckers and other birds and mammals. As these trees fall and decay 10-20 years post burn, biomass is now concentrated on the forest floor and is used for forage and dense cover for small mammals, nest sites for shrubland birds, and concentration of food for browsing ungulates. As the forest matures, 30-50 years post burn, the remaining fire killed snags decay and are used as cover for small mammals, salamanders, and birds. Fungi and invertebrates living in the dead wood provide food for the birds and small mammals.

Fire can have positive effects at all ecosystem levels from the individual up to the landscape level. At the landscape level, fire produces a mosaic which produces changes in the: availability of habitat patches and heterogeneity; composition and structure of larger areas; and connections among habitat patches (Smith 2000). By increasing heterogeneity, animal species have an increased opportunity to select from a variety of habitat condition and successional stages.

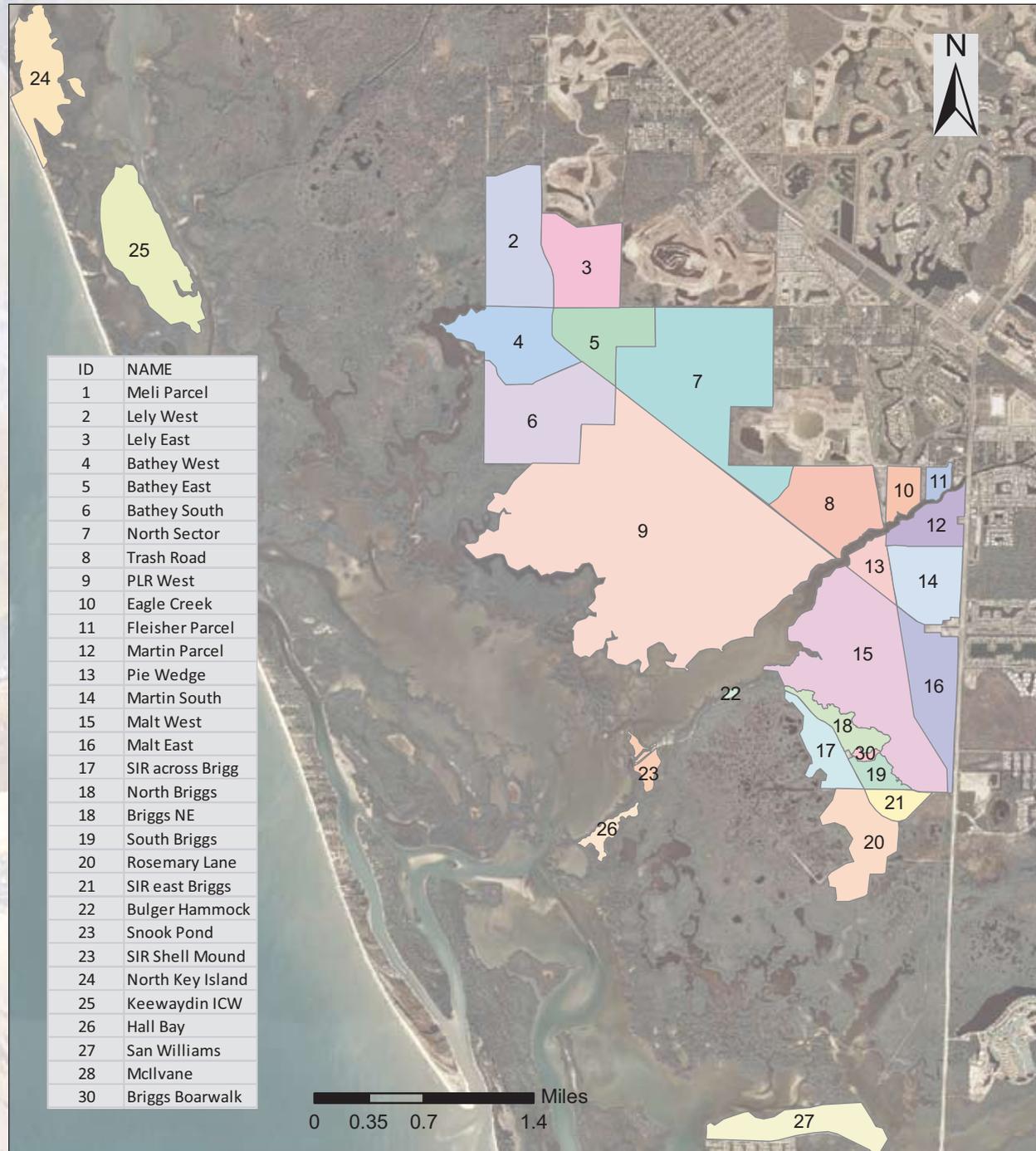
Rainy (Growing) Season vs. Dry Season Fire

Two distinct seasons occur in Florida, the rainy, spring/summer (growing) season and the dry, winter season. Before the inclusion of humans into the landscape, approximately 12,000 year B.P. almost all fires occurred from lightning strikes during the rainy season.

The physiological effects between burning in the growing season and the dry season do not appear to be as clear as one might expect. In terms of effects on soil, two divergent points of view exist (Robbins and Myers 1992)

1. Leeching of nutrients is greatest during burns conducted in the dry season (fall and early winter) as dormant vegetation cannot easily uptake nutrients.
2. Nutrients are concentrated in the aerial portions of plants during the growing season and a fire at this time will cause loss of these vital nutrients through volatilization. In contrast, nutrients are stored below ground in the dry season and are protected during surface burns.

In terms of effects on plants, again, the difference is not clear. Since the height of the fire increases as temperature increases, more crown damage will occur during the warmer, growing season although the lethal temperature may



be lower in the growing season. Mortality was found to be dependent not on whether the burn occurred in the growing or dry season but on what part of the season it was conducted. Mortality is usually greatest following late growing season fires than early growing season. Low intensity burning during any season appears to be OK. It is hypothesized that the effects of burns would differ between C3 and C4 grasses with C4 grasses better to handle growing season fires but no definitive conclusion has been reached..

It has long been held that for pine flatwoods, annual summer burning kills off the understory (USDA 1988) but a study conducted in the Everglades National Park, for the effect on Slash pine (*Pinus elliottii*) found no difference (Robbins and Myers 1992).

Dry season burns are thought to lead to the increase in Brazilian pepper “tree islands” with Tropical Hardwood Habitats (Zouhar et al. 2008).

Rookery Bay Fire Management Units

In Rookery Bay Reserve, 30 Burn Units (Fig. 1 and Table 1) have been established. Over time, additional units will be added and the boundaries of existing units may be modified. Historically, not every burn unit has had a prescribed burn although a few of the units have been burnt repeatedly. The burn history of each unit is presented in Table 2.

Fire Plan Table 1 / Rookery Bay Burn Units

Number	Name	Acres	Number	Name	Acres
1	Meli Parcel	68	16	Malt East	157
2	Lely West	216	17	SIR across Briggs	75
3	Lely East	164	18	North Briggs	54
4	Bathey West	169	19	South Briggs	33
5	Bathey East	132	20	Rosemary Lane	132
6	Bathey South	277	21	SIR East Briggs	38
7	North Sector	506	22	Bulger Hammock	3
8	Trash Road	186	23	Shell Mound-Snook Pond	24
9	PLR West	509	24	North Key Island	145
10	Eagle Creek	40	25	Keewaydin ICW	229
11	Fleisher Parcel	17	26	Hall Bay	23
12	Martin Parcel	78	27	Sam Williams	137
13	Pie Wedge	47	28	Mcllvane	258
14	Martin South	133	29	Faka-Union Berm	545
15	Malt West	460	30	Briggs Boardwalk	6

Fire Plan Table 2 / Dates of known prescribed burns and Authorization Numbers for each Burn Unit

BU	Date Burnt	Site	Acres Burnt	Authorization Number
5 & 6	01/13/05	Bathey NE/SE .	8	2005-009904
8	01/14/10	Trash Rd.	149	2010-004450
8	01/15/10	Trash Rd.	149	2010-004788
12	12/02/03	Martin Parcel	63	50733
12	02/20/04	Martin Parcel	63	82014
13	01/18/05	Pie Wedge	27	2005-11827
14	01/23/06	Martin South	22	012339
17	02/14/03	SIR Scrub B/E	50	15967
17	02/15/03	SIR across Briggs	100	16394
17	01/10/07	SIR across Briggs		2007-1
18	11/22/95	North Briggs	60	104077
18	03/07/07	North Briggs		004628
18A	02/09/10	Briggs North	13.8	2010-011-989
18A	02/15/10	Briggs North	13.8	013-621

BU	Date Burnt	Site	Acres Burnt	Authorization Number
18B	01/10/99	North Briggs	7.2	
18B	02/07/10	Briggs North	22.1	2010-011-146
19	02/15/06	South Briggs	20	
19B	01/11/10	South Briggs	4	2010-003129
20	03/20/02	Rosemary Lane	21	29897
20	02/17/04	SIR Rosemary Lane SW	35	80185
20	02/22/05	Rosemary Lane	20	35362
20	02/23/05	Rosemary Lane	30	36280
21	03/01/02	SIR East Briggs	15	22542
22	12/17/02	Bulger Hammock	8	106444
22	12/15/04	Bulger Hammock	8	210470
22	08/10/09	Bulger Hammock	3	057521
23A	02/11/03	Snook Pond	50	14369
23A	11/13/09	Snook Pond	16	079163
23B	01/07/03	Shell Mound	15	1785
24	03/23/02	Keewaydin Island	160	30428
26	01/12/10	Hall Bay	24.7	2010-00354
29	10/18/01	Faka Union	30	
No #	03/22/02	Cannon Island	10	

Fire Plan Table 3 / Suggested Burn Rotation for each Burn Unit

Unit #	Name	Predominant Burnable Habitats	Burn Rotation (years)
1	Meli Parcel	Mesic Flatwoods	1-4
2	Lely West	Mesic Flatwoods	1-4
3	Lely East	Mesic Flatwoods	1-4
4	Bathey West	Tidal Marsh	1-5
5	Bathey East	Mesic Flatwoods	1-4
6	Bathey South	Tidal Marsh	1-5
7	North Sector	Mesic Flatwoods	1-4
8	Trash Road	Mesic Hammock	1-4
9	PLR West	Mesic Flatwoods	1-4
10	Eagle Creek	Mesic Flatwoods	1-4
11	Fleisher Parcel	Mesic Hammock	2-5
12	Martin Parcel	Mesic Hammock	1-4
13	Pie Wedge	Tidal Marsh	1-5
14	Martin South	Mesic Flatwoods	1-5
15	Malt West	Tidal Marsh	1-5
16	Malt East	Tidal Marsh	1-5
17	SIR across Briggs	Scrub	4-20
18	North Briggs	Mesic Flatwoods	1-4
19	South Briggs	Scrub	4-20
20	Rosemary Lane	Scrub	4-20
21	SIR East Briggs	Scrubby flatwoods	3-14
22	Bulger Hammock	Mesic Flatwoods	1-4
23	Shell Mound/Snook Ponds	Disturbed	2-4

Unit #	Name	Predominant Burnable Habitats	Burn Rotation (years)
24	North Key Island	Mesic Flatwoods	1-3
25	Keewaydin ICW	Maritime Hammock	4-15
26	Hall Bay	Coastal Strand	4-15
27	Sam Williams	Coastal Strand	4-15
28	Mcllvane	Tidal Marsh	1-5
29	Faka-Union Berm	Tidal Marsh	1-5
30	Briggs Boardwalk	Mesic Flatwoods	1-3

Annual Fire Planning

Annually, each management/burn zone should be evaluated as to whether it should be placed on the annual plan for burning in that fiscal year. Determining whether a zone should be burned or not in the next annual cycle is a matter of considering fire return intervals for each community type, present fuel load, resource management objectives, and strategic location. A zone can be placed on the annual resource management work plan for a variety of reasons, not just because it is “due” or “overdue” from a time perspective. It is very important to consider how each zone fits into the overall scheme of accomplishing a number of burns. Each year, the Reserve should have a selection of zones that meet different weather parameters to increase the chance of being able to burn under a variety of conditions. To the greatest extent possible, zones should be planned in a sequence so that each burn makes the next burn easier by reducing the amount of holding required to burn each zone (i.e. plan to burn into recently burned zones).

While it is not ideal to burn 100% of a natural community type in one area, most burning gets spaced in time so that zones are rarely burned all at the same time. The annual plan should consider season of burn with an emphasis placed on growing season burning as the ideal objective but with the flexibility to burn as opportunities present themselves. The frequency of burning is very important. Long-term research indicates that frequent burning can at least partially compensate for the effects of season of burn. Ideally, an area should be burned as frequently as possible under a variety of conditions, including the time of year.

The annual fire plan should include zones to be burned, zones that need mechanical treatments, equipment needs, and personnel training needs. Including all of these items gives the Reserve and burn managers a more complete picture of the overall fire management needs for each annual cycle. The annual plan should provide strong guidance to the park but modifications will occur throughout the year for a variety of reasons. (DEP 2010)

Wildfire

1. Purpose:

The purpose of this plan is to outline operating procedures between participating agencies during wildfire operations.

2. Wildfires:

While conducting wildfire management activities on lands managed by RBNERR, the responding agencies will adhere to the land management policies and standards of RBNERR.

RBNERR lands will follow Minimum Impact Suppression Tactics (MIST) Guidelines. In order to minimize the lasting impacts to resources while suppressing wildfires on RBNERR lands, the use of light hand tactics, low psi impact rubber tracked machinery, and hose lays off existing fire lines and roads. When suppressing fires within the authorized boundaries of RBNERR, other cooperators will adhere to this standard except in the case of immediate threats to life safety or property. This will mean that plows or dozer blades will only be used in the event of the above mentioned threats. Foam or wetting agents may be used, as needed, but may not be used over water. Endangered species are a concern and will be considered in any suppression action as regards to negative impacts on sensitive habitats.

3. Restoration and Rehabilitation:

In the event of dozer / plow activities, RBNERR will be asking for assistants for and during restoration and rehabilitation. After fire spread has stopped, lines are secured, and fire is deemed out cold, restoration activities will include filling in deep and wide fire lines, cup trenches and obliterate any berms. The berm material should be spread back into the fire line or recontoured to the fire line. Any trees or large size brush cut during fire line construction should be scattered to appear natural. Discourage the use of newly created fire lines and trails by blocking with brush, limbs, poles, and logs in a natural-appearing arrangement.

Fire Assistance Partnership Agreements:

The RBNERR Resource Management staff are pursuing the establishment of agreements such as an MOU/ Operating Plan with: DOF - Caloosahatchee District, Florida Panther NWR, Ten Thousand Islands NWR, Big Cypress Natl. Park, Everglades Natl. Park, Golden Gate Fire Dept, Isles of Capri Fire Dept., Marco Island Fire Dept., and the East Naples Fire Dept.

Burn Crew Positions and Responsibilities

Incident Commander/Burn Boss

The single person in charge of the burn; ultimately responsible for planning, preparation, execution, and mop-up of the burn; ultimately responsible for crew safety; ultimately responsible for paperwork, including acquiring burn authorization and completing all required burn prescription, day of burn, and evaluation paperwork. The burn boss can delegate portions of their responsibilities. Any staff member meeting the position qualifications can fill the position.

Burn Boss Trainee

Performs all the duties and assumes the responsibilities of a burn boss while working under the direct supervision of a qualified burn boss. All decisions and actions must be approved by the burn boss. An individual's DOF certification burn is done while the individual is acting as a BBT.

Crew Boss

Supervises a crew (hand crew, engine crew(s), holding crew, firing crew, etc.); serves as an assistant to the Incident Commander/Burn Boss and carries out his/her directions; responsible for crew safety and task assignments and performance; maintains full communication with the Incident Commander/Burn Boss and crew members.

Crew Boss Trainee

Performs all the duties and assumes all the responsibilities of a crew boss while working under the direct supervision of a qualified crew boss. All decisions and actions must be approved by the crew boss.

Crew

A non-supervisory position that may include responsibility for any combination of ignition, holding, and weather monitoring tasks. May be assigned to watch a Crew Trainee.

Crew Trainee

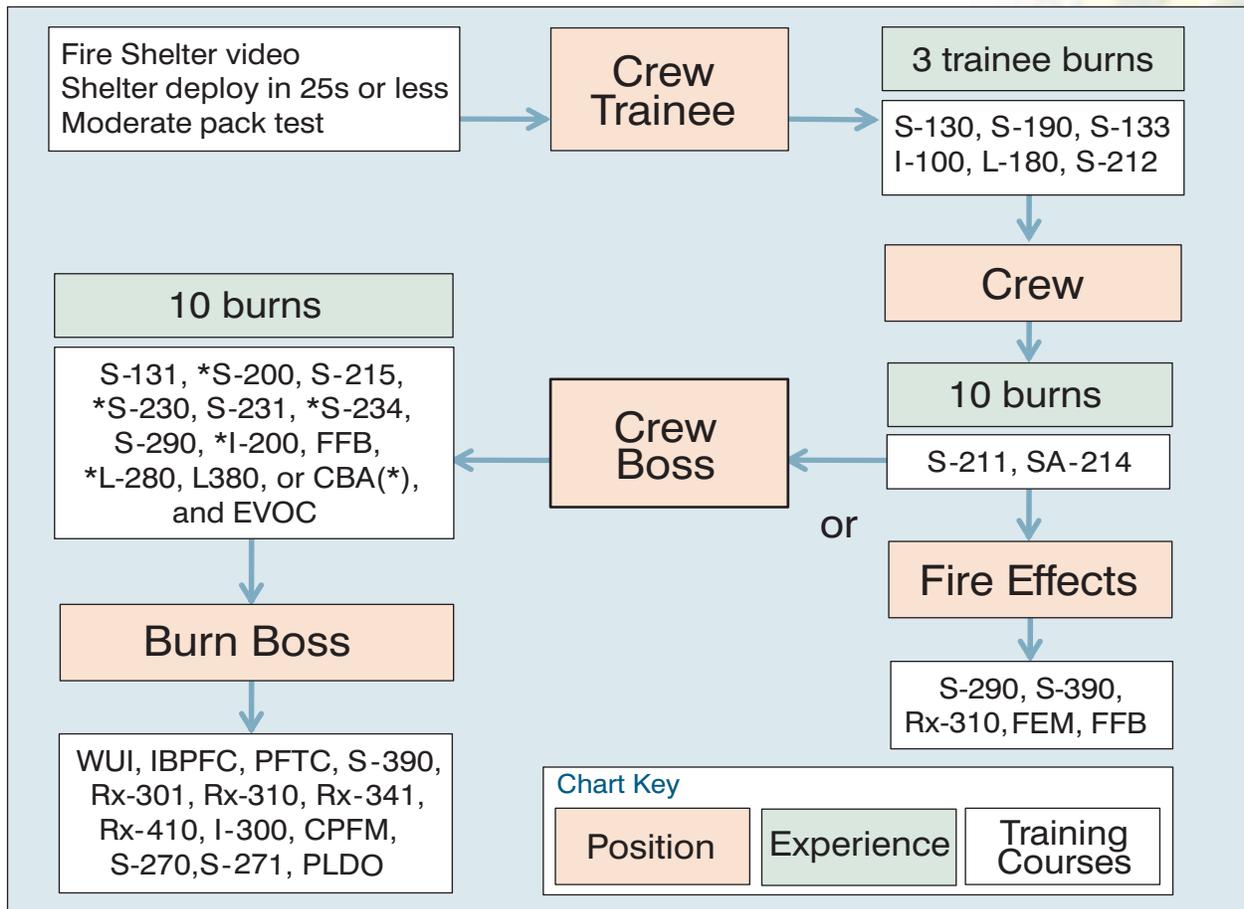
A position that shadows a specified crew member to learn the responsibilities and techniques of the position. Not allowed to work alone on a fire. Does not count towards minimum staff listed on the burn prescription.

Training and Experience Requirements

The minimum certification, training, and experience requirements for each burn crew position are indicated in Figure 2. All staff (and volunteers) who participate as part of the Reserve's Burn Team must meet these requirements. The requirements for a position include all the requirements of the positions supervised (i.e., crew boss must also meet the requirements of a crew member; burn boss must meet the requirements of a crew boss). As practicable, staff should accumulate both training and experience required to advance to the next level. Staff should keep accurate personal records to document accomplishments.

Course List

<i>I-100</i>	<i>Introduction to ICS (Incident Command System)</i>
<i>I-200</i>	<i>Basic ICS: ICS for Single Resources and Initial Action Incidents</i>
<i>I-300</i>	<i>Intermediate ICS: ICS for Supervisors and Expanding Incidents</i>
<i>L-180</i>	<i>Human Factors in the Wildland Fire Service</i>
<i>L-280</i>	<i>Followership to Leadership</i>
<i>L-380</i>	<i>Fireline Leadership</i>
<i>Rx-301</i>	<i>Prescribed Fire Implementation</i>
<i>Rx-310</i>	<i>Introduction of Fire Effects</i>
<i>Rx-341</i>	<i>Prescribed Fire Plan Preparation</i>
<i>Rx-410</i>	<i>Smoke Management Techniques</i>
<i>S-130</i>	<i>Firefighter Training</i>
<i>S-133</i>	<i>Look Up, Look Down, Look Around</i>
<i>S-190</i>	<i>Introduction to Wildland Fire Behavior</i>
<i>S-200</i>	<i>Initial Attack Incident Commander</i>
<i>S-211</i>	<i>Portable Pumps and Water Use</i>
<i>S-212</i>	<i>Wildland Fire Chain Saws</i>
<i>S-215</i>	<i>Fire Operations in the Wildland/Urban Interface</i>
<i>S-230</i>	<i>Crew Boss (Single Resource)</i>
<i>S-231</i>	<i>Engine Boss (Single Resource)</i>
<i>S-234</i>	<i>Ignition Operations</i>
<i>S-270</i>	<i>Basic Air Operations</i>
<i>S-271</i>	<i>Helicopter Crewmember</i>
<i>S-290</i>	<i>Intermediate Wildland Fire Behavior</i>
<i>S-390</i>	<i>Introduction to Wildland Fire Behavior Calculations</i>
<i>CBA</i>	<i>Crew Boss Academy</i>
<i>EVOG</i>	<i>Emergency Vehicle Operating Certificate</i>
<i>FEM</i>	<i>Fire Effects Monitoring</i>
<i>FFB</i>	<i>Florida Fire Behavior</i>
<i>IBPFC</i>	<i>Interagency Basic Prescribed Fire Course</i>



Prescribed Fire Plan Figure 2 | Training and Experience Requirements for each Position

PFTC National Interagency Prescribed Fire Training Center

PLDO Plastic Sphere Dispenser Operator

SA-214 Southern Area Engine Academy

WUI Implementing Prescribed Fire in the Wildland Urban Interface, Advanced Rx Fire

Logistical Staff versus Operational Staff

All personnel assigned to work inside the “control line” on a prescribed burn or on extended attack during a wildfire are considered Operational Staff and shall meet all DEP/CAMA Burning Standards for training, PPE, and fitness. Operational positions on a prescribed burn consist of Burn Boss, Burn Boss Trainee, Crew Boss, Crew Boss Trainee, Crew, and Crew Trainee. Operational positions on an extended attack wildfire consist of Incident Commander, Division Supervisor, Strike Team Leader, Crew Boss, and Crew.

Logistical Support Staff are personnel who are acting in a supporting role to the more actively engaged Operational Staff. Logistical Support Staff cannot be actively engaging the fire or actively on standby for fire suppression. They can act in such roles as ground support (mechanic, fuel transport); liaison officer; information officer; traffic control; field monitor (weather, photos, etc.); patrol (does not include active mop-up); mentor; advisor; etc. Discretion needs to be used in regard to PPE and training for Logistical Support Staff. If an individual is making a quick trip to the fireline and then leaving, no special training or PPE is required (ex. person shuttling food, fuel, etc.). However, if the individual will be spending time on the fireline where they could be exposed to an escape, they need standard PPE and fire shelter training (ex. person taking photos all day along the fireline).

Annual Training Requirements – Pack Tests and Fire Shelter Refreshers

All fire staff must refresh their skills in the areas of fire shelter deployment and pack testing once annually. Staff must view the fire shelter deployment video and practice fire shelter deployment using either the appropriate practice or actual fire shelter. Deployment will be timed and must be successfully accomplished in 25 seconds or less (and include PPE of a hard hat and leather gloves). All operational fire staff must annually successfully complete the moderate pack test.

Annual testing (pack and shelter) typically occurs from October 31 to January 31 of the following year. The January yearly date is recorded in the database, and the results are only good until January 31st of the following year. For example: a person tests on November 15, 2008; they are in compliance until January 31, 2010. If a person tests on January 15, 2009; they are in compliance until January 31, 2010. If a person test on April 12, 2009; they are current until January 31, 2010.

Equipment and Personal Protective Equipment (PPE) Required for Prescribed Burns

Minimum Required Equipment

The following equipment is required on all prescribed burns conducted on Reserve managed Lands (DEP 2010).

1. A minimum of two pieces of rolling water-delivery equipment; must carry spare/replacement equipment sufficient that basic repairs can be made in the field. Spare equipment would include items such as spare hose of various lengths and diameter, spare nozzles of various types, spare fittings, gaskets for hose, nozzles, and drip torches. Engines (fire trucks) that are typed according to National Wildfire Coordinating Group (NWCG) standards must carry equipment required for that specific type.
2. Rolling equipment must be able to draft/refill the tank. If the equipment is not draft-capable, a portable pump and draft hose must be carried for that task
3. Fire extinguisher in each vehicle.
4. Vehicle/pump tool kits with important spare parts including, but not limited to, spare spark plugs, fuel filters, Teflon tape, pipe wrenches, etc.
5. High-band two-way radio for each crew member on the fireline; high-band mobile radio mounted inside of engines.
6. Fire belt weather kit or appropriate electronic weather monitoring equipment that is correctly calibrated.
7. Hand tools that match the task and number needed for job (Council fire rake, fire flap, round-pointed shovel, ax, McLeod, Pulaski, etc.).
8. Drip torches with spare parts (gaskets, wicks, spouts, plugs, etc.) needed to make repairs on the fire.
9. Sufficient spare fuel in appropriately labeled safety cans with funnel or spout to maintain for drip torches, pump motor and, if necessary, the engine itself.
10. Chainsaw with tools and appropriate PPE for saw operations. (wrench, spare chain, bar oil, chaps and spare fuel).
11. First aid kit for burning applications, including eyewash.
12. Telephone or radio equipment necessary to provide 24 hour communications from the burn site. Must include a list of all FPS and other emergency contact numbers (DOF, EMS, DOT, Air Rescue, Hospital, and District Bureau Chief, nearest backup support).
13. Drinking water for the crew.
14. Red or amber light mounted on top of engine to be used to alert the public of hazard conditions.
15. The abbreviation DEP plus the last four digits of the license plate number will appear on each engine's roof to allow for vehicle identification from the air. Numbers will be a minimum size of 12" tall, but may be adjusted as needed due to roof constraints. The markings will be red reflective stickers or paint.
16. The standard park abbreviation (from statewide burn database) and the last 2 digits of the engine's license plate will be placed on the front center portion of the engine doors or on the front quarter panels. For example, the Hillsborough River engine DEP7359 would be labeled as HR-59. These decals will be 3" red reflective letters/numbers.

Recommended Equipment (Optional):

1. Hydrant wrench and adapter for engines working in areas with fire hydrants.
2. ATV with mounted water tank and 12-volt pump.
3. Rechargeable flashlight mounted in cab of engine.
4. Additional or backup PPE stored in engine for volunteers or quick response for staff.
5. Public address system with siren. Public address system must connect to mobile radio allowing radio traffic to be broadcast through external speaker.

Equipment Maintenance and Standardization

1. All fire equipment must be kept "fire ready" such that no preparation action is needed to take the vehicle and its equipment to a fire. Fire equipment should be returned to ready status as soon as possible after both prescribed fires and wildfires. Needed repairs should be made as soon as possible. Replacement items will be purchased as soon as possible.
2. Equipment must be maintained in top mechanical condition. Equipment not in good mechanical condition should not be used in fire operations.
3. When replacing or repainting engines, the cab of the engine shall be white in color with FPS emblems placed on the outside center of each front door.
4. When planning for equipment for a prescribed fire, plan for the equipment needed to handle the fire if it escapes.

PPE Requirements

The following items of personal protection equipment must be worn by Reserve staff and are required on all prescribed fires, wildfires, and during mop-up. There are no exceptions to this standard. Use of additional items will

be determined by the Burn Boss according to the site and weather characteristics of each particular burn. All Nomex clothing items must be NFPA 1977 approved (DEP 2010).

1. High-density polyethylene hardhat (Bullard or similar brand preferred). Hardhat must be yellow in color to promote visibility in smoky conditions. Existing non-yellow hardhats shall be phased out as they become unsafe for wear. Adornments such as stickers placed on hardhats shall function for agency recognition and/or group unity. The only other type of sticker allowed on hardhats shall be reflective strips.
2. Eye protection (face shield, goggles, safety rated glasses or safety rated sunglasses).
3. Outerwear (shirt and pants or jumpsuit) shall be of Nomex (Aramid, Nomex IIIA, or Advanced Fabric Nomex). Nomex outer-wear colors shall be yellow for shirts and green for pants. Jumpsuits shall be yellow. Existing Nomex of other colors shall be phased out as they become unsafe for wear. Patches added to outerwear may uniform patches placed on the shoulder or other park-specific burn team patches placed on the chest. Patches received as part of an approved training program may also be worn on the chest. Clothing worn under Nomex should be made from cotton or other natural fibers.
4. Leather boots with hard, slip-resistant soles (leather, Vibram, or rubber preferred); boots to be non-steel toed, lace-up and at least 8" tall.
5. Leather gloves.
6. Fire shelter carried at all times either on a web belt or fire pack with shelter holder so that shelter is readily accessible (deployment training required).
7. Nomex (Aramid) fabric neck, ear and face protector attached to hardhat with Velcro.
8. Directional compass.
9. Ear protection for staff working around pump engines, chainsaws or heavy equipment.
10. Hand-held radio carried in a chest pack; radios should not be carried on a web belt.
11. Bandana or some other cotton or Nomex (or equivalent) item to assist with filtering large particulates while working in heavy smoke. Neoprene filter masks or masks with exposed filters are not permitted due to the tendency to melt and/or ignite.
12. Headlamp or flashlight that can be affixed to allow hands-free operation at night. This item needs to be available to staff but may be stored in the engine (fire truck).
13. Whistle (plastic or metal) attached to radio chest pack or location that makes it readily accessible for noise generation.
14. A means for starting a fire such as matches or a lighter.

Recommended Optional Items:

1. Canteen with web belt or camel pack - 1 quart minimum.
2. Multi-purpose tool such as Leatherman, Gerber, or small knife.

RBNERR Fire Equipment

Current

- 2005 Ford F450 4x4 Gas Truck (400 gal.)
- 1968 2 ½ ton Army Brush Truck (800 gal.)
- 2006 Polaris Ranger 6x6 w/ 60 gal. tank
- 2003 Kawasaki Prairie 360 ATV w/ 25 gal. tank
- 2000 Kawasaki Prairie 400 ATV w/ 25 gal. tank
- 1 dual axle trailer (may include Trac Loader)

Needs/Wants

- Ford F550 4x4 Diesel Extended Cab Truck
- Update 2 ½ ton to a newer 5 ton Brush Truck
- Bobcat UTV 2200 Diesel
- 1 Dual axle trailer
- 1 small trailer for support
- RAWS (Remote Automated Weather Station)

Monitoring for Plant and Animal Responses to Fire

Once the fire management plan is implemented, Rookery Bay will implement an evaluation tool to determine the botanical and zoological responses to the fire regimes in each burn unit and collectively across the Reserve

Photo Points

At approximately four (4) sites per burn unit, photos will be taken facing north (0°), east (90°), west (180°), and south (270°). These sites are marked by metal poles driven into the ground. Photos will be taken pre-burn, 1-2 days post-burn, 6 months post-burn, 1 year post-burn, and annually until the next burn in the unit.

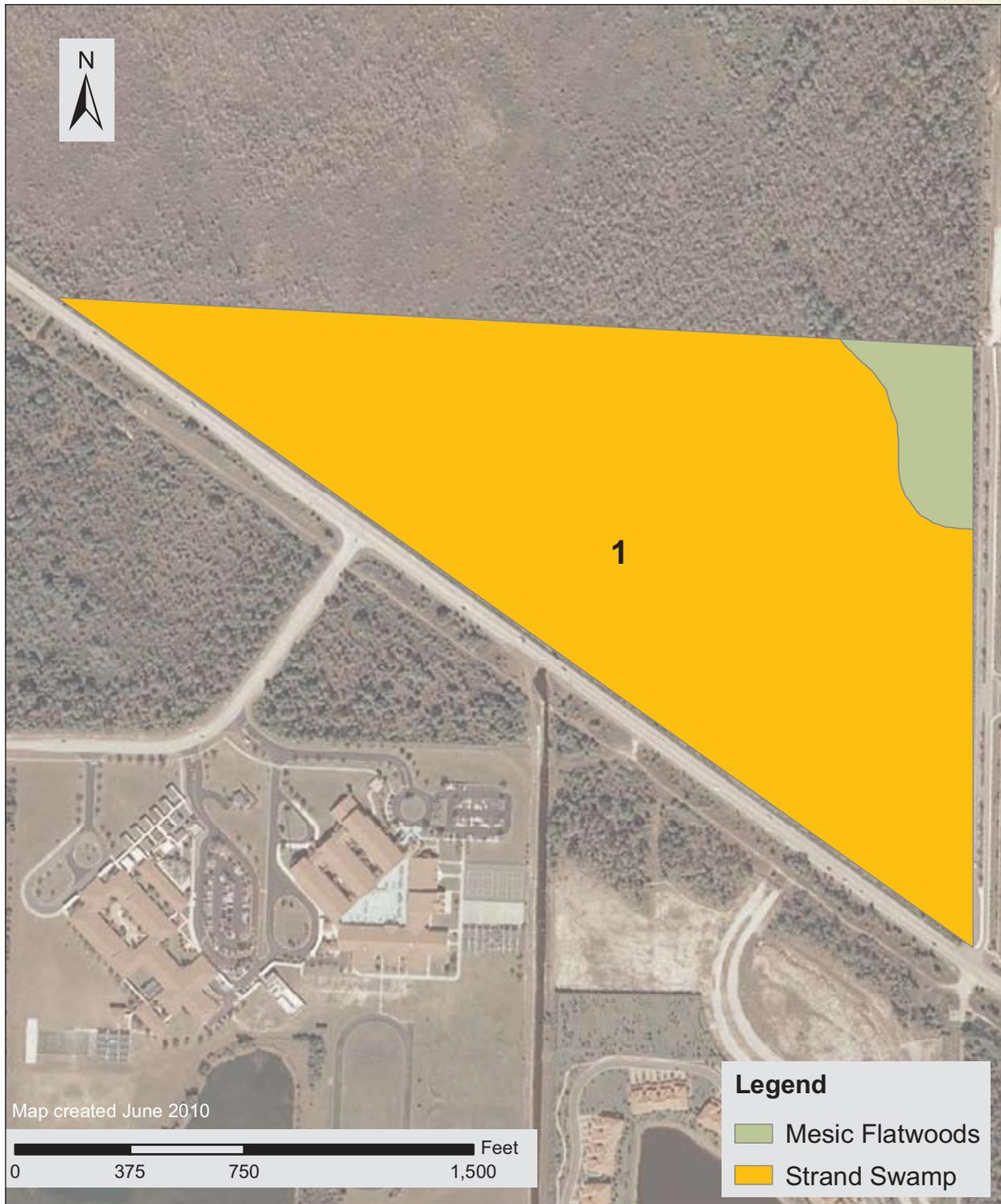
Vegetation (as staff time permits)

Vegetation will be sampled in permanently marked plots in each burn unit. The initial sampling of permanent plots will provide the baseline conditions against which repeated measurements will be compared to detect changes brought about by the treatment burns. The vegetation sampling method is designed to allow detection of fire effects in community composition (loss or gain of species or change in percent cover of invasive, exotic vegetation) and for each species, population density (density of woody plants; frequency for herbs), dominance (basal area for woody species; cover for herbs) and size-class distribution for woody species.

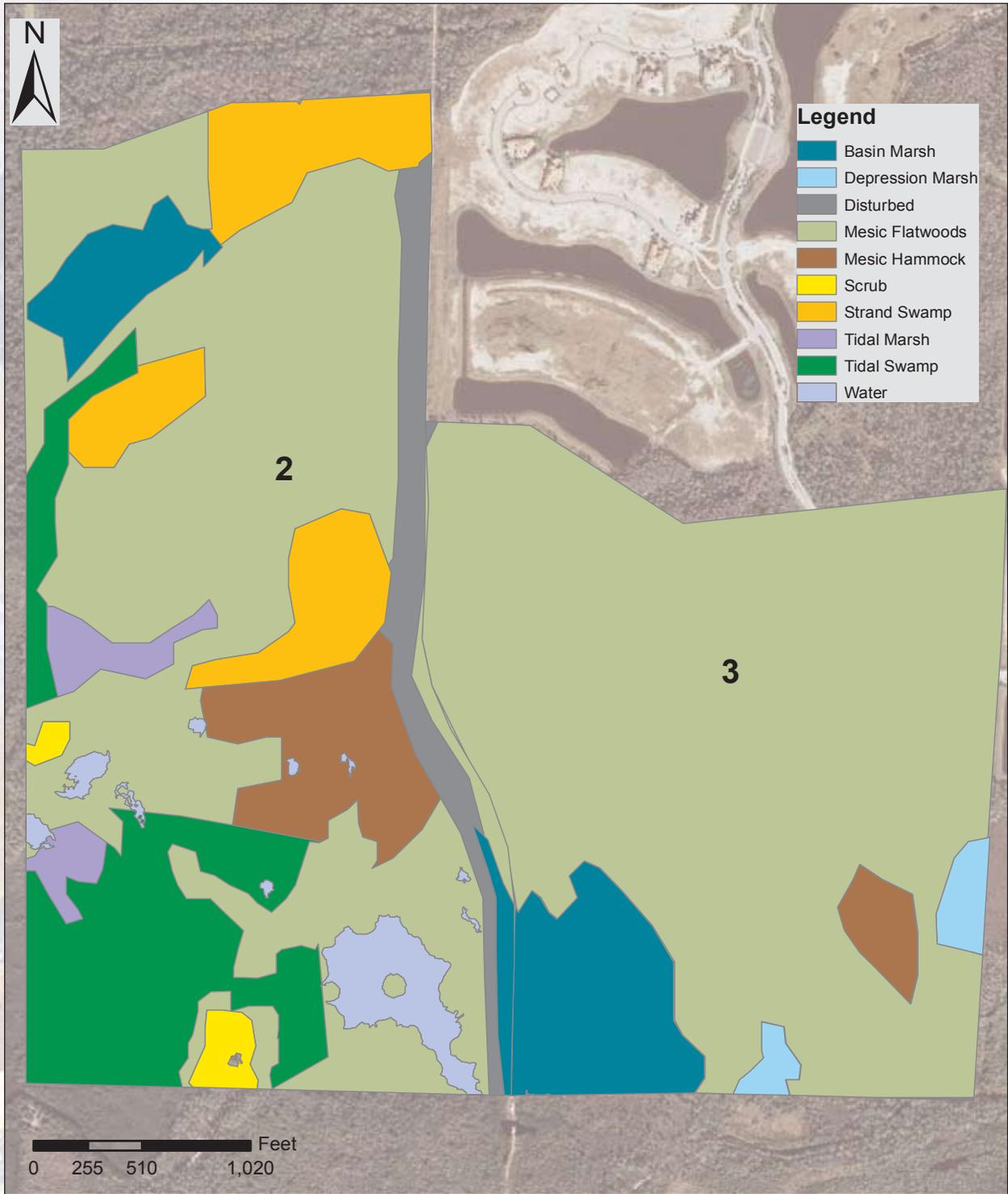
Permanent plot markers of steel reinforcement bar (rebar) will be driven 30-60 cm into the ground. Plot locations will be chosen by overlaying a grid on an enlarged aerial image and randomly choosing points that fall in each plot. The species and number of each plant within a 0.90 m radius will be noted. At randomly selected points, rebar will be driven into the ground and the species and dbh of all trees within a 3 m radius will be noted.

Literature Cited

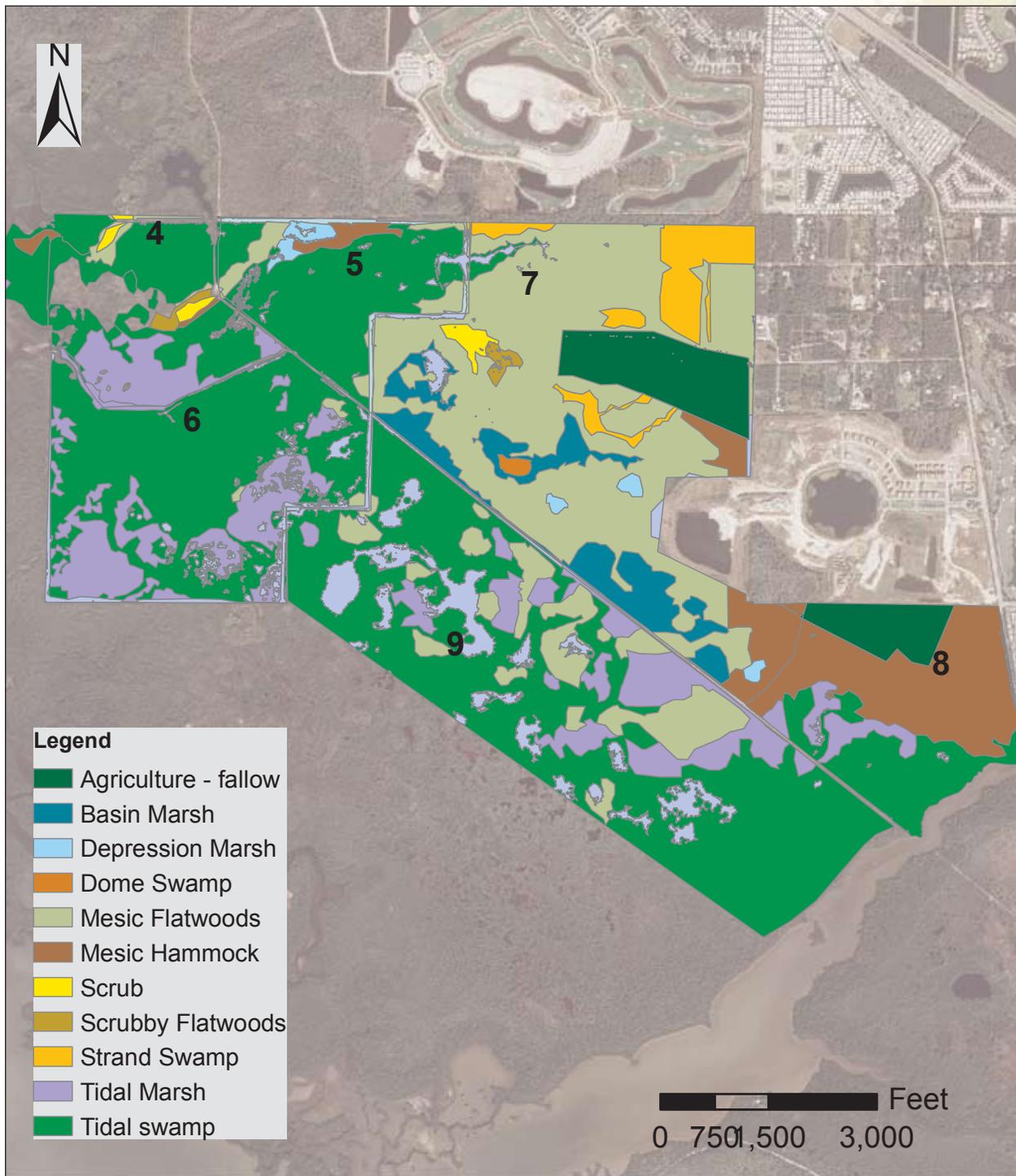
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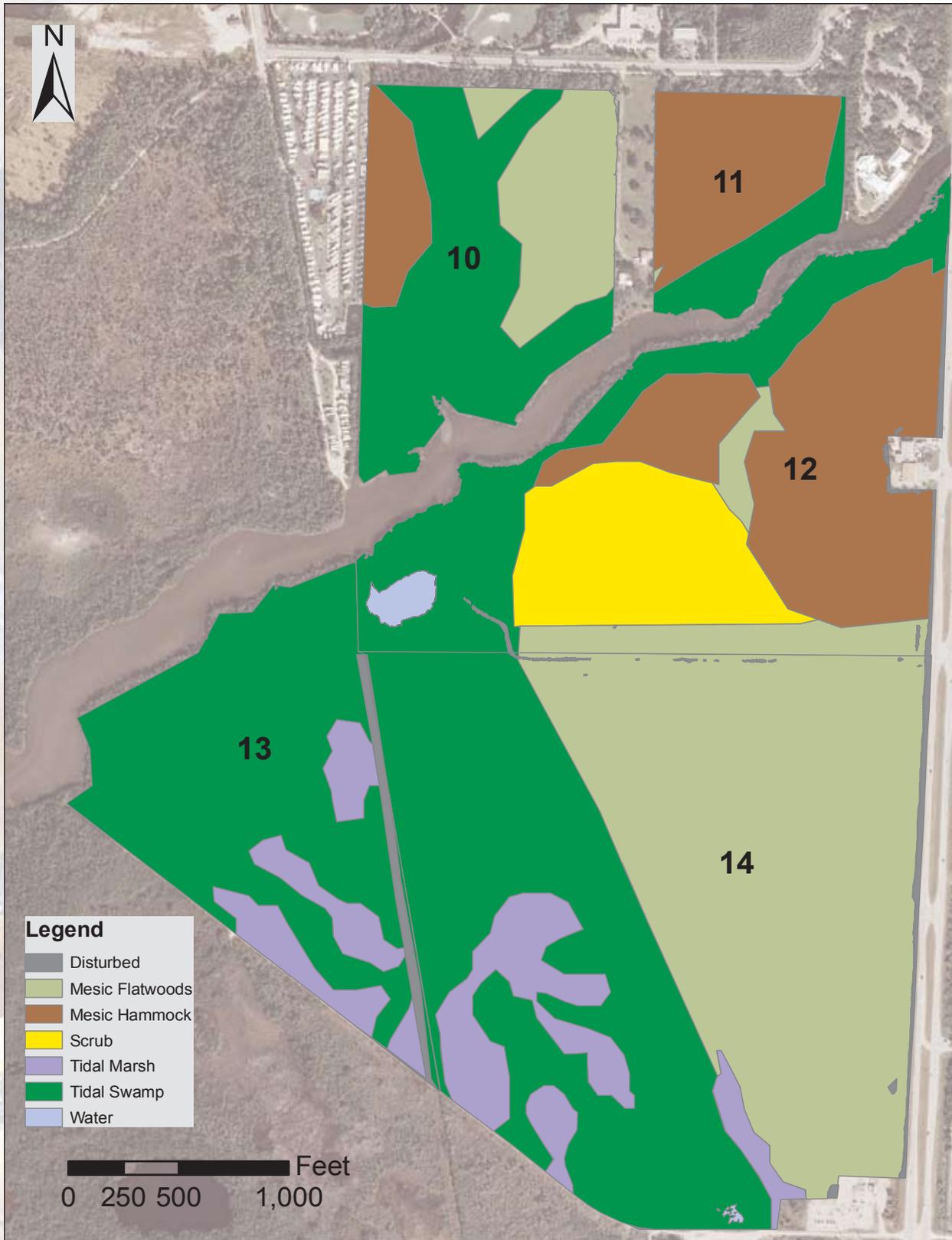
Prescribed Fire Plan Figure 3 | Burn Unit 1 (June 2010)



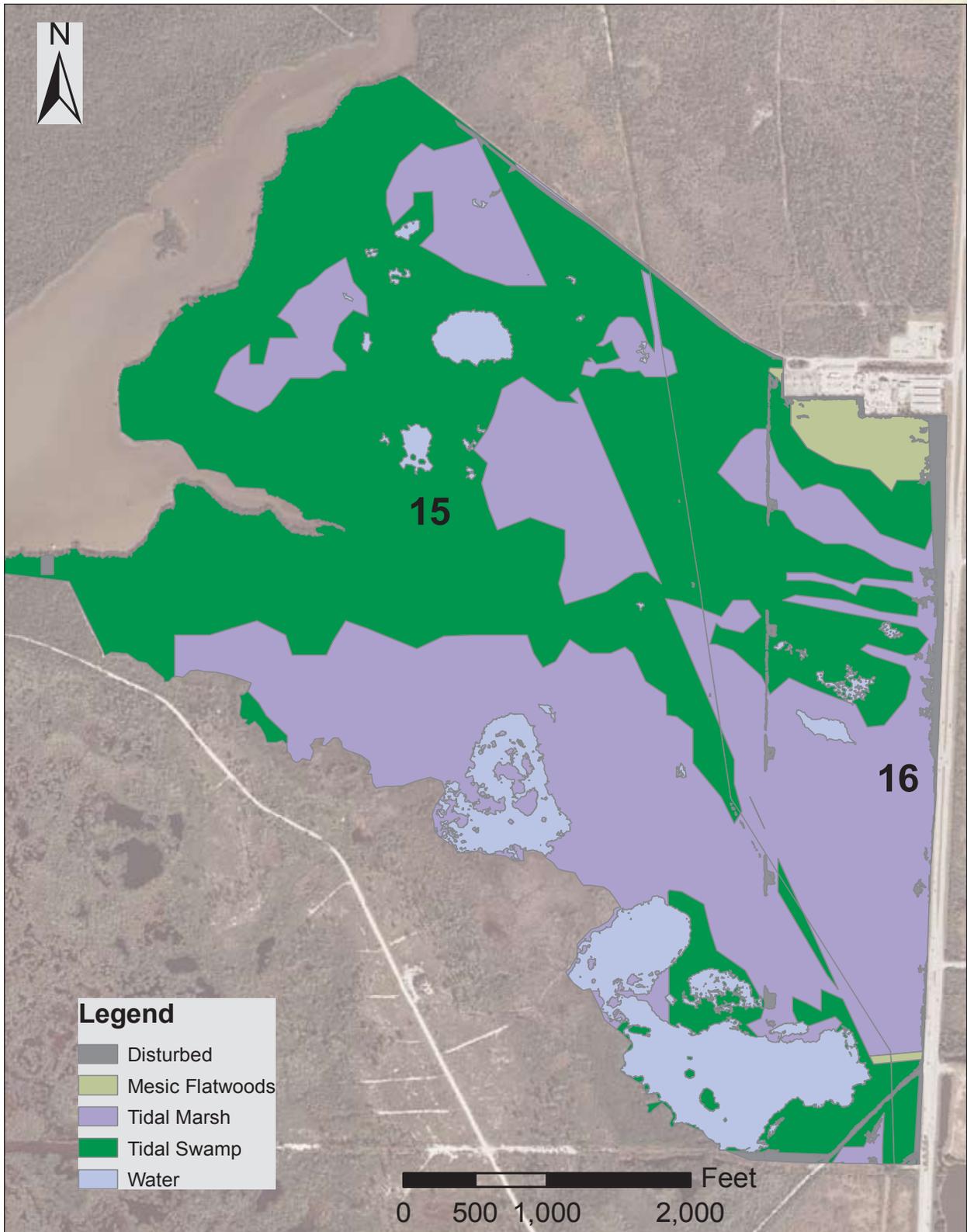
Prescribed Fire Plan Figure 4 | Burn Units 2 & 3 (July 2010)



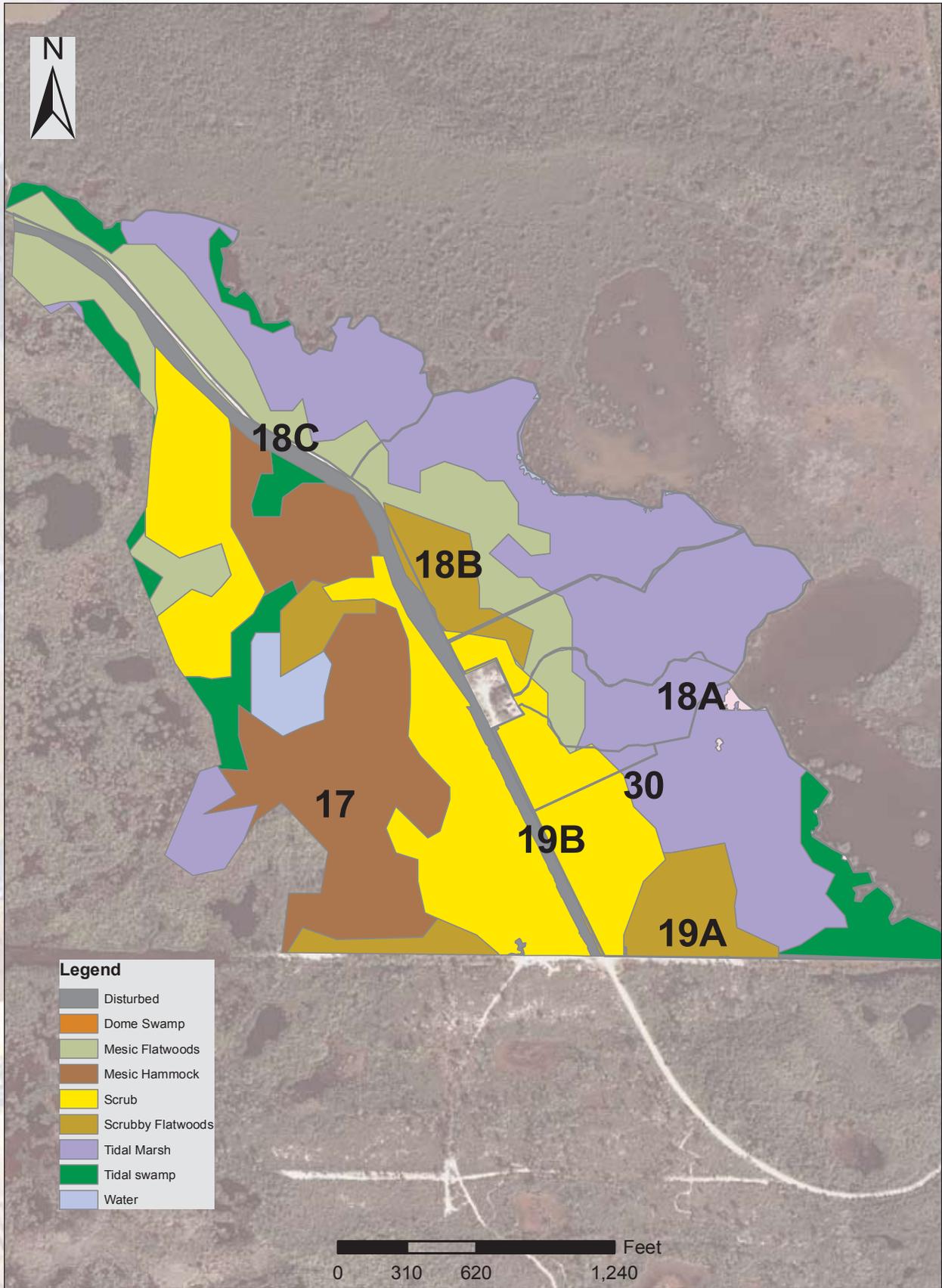
Prescribed Fire Plan Figure 5 | Burn Units 4 - 9 (July 2010)



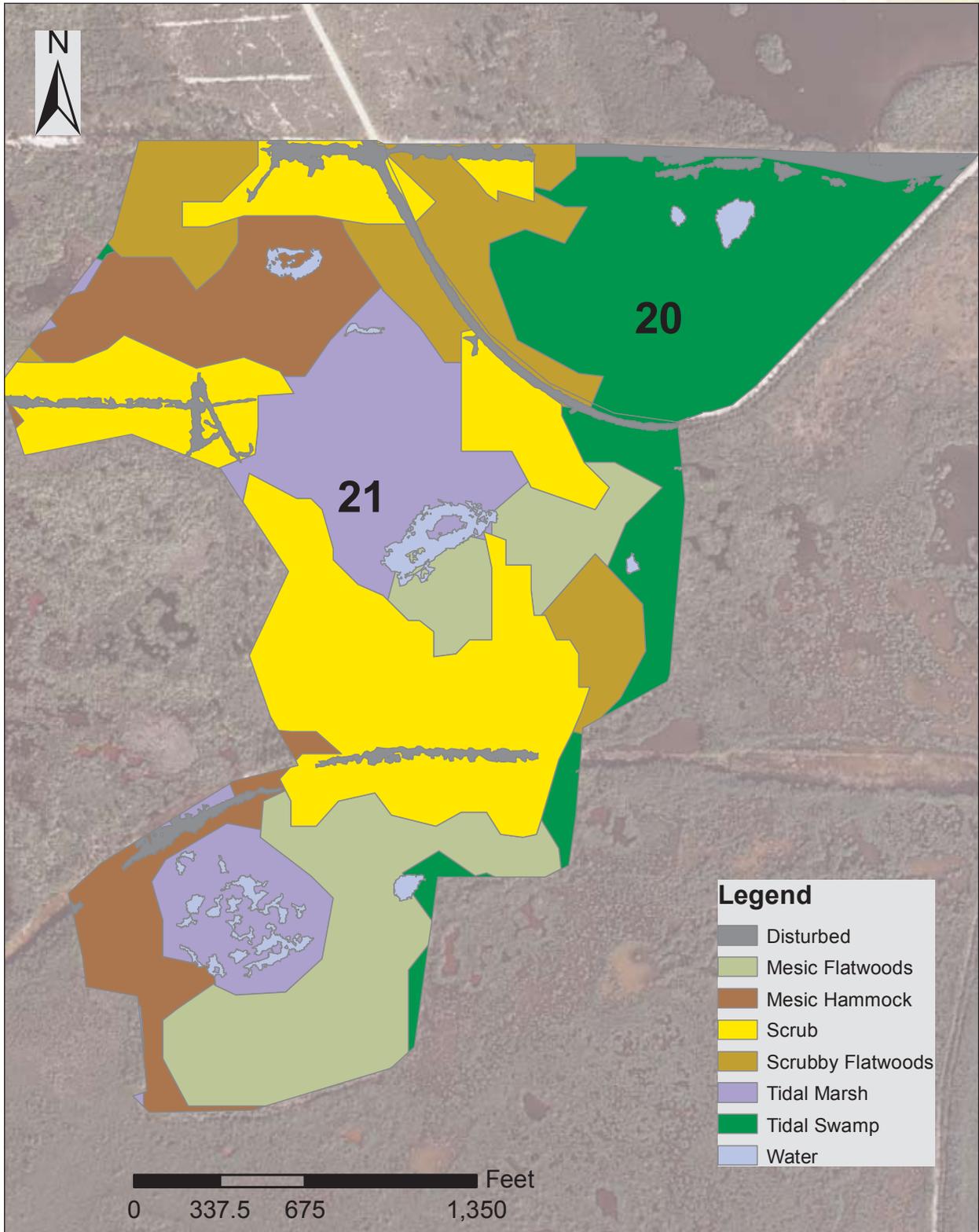
Prescribed Fire Plan Figure 6 | Burn Units 10 - 14 (July 2010)



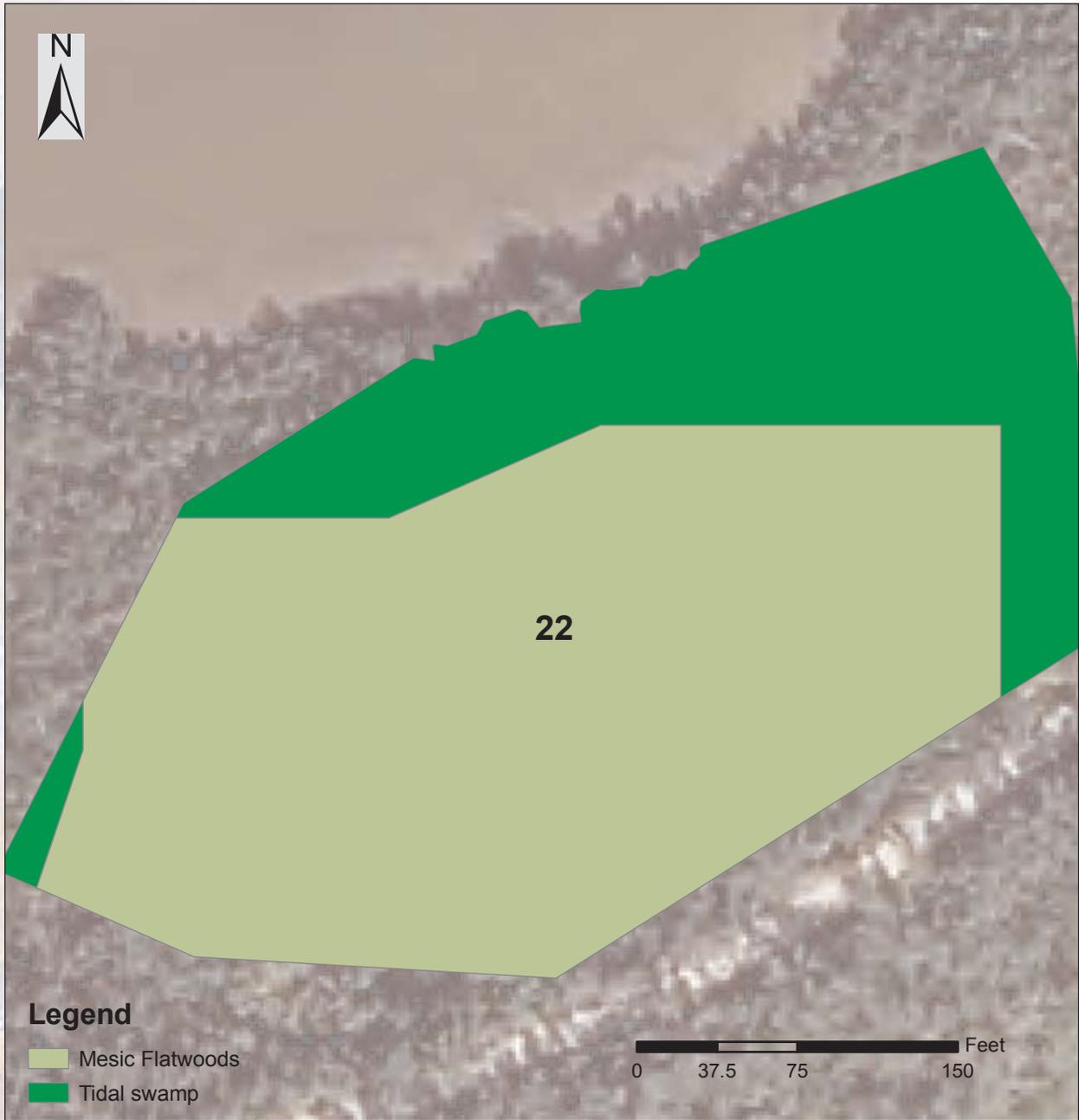
Prescribed Fire Plan Figure 7 | Burn Units 15 & 16 (July 2010)



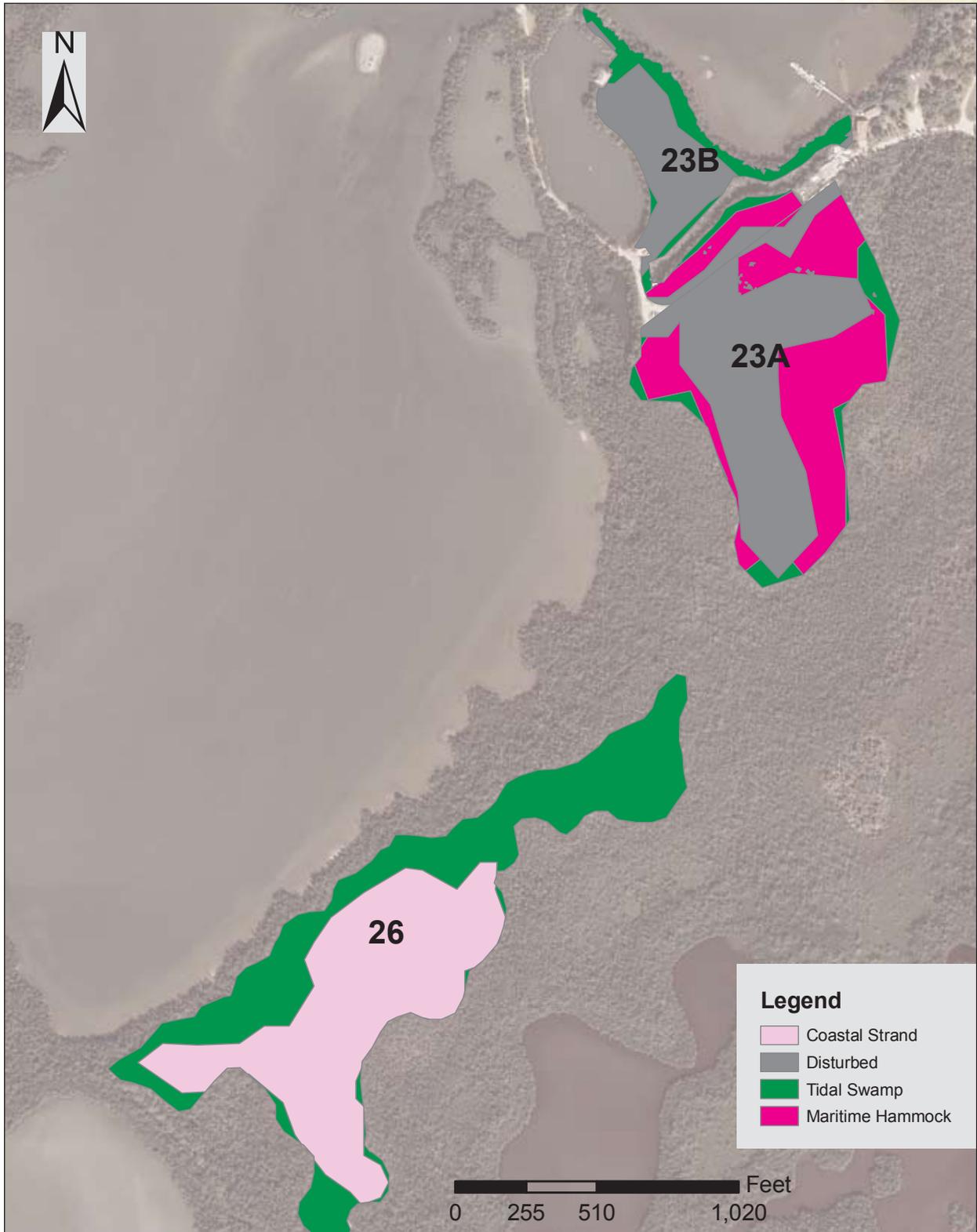
Prescribed Fire Plan Figure 8 | Burn Units 17 - 19 & 30 (July 2010)



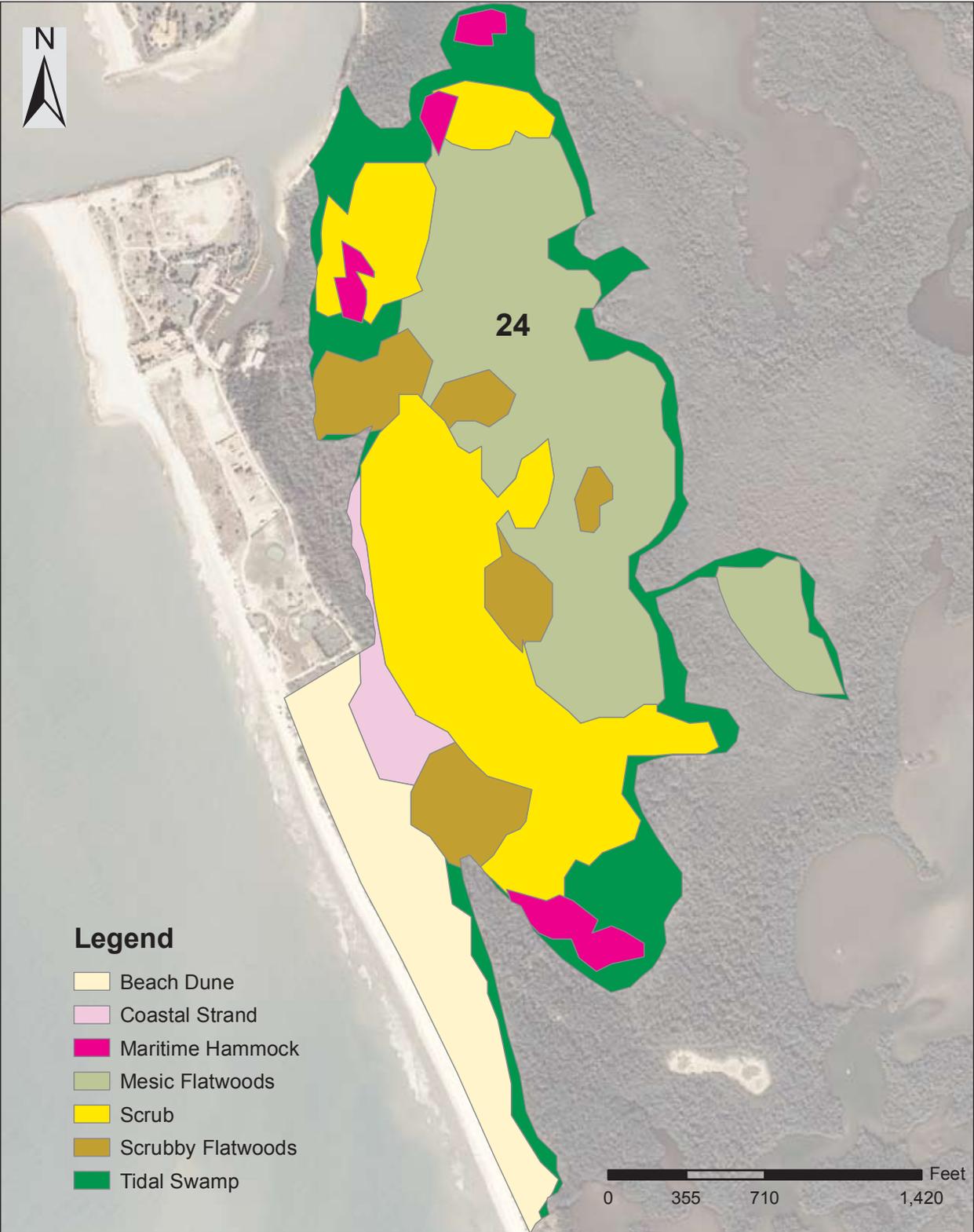
Prescribed Fire Plan Figure 9 | Burn Units 20 & 21 (July 2010)



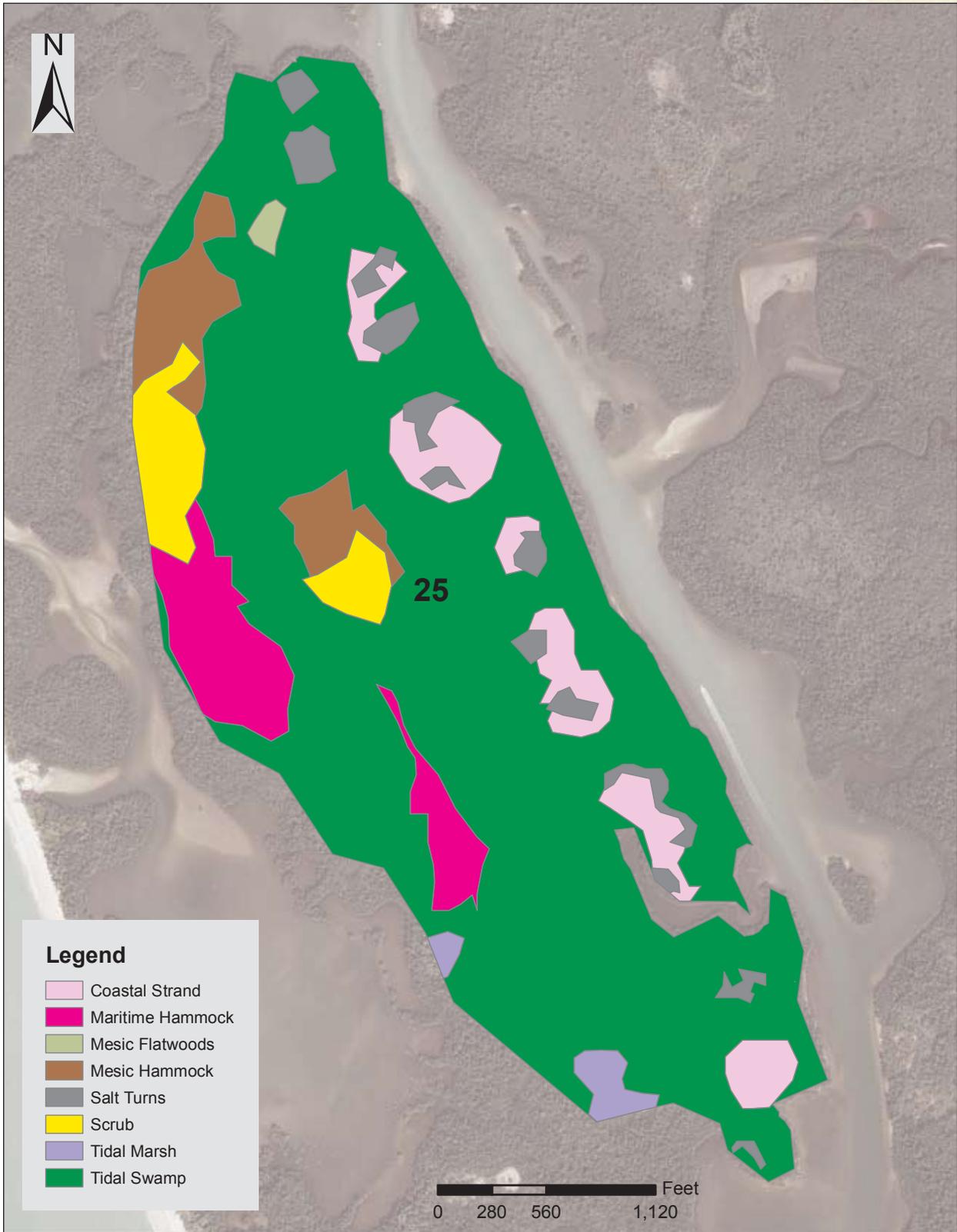
Prescribed Fire Plan Figure 10 | Burn Unit 22 (July 2010)



Prescribed Fire Plan Figure 11 / Burn Units 23 & 26 (July 2010)



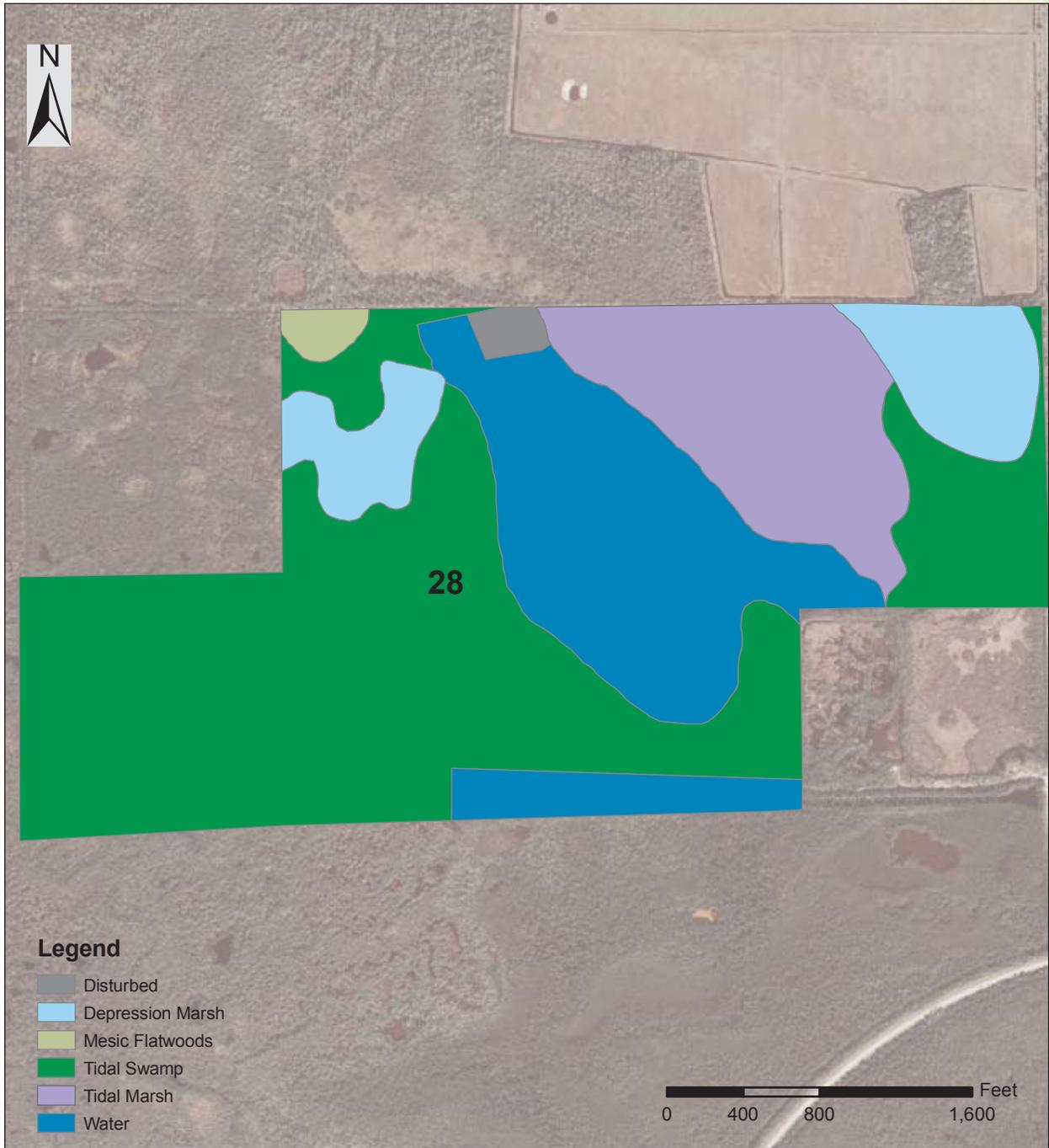
Prescribed Fire Plan Figure 12 | Burn Unit 24 (July 2010)



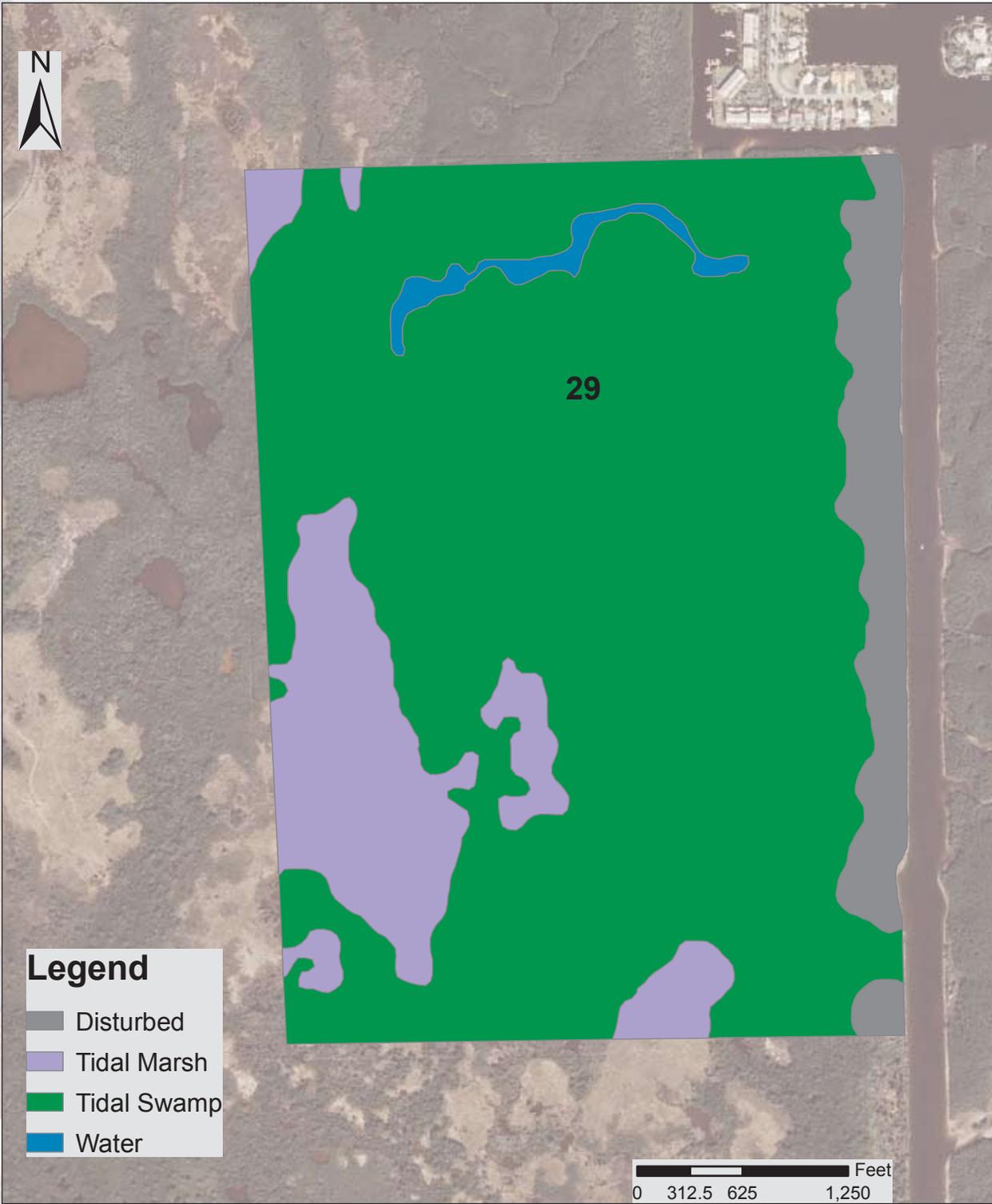
Prescribed Fire Plan Figure 13 / Burn Unit 25 (July 2010)



Prescribed Fire Plan Figure 14 | Burn Unit 27 (July 2010)



Prescribed Fire Plan Figure 15 / Burn Unit 28 (July 2010)



Prescribed Fire Plan Figure 16 / Burn Unit 29 (July 2010)

B.9 / Recorded Managed Archaeological Sites

Northern Component: Rookery Bay Proper (includes sites from Gordon's Pass in Naples South to Cape Romano)			
FMSF#	Site Name	Property Management	Resource Description
CR579	Hand Hammock	RBNERR	Prehistoric/Historic site, Weisman/Newman 1995 CARL Inventory survey, DHR master site file, prehistoric pottery found, shell tools, historic bottles, and citrus trees.
CR549	Shell Bay Mounds (N) rookery channel	RBNERR	Prehistoric site, also known as North Rookery Channel site, Weisman/Newman 1995 CARL, DHR master site file. Site NOT MAPPED or Photo-documented.
CR549	Shell Bay Mounds (center)	RBNERR	This coordinate taken at estimated center of complex on a high flat top mound.
CR781	mid Key Island	RBNERR	Prehistoric site.
CR768	Newer Old shack East side	RBNERR	Historic site, standing structure north end east side of Little Marco Island. Weisman 1995 CARL: T. Lewis 1997, 1916 drawing Rob Storter Naples local.
CR768	Old shack site West side	RBNERR	Historic site, West side Little Marco, Hand Hewn beams, wooden posts, 9.3 meter sq, north end of Little Marco. 1995 CARL Weisman/Newman, 1997 Lewis.
CR769	Munlin Creek Site	RBNERR	Historic site, former homestead burned on south west side of Halloway Island, 1995 Weisman/Newman CARL survey; 1997 T. Lewis USF graduate thesis.
CR54	Sand Hill Bay Mound	RBNERR	Prehistoric, sand burial 33 ft above sea level, 1895 Dansford; 1995 CARL survey Wiesman/Newman. Human jaw teeth found 1995 Bertone/Burch FLDEP RBNERR.
CR776	Johnson's Landing	RBNERR	Prehistoric site, shell midden/mound, 1995 CARL survey Weisman/Newman; 1996 Wheeler/Newman Limited testing Johnson landing CARL survey.
CR51	Johnson's Place	RBNERR	Historic site, structural posts, glass & ceramic pottery sighted, 1995 CARL Weisman/Newman; 1997 T. Lewis thesis.
CR578	Johns Pass Hammock	RBNERR	Prehistoric site, Weisman 1995 CARL survey.
CR767	Bartell Place	RBNERR	Historic site, 1995 Wiesman/Newman CARL survey, 1981 Leonard Ascher USCG auxiliary oral interview Preston Sawyer and Norman Ernest Carroll on Bay names.
CR582	North Point	RBNERR	Prehistoric site, 1995 Wiesman/Newman CARL Survey, sand tempered pottery, prehistoric campsite.
CR581	Palm Grove	RBNERR	Prehistoric site, 1995 Wiesman/Newman CARL Survey, sand tempered plain pottery, prehistoric shell midden campsite.
CR580	Dales Digging	RBNERR	Prehistoric site, 1995 Wiesman/Newman CARL Survey, sand tempered plain pottery / unidentified rim ticked sherds, prehistoric campsite.
CR298	Garden Patch	RBNERR	Prehistoric/Historic Site, 1995 Wiesman/Newman CARL Survey, Shell tools, sand-tempered plain pottery, hand - wrought hoe head found at site, prehistoric camp historic site.
CR52	T.E. Williams Place	RBNERR	Historic site, 1995 Wiesman/Newman CARL Survey.
CR850	Williams Grove	RBNERR	Historic site features, house foundation, stone rubble, see Glowacki/Newman 2003 CARL field project (supplementary information).
CR777	Sam Williams prehistoric Site	RBNERR	Prehistoric site along mangrove edge of Johnson bay. 2003 Glowacki/Newman (Pg 23, figure 9).
CR778	Ernie Carroll Site	RBNERR	Prehistoric site, located western Hall Bay, NEED DHR SITE FILE INFO FOR THIS SITE.

Northern Component: Rookery Bay Proper
(includes sites from Gordon's Pass in Naples South to Cape Romano)

FMSF#	Site Name	Property Management	Resource Description
CR716	Hall Bay Cabin	RBNERR	Historic site, 1995 Wiesman/Newman CARL survey, 1981 Leonard Ascher USCG auxiliary oral interview Preston Sawyer and Norman Ernest Carroll on Bay names.
CR782	Hall Bay Cabin 2	RBNERR	Historic Site, 1997 T. Lewis Pioneer Settlements In Rookery Bay And Ten Thousand Islands, 1984 Ernie Carroll Sr. interview Cannon Island Area.
CR55	Shell Island 1	RBNERR	Prehistoric/ Historic site, 1995 Wiesman/Newman CARL Survey, 2003 RB CARL January 2003 Field Project.
CR754	Kirkland Cemetery	RBNERR	Historic site, 1995 Wiesman/Newman CARL survey, Gene Roberts date unknown. Kirkland Family History. DHR Land Deeds in RB historical bibliography.
CR717	Henderson Creek Site (Bolger Place)	RBNERR	Historic Site, 1995 Wiesman/Newman CARL Survey, 1984 March 14 interview E. Carroll Senior with Bill Vines on Cannon Island Area, 1984 March 22 interview Preston Sawyer on Cannon Island Area.
CR728	Kirkland Place	RBNERR	Historic Site, 1995, Wiesman/Newman CARL Survey, 1997 Tim Lewis Thesis, 1966 Charlton W. Tebeau FI, Last Frontier The History Of Collier County.
CR718	New Building Site	RBNERR	Prehistoric Site, 300 Tower Road Parking lot.
CR714	Shell Island 2	RBNERR	Prehistoric site, northern portion of CR55, shell Island Road shell mound trail. 1995 Wiesman/Newman CARL Survey.
CR715	Shell Island 3	RBNERR	Prehistoric Site/Historic Scatter. Southern portion of CR 55 = CR714/ CR715.
CR1103	Shell Island Outer Mound	RBNERR	Prehistoric site, sand mound new site discovered 6/29/10 (possible burial mound).
CR899	McReynold's Site	RBNERR	Historic site, DEP DHR letter Los Cayos application for exploration permit DHR Ryan Wheeler, DHR Jennifer McKinnon Cape Romano Field investigation March 1-5, 2005, FSU Cheryl Ward May 16, 2007 Site Inspection visit to 8CR 899 McReynold's site Cape Romano, J. Coz Cozzi Mote Marine Nautical Program Mc Reynolds Site Archaeological Survey for 2008, Robert S. Carr 2009 Archaeological Assessment of Historic Artifact Scatter, Cape Romano, Collier County, Florida. ARTIFACTS FOUND Ballast stone, Spanish olive jar fragments. Artifacts curated at RBNERR 300 Tower Road Naples, Florida.
CR00035	Addison's Key	RBNERR	Prehistoric shell midden.

Southern Component: Rookery Bay Proper
(includes sites in the Ten Thousand Islands south of Cape Romano to Everglades Natl. Park boundary)

FMSF#	Site Name	Property Management	Resource Description
8CR19	Daniels Point	RBNERR	Prehistoric/Historic, Hrdlicka 1922, Goggin 1949b, ENP arch survey 1965, Carr 2003 phase 1 arch assessment 10-Thousand Islands.
8CR22	Fakahatchee Key	RBNERR	Prehistoric/Historic, Hrdlicka 1922, Goggin 1949b, Carr 2003 Phase 1 Arch Assessment 10-Thousand Islands, photo documented.
8CR27	Dismal Key	RBNERR	Pre/ Historic, More, 1905, Hrdlicka 1922, Goggin 1949b, Reiger 1981, Carr 2003, mapped, photo documented.
8CR28	Shell Key	RBNERR	Prehistoric only, Hrdlicka 1922; Goggin, 1949b; Barbara Logie, 1985, Carr 2003, Mapped, Photo documented.
8CR29	Button Wood Key	RBNERR	Prehistoric, Hrdlicka 1922:31, Carr 2003 Phase 1 Arch assessment 10-Thousand Islands, photo documented.

Southern Component: Rookery Bay Proper*(includes sites in the Ten Thousand Islands south of Cape Romano to Everglades Natl. Park boundary)*

FMSF#	Site Name	Property Management	Resource Description
8CR35	Addison Key	RBNERR	Prehistoric/Historic, Hrdlicka, 1922; Goggin 1949b; Beriault, 1981, Carr 2003, mapped, photo documented.
8CR36	Addison Grove	RBNERR	Prehistoric/Historic grove, More, 1907; Hrdlicka, 1922; Goggin 1949b: Carr 2003, Site mapped, photo documented.
8CR103	Fakahatchee west	RBNERR	Prehistoric/Historic fishing camp, Stokes, 1965; Carr 2003, site mapped, site photo documented.
8CR194	Marco River (turtle creek)	RBNERR	Prehistoric, A.P Kirk, 1973, Beriault, 1974,76. Carr 2003 Phase 1 Arch Assessment 10-Thousand Islands. Site mapped , site photo documented.
8CR196	Tripod Key	RBNERR	Prehistoric site, Beriault, 1976; Carr 2003 Phase 1 Arch Assessment 10-Thousand Islands. Site mapped, site photo documented.
8CR548	Hamilton place	RBNERR	Prehistoric/Historic, Carr 2003 Phase 1 Arch Assessment 10-Thousand Islands. Site mapped and photo documented. Leon Hamilton?
8CR738	Brush Key	RBNERR	Prehistoric site, Fl state site file (Walter Buschelman, 1991) Carr 2003 Phase 1 Arch Assessment 10-Thousand Islands. Site mapped, site photo documented.
8CR861	Shell Key Ring	RBNERR	Prehistoric site, Carr 2003 Phase 1 Arch Assessment 10-Thousand Islands. Site mapped, site photo documented.
8CR862	Dismal Key Shell Ring	RBNERR	Prehistoric/Historic, Carr 2003 Phase 1 Arch Assessment 10-Thousand Islands. Site RBNERR mapped, site photo documented, Mold blow green bottle found, Three Vandal pits found.
8CR863	Santina Horseshoe	RBNERR	Prehistoric site, Carr 2003 Phase 1 Arch Assessment 10-Thousand Islands. Site mapped, site photo documented.
8CR864	Lories Place	RBNERR	Prehistoric site, Carr 2003 Phase 1 Arch Assessment 10-Thousand Islands. Site mapped, site photo documented. DHR master site file.
8CR865	Steve's Place	RBNERR	Prehistoric site, Carr 2003 Phase 1 Arch Assessment 10-Thousand Islands. Site mapped, site, photo documented. DHR master site file.
8CR866	Pumpkin Bay Linear Ridge	RBNERR	Prehistoric site, Carr 2003 Phase 1 Arch Assessment 10-Thousand Islands.DHR master site file, site mapped, site photo documented.
CR00037	HORRS ISLAND 1	RBNERR	Prehistoric shell midden.
CR00038	HORRS ISLAND 2	RBNERR	Prehistoric shell midden.
CR00039	HORRS ISLAND 3	RBNERR	Prehistoric shell midden.
CR00040	HORRS ISLAND 4	RBNERR	Prehistoric shell midden.
CR00041	HORRS ISLAND 5	RBNERR	Prehistoric burial mound(s).
CR00101	FAKAHATCHEE 3	RBNERR	Prehistoric shell midden.
CR00102	FAKAHATCHEE 2	RBNERR	Prehistoric shell midden.

Rookery Bay NERR Exotic/Invasive Flora/Fauna Control Plan / 2010

OVERVIEW OF ROOKERY BAY NATIONAL ESTUARINE RESEARCH RESERVE

Rookery Bay National Estuarine Research Reserve (RBNERR), Rookery Bay Aquatic Preserve, and the Ten Thousand Islands Aquatic Preserve are managed by the Coastal and Aquatic Managed Areas (CAMA) a division of the Florida Department of Environmental Protection FDEP (Figure 1). These lands have been purchased to protect the natural resources for public use, research, and education. Much of southwest Florida, as well as, other portions of Florida and the United States have been invaded by invasive plant and animal species. Diverse systems support a wider range of animal species, while monotypic systems support a smaller range. One of the most detrimental effects of invasives is that they displace and disturb native vegetation and turn once biologically diverse systems into near monocultures with minimal diversity. The erosion of diversity within a system renders it increasingly vulnerable to any changes that occur and can cause an entire breakdown and death of a once viable ecosystem. These invasives also compete with native wildlife for food and shelter and in most cases what makes these species invasive is their ability to outcompete native plants and animals. Invasive plants affect both the native plant communities and the faunal composition of areas that they move in to.

This Invasive Control Plan has been developed to focus invasive control efforts at the RBNERR and serves as a living document that will be regularly reviewed and updated so as to adapt to the constantly changing biological conditions within the Reserve. There are many invasive plants and animals on lands managed by Rookery Bay NERR and it must be understood that the locations and coverages related to different invasive species will always be in a state of change. Also, constant vigilance must be established and maintained to watch for any early evidence of new species attempting to gain a foothold and establish themselves permanently within the RBNERR.

This plan will:

- Identify the invasive species present at Rookery Bay
- Discuss methods for controlling these species
- Target priority sites
- Track re-infestation rates and levels of maintenance required for habitat restoration
- Detail herbicide applications
- Describe methods used to track and monitor invasives species of flora and fauna.
- Describe additional policies and guidelines developed by the FDEP / CAMA and FDOACS (Florida Department of Agriculture and Consumer Services) are included below.

INVASIVE PLANTS

A comprehensive list of all invasive and/or exotic species that occur within the RBNERR boundary is maintained as a separate living document that is regularly reviewed and adjusted as needed.

Types & Categories

Invasive – a non-indigenous species, or one introduced into the state, either purposefully or accidentally; it then escaped into the wild in Florida where it reproduces either sexually or asexually. Invasive plants have been assigned by the Exotic Pest Plant Council (EPPC) into these two categories, as determined by their invasive characteristics and potential.

Category I - Species that are invading and disrupting native plant communities in Florida. *This definition does not rely on the economic severity or geographic range of the problem, but on documented ecological damage caused.*

Category II - Species that have shown a potential to disrupt native plant communities. *These species may become ranked as Category I, but have not yet demonstrated disruption of natural Florida community.*

Native - a species already occurring in Florida at the time of European contact (1500) (Stevenson, 1993). Native species under certain conditions can also exhibit the same invasive affects on an ecosystem as introduced non-native species.

HERBICIDE TRAINING & CERTIFICATION

Anyone who applies herbicide in natural areas must have basic training. At least two staff persons at the Reserve must be fully trained, certified, and must maintain current status of their certifications as licensed applicators including both natural areas and aquatic endorsements. RBNERR licensed applicators must keep their licenses active and stay in touch with the ever changing world of exotics, by attending trainings CEU's, conferences, and workshops. Failure to do this compromises the Reserve's ability to fully support its stated mission.

TREATMENT TYPES & METHODS

There are many methods that can be used to control invasive, exotic plants, including chemical, physical, biological, and mechanical methods. In this section, each control method is discussed, with references to specific plants related to application of each method.

Chemical Control Methods

The use of herbicides is imperative in controlling invasive plant species. A number of chemicals are available with a variety of application methods, concentrations, kill rates, non-target impacts, and costs. Defined below are the kinds of herbicide and methods currently being used for applying them to invasive plant species within the Reserve.

Methods currently used in herbicide application are:

Foliar: Herbicides are pre-mixed with a diluent and sprayed onto the foliage of the plant so that the leaves are 'sprayed-to-wet', which means applying only enough solution to begin running off the leaf surface.

Basal Bark: Herbicides are applied to the stem or trunk of the plant in a wide band near the base. The chemical is absorbed and trans-located throughout the plant.

Cut Stump: Immediately after cutting the stem or trunk near ground level, an herbicide is applied to the stump.

Other application methods utilized on a very limited basis in the reserve include: 'hack and squirt', 'frill and girdle', 'direct injections', basal soil treatment and aerial application.

Herbicides Currently Used at the Reserve

Outlined alphabetically below are the chemicals currently in use at the Reserve. The concentrations of these chemicals for use on specific plants and mixing ratios are given within this document.

Oils, Surfactants, & Dyes

These chemicals are used to enhance the activity of the herbicide. Generally, oils are used in basal bark applications to enhance uptake of the herbicide through the bark and into the cambium. Surfactants are used in foliar applications to enhance uptake of the herbicide through the leaves by breaking down the cuticle layer. Colored dyes are used to track what stumps/plants have been treated. Most dyes photo degrade within 24-hours, so dye tracking is good only for the day of treatment.

Current Herbicides		Current Surfactants, Dyes, Adjuvants	
Accord	Habitat	Impel Red	
Arsenal	Imazapyr E Pro 2	Diluent Blue	
Element 3A	Razor Pro	Basal Oil	
Element 4	Renovate 3	AD100	
Escort XP	Rodeo	DLZ	
Garlon 3A	Roundup Pro	CideKick II	
Garlon 4	Stalker	Kammo	
Glyphosate 4	Vista	TerraMark SPI / Blue	
		Red Dye	

GENERAL SAFETY IN HERBICIDE APPLICATION AND USE

Basic safety aspects of working with chemical applications are outlined below. These safety measures address preventing the skin from coming in contact with the chemicals being used. Chemicals used within the Reserve are not 'Restricted Use' chemicals, and, thus, are not as dangerous as some of those used in other applications, such as on agricultural fields. However, care should be taken to use ALL chemicals wisely and with respect.

- Gloves should be worn at all times while handling chemicals during all aspects of invasive species control activities. (rubber / latex gloves must be worn under leather gloves)
- Sturdy shoes or boots must be worn to prevent slipping and falling.
- Eye protection must be worn if there is any chance of getting the pesticide into eyes.
- A long-sleeved shirt and pants must be worn when applying chemicals.
- A First Aid kit with eye wash must be taken on all invasive plant control field excursions.
- Material Data Safety Sheets as related to herbicide application must be available and properly filled out and maintained.

Herbicide 'recipes' are provided in Table 1A. When mixing herbicides, always start with the active ingredient (herbicide). Inert substances (dyes, carriers, adjuvants) should be added after the active ingredient to 'rinse' the funnel and measuring cup.

PHYSICAL CONTROL METHODS

Mechanical Control

Mechanical control of invasive plants can be used. In high density infestations, specialized equipment may be used, and in many cases can allow easier access to sites. Many factors should be taken into consideration when determining where to use mechanical control. Debris from mechanical removal can be hauled off-site to a designated area, or it can be piled on-site, allowed to dry, and then burned. Removal methods should be decided prior to initiation of the work. The use of equipment in low to medium density infested areas may not be suitable due to the disruption caused to the native community. Once equipment disturbs the soil structure, the area is more susceptible to invasive plant invasions, and will need to be monitored for possible infestation. All equipment used will need pre and post weed wash to prevent any accidental introduction of invasives.

Tools and Equipment (Tools, other than heavy machinery, are used in invasive plant removal.)

1. Hand girdlers are used to expose a continuous 1" wide ring of cambium around the trunk of the tree. This ring is then sprayed with a basal herbicide to control the tree in place, without felling.
2. Landscaping loppers can be used in cut stump treatments on saplings and small trees to expose a surface for herbicide application.
3. Chainsaws are also used in cut stump treatments on medium to large trees. They can also be used to cut a girdle ring around trees.

Chainsaw Equipment

Use of chainsaws requires:

1. Completion of a chainsaw safety class conducted by DOF. This class includes safety aspects, handling/use and maintenance.
2. Safety glasses, chaps, gloves, long sleeves, long pants and boots must be worn during operation of the chainsaws.
3. Ear plugs are recommended for chainsaw operators, especially is operating for an extended period of time. Disposable ear plugs work best.
4. Chainsaw maintenance is available in RM SOP's.

Related Use of Physical Labor

Control of seedlings through hand-pulling is another form of physical control used at the Reserve. This is an effective form of control when the primary root system is removed. For example, Brazilian pepper has numerous lateral roots. If the primary lateral roots are broken while pulling, the plant may re-sprout. Melaleuca, on the other hand, has a primary tap root. If this tap root is broken, the plant will re-sprout. Hand-pulling of seedlings is an important form of control in restoration areas, where the seed trees have been controlled and the canopy removed. Light penetration into these recently cleared areas can be enough to stimulate 'dormant' seed sources to sprout. While some of these seeds may be native plants, many will likely be invasive seedlings that can be controlled through hand-pulling.

BIOLOGICAL CONTROL

Biological control involves long-term methods for controlling the growth, reproduction and spread of invasive plant species. New controls are always in the pipeline of research, development, and approval for use. The controls listed in this section are not a complete list as new controls are always being added and occasionally once-approved controls are sometimes removed from the approved list for use. The methods for use of these controls is also constantly under scrutiny and subject to change. Biological controls alone will not solve all invasive plant problems. Biological control agents include parasitoids, predators, pathogens, and weed Feeders. Some of these will require approval from both state and federal agencies. Numerous in-captivity studies must be completed to determine the impact of the biological control agent on the target invasive plant, as well as on existing native communities. This process can take a number of years. There a number of biological control agents being used for Melaleuca, Brazilian pepper, and Lygodium with others being assessed for future approval for use. Rookery Bay's Natural Resource Stewardship Team will continue to work hand-in-hand with RBNERR's Research team to choose sites and set up plots to determine if controls are working.

Melaleuca

On April 26, 1997, the melaleuca snout beetle (*Oxyops vittiosa*) was released in Broward County. It was the first release of a biological control agent for melaleuca, and, subsequently, has been released at six other sites in south Florida, including Big Cypress National Preserve and a site in Lee County. These beetles feed on the new growth

on the trees, thus slowing flower and seed production. The melaleuca psyllid (*Boreioglycaspis melaleucae*) was released in 2002, and has become well established and widely dispersed in South Florida. Limited releases of the melaleuca bud-gall fly were made in 2005, but have not survived. (TAME Melaleuca)

Brazilian Pepper

The Brazilian pepper sawfly (*Heteroperryia hubrichi*) is a primitive wasp that does not sting and has caterpillar-like larvae that feed on the plant, causing defoliation (Clark 1997). This would limit growth, flower and seed production (Clark 1997).

INVASIVE PLANTS & HERBICIDE RATES

Table 1A

Common Name	Species Name	FLEPCC cat.	Herbicide & Rates
Plants			
Rosary pea	<i>Abrus precatorius</i>	I	Remove seeds, Foliar: 5% Round-up; Basal: 4% Garlon 4
Earleaf acacia	<i>Acacia auriculiformis</i>	I	Basal: 8% Garlon 4; Cut-stump: 17% Garlon 4
Sisal hemp	<i>Agave sisilana</i>	II	Hand pull / Basal: 8% Garlon 4
Mimosa	<i>Albizia Julibrissin</i>	I	Cut-stump: 17% Garlon 4
Woman's tongue	<i>Albizia lebeck</i>	I	Cut-stump: 17% Garlon 4
Coral vine	<i>Antigonon leptopus</i>	II	Foliar: 3% Round-up
Shoebuttan ardisia	<i>Ardisia elliptica</i>	I	Cut-stump: 17% Garlon 4; Basal: 8% Garlon 4
Asparagus fern	<i>Asparagus aethiopicus</i>	I	Hand pull / Foliar: 3% Round-up
Orchid tree	<i>Bauhinia variegata</i>	I	Cut-stump: 17% Garlon 4
Bishopwood	<i>Bischofa javanica</i>	I	Cut-stump: 17% Garlon 4
Paper mulberry	<i>Broussonetia papyifera</i>	II	Cut-stump: 17% Garlon 4
Australian pine	<i>Casurina equisetifolia</i>	I	Cut-stump: 17% Garlon 4
Lather leaf	<i>Colubrina asiatica</i>	I	Hand pull / Basal: 4% Garlon 4; Cut stump: 17% Garlon 4
Carrotwood	<i>Cupaniopsis anacardioides</i>	I	Cut-stump: 17% Garlon 4
Air potato	<i>Dioscorea bulbifera</i>	I	Remove bulbils, Foliar: 3% Round-up + 0.5% Escort: or 4% Garlon 4
Pothos	<i>Epipremnum pinnatum</i>	II	Hand pull / Basal: 4% Garlon 4; Cut stump: 17% Garlon 4
Surinam cherry	<i>Eugenia uniflora</i>	I	Cut-stump: 17% Garlon 4; Basal: 8% Garlon 4
West Indian marsh grass	<i>Hymanache amplexicaulis</i>	I	Foliar: 3% Round-up + 0.5% Arsenal
Cogon grass	<i>Imperata cylindrica</i>	I	Foliar: 3% Round-up + 0.5% Arsenal
Life plant	<i>Kalanchoe pinnata</i>	II	Hand pull - Foliar: 8% Garlon; or 5% Round-up + surfactant
Lantana	<i>Lantana camara</i>	I	Hand pull / Basal: 4% Garlon 4; Cut stump: 17% Garlon 4
Lead tree	<i>Leuceana leucocephala</i>	II	Cut-stump: 25% Garlon 4
Old World climbing fern	<i>Lygodium microphyllum</i>	I	Foliar: 3% Round-up + 0.5% Arsenal or 2oz Escort/100 gallon dilent
Cat's claw vine	<i>Macfadyena unguis-cati</i>	I	Foliar: 3% Round-up + 0.5% Arsenal
Melaleuca	<i>Melaleuca quinquenervia</i>	I	Hand pull seedlings and saplings Cut-stump: 10% Arsenal or Habitat
Chinaberry	<i>Melia azedarach</i>	II	Basal: 4% Garlon 4; Cut-stump: 17% Garlon 4
Natal grass	<i>Milinis repens</i>	I	Foliar: 3% Round-up + 0.5% Arsenal
Cat claw mimosa	<i>Mimosa pigra</i>	I	Basal: 4% Garlon 4; Cut-stump: 17% Garlon 4
Ground orchid	<i>Oeceoclades maculata</i>		Hand pull
Guinea grass	<i>Panicum maximum</i>	II	Foliar: 3% Round-up + 0.5% Arsenal
Torpedo grass	<i>Panicum repens</i>	I	Foliar: 3% Round-up + 0.5% Arsenal

Common Name	Species Name	FLEPCC cat.	Herbicide & Rates
Elephant grass	<i>Pennisetum purpureum</i>	I	Foliar: 3% Round-up + 0.5% Arsenal
Fountain grass	<i>Pennisetum setaceum</i>	I	Foliar: 3% Round-up + 0.5% Arsenal
Water-lettuce	<i>Pistia stratiotes</i>	I	
Guava	<i>Psidium guajava</i>	I	Cut-stump: 17% Garlon 4
Downy rose-myrtle	<i>Rhodomyrtus tomentosa</i>	I	Foliar: 1% Arsenal + 2% Round-up; Basal/Cut-stump: 17% Garlon 4
Oyster plant	<i>Tradescantia spathacea</i>	II	Hand pull - Foliar: 8% Garlon 4
Castorbean	<i>Ricinus communis</i>	II	Basal: 4% Garlon 4; Cut-stump: 17% Garlon 4
Bowstring hemp	<i>Sansevieria hyacinthoides</i>	II	Cut surface, basal stem: 10% Garlon 4
Inkberry/Beach naupaka	<i>Scaevola taccada var. sericea</i>	I	Hand pull / Foliar: 2% Round-up or 2oz Escort/100 gallon dilent
Schefflera	<i>Schefflera actinophylla</i>	I	Cut-stump: 17% Garlon 4; Basal: 8% Garlon 4
Brazilian pepper	<i>Schinus terebinthifolius</i>	I	Cut-stump: 17% Garlon 4 in oil
Climbing cassia	<i>Senna pendula var. glabrata</i>	I	Foliar: 3% Round-up + 0.5% Arsenal
Rattlebox	<i>Sesbania punicea</i>	II	Foliar: 3% Round-up; Basal: 8% Garlon 4
Twinleaf nightshade	<i>Solanum diphyllum</i>	II	Foliar: 3% Round-up; Basal: 8% Garlon 4
Tropical soda apple	<i>Solanum viarum</i>	I	Foliar: 2-5% Round-up or 0.25%-1.0% Garlon 4 in oil
Wedelia	<i>sphagneticola trilobata</i>	II	Foliar: 2-5% Round-up or 0.25%-1.0% Garlon 4 in oil
Arrowhead vine	<i>Syngonium podophyllum</i>	I	Foliar: 3% Round-up + 0.5% Arsenal
Java plum	<i>Syzygium cumini</i>	I	Basal: 8% Garlon 4; Cut-stump: 17% Garlon 4
Mahoe	<i>Talipariti tiliaceus</i>	II	Cut-stump: 17% Garlon 4 in oil
Tropical almond	<i>Terminalia catappa</i>	II	Cut-stump: 17% Garlon 4
Seaside mahoe	<i>Thespesia populnea</i>	I	Hand pull seedlings / Cut-stump: 17% Garlon 4
Puncture weed	<i>Tribulus cistoides</i>	II	Foliar: 2-5% Round-up or 0.25%-1.0% Garlon 4 in oil
Caesar's weed	<i>Urena lobata</i>	II	Hand pull / Foliar: 3% Round-up + 0.5% Arsenal
Para grass	<i>Urochloa mutica</i>	I	Foliar: 3% Round-up + 0.5% Arsenal

HERBICIDE RECORDING

A running inventory record of all herbicides and other chemicals will be kept on file. A mixing folder with also be kept on file and hard copy in herbicide shed. Herbicides that leave a facility must be recorded with the following:

- Name of pesticide applicator and license number
- Name of person applying
- Date and time of treatment
- Location of treatment site
- County, range, township, and section
- Maps of area treating
- Target type
- Total area treated and or number of treated
- Chemical used
- Application method and rate

All this info will be kept of file and hard copy at herbicide shed.

CLEANING OF EQUIPMENT AND PROPER DISPOSAL OF CONTAINERS

Proper disposal is an important part and a responsible of the Reserve. There are different types of wastes. Empty containers, excess mixture, excess product, rinse water, and material generated from spills. The BMP is to follow labels and MSDS. All spray bottles and backpack sprayers are cleaned in the lab sink. Here all chemicals are

collected in a tank and disposed of regularly. Larger containers are tripled rinsed collecting all waste in a single container that is used to re-apply at labeled sites. Once these containers are cleaned they are dried, they are disposed at the County transfer station. Any excess mixture, product, and or materials from spills are disposed at local hazardous material station, by calling FDEP for a list of licensed contractors.

EXOTIC/INVASIVE VEGETATION & RESPONSE TO FIRE

In the Reserve, almost all of the above described habitats have been affected to some extent by the presence of invasive, non-native (“exotic”) vegetation. Some of the predominate invasive, exotics include, Melaleuca (*Melaleuca quinquenervia*), Brazilian pepper (*Schinus terebinthifolius*), Australian pine (*Casaurina equisetifolia*), Old World climbing fern (*Lygodium microphyllum*), Downy rosemyrtle (*Rhodomyrtus tomentosa*), earleaf acacia (*Acacia auriculiformis*), air potato (*Dioscorea bulbifera*), carrotwood (*Cupaniopsis anacardioides*), Caesar weed (*Urena lobata*), and Wedelia (*Sphagneticola trilobata*).

One of the most significant ways that a plant invasion can affect the ecosystem is through the alteration of the fire regime. This can occur through either direct effects, such as competitive interference, or through indirect effects, such as changes in habitat, biogeochemical cycle, or disturbance regime. Additional indirect effects of fire that can lead to an increase in invasive, exotic vegetation include: that fire:

- increases light availability by reducing cover (note most invasive plants are shade-intolerant);
- increases the water available to the invasive by killing of natives;
- increases nutrient availability by killing natives and converting nutrients to from storage in biomass to useable forms; and
- increases exposed mineral soil which affects post fire regeneration.

The interaction between fire and exotic is complicated. Fire can increase the abundance of exotic vegetation through disturbance but the lack of fire, by exclusion, can also give exotic vegetation an opportunity to establish and grow. If fire is used as a tool for the control of these invasives, the burning should utilize their known phenological characteristics such as timing of seed or flower production and the stages of development such as seedling or sapling stage.

The affects of fire ecology on invasive management is a new and growing field. The effects of fire to many species have yet to be completely understood, although two species, Melaleuca, and Brazilian pepper have received some recent attention. Each is discussed in further detail below. Research has only begun on the two species of climbing fern but it has been established that climbing ferns alter the fire regime by acting as ladders for burns into canopies which may not be canopy burn-adapted and that climbing ferns will spread after fire.

Melaleuca (*Melaleuca quinquenervia*)

It has been stated that there may not be a better fire adapted species in the world than Melaleuca, which has been nicknamed the “Australian Fireproof Tree”. Melaleuca produces serotinous cones which release seeds following fire, mechanical injury, radial growth, frost, shade dominance, age, and possibly herbicide treatment. Following fire, Melaleuca is known to produce over 20 million seeds per tree.

Along with seed production following fire, Melaleuca has adaptation to fire that includes moisture in the bark for protection, shagginess in the bark to allow fire to ladder into the canopies in habitats adapted for surface fire, and volatile leaves. The rapid resprouting of these seeds grants a competitive five to eight month advantage to Melaleuca over natives. Fire affects on Melaleuca are reported to have a positive feedback loop. Fire promotes Melaleuca while Melaleuca promotes fire.

Melaleuca seedlings are very slow growing and can be one of the effective methods to control it. 100% mortality has been observed on Melaleuca but only on seedlings less than 12 inches in height. Survival increases with increase in height and has been documented not to kill saplings above 6.6 ft. No long term study of repeated burning on saplings has been completed.

Brazilian pepper (*Schinus terebinthifolius*)

Brazilian pepper is well known for its ability to establish in disturbed areas and may establish from sprouts or seed on a recently burned site. Fire may be a deterrent to invasion only through the possible suppression of germination following fire though Brazilian pepper may establish from sprouts or seeds not exposed to burning. Fire retardant characteristics of Brazilian pepper include a decrease in the herbaceous cover and the moist conditions in which is plant is often found.

Plant size appears to be the most important aspect to survival following fire. Mortalities of up to 100% have been recorded in plants less than 20 inches but decreases rapidly to a mortality of only 25% in saplings 24 inches. As Brazilian pepper may grow up to 3 feet over a 6 month period following burning (average of 5 inches), this may not be an effective control strategy. Timing of burning may also be important. One study found that the greatest mortality of cut pepper occurred June – October which is coincident with the normal fire regime, wet conditions during this time, will slow/stop burns and, therefore, nullify the effect of this timing.

FAUNA

Invasive fauna control addresses only a few priority animals. Over the course of the past year, staff have been involved in a growing number of calls. Invasive fauna, like flora, is constantly evolving. Adaptive Management is the word. This section will address:

- definitions
- known invasive fauna and watch list
- methods of control
- data collection and reporting
- policies and procedures

Invasive Animal Definitions:

- **Native:** A species already occurring in Florida at the time of European contact (1500).
- **Domestic:** Tame species that are pets or livestock.
- **Invasive:** A non-indigenous species, or one introduced into the state, that has either purposefully or accidentally; it then escaped into the wild in Florida where it reproduces.
- **Feral:** Species that have returned to an untamed state from domestication.
- **Nuisance:** A native, non-indigenous, feral or domestic species that cause resource management and human safety problems.

HABITAT MAPPING & ENCROACHMENT RATES

A few areas within the Reserve have been mapped for community type, as well as, for the presence of invasive plants. Much of the Reserve, however, still needs to be mapped, especially for invasive plants. As of the writing of this document funding for habitat mapping has been acquired and the habitat mapping project will be well underway by the time the RBNERR management plan is approved. Mapping efforts will aid in determining the total amount of land infested by invasive plants, as well as breaking that total down by species. This information will be used for the strategic targeting staff efforts, grant funding, and mitigation opportunities. Mapping efforts will be gathering data regarding habitats along with invasive infestation in the Reserve. This data is being collected using CERP coding and cross referenced into FNAI codes. We then will be able to provide insight into the effects of our management actions. These activities are of utmost importance in establishing a base for invasive plant removal and encroachment within the Reserve.

Common Name	Species Name	Common Name	Species Name
<i>Nuisance species (N) • Watch species (W)</i>			
Mammals		Fishes	
Coyote	<i>Canis latrans</i>	Mayan Cichlid	<i>Cichlasoma urophthalmus</i>
Feral cat	<i>Felis catus</i>	Spotted tilapia	<i>Tilapia mariae</i>
Feral hogs	<i>Sus scrofa</i>	Walking catfish	<i>Clarias batrachus</i>
Nine-banded armadillo	<i>Dasyus novemcinctus</i>	Pike killifish	<i>Belonesox belizanus</i>
Raccoons (N)	<i>Procyon lotor</i>	Florida pompano	<i>Trachinotus carolinus</i>
Dog packs (W)	<i>Canis lupus familiaris</i>	Brown hoplo	<i>Hoplosternum littorale</i>
Reptiles		Black acara	<i>Cichlasoma nigrofasciatum</i>
Cuban brown anole	<i>Anolis sagrei sagrei</i>	Convict cichlid	<i>Cichlasoma bimaculatum</i>
Mexican spinytail iguana	<i>Ctenosaura pectinata</i>	Mozambique tilapia	<i>Oreochromis mossambicus</i>
Green Iguana	<i>Iguana iguana</i>	Blue tilapia	<i>Oreochromis aureus</i>
Burmese python	<i>Python molurus bivittatus</i>	Spotted tilapia	<i>Tilapia mariae</i>
African spur thigh tortoise	<i>Geochelone sulcata</i>	Pike killifish	<i>Belonesox belizanus</i>
Brown tree snake	<i>Boiga irregularis</i>	Oscar	<i>Astronotus ocellatus</i>
Knight anole	<i>Anolis equestris equestris</i>	Insects	
Ball python (W)	<i>Python regius</i>	Mexican bromeliad weevil	<i>Metamasius callizona</i>
Boa constrictor (W)	<i>Boa constrictor</i>	Prickly pear caterpillar	<i>Cactoblastis cactorum</i>
African rock python (W)	<i>Python sebae</i>	Lobate lac scale	<i>Paratachardina pseudolobata</i>

Common Name	Species Name	Common Name	Species Name
<i>Nuisance species (N) • Watch species (W)</i>			
Spectacled caiman (W)	<i>Caiman crocodilus</i>	Fire ants	<i>Solenopsis invicta</i>
Monitor lizard (W)	<i>Varanus</i> spp.	Africanized bees (W)	<i>Apis</i> spp. hybrid
Mollusks & Crustaceans		Birds	
Island applesnail	<i>Pomacea insularum</i>	Ring-necked dove	<i>Streptopelia risoria</i>
Chinese mitten crab	<i>Eriocheir sinensis</i>	Scarlet macaw	<i>Ara macao</i>
Asian swimming crab	<i>Charybdis helleri</i>	Rose-ringed parakeet	<i>Psittacula krameri</i>
Golden orb crab	<i>Quadrula aurea</i>	African grey parrot	<i>Psittacus erithacus</i>
Green mussel	<i>Perna viridis</i>	Monk parakeet	<i>Myiopsitta monachus</i>
Zebra mussel	<i>Dreissena polymorpha</i>	European starlings (W)	<i>Sturnus vulgaris</i>
Amphibians			
Cuban tree frog	<i>Osteopilus septentrionalis</i>		
Greenhouse frog	<i>Eleutherodactylus planirostris</i>		
Marine toad	<i>Bufo Marinus</i>		

CURRENT CONTROL METHODS BY SPECIES

Feral hog (*Sus scrofa*)

Catalogue: Invasive

Impact(s): Hogs make wallows (depressions dug in mud) these are normally evident near standing water or marshes. They are also notorious for causing damage such as severely rooted-up soils, similar to plowing: transport invasive seeds. Just recently, hogs were getting into sea turtle nests on Keewaydin Island and predated them.

Location(s): Signs of hogs have been observed in almost all areas of RBNERR, including barrier islands. (Shell Island Road, Bathy, Trash Road, Cannon Island, Little Marco Island, Keewaydin Island, CR 951)

Control Method: RBNERR is currently trapping in areas of concern, and has designated LE Officers that help support hunting. The Reserve has also in the past contracted with USDA Wildlife Services. Efforts are in the research and planning stage for the future to model a RBNERR program for hunting of hog after the Conservation Collier's Youth Hunting Program that is run in conjunction with FWCC.

Raccoon (*Procyon lotor*)

Catalogue: Nuisance

Impact(s): Predation on protected sea turtle nests (eggs and hatchlings); invasive plant species spread, especially Brazilian pepper.

Location(s): Primary impacts occur on barrier islands, i.e. Keewaydin Island, Sea Oat Island, Cape Romano Complex, and the Ten Thousand Islands.

Control Method: RBNERR is currently trapping pre- turtle season, and then focusing on problem areas. The Reserve also contracts with USDA Wildlife Services for trapping in the Ten Thousand Islands. The Reserve's sea turtle program also cages sea turtle nests to prevent predation.

Spiny-tailed iguana (*Ctenosaura pectinata*)

Catalogue: Invasive

Impacts(s): Omnivores have been known to consume young birds and eggs. Observed using gopher tortoise (*Gopherus polyphemus*) burrows, and may compete with them for space in burrow. Research began in 2010, to capture iguanas on Keewaydin Island for gut analysis. These analyses will help determine how detrimental they may be on fauna or flora. A single iguana was observed by staff taking a Least tern (*Sterna antillarum*) chick on Southern Keewaydin Island in 2010.

Location(s): Keewaydin and Little Marco Islands

Control Method: Removal

Green iguana (*Iguana iguana*)

Catalogue: Invasive

Impact(s): While generally herbivorous, green iguanas look similar to spiny-tailed iguanas, there seems to be minimal impacts with-in the Reserve. This may be a result of being out competed by the spiny-tailed iguanas. They have shown impacts on Marco Island.

Location(s): Keewaydin Island, Goodland

Control Method: Removal

Burmese python (*Python molurus bivittatus*)

Catalogue: Invasive

Impact(s): We know they influence the taking of small mammals, but little is known about impacts this species may have on fauna within the Reserve. Recent findings may have this species using gopher tortoise burrows as refuge.

Location(s): Shell Island Road, CR 951, CR92, US 41, Marco Island Airport, Fiddler's Creek, Marco Island, Henderson Creek

Control Method: Removal if encountered and remains sent to Skip Snow at Everglades National Park for necropsy.

Data Collection and Reporting

RBNERR has in place a reporting system for all exotics. All data gathered is being input into GIS layers to serve as a management tool. Many other agencies are also involved in data collection. The hope is for the State to stream line and be transparent in data of all invasive species. Currently, RBNERR reports fauna sightings and captures to Invasives.org, CISMA, and FWCC.

PROJECT PRIORITIES

Invasive flora and fauna removal priorities for the Reserve are outlined below. These priority sites will be updated as areas are established as 'invasive free'. Invasive plant free areas will be placed on a maintenance schedule targeting seedlings and re-sprouts.

Staff Efforts

Staff efforts for invasive plant removal are targeted at smaller, manageable projects; long-term maintenance of previously cleared sites and patrolling for initial infestations of 'new invaders'.

Keewaydin Island – Keewaydin Island is an area of high public use, with incredibly diverse native communities, including coastal scrub, tropical hardwood hammocks, pine flatwoods, coastal strand and dunes.

Efforts: Flora - herbicide maintenance; Fauna - Iguana hunts, hogs and raccoons as needed

Shell Island Road - As the entrance to the Reserve, Shell Island Road is a high profile area for public viewing. A first impression of the Reserve should be of the diverse native communities along this road, including marsh, mangrove, hammocks, scrub and pine flatwoods. Past and current mitigation efforts have targeted the removal of the large Brazilian pepper trees that line the road.

Efforts: Flora - Mechanical removal, herbicides; Fauna – Trapping hogs

SR 951 – Hydric Pine flatwoods, Coastal Hammock - Melaleuca, Downy rose myrtle, Air potato, Earleaf acacia, Caesar weed, and Lygodium are some of the most threatening, fastest spreading invasive plants in the Reserve. There are a total of 318 acres of infestation. Mitigation, ROMA, and grants may be the best chance to bring in order.

Efforts: Flora – Mechanical removal, herbicides; Fauna – Trapping hogs, looking for pythons

Future ROMA site

Sand Hill – Coastal scrub - large stand of Melaleuca and Lygodium

Efforts: Flora – herbicides; Fauna – none at this time

Cape Romano Complex – Barrier Islands

Efforts: Flora – herbicides; Fauna – Trapping raccoons

Ten Thousand Islands – Barrier Islands

Efforts: Flora – herbicides; Fauna – Trapping raccoons

SUMMARY & FUTURE CHALLENGES

Invasive Flora & Fauna are a constant resource management challenge and will remain to be so here at the RBNERR into perpetuity. RBNERR will continue to strengthen our cooperation and involvement in the local CISMA and will continue to build new management bridges with other local agencies. Budget is of course our greatest challenge in our battle in identification and control of all exotic/invasives. We have been working hard in the past to obtain funding through grants and mitigation to support our budgetary needs for the control of invasives, however, we are in desperate need of much, much more funding in order to really get a good handle on controlling the invasives within the Reserve. We are also in the process of investigating the feasibility of creating a ROMA that will help us in the receiving of mitigation funds.

We will, also be working with our Research division here at RBNERR to investigate and pursue research projects to give us more and better data that we can use to better inform our control efforts. Burmese Pythons are just one of the many new challenges that will be demanding more of our staff-time and budget in order to control their spread.

Web Sites

Collier County : http://library.municode.com/HTML/13992/level2/CHAP3_3.05.00.html#CHAP3_3.05.00_3.05.08

City of Naples: http://library.municode.com/HTML/13804/level3/PII_C22_All.html#PII_C22_All_s22-35

FLEPPC sites

Home: <http://www.fleppc.org/>

2009 list <http://www.fleppc.org/list/List-WW-F09-final.pdf>

Management plans

Air Potato: http://www.fleppc.org/Manage_Plans/AirpotatoManagementPlan_Final.pdf

Brazilian Pepper: http://www.fleppc.org/Manage_Plans/2006BPmanagePlan5.pdf

Chinese Tallow : http://www.fleppc.org/Manage_Plans/Tallow_Plan.pdf

Lather leaf: http://www.fleppc.org/Manage_Plans/CA%20Mngt%20Plan.pdf

Lygodium: http://www.fleppc.org/Manage_Plans/Lygo_micro_plan.pdf

Melaleuca: http://www.fleppc.org/Manage_Plans/mplan.pdf

Plant Atlas: <http://www.florida.plantatlas.usf.edu/>

Pesticide Applicator License. <http://www.doacs.state.fl.us/onestop/aes/pestapp.html>

Institute of Food and Agricultural Services (IFAS): <http://www.ifas.ufl.edu/>

South Florida Water Management District (SFWMD):

<http://www.sfwmd.gov/portal/page/portal/xweb%20protecting%20and%20restoring/vegetation%20and%20exotic%20control>

Additional Internet Information Sources:

http://www.botany.hawaii.edu/faculty/cw_smith/ter_cat.htm

http://www.botany.hawaii.edu/faculty/cw_smith/syz_cum.htm

http://www.botany.hawaii.edu/faculty/cw_smith/psi_gua.htm

http://www.botany.hawaii.edu/faculty/cw_smith/rho_tom.htm

http://www.botany.hawaii.edu/faculty/cw_smith/sch_ter.htm

http://www.botany.hawaii.edu/faculty/cw_smith/sch_act.htm

<http://www.wtith.com/topics/tcm/herbs/chinab.htm>

<http://www.winrock.org/forestry/factpub/factsh/aurichg2.txt>

<http://www.pathfinder.com/@Kv2JCgUAwyNOK8Ww/vg/TimeLife/Houseplants/Foliage>

<http://flora.harvard.edu/china/solan/sola095.htm>

<http://flora.harvard.edu/china/solan/sola067.htm>

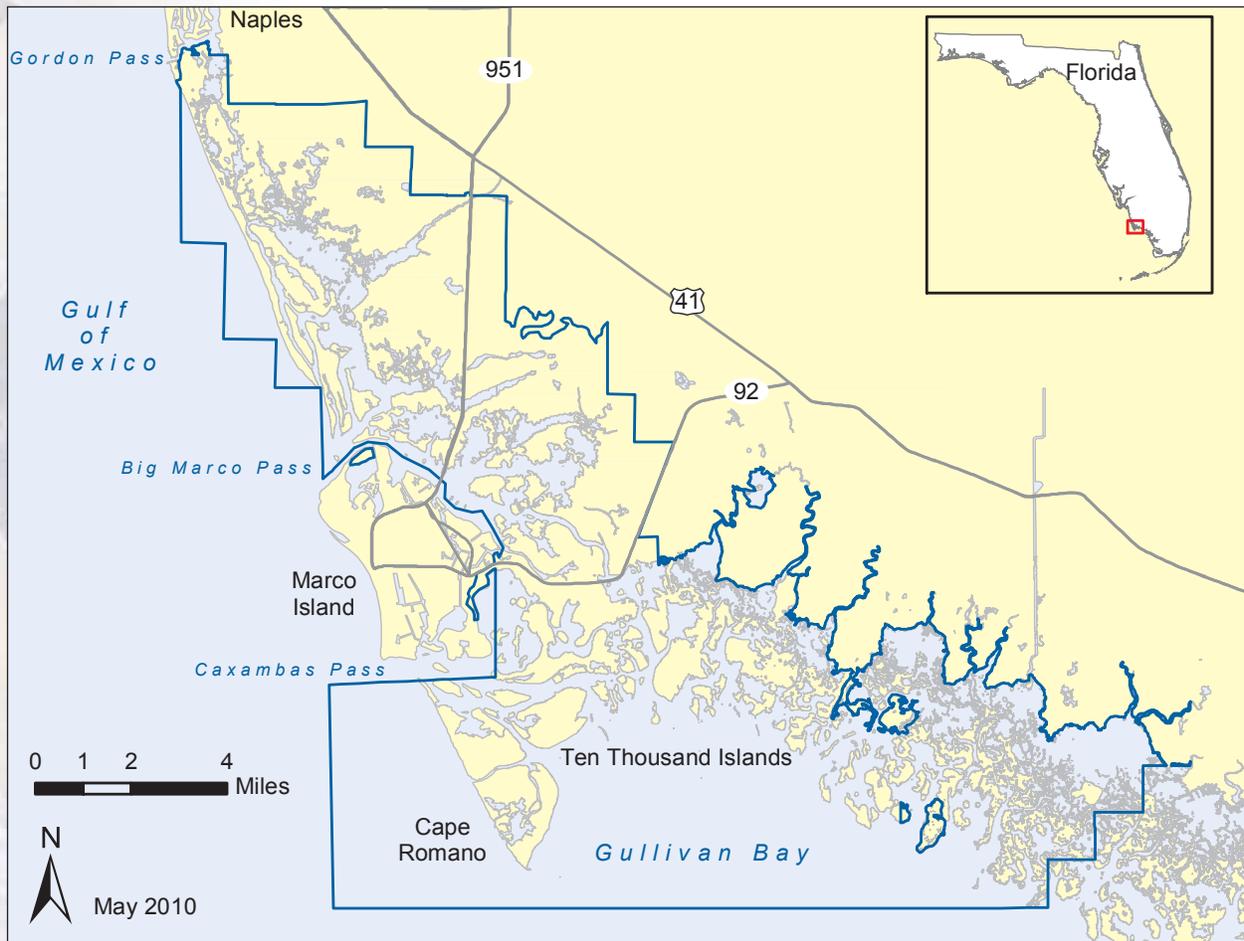
<http://www.usf.edu/isb/projects/atlas/maps>

http://www.mangonet.com/~doog/sofl_plants/exotic_australia.html

<http://eddie.mannlib.cornell.edu/instruction/horticulture/H415/species/leucaena/overview>

<http://www.kidsource.com>

Control of Nonnative Plants in Natural Areas of Florida IFAS: <http://edis.ifas.ufl.edu/pdf/files/wg/wg20900.pdf>



Rookery Bay National Estuarine Research Reserve location and boundaries

B.11 / Master Facilities Plan (MFP)

Rookery Bay National Estuarine Research Reserve

Master Facilities Plan (MFP)

Introduction - Rookery Bay National Estuarine Research Reserve (RBNERR) is one of three nationally recognized National Estuarine Research Reserves in the state of Florida. It was established in 1978 in order to preserve the natural environment of Rookery Bay and Henderson Creek, the Bay's main source of fresh water, and the associated wetlands and upland areas that are part of the Bay's watershed.

RBNERR is funded in part by both Federal (NOAA) and State of Florida funds. The Florida Department of Environmental Protection (DEP) is the state agency through which funds and management of the facility are coordinated. The director and staff of RBNERR are responsible for the management and monitoring of the resources within the Reserve, undertake and coordinate research activities within RBNERR, and provide educational and interpretive programs for the public related to the special resources within RBNERR. The RBNERR is assisted in its educational, interpretive and research activities by the Conservancy, a non-profit organization dedicated to preserving southwest Florida's native ecosystems. Today, RBNERR encompasses nearly 113,000 acres of state and federally-owned lands.

The following report describes the site plan and proposed facilities to be developed to serve the future needs of RBNERR. This plan also incorporates the design of the first building to be constructed on the site. The headquarters building was designed in 1995, and is planned to be constructed in 1996.

Facilities Development Master Plan

Site Selection - The purpose of the Master Plan is to provide a blueprint for the long-range development of new facilities to serve the staff and visitors to RBNERR. While the Reserve currently operates out of several existing buildings located at the end of Shell Island Road, these facilities are outdated and the space provided is inadequate to accommodate existing and potential activities of the Reserve. As a result, the director and staff of RBNERR examined several alternative sites for expanding staff, research, and visitor facilities. The conclusion of this analysis was that the location of the existing facilities was not large enough, nor sufficiently visible or accessible to the public to meet the long-range needs of the Reserve. In addition, although several alternative sites were considered for development of additional facilities, only one site provided opportunities for easy auto access and public visibility, water access, and minimized the environmental impacts of the anticipated new construction.

The site selected for development of future facilities is located along Henderson Creek, with access from SR 951. The site consists of approximately 9.6 acres of land and includes approximately 600 feet of shoreline along Henderson Creek providing opportunities for environmental education and interpretation of the natural resources of RBNERR. The site also includes an existing canal along its western boundary, potentially providing opportunities for water access to the aquatic resources of RBNERR. Located along SR 951, the site is near existing electrical, water and sewer service, thereby minimizing site development costs and environmental impacts. In addition, it is located on the fringe of RBNERR and includes a large area of previously disturbed uplands, thereby allowing future development to occur without impacting the sensitive plant and animal communities within the core areas of RBNERR. The site also provides for a footpath bridge granting access to 50 acres on the adjacent shoreline of Henderson Creek.

Program of Improvements

The Master Plan includes the following program elements:

Headquarters Building - The headquarters building includes approximately 4,500 square feet of floor area. This building contains offices for the director, administrative staff and research, education and resource management department staff. In addition, the building includes an assembly/meeting room to provide space for conferences and other public functions related to RBNERR.

Laboratory Building - The master plan includes a laboratory building adjacent to the headquarters building. The laboratory building provides facilities for both qualitative and quantitative analysis of chemical, physical and biological samples and materials. A portion of this laboratory has windows to an interior corridor to allow for interpretation of laboratory-based research activities by visitors. In addition to the laboratory, this building may contain several small offices to accommodate visiting investigators, a library room and a room dedicated to the integrative uses of computers for data management, remote access and CADD/GIS activities. The plan accommodates a laboratory building of approximately 4,200 square feet.

Environmental Learning Center - The new location of RBNERR's facilities provides the opportunity to construct a facility that will provide space to accommodate the environmental educational activities of RBNERR and allow the expansion of those activities to serve the growing population of southwest Florida. The master plan designates a site for a building of approximately 9,500 square feet of enclosed space. This building includes space for an exhibit room, an audio-visual presentation room, lobby/reception areas and staff offices.

Maintenance Building - The Master Plan provides a location for a small on-site maintenance facility. Although the main maintenance facility for RBNERR is planned to remain at its present location on Shell Island Road, it is anticipated that a small 600 square foot facility will be required to serve the immediate maintenance needs of the facilities at Henderson Creek. Basic building and grounds care will be provided from this facility.

Parking Facilities - The Master Plan provides parking for 95 automobiles and 8 oversize vehicles such as buses or recreational vehicles. This amount of parking is anticipated to easily accommodate the needs of the headquarters and laboratory facilities and has been sufficient for the Environmental Learning Center except for very large events.

Interpretive Site Amenities - In addition to the new buildings, the Master Plan illustrates the development of outdoor interpretive facilities. These facilities include a boardwalk running along the three major buildings facing Henderson Creek. The boardwalk provides opportunities to introduce visitors to the resources of RBNERR and connects to a path which extends to the oak hammock located at the northeast corner of the site. This area offers an extensive shaded canopy of oaks with opportunities for interpretation of upland plant and animal communities. On the west side of the property, the plan calls for developing a boat dock for RBNERR vessels and a canoe launch along the existing canal that borders the site. Both facilities will provide opportunities to access the aquatic resources of RBNERR. In addition, a bridge providing a public access footpath across Henderson Creek connects to a series of interpretive boardwalks and trails on 50 acres of pine, oak and mangrove forested wetlands immediately south of the Creek.

Site Plan

The site plan shown in the accompanying illustration was developed through consideration of the environmental condition of the site and the program of improvements necessary to meet the future needs of RBNERR. The plan is organized to locate the three buildings proposed for construction along the southern side of the property where they can take advantage of views along Henderson Creek and minimize impacts on the natural resources associated with the site, as well as enhance the opportunities of this location. The plan illustrates the construction of a continuous boardwalk along the southern side of the buildings. This path provides access between buildings for staff and creates opportunities for interpretive displays related to the aquatic resources of RBNERR. At its southwestern end, the boardwalk connects to a pedestrian bridge that crosses Henderson Creek. This provides access to RBNERR lands south of the creek which have additional interpretive trails. The boardwalk also ties to paths leading to the oak hammock at the northeast corner of the site where additional interpretive activities can be programmed.

The main auto access to the site is provided from Tower Road which borders the northern edge of the property. This provides convenient and readily visible public access to the main public facilities of RBNERR. Parking is located in the central portion of the site and its total area is limited so as not to impact the oak hammock in the northeastern corner of the site. Existing trees, especially the larger oak trees that exist in several spots within the parking areas, have been retained as possible.

A second driveway just past the main entrance provides a service entrance. Consequently, the on-site maintenance facility included as part of the facilities program is located at the northwestern corner of the site, adjacent to the service drive where it will not interfere with public access to the other facilities.

The Master Plan also provides service access to each of the other buildings on the site. The headquarters will share a service court and driveway with the laboratory building. The Environmental Learning Center is planned to have its own access drive and enclosed service area. Because of the location of this drive near the entrance to the Environmental Learning Center, it is proposed to use grass-block paving in lieu of asphalt paving for the driveway surface.

Rookery Bay NERR Headquarters Site

The Rookery Bay headquarters (approximately 4500 square feet) was constructed in 1996 on a parcel of land purchased through the Rookery Bay Conservation and Recreation Lands (CARL) Project. A number of locations were considered during the siting of the new building. However, the disturbance on the selected parcel was such that it minimized environmental impacts. The property had an intact canopy of slash pines, live oaks and cabbage palms, but the understory was significantly disturbed. Prior to the purchase by the state, the shoreline along the southern property boundary had been rip-rapped for stabilization and eth land adjacent to the shore had been filled and bush-hogged, resulting in a heavily disturbed site that was infested with invasive exotic plants.

Prior to site improvements by RBNERR, the midstory and shoreline were predominantly Brazilian pepper. The understory was a mix of invasive grasses, including phragmites, earleaf acacia seedling, wedelia, life plant, twinleaf nightshade and additional invasive species. As a local government requirement, RBNERR planted green buttonwood, live oak, cocoplum, firebush and wild coffee plants. For additional site enhancements, RBNERR also created mulch beds and planted a number of native hammock plants, including redberry stopper, white stopper, Simpson's stopper, Spanish stopper, wild coffee, live oak, gumbo limbo, dahoon holly, Jamaican dogwood and blue porterweed. These plantings are located immediately adjacent to the headquarters.

The Environmental Learning Center (ELC) and additional site improvements are sited to reduce environmental impact to a minimum. For example, construction for the ELC required relocation of approximately 10 cabbage palms with no additional impacts to plants on site and no impacts to wetlands. The parking lot has been carefully sited to avoid oak and pine trees. The dock is located in a previously dredged canal with no submerged vegetation.

Provided in tabular format below is a list of plant and animal species currently found or observed on this site. Invasive species are listed in italics.

Plants			
Trees	Shrubs	Groundcover	Vines
<i>Brazilian pepper</i>	Bayberry	Bidens	Coin vine
Cabbage palm	Coral bean	Broom sedge	Fox grape
Cat claw	Firebush	Cattails	Poison ivy
Dahoon holly	Red stopper	Cordgrass	<i>Rosary pea</i>
<i>Earleaf acacia</i>	Redberry stopper	Fakahatchee grass	Smilax spp.
Elderberry	Satinleaf	Gamma grass	
Green buttonwood	Simpson's stopper	Giant leather fern	
Guava	<i>Twinleaf nightshade</i>	<i>Life plant</i>	
Gumbo limbo	Wax myrtle	<i>Napier grass</i>	
Jamaican dogwood	White stopper	<i>Natal grass</i>	
Live oak	Wild coffee	<i>Phragmites</i>	
Red mangrove		<i>Wedelia</i>	
Slash pine			
White mangrove			
Animals			
Mammals	Birds	Reptiles	Fish
Eastern cottontail	Black vulture	American alligator (in adjacent Henderson Creek seasonally)	Western mosquitofish
Opossum	Blue jay	Black racer	
Raccoon	Eastern screech owl	<i>Cuban brown anole</i>	Invertebrates
River otter	<i>European starling</i>	Florida box turtle	Mangrove tree crab
	Mourning dove	Green anole	Oyster
	Pileated woodpecker		
	Red-shouldered hawk	Amphibians	
	Red-winged black bird	<i>Cuban tree frog</i>	

Visitor Use Management in Coastal and Marine Protected Areas: Summary Document and Materials for Ten Thousand Islands National Wildlife Refuge



Provided by the National Oceanic and Atmospheric
Administration (NOAA) Coastal Services Center
and Pandion Systems, Inc.

November 2005

**Section 1: Summary of the
Visitor Use Management
Workshop**

Summary of Managing Visitor Use in Coastal and Marine Protected Areas Workshop for Ten Thousand Islands National Wildlife Refuge

The following is a summary of the workshop and recommendations to help Ten Thousand Islands National Wildlife Refuge (NWR) implement the Visitor Use Management Process.

Workshop Date: May 10-12, 2005

Workshop Description: The Managing Visitor Use in Coastal and Marine Protected Areas Workshop was designed and implemented by the National Oceanic and Atmospheric Administration (NOAA) Coastal Services Center. The workshop provided information on the visitor use management process, a step-by-step approach to visitor management. Participants learned about a systematic method for minimizing visitor impacts to natural and cultural resources—a process that includes the following:

- 1) *Problem identification:* Participants looked at broad visitor use issues and broke them down into specific problems that could be addressed by resource managers.
 - 2) *Creating indicators and standards:* Once problems were identified, the project team worked with managers to establish indicators and standards for the resource areas.
 - 3) *Creating monitoring protocol:* Participants discussed monitoring protocols for resource areas that would allow managers to know when impacts approach or exceed acceptable levels of change.
 - 4) *Management tactics:* Participants discussed appropriate management tactics to use in a diverse set of visitor use scenarios.
-

Workshop Participants

(from RB National Estuarine Research Reserve and Ten Thousand Islands NWR)

<u>Participant</u>	<u>Organization</u>	<u>Participant</u>	<u>Organization</u>
Ben Nottingham	Ten Thou. Islands	Randy McCormick	Rookery Bay
Layne Hamilton	Ten Thou. Islands	Margaret Ferguson	Rookery Bay
Cheryl Metzger	Rookery Bay	Jill Schmid	Rookery Bay
Greg Curry	Rookery Bay	Mike Shirley	Rookery Bay
Tad Bartareau	Rookery Bay	Steve Bertone	Rookery Bay
Keith Laakonen	Rookery Bay	Gary Lytton	Rookery Bay
Tabitha Stadler	Rookery Bay	Pamela Keyes	Rookery Bay

Visitor Activities

- ▶ Boating
- ▶ Fishing (bank and boat)
- ▶ Canoeing and Kayaking
- ▶ Wildlife Watching
- ▶ Photography
- ▶ Beach and Island Camping (no designated places)
- ▶ Limited Hiking
- ▶ Hunting
- ▶ Jet Skiing
- ▶ Air Boating

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Visitor Use Issues Addressed during the *Visitor Use Management Workshop*

- ▶ Looting/defacing/vandalism at middens and historical sites
- ▶ Boating impacts to seagrass.
- ▶ Altered behavior of animals and altered habitat structures at beaches

Visitor Impacts

- ▶ Bird flushing
- ▶ Animal harassment
- ▶ Trampling
- ▶ Nest disturbance
- ▶ Wake erosion/impacts
- ▶ Boats scarring sea grasses
- ▶ Trash in water and on beach
- ▶ Cutting firewood at campsites
- ▶ Boats colliding with animals (manatee)
- ▶ Clearing sites
- ▶ Noise
- ▶ Spread of exotics
- ▶ Human waste
- ▶ Benthic impacts
- ▶ Vegetation disturbance (terrestrial)
- ▶ Disturbance of archaeological sites

Visitor Use Issues

Unlimited Access

Ten Thousand Islands NWR has unlimited access to its waters via innumerable public and private access points located in the surrounding areas. Its close proximity to Naples and other rapidly growing areas makes it a destination spot for thousands of visitors annually. Most access is by water via one of the public boat ramps at Goodland and Port of the Islands Resort on the Faka Union Canal or from private homes. Private homes along the water have boats and water access. In addition, many Collier County residents store boats in and out of the water at docking facilities throughout the area. Since access occurs from so many places, there is no way to limit access by restricting boat use at public launch areas.

New Residents

Collier County is one of the fastest growing areas in Florida. Many of the new residents are from other areas of the country and do not understand the impacts their actions can have on sensitive resources. Their ignorance inadvertently contributes to impacts. The continuous influx of new residents makes creating an informed public a continual challenge.

Lack of Enforcement

Ten Thousand Islands NWR has a full-time staff of two and has very little law enforcement support. They are not a law enforcement agency so must rely on county or state enforcement. These resources are already stretched thin, so assistance from these groups is limited at best. When visitors choose not to comply with regulations, there is often little that can be done. In addition, rule-breaking visitors do not have much motivation to abide by regulations because they know they probably will not get caught.

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Lack of Staff Presence

Ten Thousand Islands NWR is a vast area with 33,000 acres of estuarine habitat. Most visitors never encounter a staff member unless they go to refuge headquarters and actively seek someone out. Lack of staff presence and the open, unpopulated nature of the refuge give some visitors the sense that they are free to do whatever they want.

Confusion about Different Management Areas

Ten Thousand Islands NWR borders Rookery Bay NERR, Collier Seminole State Park, and Everglades National Park. Since access to these areas is often via the water, there are few indications that visitors have passed from one area into another; often visitors do not know which of these management areas they are in. In addition, visitors do not know the difference between one agency and another, and do not know that regulations may be different between the national park, refuge, reserve, and state park. This creates confusion and unintentional breaking of rules.

Site Needs to Make the Visitor Use Management Process successful

Staff Time: Since staffing at Ten Thousand Islands NWR is so limited, resource monitoring and implementation of the visitor use management process must be incorporated into existing staff time. This will require that the visitor use monitoring efforts be part of current monitoring efforts or be structured so that they can be completed within existing daily tasks. Monitoring should be done in a scientific, systematic way in order for the results to be consistent and valid. This requires dedicated staff members who are given the time to complete the tasks. Staff time for monitoring can be allocated in two ways:

1. It can be incorporated into monitoring that is already being done in an area. Additional steps would be added to measure visitor use impacts.
2. It can be a completely new project that becomes a part of the staff's regular routine.

Project Leader: A successful visitor use management program requires a project leader who has the interest, time, ability, and motivation to move the project forward. This leader must have the support of management and the time to monitor and manage visitor use. Without a project leader, the program is left to be pieced together by whoever has the time. A central motivator will keep the project focused and will give it the attention it needs.

Determine how **visitor use management can be integrated into NWR management plans**. Each NWR undergoes a comprehensive planning process and has to create a visitor use plan. The visitor use management process provides a framework and methodology for visitor use management. Incorporating this framework into the planning process would help ensure that visitor management is more than just an idealized concept. It would provide concrete steps for the NWR to take to proactively monitor and manage use in the refuge.

Recommendations for Implementing the Visitor Use Management Process

- ▶ Identify a *key staff member* to head up the visitor use effort and move the project forward. Give the staff member the time and resources to implement visitor use management.
- ▶ If possible, request assistance from the *NOAA Coastal Services Center* to guide the visitor use management process. Working with the NOAA Coastal Services Center will help the project stay on track and provide an excellent resource if there are questions about how things should be done. The key staff member should have regular contact with a NOAA Coastal Services Center point person to ensure consistency. In addition, site visits by NOAA staff members would help ensure that the monitoring protocol and management efforts are consistent with site needs.
- ▶ ***Begin with one easy-to-monitor visitor use issue.*** Starting small will ensure the project can be implemented within the constraints of staff time. Choose a relatively simple issue that can be readily addressed so that the visitor use management process can be used successfully at the site.

**Section 2: Summary of Notes
from the December 2004 Site
Visit**

Rookery Bay National Estuarine Research Reserve and Ten Thousand Islands National Wildlife Refuge

NOAA Visitor Use Management Project: Site Visit Notes
December 13-15, 2004

Attending the meeting:

Name	Affiliation	Phone	E-mail
Tom Fish	NOAA Coastal Services Center	(843) 740-1271	Tom.Fish@noaa.gov
Christine Denny	Pandion Systems	(352) 372-4747	cdenny@pandionsystems.com
Christian Newman	Pandion Systems	(352) 372-4747	cmnewman@pandionsystems.com
Layne Hamilton	Ten Thousand Islands NWR	(239) 353-8442, ext. 227	Layne_Hamilton@fws.gov
Ben Nottingham	Ten Thousand Islands NWR	(239) 353-8442, ext. 225	Ben_Nottingham@fws.gov
Garry Tucker	USFWS	(404) 679-7356	Garry_Tucker@fws.gov
Randy McCormick	Rookery Bay NERR	(239) 417-6310	Randy.Mccormick@dep.state.fl.us
Ann Ferguson	Rookery Bay NERR	(239) 417-6310	Margaret.Ferguson@dep.state.fl.us
Steve Bertone	Rookery Bay NERR	(239) 417-6310	Steve.Bertone@dep.state.fl.us
Cloe Waterfield	Rookery Bay NERR	(239) 417-6268	Cloe.Waterfield@dep.state.fl.us
Roy Ogles	Apalachicola NERR	(850) 670-4783	Roy.Ogles@dep.state.fl.us

National Estuarine Research Reserves' Purpose: National Estuarine Research Reserves are established to provide opportunities for long-term estuarine research and monitoring, estuarine education and interpretation, and to provide a basis for more informed coastal management decision making.

Rookery Bay's Mission: The mission of the reserve is to provide a basis for informed coastal decisions through land management, restoration, research, and education. Rookery Bay "Belongs to the people. It is yours to explore, yours to protect, yours to enjoy."

National Wildlife Refuge System Mission: To administer a national network of lands and waters for the conservation, management, and, where appropriate, restoration of the fish, wildlife, and plant resources and their habitats within the U.S. for the benefit of present and future generations of Americans.

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Visitor Use Management in Marine Protected Areas – Ten Thousand Islands NWR 2005

Mission of the Ten Thousand Islands National Wildlife Refuge: To conserve, protect, and manage the refuge's unique subtropical estuarine ecosystem, especially its endangered species, its natural biological diversity, and its rich cultural resources for the continuing, sustained benefit of the American people.

The meeting took place over 3 days and included site visits to Ten Thousand Islands NWR and Rookery Bay NERR, as well as a full-day meeting.

The full-day meeting included all participants listed above. The meeting was broken out into several sections:

- **Project goals and objectives:** The group discussed the project and what they are hoping to get from it.
- **Sensitive ecosystem areas** within the NERR and the NWR: The group marked sensitive areas on large printed maps.
- **Current use:** The group looked at large printed maps of the sites and marked where different types of recreation occurred.
- **Visitor use impacts:** The group discussed each type of recreation that occurs on the sites and listed the time of year that use occurs most heavily, resource impacts, and visitor experience impacts that result from that recreation type. The group then highlighted which impacts were of greatest concern to managers.
- **Visitor motivation** to recreate at the NERR and NWR: Why do people come to these sites?
- **Visitor experiences:** The group listed what they want visitors to get from their visit.
- **Stakeholders:** Who are some of the stakeholders who could give input into the visitor use management planning process?

Notes from the meeting follow:

The NERR and NWR were asked what they hope to accomplish with this project. Both sites said they want to be able to answer these questions:

- What are our funding needs?
- How can we better inform the visitor?
- Should some areas have restricted access to protect the resource?
- Is there a better way to approach visitor management than what they are now doing?
- How do they do a better job with what they have?
- What projects should come first?
- What grants can they go for?

They also want the following:

- Recommendations
- A plan of action

Visitor Use Management in Marine Protected Areas – Ten Thousand Islands NWR 2005

- Information on building and strengthening partnerships.

Types of Recreation at Rookery Bay NERR and Ten Thousand Islands NWR, Peak Use Times, and Resulting Impacts

Recreation Type	Use Season	Resource Impacts <i>“ ” Indicates the largest impact type</i>	Visitor Experience Impacts
Camping	Year round. Peak Nov-April	<ul style="list-style-type: none"> • Litter • Wildlife disturbance • <u>Vegetation impacts</u> <ul style="list-style-type: none"> ○ Cutting firewood ○ Clearing sites • Noise • Spread of exotics, including exotic pets • Trampling • Potential wildfire threat • Cultural resource disturbance • Human waste 	<ul style="list-style-type: none"> • Displacement • Competition for sites • Alcohol-related accidents, noise, etc. • Degraded wilderness experience for wildlife watchers
Canoe/Kayak	Year round. Peak Nov-April	<ul style="list-style-type: none"> • Litter • <u>Wildlife disturbance</u>, including marine mammals, flushing shore birds, and nesting birds • Increased access to remote areas could cause impact • Human waste 	<ul style="list-style-type: none"> • Issues with power boaters and jet skis • Noise from groups of paddlers
Shore Fishing	Year round. Peak Nov-April	<ul style="list-style-type: none"> • Benthic impacts such as <u>derelict tackle</u> • <u>Litter</u> • Rule compliance–catch restrictions • Waste • Feeding wildlife–scraps to birds 	<ul style="list-style-type: none"> • Displacement by other recreation activities

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Visitor Use Management in Marine Protected Areas – Ten Thousand Islands NWR 2005

Types of Recreation at Rookery Bay NERR and Ten Thousand Islands NWR, Peak Use Times, and Resulting Impacts

Recreation Type	Use Season	Resource Impacts <i>“ ” Indicates the largest impact type</i>	Visitor Experience Impacts
Boat Fishing	Year round. Peak Nov-April	<ul style="list-style-type: none"> Benthic impacts such as <u>derelict tackle</u> Sea grass scarring <u>Wildlife disturbance</u> Litter Rule compliance–speed zones, catch restrictions <u>Waste</u> Feeding wildlife–scraps to birds Air and water pollution, noise Boat wake erosion 	<ul style="list-style-type: none"> Displacement by other boaters and other activities
Water Skiing	Year round. Peak is when school is out	<ul style="list-style-type: none"> <u>Wildlife disturbance</u> Boat wake erosion Sea grass scarring 	<ul style="list-style-type: none"> Safety Displacement of other recreation activities Degradation of wilderness experience Use lots of space repeatedly Conflicts with fishing and other user groups
Wildlife Viewing and Photography	Year round	<ul style="list-style-type: none"> Wildlife disturbance Vegetation disturbance Wildlife feeding by commercial operations 	<ul style="list-style-type: none"> Conflicts with fishing and other user groups
Day Use/Trail Use	Year round. Peak Nov-April	<ul style="list-style-type: none"> Litter <u>Trampling</u> <u>Vandalism (signs, etc.)</u> Wildlife disturbance 	<ul style="list-style-type: none"> <u>Litter/vandalism displaces other visitors</u> Groups displacing each other Crowding

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Types of Recreation at Rookery Bay NERR and Ten Thousand Islands NWR, Peak Use Times, and Resulting Impacts

Recreation Type	Use Season	Resource Impacts <i>“ ” Indicates the largest impact type</i>	Visitor Experience Impacts
		<ul style="list-style-type: none"> • Cultural resources impacts • Road impacts on non-paved roads 	
Hunting	September, November-January	<ul style="list-style-type: none"> • Vegetation disturbance • Non-target wildlife disturbance 	
Recreational Boating	Year round	<ul style="list-style-type: none"> • Rentals and infrequent visitors may be less skilled and knowledgeable and create impacts • <u>Benthic impacts, including sea grass scarring</u> • Marine mammal disturbance • <u>Wildlife disturbance</u> • Litter • Rule compliance–speed zones • Waste 	<ul style="list-style-type: none"> • <u>Safety</u> • Disturbance of commercial crab traps • Displacement
Jet Skiing	Year round. Peak Nov-April	<ul style="list-style-type: none"> • Benthic impacts from pressure wake on seafloor • <u>Noise</u> • <u>Wildlife disturbance</u> • Rule compliance 	<ul style="list-style-type: none"> • Disturbance of other user groups • Degradation of visitor experience

Visitor Use Management in Marine Protected Areas – Ten Thousand Islands NWR 2005

Types of Recreation at Rookery Bay NERR and Ten Thousand Islands NWR, Peak Use Times, and Resulting Impacts

Recreation Type	Use Season	Resource Impacts <i>“ ” Indicates the largest impact type</i>	Visitor Experience Impacts
Air Boating	Year round. Peak Nov-April	<ul style="list-style-type: none"> Benthic impacts from pressure wake on seafloor Noise Wildlife disturbance Trimming mangroves for access Wildlife disturbance Rule compliance 	<ul style="list-style-type: none"> Safety Disturbance of other user groups Degradation of visitor experience
Education Center Visitation	Year round	<ul style="list-style-type: none"> Noise Utilities for running the center General impact from visitors to area Increased knowledge of the area leads to increased visitation 	<ul style="list-style-type: none"> Displacement

**Visitor Motivations: Answers to the Question,
“Why Do Visitors Come to Rookery Bay NERR and Ten
Thousand Islands NWR?”**

- To get back to nature
- To catch fish
- To relax
- To see wildlife
- To enjoy the beach
- To frolic in the surf
- To find peace and quiet
- To learn
- To be entertained
- To experience cultural history
- To camp
- To get away from civilization
- To explore
- To spend time with their family
- To ski
- To have outdoor adventures
- To experience thrills
- To find solitude
- To have a family experience
- For health and exercise
- For mental, emotional, and physical health
- For their spirit
- They are curious

**Visitor Experiences: Answers to the Question,
“What Do You Want People to Get from Their Visit to
Rookery Bay NERR and Ten Thousand Islands NWR?”**

- Experiences of a lifetime
- That facilities/resources are being well-managed
- Heightened awareness of conservation ethic
- Who we are and what we do
- Knowing
 - What an estuary is
 - Why it is important
 - What they can do to help protect these places
- Conservation starts in your own backyard
- That Rookery Bay NERR is
 - Yours to explore
 - Yours to enjoy
 - Yours to protect
- Knowing where they have been (i.e., at a NERR or NWR)
- Having had a high-quality experience related to big six recreation uses
- Leaving with the feeling that they had a high-quality experience
- Understanding what they can or can't do
- Leave feeling safe
- Leave feeling welcome

**Potential Stakeholders to Speak with about
Visitor Use at Rookery Bay NERR and Ten Thousand Islands
NWR**

- Collier Seminole State Park – Joe Howard
- FWC – Jason Horadam
- Collier County Park – Marla Ramsey, Doug Suiter
- City of Marco Island – Nancy Ritchie
- City of Naples – John Steiger
- Marine Industry Association – Christian Spilker, Jackie Barr
- Ecotour Operators
- Paddling Groups
- Fishing Guides
- Conservancy of SW Florida – Dave Ceiley
- Ducks Unlimited – John Gardner
- Outward Bound
- Earth Outfitters/West Marine
- Port of Islands Marina – Tom Bernard
- Cedar Bay Marina – Scott Hopkins
- Water Ski Club
- Collier County Audubon
- Friends Groups (FORB, etc.)
- Naples Auxiliary Power Squadron
- Bait and Tackle Shops
- Tom Shaw, President of Backcountry Flyfishers (239-389-1128)
- Larry E. Block, President of the Naples Fishing Club (239-455-2801)

**Section 3: Visitor Use Tables
and Sensitivity Analysis for Key
Site Resources**

Visitor Use Management in Marine Protected Areas – Ten Thousand Islands NWR 2005

What Types of Visitor Use Are Associated with Current or Potential Impacts at Rookery Bay and Ten Thousand Islands?

	Camping	Canoe/ Kayak	Shore Fishing	Boat Fishing	Water Skiing	Jet Ski	Air Boat	Day Use/ Hiking	Recreation Boating	Visitor Center	Hunting
Bird flushing	X	X	X	X	X	X	X	X	X		X
Animal harassment	X	X	X	X	X	X	X	X	X		X
Boats colliding with animals				X	X	X	X		X		
Trampling	X		X					X		X	X
Nest disturbance	X							X			
Wake erosion/ impacts					X	X	X		X		
Boats scarring grasses				X	X	X	X		X		
Trash	X	X	X					X	X		
Cutting firewood	X										
Clearing sites	X										
Noise	X				X	X	X	X	X		X
Spread of exotics	X		X	X					X	X	
Human waste	X		X					X			
Benthic impacts						X	X		X		
Vegetation disturbance (terrestrial)	X		X					X		X	

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Visitor Use Management in Marine Protected Areas – Ten Thousand Islands NWR 2005

What Resources Are Likely to Be Affected by Current/Potential Impacts at Rookery Bay and Ten Thousand Islands?

	Rookery	Shorebird Stopover	Dune Vegetation	Midden	Marine Mammals	Turtle Nesting	Mangroves	Submerged Aquatic Vegetation	Uplands	Research Sites	Restoration Sites
Bird flushing	X	X	X	X			X		X		
Animal harassment	X	X	X	X	X		X				
Boats colliding with animals					X						
Trampling	X	X	X	X		X	X	X	X	X	
Nest disturbance	X	X	X			X					
Wake erosion/impacts	X	X	X	X		X	X			X	X
Boats scarring grasses					X			X			X
Trash	X	X	X	X	X	X	X		X	X	X
Cutting firewood							X		X		
Clearing sites	X	X	X	X		X			X		
Noise	X	X			X				X		
Spread of exotics	X	X	X	X	X	X	X	X	X	X	X
Human waste	X	X	X	X	X	X	X		X	X	X
Benthic impacts								X		X	X
Vegetation disturbance (terrestrial)	X	X	X	X		X	X		X	X	X

NOAA Coastal Services Center
Pandion Systems, Inc.

Visitor Use Management in Marine Protected Areas – Ten Thousand Islands NWR 2005

Sensitive Element Analysis for Rookery Bay NERR and Ten Thousand Islands NWR

1-3= Low sensitivity
4-6= Medium sensitivity
7-9= High sensitivity

Site Resource	Level of rarity or endangerment within site High=3 Low=1	Level of rarity or endangerment outside of site High=3 Low=1	Ability to withstand disturbance Low =3 High =1	Total
Rookeries	3	1	3	7
Turtle nesting	3	3	2	8
Middens	3	3	2	8
Research Sites	2	3	2	7
Restoration Sites A (sensitive sites)	3	3	3	9
Manatee	2	2	3	7
Shorebird use	1	1	3	5
Submerged aquatic vegetation	2	2	2	6
Dunes vegetation	1	1	2	4
Restoration Sites B (medium sensitivity)	3	2	1	6
Mangroves	1	1	1	3
Uplands	1	1	1	3

**Section 4: Worksheets
Completed during the 2005
Managing Visitor Use in
Marine Protected Areas
Workshop**

Visitor Use Management in Marine Protected Areas – Ten Thousand Islands NWR 2005

Florida Visitor Use Management Worksheet
Worksheet 1: Problem Specification

Statement of the Problem

Looting / defacing / vandalism at middens and historical sites

What are the specific impacts related to the problem?	Describe root cause(s) of impacts.	Indicator What can be measured to gauge level of impact? (Indicate which impact(s) are being monitored.)	Standard Threshold where impact becomes unacceptable?	Do you know existing impact based on indicator? If YES, describe. If NO, how would you find out?	Estimate level of existing impact... <input type="checkbox"/> acceptable <input type="checkbox"/> approaching unacceptable <input type="checkbox"/> unacceptable
<ul style="list-style-type: none"> Loss of cultural value Loss of scientific value Loss of future generation value Loss of understanding, knowledge, education value 	<ul style="list-style-type: none"> Ignorance of environmental law and resources Illegal economic gain (selling artifacts) Legal economic gain (ecotourism) Personal collecting Looking for gold Lack of understanding of importance of cultural resources Ease of accessibility Insufficient management/ protection 	<ul style="list-style-type: none"> Signs of anthropogenic digging Signs of vandalism/ defacing 	<p>More than one instance of digging, vandalism or defacing will trigger response.</p> <p>Monitoring frequency would vary depending on site location: Sites in high use areas: monitored every 3 months Medium use: 6 months Low use: annually</p> <ul style="list-style-type: none"> 20 pieces/ 100' since last survey 20% loss since last visit (not due to natural events such as storms) 	<p>Site specific</p> <p>Some sites are already unacceptable (ex: Dismal Key)</p> <p>Approaching unacceptable: Sand Key</p> <p>Acceptable: 4 Brothers</p>	

Worksheet 2: Selecting Management Tactics

Statement of the problem (from Worksheet 1): Looting/defacing/vandalism at middens and historical sites	
Five Broad Management Strategies to Consider:	
<ol style="list-style-type: none"> 1. Modify the character of visitor use by controlling where and when use occurs, what type of use occurs, and how visitors behave. 2. Modify the resource base by increasing resource durability or maintaining/rehabilitating the resource. 3. Increase the supply of recreation opportunities. 4. Reduce use in the entire area, or in problem areas only. 5. Modify visitor attitudes and expectations. 	
<p>Below are five categories of management tactics. CHECK THE TACTICS YOU THINK ARE LIKELY TO HELP RESOLVE THE PROBLEM. Refer to <i>specific impacts</i> and <i>root causes</i> when considering which tactics may be effective.</p>	
Management Tactics	Comments
<p>Site Management: The purpose of site management is to direct and channel use, and to maintain desired environmental conditions.</p> <p><input type="checkbox"/> provide facilities and structures <input checked="" type="checkbox"/> use vegetation <input type="checkbox"/> use physical barriers <input checked="" type="checkbox"/> increase (decrease), improve (not improve), or eliminate facilities <input type="checkbox"/> strengthen/harden sites <input checked="" type="checkbox"/> remove litter and other problems <input checked="" type="checkbox"/> close area or facilities</p>	<p>Vegetation: Knickerbean or yucca</p> <p>Facilities: If decide to have access, provide boardwalk to steer visitors to certain spots</p> <p>Close facilities: Put up signs to indicate closure. Rookery Bay and Ten Thousand Islands have authority to do that</p>
<p>Rationing and Allocation: The purpose of rationing is to regulate use intensity by limiting use of an area, while allocation distributes limited use and resources among competing groups.</p> <p><input checked="" type="checkbox"/> limit access using reservations <input type="checkbox"/> limit access using a first-come-first-serve (queuing) system <input type="checkbox"/> limit access using lotteries <input type="checkbox"/> limit access using merit/eligibility system <input type="checkbox"/> charge fees</p>	<p>If tours are conducted at sites that are otherwise closed.</p>
<p>Regulation: The purpose of regulations is to control the nature of visitor use in an area by specifying what is and what is not allowed.</p> <p><input type="checkbox"/> restrict access to specific locations (zoning) <input type="checkbox"/> restrict use/behavior at facilities <input type="checkbox"/> restrict/prohibit activities restrict/prohibit equipment <input type="checkbox"/> restrict/prohibit modes of travel <input type="checkbox"/> limit length of stay <input type="checkbox"/> limit group size/stock/pets <input checked="" type="checkbox"/> restrict/prohibit use to protect environmental conditions</p>	
<p>Deterrence and Enforcement: The purpose of deterrence and enforcement is to control and eliminate noncompliant visitor behavior by encouraging visitors to act in responsible ways, and making explicit the prohibitions against and the consequences of undesired behavior.</p> <p><input checked="" type="checkbox"/> provide signs <input checked="" type="checkbox"/> sanction visitors who engaged in noncompliant behavior <input checked="" type="checkbox"/> provide personnel and law enforcement</p>	<p>Call DHR and FWC/ DEP if it is a state violation</p>
<p>Visitor Education: The purpose of visitor education is to influence visitor behavior, as well as contribute to positive visitor experiences.</p> <p><input checked="" type="checkbox"/> educate visitors about appropriate behaviors <input type="checkbox"/> educate visitors to alter use patterns <input checked="" type="checkbox"/> guidelines/codes of conduct <input type="checkbox"/> purchaser guidelines <input checked="" type="checkbox"/> certification programs <input type="checkbox"/> volunteer programs (e.g., bay hosts)</p>	<p>Could use signage (might also attract visitors) Exhibit about importance of cultural resources</p> <p>Ecotour operator training/certification programs Volunteer certification program (isn't political will for state-mandated programs) See Southwest Florida (Society of Ethical Ecotourists) is a southwest Florida program</p>

Two Ways to Prioritize Tactics

1. Selection criteria for management tactics: Below are a number of questions for managers to consider when comparing possible management tactics.

Questions	Tactic #1 _____	#2 _____	Tactic #3 _____
Does the tactic adequately address the root cause of the visitor use problem?	Yes / Partially/ No	Yes / Partially/ No	Yes / Partially/ No
Do you have the authority to implement this tactic?	Yes / No	Yes / No	Yes / No
Is the tactic direct or indirect in terms of how it operates on visitor behavior?	Direct / Indirect	Direct / Indirect	Direct / Indirect
Does the tactic preserve visitor freedom of choice?	Yes / No	Yes / No	Yes / No
Does the tactic affect a large or small number of visitors?	Small / Large	Small / Large	Small / Large
Are those affected primarily visitors who are responsible for the impact(s) in question?	Yes / No	Yes / No	Yes / No
Does the tactic affect an activity to which visitors attach minimal, moderate, or great importance?	Minimal / Moderate / Great	Minimal / Moderate / Great	Minimal / Moderate / Great
Is visitor resistance to the management action likely or unlikely?	Unlikely / Likely	Unlikely / Likely	Unlikely / Likely
Does the tactic affect visitors offsite while planning their trip? Onsite while engaged in their recreational experience? Both?	Offsite / Onsite / Both	Offsite / Onsite / Both	Offsite / Onsite / Both
Consider the costs to managers in terms of tactic implementation and administration, including facility construction, operation, and maintenance, staff workload, and communication and enforcement costs. Are the costs feasible/affordable?	Yes / No	Yes / No	Yes / No
Is the tactic likely to be effective at solving the visitor use problem in question?	Yes / No	Yes / No	Yes / No
Is the tactic one that avoids, or minimizes, creating new problems?	Yes / No	Yes / No	Yes / No
Can the tactic be implemented without environmental regulatory requirements (e.g., NEPA)?	Yes / No	Yes / No	Yes / No

2. Effort-Impact Grid: Consider the **impact** specific management tactics will have on the problem (e.g., minor vs. major improvement) and the **effort** necessary to implement the management tactic (e.g., easy vs. difficult; inexpensive vs. expensive; quick vs. time-consuming; one-time vs. ongoing). Indicate where potential tactics fall in the grid.

~EFFORT~
(e.g., time, cost, expertise to implement)

	Low	Medium	High
~IMPACT~ (e.g., improvement in conditions)	High		
Medium			
Low			

Worksheet 3: Management Tactics Implementation Plan (Who Is Going to Do What? By When? Using What Resources?)

Statement of the problem (from Worksheet 1): _____

Management tactic selected to address impact (from Worksheet 2): _____

Specific action(s)	Person responsible	Resources	Time frame/frequency to implement the action	Comments
1.				
2.				
3.				
4.				

Worksheet 1: Problem Specification

Statement of the Problem

Boating impacts to seagrass.

What are the specific impacts related to the problem?	Describe root cause(s) of impacts.	Indicator What can be measured to gauge level of impact? (Indicate which impact(s) are being monitored.)	Standard Threshold where impact becomes unacceptable?	Do you know existing impact based on indicator? If YES, describe. If NO, how would you find out?	Estimate level of existing impact.... <input type="checkbox"/> acceptable <input type="checkbox"/> approaching unacceptable <input type="checkbox"/> unacceptable
<ul style="list-style-type: none"> Prop scarring Blowouts Prop dredging Turbidity Secondary impacts to manatees General disturbance of species in seagrass beds Changes in species assemblages, leads to changes throughout the community (species shifts). E.g., different seagrasses become dominant Fish nursery potential and habitat degraded Sea turtle impacts Potential for exotics to come in Pressure wakes of huge boats Less flowering/ propagation once seagrass impacted Impacts to visitors (recreation experiences (fishing and wildlife watching)) 	<ul style="list-style-type: none"> Lack of experience- anyone can boat here Visitors don't read charts Visitors don't wear polarized glasses Intentional dredging (airboat operators) Two formerly public ramps went private which is part of what is driving Collier to add new public ramps Now there is increased traffic in some "back routes" to try to circumnavigate slow speed zones Sites don't currently have authority currently to restrict access to certain areas Change in demographics of boaters may increase impacts Lack of channel and shoal marking <ul style="list-style-type: none"> County does manatee signs Coast guard does some markers Some private markers exist Trend is toward shallower draft boats which may have more of an impact because people don't understand limitations (flats fishermen are some of the worst offenders) Boat design is part of issue along with lack of understanding, overconfidence There is a perception that this is an endless resource People try to power out from groundings Education from recreation boat rental companies is spotty Campers are accessing Ten Thousand Islands with inappropriate sized boats, going in grass instead of around There is an increase in the number of boats and the number of access points. 	<ul style="list-style-type: none"> Percent area affected within a hectare annually Species change-need reference sites No. of new scars/ unit of time or area-choose representative plots; need reference sites No. of scars/ length of scars No. of times see visitors run aground during a time period Turbidity produced by boats (not very easy to measure, so not first choice for indicator) Invasive species 	<ul style="list-style-type: none"> 20% affected in high traffic area ≥ 25% dominance shift in grass beds Depends on level of use in area: High use area will allow more impact than lower use area 	<p>Rookery Bay NERR has aerial photos. These are collected annually. Could do a trend analysis. Could also do ground-truthing (transects)</p> <p>Need to compare to reference areas since environmental variables can impact grass too.</p> <p>Could do transects in an area and easily identify new scars</p> <p>Might use some technology to count boats going in some area.</p> <p>Could get back use data from county.</p>	<p>Already unacceptable along the Intracoastal waterway, lower part of Makeithan Bay, area in Johnson Bay for eastern end, Cape Romano shoals, Goodland Bay has some spots</p> <p>Approaching unacceptable on a lot of islands in the Ten Thousand Islands from campers.</p>

Worksheet 2: Selecting Management Tactics

Statement of the problem (from Worksheet 1): Boating impacts to seagrass	
Five Broad Management Strategies To Consider:	
<p>6. Modify the character of visitor use by controlling where and when use occurs, what type of use occurs, and how visitors behave.</p> <p>7. Modify the resource base by increasing resource durability or maintaining/rehabilitating the resource.</p> <p>8. Increase the supply of recreation opportunities.</p> <p>9. Reduce use in the entire area, or in problem areas only.</p> <p>10. Modify visitor attitudes and expectations.</p>	
<p>Below are five categories of management tactics. CHECK THE TACTICS YOU THINK ARE LIKELY TO HELP RESOLVE THE PROBLEM. Refer to <i>specific impacts</i> and <i>root causes</i> when considering which tactics may be effective.</p>	
Management Tactics	Comments
<p>Site Management: The purpose of site management is to direct and channel use, and to maintain desired environmental conditions.</p> <p><input checked="" type="checkbox"/> provide facilities and structures <input type="checkbox"/> use vegetation <input type="checkbox"/> use physical barriers <input type="checkbox"/> increase (decrease), improve (not improve), or eliminate facilities <input type="checkbox"/> strengthen/harden sites <input type="checkbox"/> remove litter and other problems <input type="checkbox"/> close area or facilities</p>	<p>Markers in certain locations</p>
<p>Rationing and Allocation: The purpose of rationing is to regulate use intensity by limiting use of an area, while allocation distributes limited use and resources among competing groups.</p> <p><input type="checkbox"/> limit access using reservations <input type="checkbox"/> limit access using a first-come-first-serve (queuing) system <input type="checkbox"/> limit access using lotteries <input type="checkbox"/> limit access using merit/eligibility system <input checked="" type="checkbox"/> charge fees</p>	<p>No way county will limit access unless there is legislation</p> <p>Aquatic preserve use fee or license</p>
<p>Regulation: The purpose of regulations is to control the nature of visitor use in an area by specifying what is and what is not allowed</p> <p><input checked="" type="checkbox"/> restrict access to specific locations (zoning) <input type="checkbox"/> restrict use/behavior at facilities <input checked="" type="checkbox"/> restrict/prohibit activities restrict/prohibit equipment <input checked="" type="checkbox"/> restrict/prohibit modes of travel <input type="checkbox"/> limit length of stay <input type="checkbox"/> limit group size/stock/pets <input type="checkbox"/> restrict/prohibit use to protect environmental conditions</p>	<ul style="list-style-type: none"> • Non-motorized zone • Direct shuttling of visitors to certain beaches • May have some "sacrificial" sites where visitors are directed • Restrict camping to certain areas (this could enhance aesthetics, recreational experiences in seagrass areas)
<p>Deterrence and Enforcement: The purpose of deterrence and enforcement is to control and eliminate noncompliant visitor behavior by encouraging visitors to act in responsible ways, and making explicit the prohibitions against and the consequences of undesired behavior.</p> <p><input type="checkbox"/> provide signs <input type="checkbox"/> sanction visitors who engaged in noncompliant behavior <input type="checkbox"/> provide personnel and law enforcement</p>	<ul style="list-style-type: none"> • Have talked about getting an officer for the resource – right now they cover the whole county. Their presence deters people from behaving badly • Might want to do education first to build understanding before needing regulation • Hard to get enforcement people to act on this, and hard to get judges to protect – education of judges can be useful • Be careful with signs – they can actually attract people
<p>Visitor Education: The purpose of visitor education is to influence visitor behavior, as well as contribute to positive visitor experiences.</p> <p><input checked="" type="checkbox"/> educate visitors about appropriate behaviors <input type="checkbox"/> educate visitors to alter use patterns <input checked="" type="checkbox"/> guidelines/codes of conduct <input type="checkbox"/> purchaser guidelines <input checked="" type="checkbox"/> certification programs <input checked="" type="checkbox"/> volunteer programs (e.g., bay hosts)</p>	<ul style="list-style-type: none"> • Kiosks at boat ramps, boaters' guides • Education and commenting on permits. "Snowbirds" may be relatively open to want to learn where to go. Education should be tailored to different audiences. • Information at recreation boat rental operators – could do an ethical boater code of conduct for the site – angling ethics – sticker/card makes people feel good. • People need to demonstrate that they went through some education, e.g., new development coming in – new homeowners will have to go through some education; marina is requiring visitors to sign off on behaving certain way in reserve. • Volunteer rangers (Key Wayden Island) • www.rbff.org has education resources. • Pre-scarring and post scarring photos and increase in no. of boat registrations – show this to visitors and they may behave differently • Education should target adults as well as kids. • Carefully choose educational messages.

Two Ways to Prioritize Tactics

1. Selection criteria for management tactics: Below are a number of questions for managers to consider when comparing possible management tactics.

Questions	Tactic #1 _____	Tactic #2 _____	Tactic #3 _____
Does the tactic adequately address the root cause of the visitor use problem?	Yes / Partially/ No	Yes / Partially/ No	Yes / Partially/ No
Do you have the authority to implement this tactic?	Yes / No	Yes / No	Yes / No
Is the tactic direct or indirect in terms of how it operates on visitor behavior?	Direct / Indirect	Direct / Indirect	Direct / Indirect
Does the tactic preserve visitor freedom of choice?	Yes / No	Yes / No	Yes / No
Does the tactic affect a large or small number of visitors?	Small / Large	Small / Large	Small / Large
Are those affected primarily visitors who are responsible for the impact(s) in question?	Yes / No	Yes / No	Yes / No
Does the tactic affect an activity to which visitors attach minimal, moderate, or great importance?	Minimal / Moderate / Great	Minimal / Moderate / Great	Minimal / Moderate / Great
Is visitor resistance to the management action likely or unlikely?	Unlikely / Likely	Unlikely / Likely	Unlikely / Likely
Does the tactic affect visitors offsite while planning their trip? Onsite while engaged in their recreational experience? Both?	Offsite / Onsite / Both	Offsite / Onsite / Both	Offsite / Onsite / Both
Consider the costs to managers in terms of tactic implementation and administration, including facility construction, operation, and maintenance, staff workload, and communication and enforcement costs. Are the costs feasible/affordable?	Yes / No	Yes / No	Yes / No
Is the tactic likely to be effective at solving the visitor use problem in question?	Yes / No	Yes / No	Yes / No
Is the tactic one that avoids, or minimizes, creating new problems?	Yes / No	Yes / No	Yes / No
Can the tactic be implemented without environmental regulatory requirements (e.g., NEPA)?	Yes / No	Yes / No	Yes / No

2. Effort-Impact Grid: Consider the **impact** specific management tactics will have on the problem (e.g., minor vs. major improvement) and the **effort** necessary to implement the management tactic (e.g., easy vs. difficult; inexpensive vs. expensive; quick vs. time-consuming; one-time vs. ongoing). Indicate where potential tactics fall in the grid.

~EFFORT~
(e.g., time, cost, expertise to implement)

	Low	Medium	High
~IMPACT~ (e.g., improvement in conditions)	High		
Low			

Worksheet 3: Management Tactics Implementation Plan (Who is Going to Do What? By When? Using What Resources?)

Statement of the problem (from Worksheet 1): _____
 Management tactic selected to address impact (from Worksheet 2): _____

Specific action(s)	Person responsible	Resources	Time frame/frequency to implement the action	Comments
1.				
2.				
3.				
4.				

Worksheet 1: Problem Specification

Statement of the Problem

Altered behavior of animals and altered habitat structures at beaches.

What are the specific impacts related to the problem?	Describe root cause(s) of impacts.	Indicator What can be measured to gauge level of impact? (Indicate which impact(s) are being monitored.)	Standard Threshold where impact becomes unacceptable?	Do you know existing impact based on indicator? If YES, describe. If NO, how would you find out?	Estimate level of existing impact... <input type="checkbox"/> acceptable <input type="checkbox"/> approaching unacceptable <input type="checkbox"/> unacceptable
<ul style="list-style-type: none"> Decreased egg viability of nesting birds due to flushing Decreased fecundity due to flushing Decreased egg viability and fecundity in turtles due to visitors Decreased fitness in birds, feeding behavior is impacted Decreased fitness of turtles Dogs arriving on visitor boats eat turtle and bird eggs Soil disturbance and compaction Dune erosion, loss of dune stabilization <ul style="list-style-type: none"> For firewood To clear space for camping Increased nutrients from human waste Turtles disoriented by lights from humans Egg poaching 	<ul style="list-style-type: none"> Bringing trash increases raccoons, which increases predation Human and dog interaction with animals Day boaters Ecotourism operators Campers Camping sites not clear, visitors don't know where they are Lack of public access to beaches in Collier Co. Lack of education and environmental ethic Lack of knowledge that they are in a protected area No facilities (bathrooms, trash cans) Lack of alternative habitat Lack of dog beaches Lack of places to drink beer Lack of enforcement/regulation re: alcohol, dogs, (illegal to bring alcohol on the reserve, to have a dog on shell island – not enforced) (NWR doesn't prohibit alcohol – just disorderly conduct) NWR wildlife viewers/wilderness experience visitors may unintentionally impact Visitors follow trails, exotic plant removal people made. 	<ul style="list-style-type: none"> Fecundity (but have confounding variables). This is difficult to measure. Turtles: total number of nests and number of false crawls in a season (but all have compounding variables) Flushing incidents – this will be labor intensive to monitor Footprints/pawprints in a restricted area No. of nests destroyed within a roped off area No. of nests poached per site per season (for turtles) No. of cut trees at high-use camping areas during Dec-March (new cuts to native trees) 	<ul style="list-style-type: none"> ≥ 5 trails per week through designated nesting area; then close nesting area or dune area 10 well-established social trails per linear mile 		<p>The level of acceptable impact is site specific.</p> <p>Key Island has bird impacts</p> <p>Social trails are unacceptable in some areas (Key Island) but are acceptable in other areas (Cape Romano might be approaching limit in some places)</p> <p>Panther, LuLu, Dismal are all approaching acceptable limits</p>

Worksheet 2: Selecting Management Tactics

Statement of the problem (from Worksheet 1): Altered behavior of animals and altered habitat structures at beaches	
Five Broad Management Strategies To Consider:	
<ol style="list-style-type: none"> 1. Modify the character of visitor use by controlling where and when use occurs, what type of use occurs, and how visitors behave. 2. Modify the resource base by increasing resource durability or maintaining / rehabilitating the resource. 3. Increase the supply of recreation opportunities. 4. Reduce use in the entire area, or in problem areas only. 5. Modify visitor attitudes and expectations. 	
<p>Below are five categories of management tactics. CHECK THE TACTICS YOU THINK ARE LIKELY TO HELP RESOLVE THE PROBLEM. Refer to <i>specific impacts</i> and <i>root causes</i> when considering which tactics may be effective.</p>	
Management Tactics	Comments
<p>Site Management: The purpose of site management is to direct and channel use, and to maintain desired environmental conditions.</p> <p><input checked="" type="checkbox"/> provide facilities and structures <input checked="" type="checkbox"/> use vegetation <input type="checkbox"/> use physical barriers <input type="checkbox"/> increase (decrease), improve (not improve), or eliminate facilities <input type="checkbox"/> strengthen/harden sites <input type="checkbox"/> remove litter and other problems <input checked="" type="checkbox"/> close area or facilities</p>	<p>Provide trails to steer visitors toward one dune cross-over</p> <p>Block social trails</p> <p>Close areas after 2 poaching incidents (turtle eggs)</p>
<p>Rationing and Allocation: The purpose of rationing is to regulate use intensity by limiting use of an area, while allocation distributes limited use and resources among competing groups.</p> <p><input checked="" type="checkbox"/> limit access using reservations <input type="checkbox"/> limit access using a first-come-first-serve (queuing) system <input type="checkbox"/> limit access using lotteries <input type="checkbox"/> limit access using merit/eligibility system <input type="checkbox"/> charge fees</p>	<p>Establish permit system for camping in refuge</p>
<p>Regulation: The purpose of regulations is to control the nature of visitor use in an area by specifying what is and what is not allowed</p> <p><input type="checkbox"/> restrict access to specific locations (zoning) <input type="checkbox"/> restrict use/behavior at facilities <input type="checkbox"/> restrict/prohibit activities restrict/prohibit equipment <input type="checkbox"/> restrict/prohibit modes of travel <input type="checkbox"/> limit length of stay <input type="checkbox"/> limit group size/stock/pets <input checked="" type="checkbox"/> restrict/prohibit use to protect environmental conditions</p>	
<p>Deterrence and Enforcement: The purpose of deterrence and enforcement is to control and eliminate noncompliant visitor behavior by encouraging visitors to act in responsible ways, and making explicit the prohibitions against and the consequences of undesired behavior.</p> <p><input checked="" type="checkbox"/> provide signs <input checked="" type="checkbox"/> sanction visitors who engaged in noncompliant behavior <input checked="" type="checkbox"/> provide personnel and law enforcement</p>	<p>Provide signs in bird nesting areas</p> <p>Cutting vegetation already prohibited</p>
<p>Visitor Education: The purpose of visitor education is to influence visitor behavior, as well as contribute to positive visitor experiences.</p> <p><input checked="" type="checkbox"/> educate visitors about appropriate behaviors <input checked="" type="checkbox"/> educate visitors to alter use patterns <input type="checkbox"/> guidelines/ codes of conduct <input type="checkbox"/> purchaser guidelines <input type="checkbox"/> certification programs <input type="checkbox"/> volunteer programs (e.g., bay hosts)</p>	

Two Ways to Prioritize Tactics

1. Selection criteria for management tactics: Below are a number of questions for managers to consider when comparing possible management tactics.

Questions	Tactic		
	#1 _____	#2 _____	#3 _____
Does the tactic adequately address the root cause of the visitor use problem?	Yes / Partially/ No	Yes / Partially/ No	Yes / Partially/ No
Do you have the authority to implement this tactic?	Yes / No	Yes / No	Yes / No
Is the tactic direct or indirect in terms of how it operates on visitor behavior?	Direct / Indirect	Direct / Indirect	Direct / Indirect
Does the tactic preserve visitor freedom of choice?	Yes / No	Yes / No	Yes / No
Does the tactic affect a large or small number of visitors?	Small / Large	Small / Large	Small / Large
Are those affected primarily visitors who are responsible for the impact(s) in question?	Yes / No	Yes / No	Yes / No
Does the tactic affect an activity to which visitors attach minimal, moderate, or great importance?	Minimal / Moderate / Great	Minimal / Moderate / Great	Minimal / Moderate / Great
Is visitor resistance to the management action likely or unlikely?	Unlikely / Likely	Unlikely / Likely	Unlikely / Likely
Does the tactic affect visitors offsite while planning their trip? Onsite while engaged in their recreational experience? Both?	Offsite / Onsite / Both	Offsite / Onsite / Both	Offsite / Onsite / Both
Consider the costs to managers in terms of tactic implementation and administration, including facility construction, operation, and maintenance, staff workload, and communication and enforcement costs. Are the costs feasible/affordable?	Yes / No	Yes / No	Yes / No
Is the tactic likely to be effective at solving the visitor use problem in question?	Yes / No	Yes / No	Yes / No
Is the tactic one that avoids, or minimizes, creating new problems?	Yes / No	Yes / No	Yes / No
Can the tactic be implemented without environmental regulatory requirements (e.g., NEPA)?	Yes / No	Yes / No	Yes / No

2. Effort-Impact Grid: Consider the *impact* specific management tactics will have on the problem (e.g., minor vs. major improvement) and the *effort* necessary to implement the management tactic (e.g., easy vs. difficult; inexpensive vs. expensive; quick vs. time-consuming; one-time vs. ongoing). Indicate where potential tactics fall in the grid.

~EFFORT~
(e.g., time, cost, expertise to implement)

	Low	Medium	High	
~IMPACT~ (e.g., improvement in conditions)	High			
	Medium			
	Low			

Worksheet 3: Management Tactics Implementation Plan (Who Is Going to Do What? By When? Using What Resources?)

Statement of the problem (from Worksheet 1): _____
 Management tactic selected to address impact (from Worksheet 2): _____

Specific action(s)	Person responsible	Resources	Time frame/frequency to implement the action	Comments
1.				
2.				
3.				
4.				

**Section 5: Visitor Use
Management Resources
(Articles, Books, Web Sites, etc.)**

Visitor Use Management Resources

Anderson, D.H., D.W. Lime, and T.L. Wang. 1998. *Maintaining the Quality of Park Resources and Visitor Experiences: A Handbook for Managers*. University of Minnesota Extension Service, Tourism Center. St. Paul, Minnesota.

This is a handbook for recreation and resource managers that details how to identify impacts, how to set acceptable standards for impacts, and how to identify a range of strategies to help manage for these impacts. This handbook also includes model worksheets for managers to help document existing and desired future conditions of a site, and the management strategies that can be used to achieve the desired future conditions.

Bristow, R.S. 1998. "Volunteer-Based Recreation land Management." *Parks and Recreation*. Volume 33, Number 8. Pages 70 to 77.

Being that resource managers in national parks are often forced to concentrate their monitoring efforts on high-use areas, the author examined the partnership between the National Park Service (NPS) and the Appalachian Trail (AT) Conference to develop an effective monitoring model managed by volunteers. These volunteers act as the eyes and ears of the agency, reporting environmental changes in the landscape and unwanted uses of the trails, including timber theft, overuse, and dumping. Inspections usually consist of hiking a portion of a trail and creating a monitoring report complete with photographs, observations, and other supporting evidence. This type of citizen partnership serves to strengthen the bond between the public and the NPS, providing the opportunity for those who are involved to understand the needs and issues related to our natural resources. Because a new national park is being proposed in central Maine, which the AT runs through, extending citizen partnership efforts in the region could provide many benefits.

Clark, R.N., and G.H. Stankey. 1979. "The Recreation Opportunity Spectrum: A Framework for Planning, Management, and Research." U.S. Department of Agriculture, Forest Service. Pacific Northwest Forest and Range Experiment Station. General Technical Report PNW-98.

This paper illustrates and explains six physical, biological, social, and managerial factors that can be employed to manage for recreation. the recommendations within this framework are focused on wilderness areas in the western U.S.; however, these guidelines can be modified to better fit a particular agency's desired land use management.

Cole, D.N. 1989. *Wilderness Campsite Monitoring Methods: A Sourcebook*. U.S. Department of Agriculture, Forest Service. General Technical Report INT-259.

Report provides various techniques for campsite monitoring, as well as provides examples used within past studies in various campsite areas. Some of the methods employed in these studies are transferable to overall site-monitoring techniques.

Visitor Use Management in Marine Protected Areas – Ten Thousand Islands NWR 2005

Cole, D.N., R. Manning, and D. Lime. 2005. "Addressing Visitor Capacity on Parks and Rivers." *Parks and Recreation*.

This paper was written in response to the Hass essay published in *Parks and Recreation* in September of 2004. The authors of this brief essay agree with many of the issues raised by Haas and offer their support, as well as other view points on this issue.

Driver, B.L., P.J. Brown, G.H. Stankey, and T.G. Gregoire. 1987. "The ROS Planning System: Evolution, Basic Concepts, and Research Needed." *Leisure Sciences*. Volume 9. Pages 201 to 212.

Hammitt, W.E., and D.N. Cole. 1998. *Wildland Recreation: Ecology and Management*. Second Edition. John Wiley and Sons, Inc.: New York.

This book is a guide for individuals managing for ecological impacts that result from recreational activities within natural areas. Individual areas such as impacts to soil, impacts to wildlife, impacts to vegetation, and so on are covered in detail, as well as management strategies.

Haas, G.E. 2004. "On the Water Front: Vital Judicial Ruling Addresses Visitor Capacity." *Parks and Recreation*. Volume 39, Number 9. Pages 106 to 112.

This essay addresses the court decision on Merced River in Yellowstone, in which a judge ruled that the National Park Service plan inadequately stated numbers for visitor capacity, and the implications that this ruling can cause for any agency responsible for managing recreation. It further discusses how and why recreation management plans are interpreted differently by different groups of individuals and how this also leads to implications in planning and managing recreation in natural areas.

Higginbottom, K., R. Green, and C. Northrope. 2003. "A Framework for Managing the Negative Impacts of Wildlife Tourism on Wildlife." *Human Dimensions of Wildlife*. Volume 8, Number 1. Pages 1 to 24.

Given that the effective management of negative impacts resulting from wildlife tourism is often deficient, the authors developed a simple framework of guidelines for park managers to follow to enhance the human dimension of wildlife management. The guidelines addressed management actions concerning visitors' behavior, operators' involvement in conservation efforts, wildlife behavior, and economic instruments. Additional frameworks were also provided for the monitoring of habitats related to wildlife use, and the requirements and challenges associated with successfully implementing monitoring programs, including the inherent difficulty in obtaining the substantial amount of resources needed to carry out such a program. Because one of the key attractions for national park visitors in the ecotourism development plan is wildlife viewing, park managers will need to implement an effective management plan for the human impacts on wildlife to ensure the quality of such experiences.

Hull, R.B., W.P. Stewart, and Y.K. Yi. 1992. "Experience Patterns: Capturing the Dynamic Nature of a Recreation Experience." *Journal of Leisure Research*. Volume 24, Number 3. Pages 240 to 252.

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The purpose of this study was to further examine the recreation experience of hikers to quantify these experiences into measurable groups that could be formed into management strategies.

Jennings, S. 2004. "Landscape Sensitivity and Tourism Development." *Journal of Sustainable Tourism*. Volume 12, Number 4. Pages 271 to 288.

Researched within this article was the idea that carrying capacity does not provide the best measure with which to evaluate the relationship between the natural environment and tourism. The author suggests that landscape sensitivity is best defined through a geomorphologic perspective in terms of environmental thresholds, lag time, and dynamic metastable equilibrium, the sudden shifting of the landscape between two stable states perceived through long-term observation. This innovative approach is recommended to sustainable tourism managers as being extremely valuable in response to increasing global climate change. A better understanding of evaluating how changing landscapes respond to environmental impacts can aid in the development of ecotourism plans for central Maine.

Jim, C.Y. 1989. "Visitor Management in Recreation." *Environmental Conservation*. Volume 16, Number 1. Pages 19 to 32.

This reading provides a brief summary of key management issues that recreation managers are facing. Mainly, it discusses the preservation and conservation of natural resources, while still providing enjoyment of the resource to visitors. He provides three management tactics along with an explanation of each technique, specific examples, and his opinion on how to implement these techniques without diminishing the visitors' experience. This article is useful for those with a limited knowledge of recreation management techniques.

Kuentzel, W.F., and T.A. Heberlein. 2003. "More Visitors, Less Crowding: Change and Stability of Norms over Time at the Apostle Islands." *Journal of Leisure Research*. Volume 35, Number 4: Pages 349 to 379.

This study employs a longitudinal design, as opposed to a cross-sectional design to examine visitor composition and changes of perceptions over time.

Kyle, G., K. Bricker, and A. Graefe. 2004. "An Examination of Recreationists' Relationships with Activities and Settings." *Leisure Sciences* Volume 26. Pages 123 to 142.

This paper examines the concept of "place attachment" within three different user groups (hikers, kayakers, and anglers) within their respective settings. Results show that the effect of involvement on place attachment differed among these groups.

Lime, D.W., D. H. Anderson, and T.L. Wang. 2000. "A Decision Process to Maintain the Quality of Recreation Resources and Visitor Experiences." In *Human Dimensions of Natural Resource Management: Emerging Issues and Practical Applications*, D. C. Fulton, K.C. Nelson, D.H. Anderson, and D.W. Lime. Cooperative Park Studies Program, University of Minnesota, Department of Forest Resources: St. Paul, MN.

This paper discusses the framework for assessing unacceptable impacts that result from visitor use in natural areas, as well as brings attention to the publication, *Maintaining the*

Visitor Use Management in Marine Protected Areas – Ten Thousand Islands NWR 2005

Quality of Park Resources and Visitor Experiences: A Handbook for Managers (see Anderson, Hill, and Wang 1998).

Lynn, N.A. and R.D. Brown. 2003. "Effects of Recreational Use Impacts on Hiking Experiences in Natural Areas." *Landscape and Urban Planning*. Volume 64, Numbers 1 and 2. Pages 77 to 87.

Presented in this article are the authors' results from a survey of hikers conducted in Toronto, Canada, which identified recreational use impacts responsible for negatively affecting their wilderness experiences. Surveyed impacts of overuse included damage to trees and plants, litter, trail erosion, and improperly managed campfire sites, which all contributed to the hikers' diminished sense of naturalness, remoteness, art factualism, and solitude. Given that there was found to be a high correlation between the hikers' experience and recreational impacts, a better understanding of how to manage for user benefits would serve to enhance ecotourism development, and generate support for the implementation of "Leave No Trace" principles in areas where hiking along high-use backcountry trails is expected, as in central Maine.

Manning, R.E. 2000. "Defining and Establishing Indicators and Standards in Quality." In *Human Dimensions of Natural Resource Management: Emerging Issues and Practical Applications*, D. C. Fulton, K.C. Nelson, D.H. Anderson, and D.W. Lime. Cooperative Park Studies Program, University of Minnesota, Department of Forest Resources: St. Paul, MN.

This paper describes the purpose and concept of indicators and their implementation in natural areas.

Sem, J. and C.A. Vogt. 1997. "Demarketing as a New Communication Tool for Managing Public Land Use." *Trends*. Volume 34, Number 4. Pages 21 to 25.

Discusses the use of "demarketing" to limit the number of visitors to specific natural areas to help in managing impacts from recreational activities.

Stankley, G.H., D.N. Cole, R.C. Lucas, M.E. Petersen, and S.S. Frissell. 1985. *The Limits of Acceptable Change for Wilderness Planning*. U.S. Department of Agriculture, Forest Service. General Technical Report INT-176. Intermountain Forest and Range Experiment Station: Ogden, UT.

This handbook outlines the need for and implementation of the limits of acceptable change (LAC) framework, which is widely used by the U.S. Forest Service and other federal agencies.

Stein, T.V., and J.K. Clark. "Taking a Benefits-Based Approach to Understanding, Planning, and Managing Nature-Based Recreation in Florida."

This paper discusses the benefits-based management framework within the context of a study that was conducted in five natural areas in southwest Florida. More specifically, this paper examines the differences between motivations of local residents and tourists within these five areas using a behavioral approach to recreation, and offers management strategies that would aid in all visitors (residents and tourists) achieving their desired benefits.

Visitor Use Management in Marine Protected Areas – Ten Thousand Islands NWR 2005

Tarrant, M.A., and E. Smith. No date. *Recreation Visitor Preferences for and Perceptions of Outdoor Recreation Setting Attributes*. University of Georgia and H. Ken Cordell, U.S. Forest Service: Athens, GA.

This paper presents the findings from a U.S. Forest Service-administered comprehensive national survey conducted by the southern research station between 1990 and 1994. Specifically, the survey examined recreation visitor preferences for and perceptions of outdoor recreation setting attributes. Conclusions and management implications are discussed; however, solutions for the implications raised are not thoroughly discussed.

U.S. Department of the Interior, National Park Service. 1997. *Visitor Experience and Resource Protection Framework: A Handbook for Planners and Managers*. U.S. Department of the Interior, Denver Service Center.

the Visitor Experience and Resource Protection Framework (VERP) was created by the National Park Service and is a combination of Recreation Opportunity Spectrum and limits of acceptable change (LAC). This handbook provides a history, overview, and a detailed description and implementation of each of the nine sections of the framework.

Veloso-Gomes, F., and F. Taveira-Pinto. 2003. "Portuguese Coastal Zones and New Coastal Management Plans." *Journal of Coastal Conservation*. Volume 9. Pages 25 to 34.

Discusses management implications along the coastal zones of Portugal, as well as gives an overview of several coastal management plans now in practice.

Wagar, J.A. 1965. "Quality in Outdoor Recreation." Presented at the Outdoor Recreation Seminar, Montana State University, Bozeman.

The author poses the question of quality in outdoor recreation being a subjective matter, and then approaches this question by 1) building a framework that is meant to help guide managers in providing quality recreation experiences from the perspective of the user, and 2) showing how this framework is applicable to other land management decisions.

Witzum, E.R., and D.A. Stow. 2004. "Analyzing Direct Impacts of Recreation Activity on Coastal Sage Scrub Habitat with Very High Resolution Multi-Spectral Imagery." *International Journal of Remote Sensing*. Volume 25, Number 17. Pages 3,477 to 3,496.

DRAFT

Keewaydin Island Special Area Management Plan

Rookery Bay National Estuarine Research Reserve, Office of Coastal and Aquatic Managed Areas

Florida Department of Environmental Protection

July 2010

Background

Keewaydin Island is an 8-mile long un-bridged barrier island located on the Southwest Gulf coast of Florida. The State of Florida's ownership of lands on the island currently includes 1,217 acres of the 1,417-acre island, or approximately 86% of the total acreage. The remaining 199 acres on the island are in private ownership (see Figure 1). The State's management of the Island's public lands is implemented through the 110,000-acre Rookery Bay National Estuarine Research Reserve (RBNERR), and guided by a Management Plan approved by the state and federal government.

Keewaydin Island is a unique natural wilderness area that includes nine important native plant communities (see Figure 2) that provide essential habitats and nesting grounds for protected species (e.g. loggerhead sea turtles, least terns, snowy plovers, gopher tortoises, etc.) and refuge for native wildlife. The Island is also a significant economic asset to Southwest Florida; tens of thousands of boaters visit the Island each year to enjoy the pristine Gulf beaches and natural landscapes. Private landowners use the Island seasonally and throughout the year as a permanent residence or vacation home.

As the lead management agency for RBNERR, the Florida Department of Environmental Protection has made significant progress in ensuring long-term protection of the natural resources of the Island, including land acquisitions totaling over \$15 million, restoration of native plant communities through extensive non-native plant eradication efforts, monitoring and protection of sea turtle and shorebird nesting areas, and ongoing management of public access and use. It is estimated that the State's current contribution to the management of the Island is approximately \$150,000 per year in staff time, fuel, equipment and related expenses.

Vision and Priority Objectives

The following priority objectives have been identified by RBNERR, working in partnership with members of the Reserve's Advisory Council. Outcomes of these actions will contribute to the long-term vision for the Island established by the Reserve and endorsed by the Advisory Council:

Protect and preserve the natural resources and wildlife on the Island and provide for access and use by the public compatible with sustaining a wilderness area.

For the purposes of this Plan, RBNERR defines a "Wilderness Area" as:

Wilderness is a natural environment that has not been significantly modified by human activity. It may also be defined as: "The most intact, undisturbed wild natural areas left on our planet - those last truly wild places that humans do not control and have not developed with roads, pipelines or other industrial infrastructure."^[1] Wilderness areas can be found in preserves, estates, farms, conservation preserves, ranches, National Forests, National Parks and in urban areas along rivers, gulches or otherwise undeveloped areas. These areas are considered important for the survival of certain species, biodiversity, ecological studies, conservation, solitude, and recreation. Wilderness is deeply valued for cultural, spiritual, moral, and aesthetic reasons. Some nature writers believe wilderness areas are vital for the human spirit and creativity.^[2]

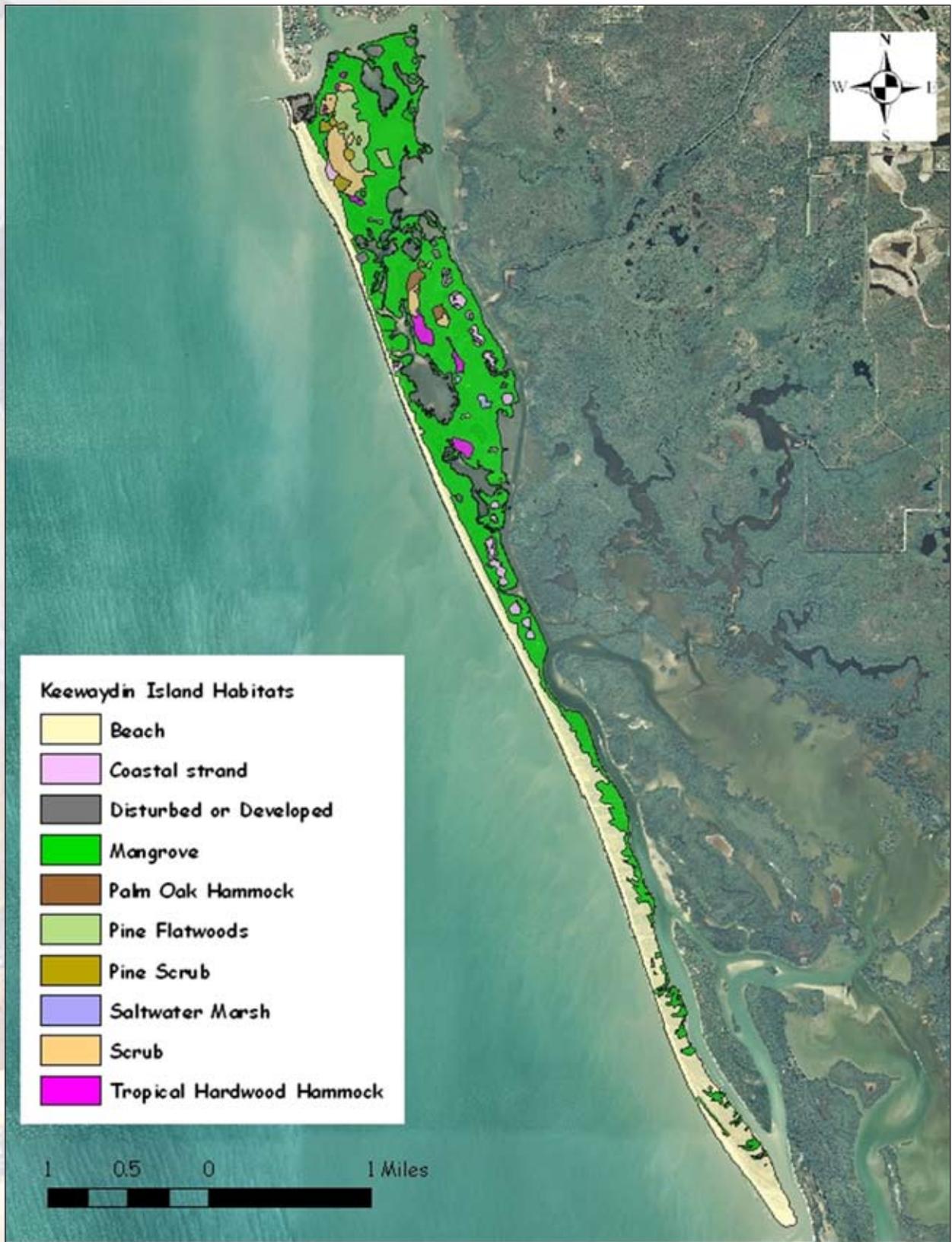
All actions conducted under the terms of this Special Area Management Plan (SAMP) are consistent with the goals and objectives of the RBNERR Management Plan.

Each objective targets a priority issue and describes intended actions requiring a commitment of staff and operational funds to achieve a successful outcome.

1. **Conduct routine patrols** along the length of the Island, to help ensure enforcement of existing federal, state, and local laws regarding the protection of natural resources and the safety of visitors and landowners. Coordinate with Florida Fish and Wildlife Commission (FWC), Collier County Sheriff's Office, and other local law enforcement agencies to facilitate patrols.
2. **Work in cooperation with local government to establish local ordinances** to help strengthen existing authorities to address safety and wildlife issues such as unleashed pets, destruction of wetlands and protected resources, and increased authority to regulate public use activities such as camping and campfires.
3. **Conduct periodic eradication of non-native plants and animals on public lands on the Island and work in cooperation with private landowners to remove non-native invasive plants and animals from private lands on the Island** to preserve native biodiversity of wildlife and plant communities and to provide refuge for native wildlife.
4. **Conduct Team OCEAN outreach and education programs for boaters, visitors and private landowners** designed to promote the use of Leave No Trace principles. This cooperative program includes partners from

both public and private sector, and engages trained volunteers to assist in a range of important stewardship actions on the Island (e.g. posting of informational signs, beach clean-up events, etc.) See RBNERR Management Plan, Chapter 6, for details of Team Ocean.

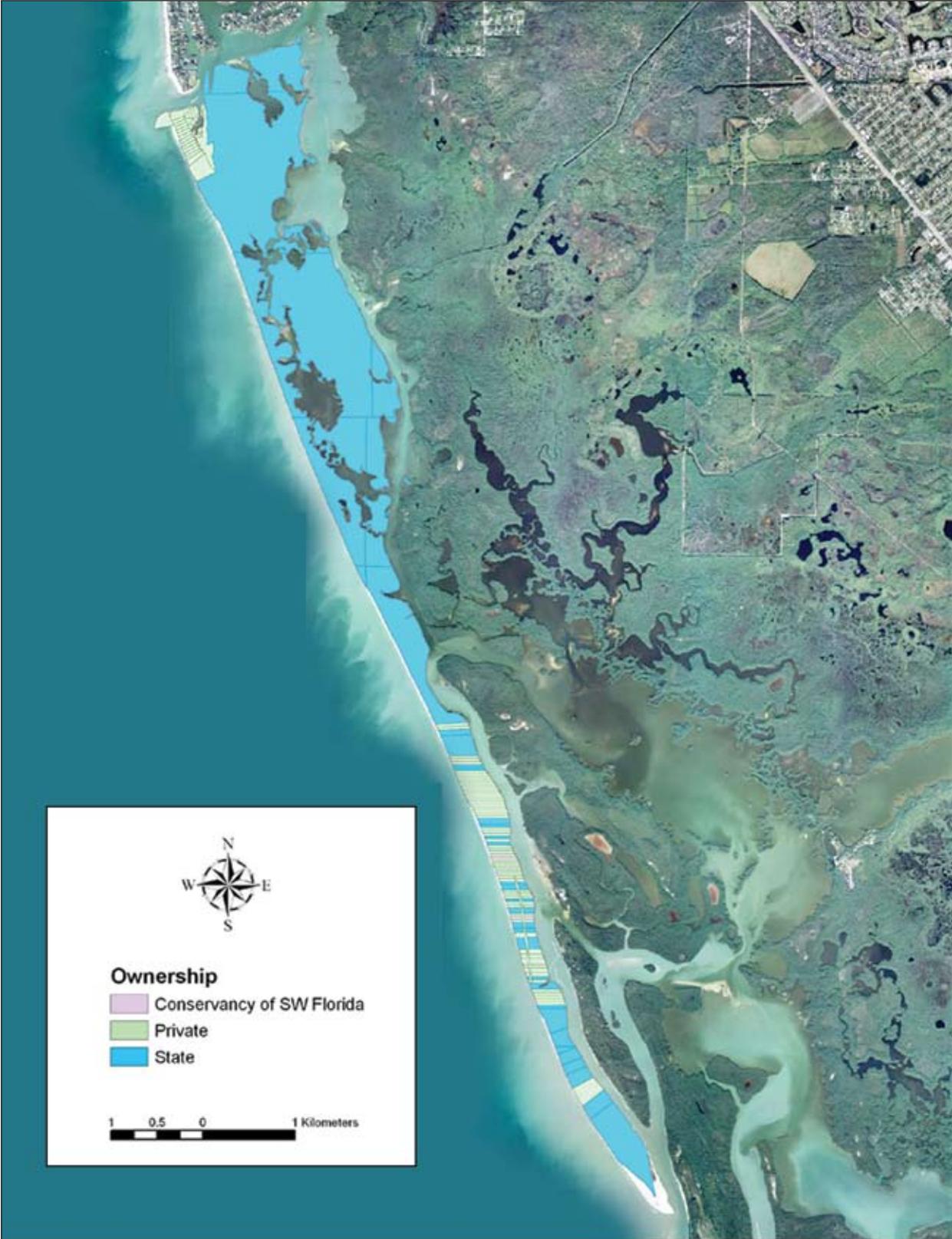
5. **Conduct seasonal monitoring and protection of sea turtle and shorebird nesting areas** as needed. This work will be conducted in partnership with the Conservancy of Southwest Florida, Florida Fish and Wildlife Commission, City of Naples, and other agencies and organizations.
6. **Manage the Island to sustain natural conditions as shoreline changes occur** through the physical processes of storms and currents. RBNERR will work in cooperation with local government and FDEP Office of Beaches and Coastal Systems to prohibit the introduction of beach re-nourishment, erosion control structures and/or tidal pass dredging on or adjacent to public lands on Keewaydin Island, with the exception of Gordon Pass (currently under a maintenance dredging plan conducted by the U.S. Army Corps of Engineers).
7. **Conduct education and outreach programs reaching private landowners** designed to increase awareness of the Island's unique natural features and discourage unauthorized land use that contributes to the degradation of the Island's wildlife and habitats. In general, code enforcement efforts conducted by local government will be preceded by education to ensure that landowners are aware of the land use codes applicable to the Island.
8. **The Friends of Rookery Bay, Inc. will maintain the Keewaydin Island Fund**, designed to provide funding support from private and public sector interests, to assist RBNERR in the implementation of actions described in the Keewaydin Island SAMP. See Appendix 1 for details of the Keewaydin Island Fund.
9. **RBNERR will continue to seek opportunities for land acquisition to increase public ownership on the Island.** This effort will involve cooperative partnerships with private landowners, local government, non-profit organizations, and federal and state agencies; alternative strategies will include seeking donations, lease or management agreements with landowners to help secure a higher level of control on remaining lands on the Island.
10. **RBNERR staff will continue to conduct review and provide comments to regulatory agencies and local governments associated with applications for proposed development or land use changes on private lands on the Island.** Staff will also coordinate with appropriate regulatory personnel on issues regarding proposed commercial activities on the Island, including potential tourism and food services.



2007 Imagery Provided By Collier County Property Appraiser
 Map Produced By Rookery Bay NERR
 For Illustrative Purposes Only



Keewaydin Island Habitats



2004 Imagery Copyright Collier County Property Appraiser
Parcel Data Provided By Southern Mapping Technology, Inc
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Keewaydin Island Ownership

Public Involvement

C.1 / Rookery Bay Advisory Council

The following appendices contain information about who served on the Rookery Bay Advisory Council, when meetings were held, copies of the public advertisements and information on obtaining meeting summaries.

C.1.1 / List of members and their affiliations

Name	Affiliate	Name	Affiliate
Mayor Bill Barnett	<i>City of Naples</i>	Ben Nottingham	<i>USFWS</i>
Mike Bauer	<i>City of Naples</i>	Mike Parsons	<i>FGCU</i>
Clay Brooker	<i>Friends of Rookery Bay</i>	Frank Perucci	<i>Marine Industries</i>
Brad Cornell	<i>Audubon Society</i>	Nancy Richie	<i>City of Marco</i>
Donna Fiala	<i>Collier County</i>	Darin Sellers	<i>Faux Realty</i>
Bryan Fluech	<i>Sea Grant</i>	Clarence Tears	<i>SFWMD</i>
Jayson Horadam	<i>FWC</i>	Greg Tolley	<i>FGCU</i>
Joyce Mazourek	<i>USFWS</i>	J.P. Van Dongen	<i>Keewaydin HOA</i>
Andrew McElwaine	<i>The Conservancy</i>	Frank Van Essen	<i>Mosquito Control</i>
Ananta Nath	<i>SFWMD</i>	Curt Witthoff	<i>Collier County Schools</i>

may be provided at the informational meeting or sent by mail to: Christine McDonald, Public Information Officer, 5007 N. E. 39th Avenue, Gainesville, FL 32609 or via the web at <http://www.dot.state.fl.us/statematerialsoffice/administration/resources/library/issues-trends/aggtaskforce/contactus.html>.

A copy of the agenda may be obtained by contacting: Christine McDonald, Public Information Officer at (352)955-6624 or by e-mail at christine.mcdonald@dot.state.fl.us.

Pursuant to the provisions of the Americans with Disabilities Act, any person requiring special accommodations to participate in this workshop/meeting is asked to advise the agency at least 7 days before the workshop/meeting by contacting: Christine McDonald, Public Information Officer at (352)955-6624 or by e-mail at christine.mcdonald@dot.state.fl.us. If you are hearing or speech impaired, please contact the agency using the Florida Relay Service, 1(800)955-8771 (TDD) or 1(800)955-8770 (Voice).

For more information, you may contact: Christine McDonald, Public Information Officer at (352)955-6624 or by e-mail at christine.mcdonald@dot.state.fl.us.

The **Commercial Motor Vehicle Review Board** announces a public meeting to which all persons are invited.

DATE AND TIME: January 10, 2008, 8:30 a.m.

PLACE: Florida Department of Transportation, Burns Building, Auditorium, 605 Suwannee Street, Tallahassee, Florida

GENERAL SUBJECT MATTER TO BE CONSIDERED: This is a monthly meeting of the Commercial Motor Vehicle Review Board for the purpose of reviewing penalties imposed upon any vehicle or person under the provisions of Chapter 316, Florida Statutes, relating to weights imposed on the highway by the axles and wheels of motor vehicles, to special fuel and motor fuel tax compliance, or to violations of safety regulations.

Any person aggrieved by the imposition of a civil penalty pursuant to Sections 316.3025 or 316.550, Florida Statutes, may apply to the Commercial Motor Vehicle Review Board for a modification, cancellation, or revocation of the penalty.

A copy of the agenda may be obtained by contacting: Christine Jones, Executive Assistant, Commercial Motor Vehicle Review Board, 325 John Knox Rd., Bldg. K, Tallahassee, FL 32303.

The **Survey Champions Team** announces a public meeting to which all persons are invited.

DATE AND TIME: January 15, 2008, 9:00 a.m.

PLACE: Department of Transportation, Haydon Burns Building, Executive Conference Room, Fifth Floor, 605 Suwannee Street, Tallahassee, Florida

PLACE: A Video Bridge telephone number for those who will dial in is: Local (850)414-4978, Toll-Free 1(866)374-3368, ext. 4978

GENERAL SUBJECT MATTER TO BE CONSIDERED: Survey Champions Meeting to review recommendations adopted by the Executive Board and select team members for sub-team that will work with a consultant to design a new survey instrument.

A copy of the agenda may be obtained by contacting: Larry Ferguson, III, CPM, Department of Transportation Performance Management Office, (850)414-4382, e-mail lawrence.ferguson@dot.state.fl.us.

Pursuant to the provisions of the Americans with Disabilities Act, any person requiring special accommodations to participate in this workshop/meeting is asked to advise the agency at least 48 hours before the workshop/meeting by contacting: Larry Ferguson, III, CPM, Department of Transportation Performance Management Office, (850)414-4382, e-mail: lawrence.ferguson@dot.state.fl.us. If you are hearing or speech impaired, please contact the agency using the Florida Relay Service, 1(800)955-8771 (TDD) or 1(800)955-8770 (Voice).

For more information, you may contact: Larry Ferguson, III, CPM, Department of Transportation, Performance Management Office, (850)414-4382, e-mail lawrence.ferguson@dot.state.fl.us.

BOARD OF TRUSTEES OF THE INTERNAL IMPROVEMENT TRUST FUND

Notices for the Board of Trustees of the Internal Improvement Trust Fund between December 28, 2001 and June 30, 2006, go to <http://www.dep.state.fl.us/> under the link or button titled "Official Notices."

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

DATE AND TIME: Thursday, January 24, 2008, 11:00 a.m.

PLACE: Rookery Bay Reserve, 300 Tower Road, Naples, FL 34113

GENERAL SUBJECT MATTER TO BE CONSIDERED: The purpose is for the members of the Advisory Committee to discuss the revision of the Rookery Bay National Estuarine Research Reserve Management Plan.

A copy of the agenda may be obtained by contacting Brenda Varnes at (239)417-6310.

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

(850)413-9970. 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).

The Training Task Force to the **State Emergency Response Commission for Hazardous Materials** announces a telephone conference call to which all persons are invited.

DATE AND TIME: March 20, 2008, 10:00 a.m.

PLACE: Sadowski Building, Conference Room 320Q, 2555 Shumard Oak Boulevard, Tallahassee, Florida 32399

GENERAL SUBJECT MATTER TO BE CONSIDERED: To discuss projects listed on their Strategic Initiatives Work Plan.

Those interested in participating in the conference call, please contact: Sheri Powers, Florida Division of Emergency Management at (850)413-9925, to obtain the conference call number.

A copy of the agenda may be obtained by contacting: Sheri Powers, State Emergency Response Commission, 2555 Shumard Oak Boulevard, Tallahassee, Florida 32399-2100, (850)413-9970.

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. The State Emergency Response Commission at (850)413-9970. If you are hearing or speech impaired, please contact the agency using the Florida Relay Service, 1(800)955-8771 (TDD) or 1(800)955-8770 (Voice).

DEPARTMENT OF TRANSPORTATION

The **Commercial Motor Vehicle Review Board** announces a public meeting to which all persons are invited.

DATE AND TIME: March 13, 2008, 9:00 a.m.

PLACE: Hampton Inn and Suites, Ft. Lauderdale Airport, 2500 Sitrling Rd., Hollywood, Florida

GENERAL SUBJECT MATTER TO BE CONSIDERED:

This is a monthly meeting of the Commercial Motor Vehicle Review Board for the purpose of reviewing penalties imposed upon any vehicle or person under the provisions of Chapter 316, Florida Statutes, relating to weights imposed on the highway by the axles and wheels of motor vehicles, to special fuel and motor fuel tax compliance, or to violations of safety regulations.

Any person aggrieved by the imposition of a civil penalty pursuant to Sections 316.3025 or 316.550, Florida Statutes, may apply to the Commercial Motor Vehicle Review Board for a modification, cancellation, or revocation of the penalty.

A copy of the agenda may be obtained by contacting: Christine Jones, Executive Assistant, Commercial Motor Vehicle Review Board, 325 John Knox Rd., Bldg. K, Tallahassee, FL 32303.

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 Christine Jones at (850)245-7914. If you are hearing or speech impaired, please contact the agency using the Florida Relay Service, 1(800)955-8771 (TDD) or 1(800)955-8770 (Voice).

For more information, you may contact: Christine Jones, Executive Assistant, Commercial Motor Vehicle Review Board, 325 John Knox Rd., Bldg. K, Tallahassee, FL 32303.

The **Department of Transportation**, District One announces a hearing to which all persons are invited.

DATE AND TIMES: Tuesday, March 25, 2008, Open House, 6:00 p.m.; Formal Hearing, 7:00 p.m.

PLACE: Polk Community College, Winter Haven Student Center, 999 Avenue H, N. E., Winter Haven, Florida

GENERAL SUBJECT MATTER TO BE CONSIDERED:

This hearing is being held to afford interested persons the opportunity to express their views concerning the location, conceptual design, social, economic and environmental effects of the proposed improvements to S.R. 542 from 1st Street in Winter Haven to U.S. 27 in Dundee in Polk County; Financial Project ID Number 410666-1-22-01.

Public participation is solicited without regard to race, color, national origin, age, sex, religion, disability or family status. Persons who require special accommodations under the Americans with Disabilities Act of 1990 or persons who require translation services (free of charge) should contact: Antone N. Sherrard, Project Manager, Florida Department of Transportation, P. O. Box 1249, Bartow, FL 33831, (863)519-2304, at least seven (7) days prior to the public hearing. If you have any questions about the project or would like more information, please contact the project manager.

A copy of the agenda may be obtained by contacting Mr. Sherrard at the address above.

BOARD OF TRUSTEES OF THE INTERNAL IMPROVEMENT TRUST FUND

Notices for the Board of Trustees of the Internal Improvement Trust Fund between December 28, 2001 and June 30, 2006, go to <http://www.dep.state.fl.us/> under the link or button titled "Official Notices."

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

by telephone (786)469-5467, or mail Ms. Michelle Simmons, MDT Public Involvement Manager, Miami-Dade Transit, 701 N. W. First Court, Suite 1700, Miami, Florida 33136.

BOARD OF TRUSTEES OF THE INTERNAL IMPROVEMENT TRUST FUND

Notices for the Board of Trustees of the Internal Improvement Trust Fund between December 28, 2001 and June 30, 2006, go to <http://www.dep.state.fl.us/> under the link or button titled "Official Notices."

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

DATE AND TIME: Thursday, September 11, 2008, 11:30 a.m. – 1:30 p.m.

PLACE: Rookery Bay Reserve Environmental Learning Center, 300 Tower Road, Naples, FL 34113

GENERAL SUBJECT MATTER TO BE CONSIDERED: The purpose is for the members of the Advisory Committee to discuss the revision of the Rookery Bay National Estuarine Research Reserve Management Plan.

A copy of the agenda may be obtained by contacting: Brenda Varnes at (239)417-6310 or brenda.varnes@dep.state.fl.us.

Pursuant to the provisions of the Americans with Disabilities Act, any person requiring special accommodations to participate in this workshop/meeting is asked to advise the agency at least 5 days before the workshop/meeting by contacting: Brenda Varnes at (239)417-6310 or brenda.varnes@dep.state.fl.us. If you are hearing or speech impaired, please contact the agency using the Florida Relay Service, 1(800)955-8771 (TDD) or 1(800)955-8770 (Voice).

STATE BOARD OF ADMINISTRATION

The **Florida Prepaid College Board** announces a workshop to which all persons are invited.

DATE AND TIME: Tuesday, September 2, 2008, 1:30 p.m. or soon thereafter – until completion

PLACE: The Hermitage Centre, Hermitage Room, 1801 Hermitage Boulevard, Tallahassee, Florida 32308

GENERAL SUBJECT MATTER TO BE CONSIDERED: To conduct a workshop to review the Board's enhanced immunization style of investment management, to review the methodology for constructing the customized benchmark, and to review the adequacy and contract pricing analysis.

A copy of the agenda may be obtained by contacting: Thomas J. Wallace, Executive Director, Florida Prepaid College Board, 1801 Hermitage Blvd., Suite 210, Tallahassee, Florida 32308, (850)488-8514.

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 Faxing a request to: Thomas J. Wallace, Executive Director, Florida Prepaid College Board at (850)488-3555. If you are hearing or speech impaired, please contact the agency using the Florida Relay Service, 1(800)955-8771 (TDD) or 1(800)955-8770 (Voice).

If any person decides to appeal any decision made by the Board with respect to any matter considered at this meeting or hearing, he/she will need to ensure that a verbatim record of the proceeding is made, which record includes the testimony and evidence from which the appeal is to be issued.

The **Florida Prepaid College Board** announces a public meeting to which all persons are invited.

DATE AND TIME: Wednesday, September 3, 2008, 9:00 a.m. or soon thereafter – until completion

PLACE: The Hermitage Centre, Hermitage Room, 1801 Hermitage Boulevard, Tallahassee, Florida 32308

GENERAL SUBJECT MATTER TO BE CONSIDERED: Board Meeting. The purpose of this meeting is to conduct the regular business of the Florida Prepaid College Board Investment Committee, to which all persons are invited.

A copy of the agenda may be obtained by contacting: Thomas J. Wallace, Executive Director, Florida Prepaid College Board, 1801 Hermitage Boulevard, Suite 210, Tallahassee, Florida 32308, (850)488-8514.

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 Faxing a written request to: Thomas J. Wallace, Executive Director, Florida Prepaid College Board at (850)488-3555, no later than five (5) days prior to the meeting. If you are hearing or speech impaired, please contact the agency using the Florida Relay Service, 1(800)955-8771 (TDD) or 1(800)955-8770 (Voice).

If any person decides to appeal any decision made by the Board with respect to any matter considered at this meeting or hearing, he/she will need to ensure that a verbatim record of the proceeding is made, which record includes the testimony and evidence from which the appeal is to be issued.

The **Florida Prepaid College Board** announces a public meeting to which all persons are invited.

DATE AND TIME: Wednesday, September 3, 2008, 11:15 a.m. or soon thereafter – until completion

PLACE: The Hermitage Centre, Hermitage Room, 1801 Hermitage Boulevard, Tallahassee, Florida 32308

GENERAL SUBJECT MATTER TO BE CONSIDERED: Board Meeting. The purpose of this meeting is to conduct the regular business of the Florida Prepaid College Board to which all persons are invited.

St., MS 55, Tallahassee, Florida 32399-0450 or calling (850)414-4000. 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).

agency at least 5 days before the workshop/meeting by contacting: Brenda Varnes at (239)417-6310 or brenda.varnes@dep.state.fl.us. If you are hearing or speech impaired, please contact the agency using the Florida Relay Service, 1(800)955-8771 (TDD) or 1(800)955-8770 (Voice).

BOARD OF TRUSTEES OF THE INTERNAL IMPROVEMENT TRUST FUND

Notices for the Board of Trustees of the Internal Improvement Trust Fund between December 28, 2001 and June 30, 2006, go to <http://www.dep.state.fl.us/> under the link or button titled "Official Notices."

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

DATE AND TIME: Thursday, January 15, 2009, 10:00 a.m. – 11:00 a.m.

PLACE: Rookery Bay Reserve Environmental Learning Center, 300 Tower Road, Naples, FL 34113

GENERAL SUBJECT MATTER TO BE CONSIDERED: The purpose is for the members of the Reserve Management Board to discuss the management of the Rookery Bay National Estuarine Research Reserve.

A copy of the agenda may be obtained by contacting: Brenda Varnes at (239)417-6310 or brenda.varnes@dep.state.fl.us.

Pursuant to the provisions of the Americans with Disabilities Act, any person requiring special accommodations to participate in this workshop/meeting is asked to advise the agency at least 5 days before the workshop/meeting by contacting: Brenda Varnes at (239)417-6310 or brenda.varnes@dep.state.fl.us. If you are hearing or speech impaired, please contact the agency using the Florida Relay Service, 1(800)955-8771 (TDD) or 1(800)955-8770 (Voice).

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

DATE AND TIME: Thursday, January 15, 2009, 11:30 a.m. – 1:30 p.m.

PLACE: Rookery Bay Reserve Environmental Learning Center, 300 Tower Road, Naples, FL 34113

GENERAL SUBJECT MATTER TO BE CONSIDERED: The purpose is for the members of the Advisory Committee to discuss the revision of the Rookery Bay National Estuarine Research Reserve Management Plan.

A copy of the agenda may be obtained by contacting: Brenda Varnes at (239)417-6310 or brenda.varnes@dep.state.fl.us.

Pursuant to the provisions of the Americans with Disabilities Act, any person requiring special accommodations to participate in this workshop/meeting is asked to advise the

PUBLIC SERVICE COMMISSION

The Florida **Public Service Commission** announces a public prehearing conference to which all persons are invited.

DATE AND TIME: Wednesday, January 7, 2009, 1:00 p.m.

PLACE: Room 148, Betty Easley Conference Center, 4075 Esplanade Way, Tallahassee, Florida

GENERAL SUBJECT MATTER TO BE CONSIDERED: Docket No. 080317-EI – Petition for rate increase by Tampa Electric Company. The purpose of this prehearing conference is to: (1) simplify the issues; (2) identify the positions of the parties on the issues; (3) consider the possibility of obtaining admissions of fact and of documents which will avoid unnecessary proof; (4) identify exhibits; (5) establish an order of witnesses; and (6) consider such other matters as may aid in the disposition of the action.

EMERGENCY CANCELLATION OF PREHEARING: If a named storm or other disaster requires cancellation of the prehearing conference, Commission staff will attempt to give timely direct notice to the parties. Notice of cancellation of the prehearing will also be provided on the Commission's website (<http://www.psc.state.fl.us/>) under the Hot Topics link found on the home page. Cancellation can also be confirmed by calling the Office of the General Counsel at (850)413-6199.

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: Office of Commission Clerk, 2540 Shumard Oak Boulevard, Tallahassee, Florida 32399-0850, (850)413-6770. If you are hearing or speech impaired, please contact the agency using the Florida Relay Service, 1(800)955-8771 (TDD) or 1(800)955-8770 (Voice).

For more information, you may contact: Florida Public Service Commission, Office of Commission Clerk, 2540 Shumard Oak Boulevard, Tallahassee, Florida 32399-0850.

The Florida **Public Service Commission** announces a prehearing conference and a hearing in the following dockets to which all persons are invited:

DOCKET NO. AND TITLES: Docket Number 080614-EM – Petition to determine need for Greenland Energy Center Combined Cycle Conversion in Duval County by JEA.

PREHEARING CONFERENCE

DATE AND TIME: Thursday, January 8, 2009, 1:30 p.m.

PLACE: Room 148, Betty Easley Conference Center, 4075 Esplanade Way, Tallahassee, Florida

hearing or speech impaired, please contact the agency using the Florida Relay Service, 1(800)955-8771 (TDD) or 1(800)955-8770 (Voice).

For more information, you may contact: Florida Transportation Commission, Room 176, MS #9, 605 Suwannee Street, Tallahassee, Florida 32399-0450, (850)414-4105.

BOARD OF TRUSTEES OF THE INTERNAL IMPROVEMENT TRUST FUND

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

DATE AND TIME: Thursday, May 21, 2009, 11:00 a.m. – 2:00 p.m.

PLACE: Rookery Bay Reserve Environmental Learning Center, 300 Tower Road, Naples, FL 34113

GENERAL SUBJECT MATTER TO BE CONSIDERED: The purpose is for the members of the Advisory Committee to discuss the revision of the Rookery Bay National Estuarine Research Reserve Management Plan.

A copy of the agenda may be obtained by contacting: Brenda Varnes at brenda.varnes@dep.state.fl.us or (239)417-6310.

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: Brenda Varnes at brenda.varnes@dep.state.fl.us or (239)417-6310. 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).

REGIONAL PLANNING COUNCILS

The **Northeast Florida Regional Planning Council** announces a public meeting to which all persons are invited.

DATE AND TIMES: Thursday, May 7, 2009, Planning and Growth Management Committee, 8:30 a.m.; Personnel, Budget and Finance Committee, 9:00 a.m.; Full Board of Directors, 10:00 a.m.; Legislative Committee immediately following the Board Meeting

PLACE: NEFRC, 6850 Belfort Oaks Place, Jacksonville, FL 32216

GENERAL SUBJECT MATTER TO BE CONSIDERED: Regular Monthly meetings.

A copy of the agenda may be obtained by contacting: Sheron Forde at (904)279-0880 or sforde@nefrc.org.

The **Central Florida Regional Planning Council** announces a public meeting to which all persons are invited.

DATE AND TIME: May 13, 2009, 9:30 a.m.

PLACE: Hardee County Civic Center, 515 Civic Center Drive, Wauchula, FL 33873

GENERAL SUBJECT MATTER TO BE CONSIDERED: Regular monthly meeting of the Council and/or its Executive Committee.

A copy of the agenda may be obtained by contacting: Patricia M. Steed, Executive Director.

If any person decides to appeal any decision made by the Board with respect to any matter considered at this meeting or hearing, he/she will need to ensure that a verbatim record of the proceeding is made, which record includes the testimony and evidence from which the appeal is to be issued.

For more information, you may contact: Patricia M. Steed, Executive Director, 555 East Church Street, Bartow, FL 33830, (863)534-7130.

WATER MANAGEMENT DISTRICTS

The **St. Johns River Water Management District** announces a public meeting to which all persons are invited.

DATE AND TIME: Wednesday, May 6, 2009, 10:00 a.m. – 12:00 Noon

PLACE: East Lake County Library, Meeting Room, 31340 South County Road 437, Sorrento, FL 32776

MANAGEMENT REVIEW TEAM TOUR (MRT)

DATE AND TIME: Wednesday, May 6, 2009, 1:00 p.m. – 3:00 p.m.

PLACE: Lake Norris Conservation Area. Meet at the Lake Norris Conservation Area parking lot by 1:00 p.m. To reserve a spot for the tour, you must RSVP by May 4, 2009. Email: tmashour@sjrwmd.com or call: (386)329-4855.

GENERAL SUBJECT MATTER TO BE CONSIDERED: The Central Recreational Public Meeting and MRT will review land management and land acquisition activities in the Central Region.

A copy of the agenda may be obtained by contacting: Terri Mashour at (386)329-4855.

Pursuant to the provisions of the Americans with Disabilities Act, any person requiring special accommodations to participate in this workshop/meeting is asked to advise the agency at least 7 days before the workshop/meeting by contacting: Karen M. Davis at (386)329-4404. 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).

DATE AND TIMES: Tuesday, May 18, 2010, Project Information Session, 5:00 p.m. – 6:00 p.m.; Following the Project Information Session a formal Public Hearing (Project Presentation and Public Testimony Period), 6:00 p.m.

PLACE: Ingram Community Building, 25029 CR 561, Astatula, Florida 34705

GENERAL SUBJECT MATTER TO BE CONSIDERED: This public hearing will be conducted to allow interested persons the opportunity to express their views concerning the location, conceptual design, and social, economic, and environmental effects of the proposed improvement. The Preferred Build Alternative for the roadway and the No Build Alternative will be presented. The purpose of this project is to enhance safety and mobility in the area. The preferred alternative improvements will include resurfacing and safety modifications to horizontal curves on the northern and southern end of the study corridor, from CR 455 to Bates Lane and from north of Virginia Avenue to Country Club Drive. The preferred alternative includes widening/reconstruction of the roadway to a two-lane urban section with a center left turn lane/median and curb and gutter from Bates Lane to north of Virginia Avenue. Sidewalks are included on both sides of the roadway from Maryland Avenue to Virginia Avenue, and on the west side only from Virginia Avenue to Palm Drive. The preferred alternative also includes the construction of a roundabout at the CR 455 intersection, reconstruction of the Monroe Street intersection and intersection improvements at Country Club Drive. The preferred alternative involves various stormwater and drainage improvements, with one associated residential relocation.

A copy of the agenda may be obtained by contacting: Ms. Mary Cooper at the address, email or fax below.

Pursuant to the provisions of the Americans with Disabilities Act, any person requiring special accommodations to participate in this workshop/meeting is asked to advise the agency at least 7 days before the workshop/meeting by contacting: Ms. Mary K. Cooper, Astatula Town Clerk, P. O. Box 609, Astatula, Florida 34705, (352)742-1100, Fax: (352)742-1970, e-mail: astatula@usa2net.net at least seven days prior to the hearing. 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).

BOARD OF TRUSTEES OF THE INTERNAL IMPROVEMENT TRUST FUND

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

DATE AND TIME: Wednesday, June 2, 2010, 2:00 p.m. – 4:00 p.m.

PLACE: Rookery Bay Reserve Environmental Learning Center, 300 Tower Road, Naples, FL 34113

GENERAL SUBJECT MATTER TO BE CONSIDERED: The purpose is for the members of the Advisory Committee to discuss the revision of the Rookery Bay National Estuarine Research Reserve Management Plan.

A copy of the agenda may be obtained by contacting: Brenda Varnes at e-mail: Brenda.Varnes@dep.state.fl.us, phone: (239)417-6310 or by mail: 300 Tower Road, Naples, FL 34113.

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: Brenda Varnes at Brenda.Varnes@dep.state.fl.us. If you are hearing or speech impaired, please contact the agency using the Florida Relay Service, 1(800)955-8771 (TDD) or 1(800)955-8770 (Voice).

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

DATE AND TIME: Wednesday, June 2, 2010, 5:00 p.m. – 6:30 p.m.

PLACE: Rookery Bay Reserve Environmental Learning Center, 300 Tower Road, Naples, FL 34113

GENERAL SUBJECT MATTER TO BE CONSIDERED: The purpose is for the members of the community to discuss the revision of the Rookery Bay National Estuarine Research Reserve Management Plan.

A copy of the agenda may be obtained by contacting: Brenda Varnes at e-mail: Brenda.Varnes@dep.state.fl.us, phone: (239)417-6310 or by mail: 300 Tower Road, Naples, FL 34113.

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: Brenda Varnes at Brenda.Varnes@dep.state.fl.us. If you are hearing or speech impaired, please contact the agency using the Florida Relay Service, 1(800)955-8771 (TDD) or 1(800)955-8770 (Voice).

PUBLIC SERVICE COMMISSION

The Florida **Public Service Commission** announces a public meeting to which all persons are invited.

DATE AND TIME: Wednesday, April 28, 2010, 6:00 p.m.

PLACE: Auburndale Civic Center, 115 West Park Street, Auburndale, FL

C.1.3 / Meeting Summaries

Minutes of Rookery Bay Advisory Council meetings are available for review by contacting Rookery Bay Reserve, 300 Tower Road, Naples, FL 34113. Meeting dates: January 24, 2008 at 11:00 a.m.; March 19, 2008 at 11:30 a.m.; September 11, 2008 at 11:30 a.m.; January 15, 2009 at 11:30 a.m.; May 21, 2009 at 11:00 a.m.; June 2, 2010 at 2:00 p.m.

C.2 / Public Scoping Meeting(s)

The following appendices contain information about the public scoping meeting which was held in order to obtain input from the public as to what they thought the issues in Rookery Bay National Estuarine Research Reserve were. There are copies of the public advertisements for those meetings and information on obtaining meeting summaries.

C.2.1 / Florida Administrative Weekly Posting(s)

Florida Administrative Weekly

Volume 34, Number 2, January 11, 2008

PLACE: First Baptist Church of Oviedo, 45 West Broadway Street, Oviedo, Florida 32765

GENERAL SUBJECT MATTER TO BE CONSIDERED:

This is an Access Reclassification Hearing, which is being held to afford interested persons an opportunity to express their views concerning the access management reclassification for Financial Project ID Number: 415030-1-38-01, otherwise known as the SR 426/CR 419 Widening Final Design in the City of Oviedo, Florida. The project involves the widening of SR 426/CR 419 from Pine Avenue to west of Lockwood Boulevard, a distance of about three miles. The project consists of changing the existing access management classifications along SR 426 to Access Class 5 from Pine Avenue to SR 434.

Public participation is solicited without regard to race, color, national origin, age, sex, religion, disability or family status.

A copy of the agenda may be obtained by contacting: Mr. Andy DeWitt, Project Manager, Inwood Consulting Engineers, Inc., 870 Clark Street, Oviedo, Florida 32765.

For more information, you may contact: Mr. Andy DeWitt, Project Manager, Inwood Consulting Engineers, Inc., 870 Clark Street, Oviedo, Florida 32765.

The **Florida Transportation Commission** announces a public meeting to which all persons are invited.

DATE AND TIME: January 17, 2008, 5:15 p.m. – until completion of business

PLACE: Hilton in the Walt Disney World Resort, 1751 Hotel Plaza Boulevard, Salon II, Lake Buena Vista, Florida

GENERAL SUBJECT MATTER TO BE CONSIDERED:

Meeting between the Chairman and Vice Chairman to discuss Commission business.

A copy of the agenda may be obtained by calling Cathy Goodman at (850)414-4105.

Pursuant to the provisions of the Americans with Disabilities Act, any person requiring special accommodations to participate in this workshop/meeting is asked to advise the agency at least 48 hours before the workshop/meeting by calling Cathy Goodman at (850)414-4105. If you are hearing or speech impaired, please contact the agency using the Florida Relay Service, 1(800)955-8771 (TDD) or 1(800)955-8770 (Voice).

For more information, you may contact: Florida Transportation Commission, Room 176, M.S. 9, 605 Suwannee Street, Tallahassee, Florida 32399-0450, (850)414-4105.

BOARD OF TRUSTEES OF THE INTERNAL IMPROVEMENT TRUST FUND

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

DATE AND TIME: Tuesday, February 19, 2008, 6:00 p.m.

PLACE: Rookery Bay Reserve, 300 Tower Road, Naples, FL 34113

GENERAL SUBJECT MATTER TO BE CONSIDERED: The purpose is to inform the public on the management plan review process and to solicit input on issues they are interested in seeing addressed in the Rookery Bay National Estuarine Research Reserve (RBNERR) Management Plan. The RBNERR Advisory Committee will be participating.

A copy of the agenda may be obtained by contacting Brenda Varnes at (239)417-6310.

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 Brenda Varnes at (239)417-6310. 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).

STATE BOARD OF ADMINISTRATION

The **State Board of Administration** announces a public meeting to which all persons are invited.

DATES AND TIMES: Wednesday, January 16, 2008, 2:00 p.m.; Thursday, January 17, 2008, 9:00 a.m.

PLACE: Hermitage Room, Plaza Level, Hermitage Centre, 1801 Hermitage Boulevard, Tallahassee, FL 32308. Gold Coast Room, 5th Floor, Hermitage Centre, 1801 Hermitage Boulevard, Tallahassee, FL 32308.

GENERAL SUBJECT MATTER TO BE CONSIDERED: Selection of an audit firm, as well as address other general business of the Audit Committee.

In compliance with the Americans with Disabilities Act, the SBA will make appropriate arrangements for anyone who needs special accommodations to attend the meeting. Please call James Linn at (850)488-4406.

The **State Board of Administration** announces a public meeting to which all persons are invited.

DATE AND TIME: Tuesday, January 22, 2008, 9:00 a.m. – until the conclusion of business

PLACE: Hermitage Room (1st Floor), 1801 Hermitage Blvd., Tallahassee, Florida

GENERAL SUBJECT MATTER TO BE CONSIDERED: To discuss the responses received concerning the above ITN and to select finalist respondents for oral presentations, if necessary, and further consideration.

DATE AND TIME: Wednesday, January 23, 2008, 9:00 a.m. – until the conclusion of business

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



Rookery Bay National
Estuarine Research Reserve
(Rookery Bay Reserve)

Public Meeting

Tuesday, February 19, 2008, 6:00 pm

Rookery Bay Reserve
300 Tower Road, Naples, FL 34113

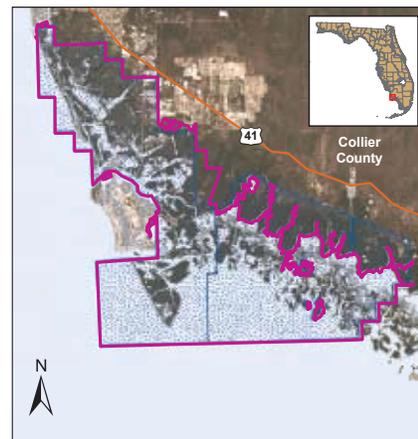
The Florida Department of Environmental Protection's Office of Coastal and Aquatic Managed Areas (CAMA) is responsible for the management of Florida's forty-one Aquatic Preserves, three National Estuarine Research Reserves, one National Marine Sanctuary, and the Coral Reef Conservation Program. These protected areas comprise more than four million acres of the most valuable submerged lands and select coastal uplands in Florida. CAMA is updating these management plans, and is currently working on the Rookery Bay plan. This site will hold a public meeting to receive input on a revision of the existing plan.

The objective of this meeting is to solicit public input regarding issues and opportunities that should be addressed in the management plan. The information from the meeting will be compiled and presented to CAMA by Reserve staff and a facilitator.

For more information, please contact Brenda Varnes (239) 417-6310 / brenda.varnes@dep.state.fl.us or visit our website at www.dep.state.fl.us/coastal. Written comments are welcome and can be submitted via fax: (850) 245-2110, Attn: RBNERR; or email Rookery.Bay@dep.state.fl.us

Pursuant to the provisions of the Americans with Disabilities Act, any person requiring special accommodations to participate in this workshop/meeting is asked to advise the agency at least 5 days before the workshop/meeting by contacting Brenda Varnes at (239) 417-6310. If you are hearing or speech impaired, please contact the agency using the Florida Relay Service, (800) 955-8771 (TDD) or (800) 955-8770 (Voice).

This publication funded in part through a grant agreement from the Florida Department of Environmental Protection, Florida Coastal Management Program by a grant provided by the Office of Ocean and Coastal Resource Management under the Coastal Zone Management Act of 1972, as amended, National Oceanic and Atmospheric Administration (NOAA) Award No. NA07NOS4190071-CZ823. The views, statements, finding, conclusions, and recommendations expressed herein are those of the author(s) and do not necessarily reflect the views of the State of Florida, NOAA, or any of its subagencies. January, 2008.



C.2.3 / Summary of the Public Scoping Meeting(s)

Public comments have been reviewed and incorporated, as appropriate, within the management plan. Minutes of the public scoping meeting are available for review by contacting Rookery Bay National Estuarine Research Reserve, 300 Tower Road, Naples, FL 34113. Meeting date: February 19, 2008 at 6:00 p.m.

C.3 / Formal Public Meeting(s)

The following appendices contain information about the formal public meetings which were held in order to obtain input from the public about the Rookery Bay National Estuarine Research Reserve Draft Management Plan. There are copies of the public advertisements for those meetings and information on obtaining meeting summaries.

CAMA held multiple public hearings and advisory group meetings from 2008-2010 to gather input from the advisory committee members, the public and various stakeholders to aid in the development of the land management plan. In response to increased public interest and a proposal by the City of Naples to annex Keewaydin Island, CAMA conducted additional advisory committee meetings and public hearings to address specific issues related to the management of Keewaydin Island, resulting in the development of a Special Area Management Plan (SAMP) for Keewaydin Island (see Appendix B.13). Recommendations presented at these meetings were incorporated into the land management plan as appropriate. Following the successful completion of the Keewaydin Island SAMP, the City of Naples made the decision to not move forward with the proposed annexation, partly as a result of having participated as a stakeholder on the advisory committee.

DATE AND TIMES: Tuesday, May 18, 2010, Project Information Session, 5:00 p.m. – 6:00 p.m.; Following the Project Information Session a formal Public Hearing (Project Presentation and Public Testimony Period), 6:00 p.m.

PLACE: Ingram Community Building, 25029 CR 561, Astatula, Florida 34705

GENERAL SUBJECT MATTER TO BE CONSIDERED: This public hearing will be conducted to allow interested persons the opportunity to express their views concerning the location, conceptual design, and social, economic, and environmental effects of the proposed improvement. The Preferred Build Alternative for the roadway and the No Build Alternative will be presented. The purpose of this project is to enhance safety and mobility in the area. The preferred alternative improvements will include resurfacing and safety modifications to horizontal curves on the northern and southern end of the study corridor, from CR 455 to Bates Lane and from north of Virginia Avenue to Country Club Drive. The preferred alternative includes widening/reconstruction of the roadway to a two-lane urban section with a center left turn lane/median and curb and gutter from Bates Lane to north of Virginia Avenue. Sidewalks are included on both sides of the roadway from Maryland Avenue to Virginia Avenue, and on the west side only from Virginia Avenue to Palm Drive. The preferred alternative also includes the construction of a roundabout at the CR 455 intersection, reconstruction of the Monroe Street intersection and intersection improvements at Country Club Drive. The preferred alternative involves various stormwater and drainage improvements, with one associated residential relocation.

A copy of the agenda may be obtained by contacting: Ms. Mary Cooper at the address, email or fax below.

Pursuant to the provisions of the Americans with Disabilities Act, any person requiring special accommodations to participate in this workshop/meeting is asked to advise the agency at least 7 days before the workshop/meeting by contacting: Ms. Mary K. Cooper, Astatula Town Clerk, P. O. Box 609, Astatula, Florida 34705, (352)742-1100, Fax: (352)742-1970, e-mail: astatula@usa2net.net at least seven days prior to the hearing. 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).

BOARD OF TRUSTEES OF THE INTERNAL IMPROVEMENT TRUST FUND

Notices for the Board of Trustees of the Internal Improvement Trust Fund between December 28, 2001 and June 30, 2006, go to <http://www.dep.state.fl.us/> under the link or button titled "Official Notices."

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

1874 Section VI - Notices of Meetings, Workshops and Public Hearings

DATE AND TIME: Wednesday, June 2, 2010, 2:00 p.m. – 4:00 p.m.

PLACE: Rookery Bay Reserve Environmental Learning Center, 300 Tower Road, Naples, FL 34113

GENERAL SUBJECT MATTER TO BE CONSIDERED: The purpose is for the members of the Advisory Committee to discuss the revision of the Rookery Bay National Estuarine Research Reserve Management Plan.

A copy of the agenda may be obtained by contacting: Brenda Varnes at e-mail: Brenda.Varnes@dep.state.fl.us, phone: (239)417-6310 or by mail: 300 Tower Road, Naples, FL 34113.

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: Brenda Varnes at Brenda.Varnes@dep.state.fl.us. If you are hearing or speech impaired, please contact the agency using the Florida Relay Service, 1(800)955-8771 (TDD) or 1(800)955-8770 (Voice).

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

DATE AND TIME: Wednesday, June 2, 2010, 5:00 p.m. – 6:30 p.m.

PLACE: Rookery Bay Reserve Environmental Learning Center, 300 Tower Road, Naples, FL 34113

GENERAL SUBJECT MATTER TO BE CONSIDERED: The purpose is for the members of the community to discuss the revision of the Rookery Bay National Estuarine Research Reserve Management Plan.

A copy of the agenda may be obtained by contacting: Brenda Varnes at e-mail: Brenda.Varnes@dep.state.fl.us, phone: (239)417-6310 or by mail: 300 Tower Road, Naples, FL 34113.

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: Brenda Varnes at Brenda.Varnes@dep.state.fl.us. If you are hearing or speech impaired, please contact the agency using the Florida Relay Service, 1(800)955-8771 (TDD) or 1(800)955-8770 (Voice).

PUBLIC SERVICE COMMISSION

The Florida **Public Service Commission** announces a public meeting to which all persons are invited.

DATE AND TIME: Wednesday, April 28, 2010, 6:00 p.m.

PLACE: Auburndale Civic Center, 115 West Park Street, Auburndale, FL

BOARD OF TRUSTEES OF THE INTERNAL IMPROVEMENT TRUST FUND

Notices for the Board of Trustees of the Internal Improvement Trust Fund between December 28, 2001 and June 30, 2006, go to <http://www.dep.state.fl.us/> under the link or button titled "Official Notices."

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

DATE AND TIME: Wednesday, December 8, 2010, 5:30 p.m. – 7:00 p.m.

PLACE: Rookery Bay National Estuarine Research Reserve (Rookery Bay Reserve) Environmental Learning Center, 300 Tower Road, Naples, FL 34113

GENERAL SUBJECT MATTER TO BE CONSIDERED: The purpose is to receive public comments on the draft Rookery Bay Reserve Management Plan.

A copy of the draft plan will be available for viewing by November 8, 2010, website: www.FloridaCoasts.org/rookery/. The Rookery Bay Reserve Advisory Committee will be participating.

A copy of the agenda may be obtained by contacting: Brenda Varnes at (239)417-6310, by mail: 300 Tower Road, Naples, Florida 34113 or by email: Brenda.Varnes@dep.state.fl.us.

Pursuant to the provisions of the Americans with Disabilities Act, any person requiring special accommodations to participate in this workshop/meeting is asked to advise the agency at least 5 days before the workshop/meeting by contacting: Brenda Varnes at Brenda.Varnes@dep.state.fl.us. If you are hearing or speech impaired, please contact the agency using the Florida Relay Service, 1(800)955-8771 (TDD) or 1(800)955-8770 (Voice).

PUBLIC SERVICE COMMISSION

The Florida **Public Service Commission** will consider at its Commission Conference, Docket No.: 100422-GU, Application of Florida City Gas, a Division of Pivotal Utility Holdings, Inc., for authority to issue short-term debt security pursuant to Section 366.04, Florida Statutes, and Chapter 25-8, Florida Administrative Code. The Company seeks PSC approval pursuant to Section 366.04, Florida Statutes, to finance its on-going cash requirements through its participation and borrowings from and investments in AGL Resources Inc.'s (AGLR) Utility Money Pool. In addition, the Company seeks approval to make short-term borrowings not to exceed \$800 million (aggregate for the Company's three utilities) annually from the Utility Money Pool according to limits that are consistent, given the seasonal nature of the Company's business and its anticipated cash demands, with the Company's capitalization. The Company's share of these borrowings will not exceed \$250 million.

DATE AND TIME: Tuesday, November 9, 2010, Commission Conference, 9:30 a.m., although the time at which this item will be heard cannot be determined at this time.

PLACE: Commission Hearing Room 148, Betty Easley Conference Center, 4075 Esplanade Way, Tallahassee, Florida 32301

GENERAL SUBJECT MATTER TO BE CONSIDERED: To take final action in Docket No.: 100422-GU.

Emergency Cancellation Of Meeting: If a named storm or other disaster requires cancellation of the meeting, Commission staff will attempt to give timely direct notice to the parties. Notice of cancellation of the meeting will also be provided on the Commission's website: <http://www.psc.state.fl.us/> under the Hot Topics link found on the home page. Cancellation can also be confirmed by calling the: Office of the General Counsel at (850)413-6199.

Pursuant to the provisions of the Americans with Disabilities Act, any person requiring special accommodation to participate in this hearing because of a physical impairment should call the: Office of Commission Clerk, (850)413-6770 at least 48 hours prior to the hearing. Any person who is hearing or speech impaired should contact the Florida Public Service Commission by using the Florida Relay Service, 1(800)955-8771 (TDD) or 1(800)955-8770 (Voice).

For more information, please contact: Katherine Fleming, Office of the General Counsel at (850)413-6218.

The Florida **Public Service Commission** announces public customer meeting in the following docket to which all persons are invited.

DATE AND TIME: Thursday, November 18, 2010, 6:00 p.m.

PLACE: School Board of Lee County Board Room, Lee County Education Center, 2855 Colonial Boulevard, Fort Myers, FL 33966

GENERAL SUBJECT MATTER TO BE CONSIDERED: Docket No.: 100330-WS – Application for increase in water/wastewater rates in Alachua, Brevard, DeSoto, Hardee, Highlands, Lake, Lee, Marion, Orange, Palm Beach, Pasco, Polk, Putnam, Seminole, Sumter, Volusia, and Washington Counties by Aqua Utilities Florida, Inc.

The purpose of the meeting is to give customers and other interested persons an opportunity to offer comments regarding the quality of service the utility provides, the proposed rate increase, and to ask questions and comment on other issues. One or more of the Commissioners of the Florida Public Service Commission may attend and participate in this meeting.

For questions, contact: Commission staff, Katherine Fleming at (850)413-6199.

Emergency Cancellation of Customer Meeting: If a named storm or other disaster requires cancellation of the meeting, Commission staff will attempt to give timely direct notice to the parties. Notice of cancellation of the meeting will also be

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



Rookery Bay National Estuarine Research Reserve

(Includes Rookery Bay Aquatic Preserve & Cape Romano – Ten Thousand Islands Aquatic Preserve)

Public Meeting

Wednesday,
December 8, 2010, 5:30 pm

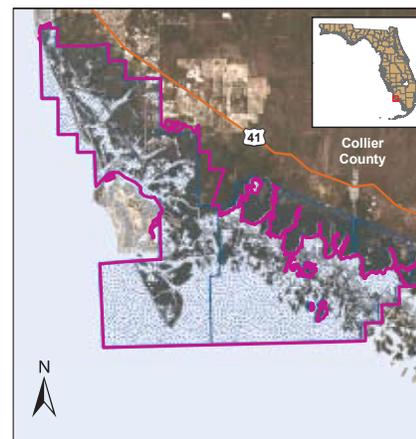
Rookery Bay Reserve
300 Tower Road, Naples, FL 34113

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), the Florida Keys National Marine Sanctuary and the Coral Reef Conservation Program. These protected areas comprise more than 4 million acres of the most valuable submerged lands and select coastal uplands in Florida. CAMA is updating the site specific management plan for Rookery Bay NERR and will be holding a formal public meeting to receive input on the draft plan. A copy of the draft management plan can be found at www.aquaticpreserves.org.

For more information, please contact Brenda Varnes at (239) 417-6310 or Brenda.Varnes@dep.state.fl.us or visit our website at www.aquaticpreserves.org. Written comments are welcome and can be submitted prior to the public meeting and up to seven days after, by fax to (850) 245-2110 marked Attn RBNERR or e-mail to Rookery.Bay@dep.state.fl.us.

Pursuant to the provisions of the Americans with Disabilities Act, any person requiring special accommodations to participate in this meeting is asked to advise the agency at least five days before the meeting by contacting Brenda Varnes at (239)417-6310. 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).

This publication was funded in part through a grant agreement from the Florida Department of Environmental Protection, Florida Coastal Management Program by a grant provided by the Office of Ocean and Coastal Resource Management under the Coastal Zone Management Act of 1972, as amended, National Oceanic and Atmospheric Administration (NOAA) Award No. NA07NOS4190071-CZ823. The views, statements, finding, conclusions and recommendations expressed herein are those of the author(s) and do not necessarily reflect the views of the State of Florida, NOAA or any of its subagencies. December 2010.



C.3.3 / Summary of the Formal Public Meeting(s)

Public comments have been reviewed and incorporated, as appropriate, within the management plan. Minutes of the formal public meetings are available for review by contacting Rookery Bay National Estuarine Research Reserve, 300 Tower Road, Naples, FL 34113. Meeting dates: June 2, 2010 at 5:00 p.m.; December 8, 2010 at 5:30 p.m.

C.4 / Federal Review

C.4.1 / Federal Review and Public Commenting

Development of the Rookery Bay National Estuarine Research Reserve (RBNERR) management plan occurred over two years and included direct input from all RBNERR staff members and the National Oceanic and Atmospheric Administration's (NOAA) Estuarine Reserves Division (ERD) staff. Public meetings offering opportunities for input from the public were also held to gather input from the local community. In addition, special meetings and opportunities for input into the management plan were offered to all representative groups that have members sitting on the advisory board for RBNERR. Groups that provided input were the U.S. Fish and Wildlife Service (Ten Thousand Islands National Wildlife Refuge), Marine Industries Association of Collier County, City of Naples, City of Marco Island, Florida Audubon, South Florida Water Management District, Keewaydin Island Homeowners Association, Conservancy of Southwest Florida, Florida Gulf Coast University, Friends of Keewaydin Island, and Friends of Rookery Bay. All appropriate comments and input were integrated into the final version of the management plan and were submitted and posted during the period of the NOAA notice in the Federal Register.

NOAA's ERD reviewed and approved the plan after ensuring sufficient opportunity for comment by the public, per 15 Code of Federal Regulations 921.33. Once the management plan was approved by NOAA's ERD, a Federal Register notice announcing a 30 day public comment period was published on August 20, 2012. The comment period ended on September 19, 2012. After the required 30 day public comment period, and having received no comments, no additional revisions were made to the document.





center playing card board which APP exports are within the scope of the antidumping duty and countervailing duty orders; (2) APP's Zenith packaging paperboard (except with a basis weight of 215 gsm), APP's Sinar Vanda packaging paperboard (except with a basis weight of 210 gsm), and APP's grey-center playing card board and black-center playing card board which APP exports are not within the scope of the antidumping duty and countervailing duty orders; preliminary ruling February 2, 2012.

A-201-837/A-570-954/C-570-955:
Magnesia Carbon Bricks from Mexico and the People's Republic of China

Requestor: Fedmet Resources Corporation; its magnesia alumina carbon bricks are within the scope of the antidumping and countervailing duty orders; March 30, 2012.

Anti-Circumvention Determinations Completed Between January 1, 2012, and March 31, 2012

None.

Interested parties are invited to comment on the completeness of this list of completed scope and anticircumvention inquiries. Any comments should be submitted to the Deputy Assistant Secretary for AD/CVD Operations, Import Administration, International Trade Administration, 14th Street and Constitution Avenue NW., APO/Dockets Unit, Room 1870, Washington, DC 20230.

This notice is published in accordance with 19 CFR 351.225(o).

Dated: August 9, 2012.

Christian Marsh,

Deputy Assistant Secretary for Antidumping and Countervailing Duty Operations.

[FR Doc. 2012-20066 Filed 8-17-12; 8:45 am]

BILLING CODE 3510-DS-P

DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric Administration

Rookery Bay, FL and Kachemak Bay, AK National Estuarine Research Reserve Management Plan Revisions

AGENCY: Estuarine Reserves Division, Office of Ocean and Coastal Resource Management, National Ocean Service, National Oceanic and Atmospheric Administration, Commerce.

ACTION: Notice of Public Comment Period for the Rookery Bay, Florida and Kachemak Bay, Alaska National

Estuarine Research Reserve Management Plan Revisions.

SUMMARY: Notice is hereby given that the Estuarine Reserves Division, Office of Ocean and Coastal Resource Management, National Ocean Service, National Oceanic and Atmospheric Administration, U.S. Department of Commerce is announcing a thirty day public comment period for the Rookery Bay, Florida and the Kachemak Bay, Alaska National Estuarine Research Reserve Management Plan Revisions. Pursuant to 15 CFR section 921.33(c), these revisions will bring these plans into compliance. The Rookery Bay, Florida Reserve is updating their last plan approved in 2003; and the Kachemak Bay, Alaska Reserve is updating their last plan approved in 2006. The revised management plans outline the administrative structure; the research, education, training, and stewardship goals of the reserve; and the plans for future land acquisition and facility development to support reserve operations.

The Rookery Bay Reserve takes an integrated approach to management, linking research, education, training and stewardship functions to address high priority issues including land use changes affecting freshwater inflow, loss of native biodiversity, lack of public awareness and community involvement in stewardship, incompatible use by visitors, and ecological impacts of catastrophic change events. Since the last management plan, the reserve has constructed additional exhibits and a pedestrian bridge that connects the Environmental Learning Center to a boardwalk and interpretive trails describing several ecosystems and functions. The revised management plan will serve as the guiding document for the 110,000 acre Rookery Bay Reserve for the next five years.

The Kachemak Bay Reserve takes an integrated approach to management, linking research, education, and training functions to address high priority issues including climate change and harvested species, such as salmon and shellfish. The reserve will continue research on coastal dynamics and their impact to coastal communities, and will be enhancing monitoring programs on invasive species and harmful algal blooms to transfer information to coastal decision makers. Since the last management plan, the reserve has constructed additional exhibits, completed habitat maps of the benthic and shoreline habitats of the bay, and contributed to the body of knowledge on the ecological value of headwater streams to juvenile salmon. The revised

management plan will serve as the guiding document for the 372,000 acre Kachemak Bay Reserve for the next five years. No additional lands have been added to the reserve boundary; the discrepancy in designated and current acreage is due to improved mapping accuracy.

View the Rookery Bay, Florida Reserve Management Plan revision at www.floridadep.org/rookery/management/plan.htm and provide comments to Penny.Isom@dep.state.fl.us.

View the Kachemak Bay, Alaska Reserve Management Plan at www.adfg.alaska.gov/index.cfm?adfg=kbrr_resources.management and provide comments to dfg.kbrr.managementplan@alaska.gov.

FOR FURTHER INFORMATION CONTACT: Erica Seiden at (301) 563-1172 or Laurie McGilvray at (301) 563-1158 of NOAA's National Ocean Service, Estuarine Reserves Division, 1305 East-West Highway, N/ORM5, 10th floor, Silver Spring, MD 20910.

Dated: August 8, 2012.

Margaret Davidson,

Acting Director, Office of Ocean and Coastal Resource Management, National Oceanic and Atmospheric Administration.

[FR Doc. 2012-20228 Filed 8-17-12; 8:45 am]

BILLING CODE 3510-08-M

DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric Administration

RIN 0648-XA626

Marine Mammals; File No. 16160

AGENCY: National Marine Fisheries Service (NMFS), National Oceanic and Atmospheric Administration (NOAA), Commerce.

ACTION: Notice; issuance of permit amendment.

SUMMARY: Notice is hereby given that a major amendment to Permit No. 16160 has been issued to The Whale Museum (Responsible Party: Jenny Atkinson), PO Box 945, Friday Harbor, WA 98250.

ADDRESSES: The permit amendment and related documents are available for review upon written request or by appointment in the following offices:

Permits and Conservation Division, Office of Protected Resources, NMFS, 1315 East-West Highway, Room 13705, Silver Spring, MD 20910; phone (301)427-8401; fax (301)713-0376; and Northwest Region, NMFS, 7600 Sand Point Way NE., BIN C15700, Bldg. 1, Seattle, WA 98115-0700; phone (206)526-6150; fax (206)526-6426.

Management, U.S. Department of Commerce.
 Mark S. Paese, Director, Office of Operational Systems, Office of Operational Systems, National Weather Service.
 Ciaran M. Clayton, Director of Communications Office of the Under Secretary.
 Steven S. Fine, Ph.D., Director, Air Resources Laboratory, Office of Air Resources Laboratory, Office of Oceanic and Atmospheric Research.
 Dr. Ned Cyr, Director, Office of Science and Technology National Marine Fisheries Service.

Dated: September 24, 2012

Jane Lubchenco,
Under Secretary of Commerce for Oceans and Atmosphere.

[FR Doc. 2012-24230 Filed 10-1-12; 8:45 am]

BILLING CODE 3510-12-P

DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric Administration

National Estuarine Research Reserve System

AGENCY: Estuarine Reserves Division, Office of Ocean and Coastal Resource Management, National Ocean Service, National Oceanic and Atmospheric Administration, U.S. Department of Commerce.

ACTION: Notice of Approval of the Rookery Bay, Florida and Kachemak Bay, Alaska National Estuarine Research Reserve Management Plan Revisions.

SUMMARY: Notice is hereby given that the Estuarine Reserves Division, Office of Ocean and Coastal Resource Management, National Ocean Service, National Oceanic and Atmospheric Administration, U.S. Department of Commerce approves the Rookery Bay, Florida and the Kachemak Bay, Alaska National Estuarine Research Reserve Management Plan Revisions. The revised management plans outline the administrative structure; the research, education, training, and stewardship goals of the reserve; and the plans for future land acquisition and facility development to support reserve operations.

The Rookery Bay Reserve takes an integrated approach to management, linking research, education, training and stewardship functions to address high priority issues within the 110,000 acre Reserve including land use changes affecting freshwater inflow, loss of native biodiversity, lack of public awareness and community involvement

in stewardship, incompatible use by visitors, and ecological impacts of catastrophic change events. The Reserve's Environmental Learning Center provides excellent visitor education experiences and a connecting pedestrian bridge connects visitors to a boardwalk and interpretive trails.

The Kachemak Bay Reserve takes an integrated approach to management by linking research, education, and training functions within the 372,000 acre Reserve to address high priority issues including climate change and harvested species, such as salmon and shellfish. The Reserve will continue research on coastal dynamics, monitoring of invasive species and harmful algal blooms, and will transfer information to coastal decision makers.

The Rookery Bay, Florida Reserve Management Plan can be found at www.floridadep.org/rookery/management/plan.htm and the Kachemak Bay, Alaska Reserve Management Plan can be found at www.adfg.alaska.gov/index.cfm?adfg=kbr_r_resources.management.

FOR FURTHER INFORMATION CONTACT: Erica Seiden at (301) 563-1172 or Laurie McGilvray at (301) 563-1158 of NOAA's National Ocean Service, Estuarine Reserves Division, 1305 East-West Highway, N/ORM5, 10th floor, Silver Spring, MD 20910.

Dated: September 13, 2012.

Margaret Davidson,
Acting Director, Office of Ocean and Coastal Resource Management, National Oceanic and Atmospheric Administration.

[FR Doc. 2012-24156 Filed 10-1-12; 8:45 am]

BILLING CODE 3510-08-M

DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric Administration

RIN 0648-XC218

Marine Mammals; File No. 17298

AGENCY: National Marine Fisheries Service (NMFS), National Oceanic and Atmospheric Administration (NOAA), Commerce.

ACTION: Notice; receipt of application.

SUMMARY: Notice is hereby given that Mystic Aquarium, Mystic, Connecticut 06355 [Responsible Party: Stephen Coan], has applied in due form for a permit to collect, import, export, and receive marine mammal parts for scientific research.

DATES: Written, telefaxed, or email comments must be received on or before November 1, 2012.

ADDRESSES: The application and related documents are available for review by selecting "Records Open for Public Comment" from the *Features* box on the Applications and Permits for Protected Species (APPS) home page, <https://apps.nmfs.noaa.gov>, and then selecting File No. 17298 from the list of available applications.

These documents are also available upon written request or by appointment in the following offices:

Permits and Conservation Division, Office of Protected Resources, NMFS, 1315 East-West Highway, Room 13705, Silver Spring, MD 20910; phone (301) 427-8401; fax (301) 713-0376; and

Northeast Region, NMFS, 55 Great Republic Drive, Gloucester, MA 01930; phone (978) 281-9328; fax (978) 281-9394.

Written comments on this application should be submitted to the Chief, Permits and Conservation Division, at the address listed above. Comments may also be submitted by facsimile to (301) 713-0376, or by email to NMFS.Pr1Comments@noaa.gov. Please include the File No. in the subject line of the email comment.

Those individuals requesting a public hearing should submit a written request to the Chief, Permits and Conservation Division at the address listed above. The request should set forth the specific reasons why a hearing on this application would be appropriate.

FOR FURTHER INFORMATION CONTACT: Joselyd Garcia-Reyes or Amy Sloan, (301) 427-8401.

SUPPLEMENTARY INFORMATION: The subject permit is requested under the authority of the Marine Mammal Protection Act of 1972, as amended (MMPA; 16 U.S.C. 1361 *et seq.*), the regulations governing the taking and importing of marine mammals (50 CFR part 216), the Endangered Species Act of 1973, as amended (ESA; 16 U.S.C. 1531 *et seq.*), the regulations governing the taking, importing, and exporting of endangered and threatened species (50 CFR 222-226), and the Fur Seal Act of 1966, as amended (16 U.S.C. 1151 *et seq.*).

The objective of this application is to support multiple ongoing research programs at the Mystic Aquarium, including studies of diet and nutrition, disease, immune function, environmental stressors, toxicology and health of marine mammals. Mystic Aquarium requests the annual collection, receipt, import and export of samples from 5,000 individual cetaceans and 5,000 individual pinnipeds under NMFS jurisdiction for continued research on these species.

Goals, Objectives, and Strategies Table

D.1 / Current Goals, Objectives and Strategies Table

The following table is a summary of the issues, goals, objectives, strategies and performance measures identified in Chapter Six. The “Status” column identifies the current state (initiated or not initiated) of the activity. An “I” in this column indicates if this is an activity that is already underway. The “Type” column indicates if the activity will be repeated (typically annually) and the “Cost Estimate” column identifies the anticipated costs associated with the strategy not including infrastructure maintenance or personnel. Budget categories identified correlate with the CAMA Management Program Teams and NOAA Funded Programs and translate to those used by the Land Management Uniform Cost Accounting Council (pursuant to 259.037, F.S.) Headings: Ecosystem Science, Education and Outreach, and Resource management. Please see Chapter Seven for a detailed overview of RBNERR’s Administration and Facilities Plan.

Objectives/Strategies/Performance Measures	Status	Type	Esti. FTE	Cost Estimate	Plan Year Initiated
<i>I= Initiated, N= Not Initiated, R= Recurring, NR- Not Recurring</i>					
Public Use					
Goal: Ensure user experiences are sustainable and consistent with natural and cultural resource protection for the benefit of existing and future generations.					
Issue One - Objective One: Minimize adverse impacts to natural and cultural resources from incompatible use.					
Research Strategies:					
1. Provide input into the RBNERR State of the Reserve (SOTR) document.	N	R	0.05	\$2,000	2
2. Provide input into the Office of Coastal and Aquatic Managed Areas (CAMA) “State of the Coast”.	N	NR	0.05	\$3,500	2
Resource Management Strategies:					
1. Provide input into the RBNERR State of the Reserve (SOTR) document.	N	R	0.05	\$2,000	2
2. Provide input into the Office of Coastal and Aquatic Managed Areas (CAMA) “State of the Coast”.	N	NR	0.05	\$3,500	2
3. Posting of boundary locations, management regulations and install fencing where appropriate and possible.	I	R	0.15	\$15,000	1
4. Work cooperatively with partner agencies and local, state and federal law enforcement agencies to protect natural and cultural resources within RBNERR.	I	R	0.15	\$51,000	1
5. Utilize trained volunteers to provide additional public information dissemination.	I	R	0.15	\$5,000	1
6. Continue cooperative efforts with local governments.	I	R	0.1	\$3,000	1
Education and Outreach Strategies:					
1. Conduct education and outreach programs for targeted audiences such as marine industries, tourism and visitor’s groups, ecotour providers, and naturalists.	I	R	0.5	\$30,000	1
2. Partner with law enforcement officers and agencies to provide them access to information, tools and training.	I	R	0.05	\$1,500	1
3. Maintain current signage, publications and interpretive exhibits educating various audiences about best stewardship practices for visitors.	I	R	0.05	\$2,000	1
Performance Measures:					
1. Track the number of programs and participants for targeted audiences, such as eco-tour providers and naturalists.	I	R	0.015	\$500	1
2. Measure knowledge or skills gained through post-program surveys.	N	R	0.015	\$2,500	2
3. Track the number of people exposed to RBNERR publications, exhibits or signs.	N	R	0.015	\$500	3
4. Count the number of information submissions to State of the Reserve and State of the Coast coordinators.	N	NR	0.015	\$500	2

Objectives/Strategies/Performance Measures	Status	Type	Esti. FTE	Cost Estimate	Plan Year Initiated
<i>I= Initiated, N= Not Initiated, R= Recurring, NR- Not Recurring</i>					
5. Establish effective methods for surveying and quantifying public-use activities and associated damage to natural and cultural resources.	N	R	0.015	\$5,000	3
6. Find additional funding for the continuation of the "Team Ocean" program that supports a multi-tiered public outreach effort.	I	NR	0.009	\$1,000	1
7. Measure the extent of visitor education contacts delivered by Team Ocean personnel.	I	R	0.015	\$2,000	1
8. Obtain funding to complete an updated cultural resource survey for the northern half of the RBNERR.	N	NR	0.009	\$500	2
9. Track trends in law enforcement citations and incompatible use incidents.	N	R	0.015	\$2,000	2
Issue One - Objective Two: Create and maintain a variety of opportunities for low impact public access and compatible use of the Reserve.					
Research Strategies:					
1. Detrimental effects of public use will be monitored.	N	R	0.009	\$2,500	2
Resource Management Strategies:					
1. Provide public use of RBNERR through the encouragement of traditional, low-impact recreational uses including, but not limited to bird watching, nature photography, hiking and camping.	I	R	0.15	\$4,500	1
2. Develop public access and visitor use projects that are compatible with RBNERR's mission, protect key natural and cultural resources and keep pace with the changing needs of local communities.	I	NR	0.1	\$3,500	1
3. Construct a public access facility for non-motorized vessels.	I	NR	0.15	\$7,500	1
4. Develop and install visitor education signage regarding the responsible use of coastal areas in the RBNERR.	N	NR	0.015	\$15,000	2
5. Complete a trail improvement project for the Sam Williams Island/Isles of Capri Community public access trail.	N	NR	0.1	\$20,000	3
Education and Outreach Strategies:					
1. Provide training and gain access to resources to assist RBNERR staff and other local natural resource managers with the knowledge, tools, and resources necessary to create low impact visitor use opportunities.	N	R	0.15	\$7,500	2
2. Partner with law enforcement officers and agencies to provide them access to information, tools and training.	I	R	0.05	\$1,500	1
3. Continue providing a variety of educational programs and tours that offer visitors a chance to experience the coastal environment while learning about low impact environmental ethics.	I	R	0.15	\$12,500	1
Performance Measures:					
1. Track the number of programs and participants for targeted audiences, such as eco-tour providers and naturalists.	I	R	0.09	\$500	1
2. Measure knowledge or skills gained through post-program	I	R	0.09	\$1,500	1
3. Track the number of people participating in field-based tours and programs.	I	R	0.015	\$500	1
Totals			2.542	\$210,000	

Habitat and Species Management

Goal: Improve the conservation of native biodiversity.

Issue Two - Objective One: Restore and sustain critical habitats within the RBNERR.

Research Strategies:

1. Monitor physical parameters and nutrients of water according to NOAA's System Wide Monitoring Program protocols.	I	R	0.75	\$300,000	1
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Objectives/Strategies/Performance Measures	Status	Type	Esti. FTE	Cost Estimate	Plan Year Initiated
<i>I= Initiated, N= Not Initiated, R= Recurring, NR- Not Recurring</i>					
2. Collect weather data according to NOAA's System Wide Monitoring Program protocols.	I	R	0.15	\$50,000	1
3. Facilitate research to examine the factors affecting the occurrence, extent and biological significance of harmful algal blooms (HABs), mangrove die-offs, seagrass declines, and other biological phenomena.	I	R	0.5	\$50,000	1
4. Gather data and monitor for changes in plant communities over time.	N	R	0.15	\$10,000	3
Resource Management Strategies:					
1. Implement where possible the principles of adaptive management including habitat restoration, habitat creation, habitat mitigation and habitat maintenance activities.	I	R	0.2	\$15,000	1
2. Maintain and strengthen the RBNERR's prescribed fire management program.	I	R	0.15	\$75,000	1
3. Incorporate volunteers into appropriately skilled activities and outreach opportunities.	N	R	0.03	\$6,500	2
4. Assure that staff acquire and maintain the appropriate level of training and/or licensing needed to properly and efficiently manage the Reserve's natural resources.	I	R	0.03	\$5,000	1
5. Initiate project activities for the Fruit Farm Creek Mangrove Restoration Project that will include activities regarding the assessment of previous research, identification of funding, engineering planning, permitting, and initiation of subsequent on-the-ground work needed to move project forward.	I	NR	0.15	\$5,000	1
6. Complete and finalize a new set of ground-truthed vegetative habitat maps for the Reserve. These maps will identify sensitive areas that warrant more intensive monitoring and management.	I	NR	0.2	\$7,500	1
7. Determine locations for geodetically controlled data gathering stations that can be monitored for vegetation changes in key sensitive habitats located in areas identified as vulnerable to sea-level rise.	N	NR	0.1	\$5,000	2
8. Forge partnerships with local government agencies and non-governmental organizations that will help RBNERR staff to facilitate the planning and initiation of efforts to restore natural resources impacted by humans.	I	R	0.2	\$5,000	1
9. Complete the RBNERR Vertical Control Plan and establish appropriate phases of a local network.	N	NR	0.05	\$5,000	3
10. Establish and maintain strong partnerships and work-agreements with other agency fire management/control programs and maintain and update all trainings and certifications for RBNERR fire team staff.	I	R	0.05	\$5,000	1
Education and Outreach Strategies:					
1. Conduct education, training and outreach programs for targeted audiences such as GIS users, land-use planner, elected and appointed officials, natural resource managers, landscapers, ecotour providers and naturalists.	I	R	0.15	\$15,000	1
2. Partner with entities with a vested interest in habitat and species management and provide them and RBNERR staff with increased access to information, tools or training and cooperatively address issues.	I	R	0.05	\$2,500	1
3. Maintain interpretive signage, outreach publications, exhibits and educational programs at the ELC.	I	R	0.015	\$6,500	1
Performance Measures:					
1. Track the number of programs and participants for targeted audiences, such as ecotour providers and naturalists.	I	R	0.015	\$250	1
2. Measure knowledge or skills gained through post program surveys.	I	R	0.015	\$500	1

Objectives/Strategies/Performance Measures	Status	Type	Esti. FTE	Cost Estimate	Plan Year Initiated
<i>I= Initiated, N= Not Initiated, R= Recurring, NR- Not Recurring</i>					
3. Track the number of visitors to the ELC that are exposed to RBNERR exhibits or who participate in educational programs that address critical wildlife habitat.	I	R	0.015	\$500	1
4. Maintain training database identifying all training/licenses obtained, required and renewal status.	N	R	0.015	\$500	2
Issue Two - Objective Two: Reduce non-native invasive plant and animal species.					
Research Strategies:					
1. Support visiting investigators conducting research on invasive species.	N	NR	0.01	\$2,500	2
Resource Management Strategies:					
1. Remove and/or control Florida Exotic Pest Plant Control Council Category I and Category II, invasive exotic plant species within RBNERR managed lands.	I	R	0.5	\$45,000	1
2. Remove and/or control non-native invasive wildlife species within RBNERR managed lands	I	R	0.1	\$10,000	1
3. Implement preventative and protective measures to avoid or reduce the new establishment of non-native species.	I	R	0.1	\$7,500	1
4. Proactively respond to new, non-native species invasions with the intention of their removal and/or control.	N	R	0.1	\$5,000	2
5. Control existing invasive species consistent with state and federal protocol to minimize non-target damage.	I	R	0.1	\$500	1
6. Maintain GIS database of invasive species and treated capture sites.	N	R	0.09	\$5,000	3
7. Maintain and/or acquire appropriate level of training/licensing.	I	R	0.015	\$2,500	1
8. Work with state government to identify approved applicable bio-controls for use in control or eradication of invasives.	N	R	0.015	\$2,500	2
Education and Outreach Strategies:					
1. Conduct education, training and outreach programs for targeted audiences such as landscape and lawn care providers, natural resource managers, city and county staff, realtors, homeowner associations, ecotour providers, and naturalists.	N	R	0.15	\$4,500	3
2. Partner with entities with a vested interest in non-native species management to provide them, and RBNERR staff with increased access to information, tools or training and cooperatively address issues.	N	R	0.15	\$2,500	2
3. Maintain current signage, outreach publications and interpretive exhibits at the ELC that educate various audiences about invasive, non-native species.	I	R	0.015	\$1,500	1
Performance Measures:					
1. Track the number of programs and participants for targeted audiences, such as ecotour providers and naturalists.	I	R	0.015	\$500	1
2. Measure knowledge or skills gained through post program surveys.	I	R	0.015	\$500	1
3. Track the number of people visiting the ELC who are exposed to RBNERR publications, interpretive exhibits or programs that address the challenges posed by non-native invasive species.	N	R	0.015	\$250	2
4. Track the number of visiting investigators conducting research on invasive species in RBNERR.	N	R	0.09	\$500	2
5. Track the number of acres treated and number of animals removed.	N	R	0.015	\$1,500	2
6. Document active participation in local Cooperative Invasive Species Management Areas.	N	R	0.09	\$500	2

Objectives/Strategies/Performance Measures	Status	Type	Esti. FTE	Cost Estimate	Plan Year Initiated
<i>I= Initiated, N= Not Initiated, R= Recurring, NR- Not Recurring</i>					
7. Measure the reduction of invasive non-native plant and wildlife species within RBNERR managed habitats compared to adjacent unmanaged landscapes.	N	R	0.02	\$2,500	3
8. Maintain training database identifying all training and licenses obtained, required and renewal status.	N	R	0.015	\$500	2
Issue Two - Objective Three: Maintain natural fire ecology of pyrogenic habitats through implementation of natural fire regimes.					
Research Strategies:					
1. Map pyrogenic habitats to monitor size and boundaries of habitats for use in management activities.	N	R	0.2	\$2,500	2
Resource Management Strategies:					
1. Use fire as a tool to restore the natural processes of critical habitats and to support listed species recovery efforts.	I	R	0.5	\$125,000	1
2. Reduce hazards associated with past fire suppression through the implementation of fire and/or mechanical fuels reduction.	I	R	0.2	\$30,000	1
3. Dedicate, maintain and procure adequate and reliable equipment and ensure staff are adequately trained to implement the RBNERR's prescribed fire program.	I	R	0.2	\$10,000	1
Education and Outreach Strategies:					
1. Use the interpretive opportunities available at the ELC to educate the public about the importance and value of maintaining the natural fire ecology of pyrogenic habitats.	I	R	0.09	\$5,000	1
Performance Measures:					
1. Track number acres of fire hazard reduced, acres of habitats restored and acres of habitats sustained in a prescribed successional rotation as they relate to the RBNERR Prescribed Fire Plan.	I	R	0.09	\$500	1
2. Track the number of acres of pyrogenic habitat burned by prescribed fire that will provide enhanced and restored conditions for listed species such as Gopher tortoises, Indigo snakes, and Scrub Jays.	I	R	0.015	\$500	1
3. Track the extent of RBNERR assistance provided to various local, state, and federal agencies in prescribed fire, wildfire suppression and related activities.	I	R	0.015	\$500	1
4. Review maintenance logs for all vehicles, vessels and equipment.	I	R	0.015	\$250	1
Issue Two - Objective Four: Research, manage, and protect state and federal listed species in their recovery while assisting federal, state and local agencies, and private organization efforts to do the same.					
Research Strategies:					
1. Monitor beach/dune habitat size and locations in RBNERR.	N	R	0.15	\$7,500	3
2. Evaluate the status of and monitor protected wildlife species within RBNERR, with a specific focus on sea turtles, wading birds, shorebirds, American crocodile, Florida panther, Eastern indigo snake, gopher tortoise and the West Indian manatee.	N	R	0.25	\$23,500	2
3. Develop GIS database of protected species negatively impacted by nuisance species.	N	R	0.015	\$3,500	3
Resource Management Strategies:					
1. Utilize data from research and monitoring efforts to develop management recommendations with a specific focus on listed species of fauna such as sea turtles, wading birds, shorebirds, American crocodile, Florida panther, Eastern indigo snake, gopher tortoise and the West Indian manatee.	N	R	0.15	\$12,500	3
2. Utilize data from research and monitoring efforts to develop management recommendations with a specific focus on protected plant species such as Curtiss' milkweed, sand dune spurge, butterfly orchid, wild pine, fuzzy wuzzy, and sweetscented pigeonwings.	N	R	0.15	\$10,000	3
3. Control nuisance wildlife species that are negatively impacting imperiled species within RBNERR managed lands.	I	R	0.15	\$15,000	1

Objectives/Strategies/Performance Measures	Status	Type	Esti. FTE	Cost Estimate	Plan Year Initiated
<i>I= Initiated, N= Not Initiated, R= Recurring, NR- Not Recurring</i>					
4. Continue active involvement with marine mammal stranding network including attending update meetings, trainings and providing community awareness of partner efforts.	I	R	0.25	\$8,500	1
5. Complete a RBNERR "Species Management Plan" focusing on listed species and providing management recommendations for both flora and fauna.	N	NR	0.15	\$3,500	3
6. Develop and implement a "Nuisance Animal Control Plan" based on GIS database developed in conjunction with research staff.	N	NR	0.15	\$2,500	2
Education and Outreach Strategies:					
1. Conduct education, training and outreach programs for targeted audiences, such as landscape and lawn care providers, natural resource managers, homeowners associations, realtors, eco-tour providers and naturalists, and the general public that incorporates the best available science, identification of listed species, the value of them and associated stewardship practices.	I	R	0.15	\$12,500	1
2. Partner with entities with a vested interest in listed species management to provide them, and RBNERR staff with increased access to information, tools or training and cooperatively address issues.	I	R	0.2	\$5,000	1
3. Maintain current outreach publications, interpretive exhibits and educational programs at the ELC that address the importance of protecting listed species.	I	R	0.15	\$7,500	1
Performance Measures:					
1. Track the number of programs and participants for targeted audiences, such as landscapers, ecotour providers and naturalists.	I	R	0.015	\$500	1
2. Measure knowledge or skills gained through post-program surveys.	I	R	0.015	\$1,500	1
3. Track the number of visitors to the ELC exposed to programs or products that address the importance of protecting listed species.	I	R	0.09	\$500	1
4. Track the number of nesting shorebird monitoring trips and miles of beach monitored.	N	R	0.09	\$2,500	2
5. Track the number of nesting sea turtle monitoring trips and miles of beach monitored.	I	R	0.15	\$2,500	1
6. Track the number of incidents of protected species negatively impacted by nuisance species.	N	R	0.15	\$2,500	2
Totals			8.355	\$961,250	

Cultural Resource Management

Goal: Enhance the preservation of the RBNERR's cultural resources through good science resulting in informed management practices.

Issue Three - Objective One: Complete cultural resource assessment surveys within the RBNERR boundary.

Research Strategies:

1. Conduct assessments and facilitate research efforts on cultural resources within the RBNERR focusing on those most vulnerable to damage from sea level rise, erosion, and human activities	I	R	0.15	\$8,500	1
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Resource Management Strategies:

1. Utilize data from research and monitoring efforts to develop management recommendations for cultural and historical resources with a specific focus on those resources most vulnerable to sea level rise, erosion, and human activities (development).	N	R	0.2	\$5,000	2
2. Provide for safe, secure, and effective cultural and historical resource management activities for RBNERR personnel and volunteers.	I	R	0.1	\$2,500	1

Objectives/Strategies/Performance Measures	Status	Type	Esti. FTE	Cost Estimate	Plan Year Initiated
<i>I= Initiated, N= Not Initiated, R= Recurring, NR- Not Recurring</i>					
3. Utilize RBNERR GIS capabilities to utilize the latest LiDAR data and digital aerial photography to identify, locate, and assess previously unknown cultural resource sites.	I	R	0.15	\$6,500	1
4. Identity the location and condition of all artifacts previously collected by both amateur and professional archaeologists in RBNERR and provide recommendations as to the management of all related data and artifacts.	N	NR	0.15	\$12,500	3
5. Complete the RBNERR "Cultural & Historical Resource Management Plan". Include management recommendations that focus on resources most vulnerable to sea level rise, erosion, and human activities.	N	NR	0.1	\$2,500	2
6. Assemble a "Scope of Collections" document, including a catalog and inventory of all RBNERR artifacts in permanent collections held at RBNERR or other known agencies (DHR) or institutions (universities and/or museums) and include in the RBNERR "Cultural and Historical Resource Management Plan".	N	NR	0.09	\$2,500	3
Performance Measures:					
1. Number of cultural resource sites assessed, as well as, sites newly recorded and/or updated In the Florida Department of Historical Resources Master Site File list.	I	R	0.1	\$1,500	1
2. Number of new cultural resource sites discovered with aid from newest available LiDAR data and digital aerial imagery.	I	R	0.09	\$500	1
3. Update and maintain Florida Master Site File forms for all known but unrecorded sites.	I	R	0.015	\$500	1
4. Track efforts to get the RBNERR designated as a Cultural Historic District.	N	NR	0.015	\$500	3
5. Number of new projects provided support by RBNERR GIS specialist.	I	R	0.015	\$500	1
Issue Three - Objective Two: Develop an effective monitoring and education approach to help maintain and conserve known archaeological sites and their associated artifact assemblage from vandalism, erosion and other forms of degradation.					
Research Strategies:					
No core strategies					
Resource Management Strategies:					
1. Explore effective methods to discourage vandalism and other disturbance of resources.	I	R	0.09	\$1,500	1
2. Seek professional archaeological assessments to document and determine feasibility of relocation, re-creation and repair of historic structures.	N	NR	0.15	\$8,500	3
3. Erect fencing and other measures of protection around chosen resource sites deemed vulnerable to human activities.	I	R	0.1	\$12,000	1
4. Relocate, recreate, and repair historic sites and related structures if applicable and if feasible as directed by professional archeological assessment.	I	R	0.1	\$15,000	1
Education and Outreach Strategies:					
1. Conduct education, training and outreach programs for targeted audiences that incorporates the best available science, the value of cultural resources and their associated cultures, and appropriate resource management practices.	I	R	0.25	\$15,500	2
2. Utilize the ELC interpretive exhibits and guided walks to develop public appreciation for the value of RBNERR's cultural resources.	I	R	0.09	\$6,500	1
Performance Measures:					
1. Track the number of programs and participants for targeted audiences and measure the knowledge of said audiences, including cultural resource managers, eco-tour providers, naturalists, and the general public, gained through post-program surveys.	N	R	0.015	\$2,500	2

Objectives/Strategies/Performance Measures	Status	Type	Esti. FTE	Cost Estimate	Plan Year Initiated
I= Initiated, N= Not Initiated, R= Recurring, NR- Not Recurring					
2. Track the number of visitors to the ELC and those participating in guided walks.	I	R	0.15	\$5,000	1
Totals			2.12	\$110,000	

Land Use Impacts

Goal: Minimize adverse environmental impacts from land use while restoring the ecosystem services.

Issue Four - Objective One: Promote informed coastal decisions by providing science-based information and education to targeted audiences including elected officials, government agencies and the private sector.

Research Strategies:

1. Strategically engage RBNERR staff in local and regionally comprehensive land use planning efforts conducted by the Southwest Florida Water Management District, Collier County, City of Naples and City of Marco Island.	I	R	0.5	\$15,000	1
2. Position RBNERR staff to be regionally recognized for input during land use and watershed decisions.	N	NR	0.15	\$1,500	2
3. Strategically identify and actively support RBNERR partnerships with communities, agencies and organizations at the local, regional, national and international levels that will provide mutual benefits and advance RBNERR's mission.	N	R	0.1	\$8,500	2
4. Provide GIS support for education and training programming targeting coastal decision makers to encourage BMPs for RBNERR's watershed as requested.	N	R	0.1	\$5,500	2
5. Attend land use decision meetings hosted by regulatory agencies and others to proactively provide environmental research-based comments.	I	R	0.15	\$7,500	1

Resource Management Strategies:

1. Encourage watershed-scale ecosystem management principles to be included in the city and county comprehensive plans.	N	NR	0.05	\$5,000	2
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Education and Outreach Strategies:

1. Conduct education, training and outreach programs to targeted audiences, such as landscape and lawn care providers, elected and appointed officials, land use planners, stormwater managers, developers, regulatory agencies, realtors, homeowners associations, marine industries, etc., and the general public, that incorporates the best available science, decision-making related to land use issues, and associated stewardship practices.	I	R	0.5	\$35,000	1
2. Partner with entities with a vested interest in land use planning and impacts to provide them and RBNERR with increased access to information, tools or training and cooperatively address issues.	N	R	0.2	\$15,000	2
3. Utilize RBNERR's Coastal Training Program to disseminate information, provide training or create demonstration projects about land use planning and associated impacts to a range of audiences.	N	R	0.4	\$24,500	3
4. Develop web-based distribution methods of information related to land-use planning decision making.	N	NR	0.2	\$15,000	2
5. Provide training and gain access to resources to assist RBNERR staff and other natural resource managers and local government staff with the knowledge, tools and resources necessary to address land-use planning and associated impacts.	N	R	0.2	\$12,500	3

Performance Measures:

1. Track the number of programs and participants for targeted audiences, such as landscaper and stormwater managers.	I	R	0.015	\$1,500	1
2. Measure knowledge gained through post-program surveys.	I	R	0.09	\$1,200	1
3. Track outputs and products associated with partnering efforts.	N	R	0.015	\$2,500	2

Objectives/Strategies/Performance Measures	Status	Type	Esti. FTE	Cost Estimate	Plan Year Initiated
<i>I= Initiated, N= Not Initiated, R= Recurring, NR- Not Recurring</i>					
4. Number of land use planning meetings or conference calls attended.	I	R	0.09	\$500	1
5. Number of GIS training sessions administered or maps produced.	I	R	0.03	\$500	1
Issue Four - Objective Two: To the greatest extent possible, restore natural flow-ways and freshwater hydroperiods to assure the correct quality, quantity and timing of freshwater entering into the Reserve's estuaries.					
Research Strategies:					
1. Monitor physical parameters and nutrients of water according to NOAA's System Wide Monitoring Program protocols.	See Issue 2, Objective 1				
2. Collect weather data according to NOAA's System Wide Monitoring Program protocols.		See Issue 2, Objective 1			
3. Provide water quality data, when requested, to facilitate conservation of natural flow-ways.	I	R	0.2	\$10,000	1
Resource Management Strategies:					
1. Collaborate with other agencies to restore and protect natural freshwater inflows to the fullest extent possible.	I	R	0.25	\$8,500	1
2. Establish adequate long-term control of key land and water resources and essential buffer areas necessary for the protection of RBNERR resources.	I	R	0.15	\$5,000	1
Performance Measures:					
1. Number of times water quality equipment retrieved and water samples taken.	I	R	0.09	\$500	1
2. Number of times weather station calibrated or serviced.	I	R	0.09	\$500	1
3. Number of requests for water quality data.	I	R	0.09	\$250	1
4. Ensure that RBNERR remains listed on the "Priority Water body List" of the South Florida Water Management District.	N	NR	0.015	\$500	2
5. Establish "Minimum Flows and Levels" for Henderson Creek, as well as other tributaries if applicable.	N	NR	0.15	\$7,500	3
6. Establish "Water Reservations" for applicable areas of the RBNERR.	N	NR	0.5	\$12,500	3
Issue Four - Objective Three: Increase land acquisition for environmental protection within the Rookery Bay watershed.					
Research Strategies:					
1. Identify wetlands, flow-ways, critical habitats, conservation areas, cultural sites and lands uses within RBNERR and its watershed in need of protection and/or restoration utilizing GIS database developed by the RBNERR research staff.	N	NR	0.2	\$8,500	3
Resource Management Strategies:					
1. Work with local government agencies, institutions, and private land owners to minimize habitat fragmentation within RBNERR's watershed.	I	R	0.25	\$7,500	1
2. Work with local government agencies, institutions, and private land owners to identify and maximize functional wildlife corridors within RBNERR watershed.	I	R	0.25	\$7,500	1
Performance Measures:					
1. Number of sites identified for protection and/or restoration.	I	R	0.015	\$1,500	1
2. Number of acres of habitat-fragmentation minimized.	N	R	0.09	\$500	2
3. Number of wildlife corridors identified and protected.	N	R	0.09	\$500	2
4. Prioritized list of land acquisition of out-parcels within RBNERR's watersheds.	N	NR	0.15	\$2,500	3
Totals			5.37	\$224,950	

Objectives/Strategies/Performance Measures	Status	Type	Esti. FTE	Cost Estimate	Plan Year Initiated
<i>I= Initiated, N= Not Initiated, R= Recurring, NR- Not Recurring</i>					
Informed Community and Individual Action					
Goal: To increase the community's level of awareness, knowledge, skills and sense of value for the coastal environment that would result in positive attitudinal and behavioral change.					
Issue Five - Objective One: Promote active stewardship by increasing the community's understanding of the value of coastal resources.					
Research Strategies:					
1. Facilitate and support research in RBNERR conducted by visiting investigators, through partnerships with universities, research institutions, agencies, etc.	I	R	0.15	\$15,000	1
2. Provide a steady stream of information and updates on scientific research and environmental conditions to the community at large as well as targeted audiences in the scientific and resource management communities.	I	R	0.25	\$7,500	1
3. Establish Research Advisory Committee comprised of representatives from regional agencies and institutions, including, but not limited to, Florida Gulf Coast University, Edison State College, and United States Geological Survey.	I	R	0.1	\$2,500	1
Resource Management Strategies:					
1. Work with the RBNERR Education and Coastal Training Programs to provide them with information regarding the most current and applicable land management tools currently being utilized by the RBNERR Stewardship team.	I	R	0.15	\$4,000	1
Education and Outreach Strategies:					
1. Conduct education, training and outreach programs for a variety of targeted audiences that incorporates the best available science and stewardship practices while emphasizing the value of coastal resources.	I	R	0.25	\$25,000	1
2. Partner with entities with a vested interest in environmental education to provide them, and RBNERR staff, with increased access to information, tools, or training to cooperatively address issues.	I	R	0.15	\$12,500	1
3. Maintain current signage, outreach publications, websites and interpretive exhibits educating about coastal stewardship.	I	R	0.75	\$9,500	1
4. Work in partnership with the FORB to sustain a robust and effective local grassroots community organization that supports all key elements of the RBNERR mission.	I	R	0.25	\$18,500	1
5. Develop, conduct and sustain a robust community volunteer program that effectively engages students and adults in stewardship activities.	I	R	1.0	\$23,500	1
6. Enhance and maintain communication systems for RBNERR personnel and with the local community, key partners, agencies, and through email, voicemail, networking, etc.	I	R	0.2	\$20,000	1
Performance Measures:					
1. Number of programs and participants for targeted audiences such as ecotour providers, Estuary Explorers, Florida Master Naturalist programs, etc.	I	R	0.2	\$2,500	1
2. Measure knowledge gained through post-program surveys.	I	R	0.09	\$3,500	1
3. Number of educational outreach products produced and distributed to the public.	N	R	0.1	\$2,500	2
4. Number of visitors to the ELC and its activities, exhibits, and programs.	I	R	0.2	\$2,500	1
5. Track outputs and products associated with partnering efforts.	N	R	0.3	\$7,500	3
6. Number of volunteers and hours of volunteering.	I	R	0.25	\$7,500	1
7. Track the amount of RBNERR staff time contributed to the FORB partnership.	N	R	0.2	\$2,500	3
8. Number of visiting investigators.	I	R	0.15	\$3,500	1

Objectives/Strategies/Performance Measures	Status	Type	Esti. FTE	Cost Estimate	Plan Year Initiated
<i>I= Initiated, N= Not Initiated, R= Recurring, NR- Not Recurring</i>					
9. Number of scientific summary documents and presentations delivered to the community at large.	N	R	0.09	\$2,500	2
10. Number of Advisory Committee meetings.	I	R	0.09	\$2,500	1
11. Number of meetings held to transmit information to the Education and CTP teams regarding Land Management tools currently being used by RBNERR staff.	I	R	0.015	\$1,500	1
Totals			4.935	\$176,500	

Global and Regional Change Events

Goal: To determine appropriate level of response and serve as a regional clearinghouse of accurate and credible science-based information and a coordinator of appropriate response for partners and the general public related to global and meteorological change events, catastrophic environmental events (both natural and human-induced) and harmful algal blooms (HAB).

Issue Six - Objective One: Develop and sustain effective regional networks with local and regional environmental interests and disseminate the best available scientific information regarding significant change events such as climate change, catastrophic events such as the Deepwater Horizon oil spill and the occurrence of HABs.

Research Strategies:

1. Work in partnership with NOAA and other agencies to access up-to-date data and projection on sea level rise.	N	R	0.15	\$4,500	3
2. Work in partnership with NOAA, United States Coast Guard, and other agencies to access up-to-date science-based information related to human-induced environmental catastrophic events.	N	NR	0.1	\$3,500	2
3. Work in partnership with NOAA and other agencies to access current algal bloom predictions/projections on HABs.	N	NR	0.1	\$3,500	2
4. Conduct baseline data collection of water, fish, and habitat characteristics to monitor changes associated with major events.	I	R	0.25	\$7,500	1

Resource Management Strategies:

1. Provide GIS support for climate change and sea level rise educational and research initiatives.	N	R	0.15	\$6,000	3
2. Ensure RBNERR's preparedness for future possible oil spill incidents.	I	R	0.1	\$3,000	1
3. Ensure that RBNERR "Vertical Control Plan" goals and outcomes integrate common goals and outcomes of adjacent land management agencies.	N	NR	0.015	\$2,500	3
4. Update the RBNERR's oil spill response plan.	N	NR	0.1	\$3,500	2
5. Complete the RBNERR Vertical Control Plan and establish appropriate phases of local network.	N	NR	0.15	\$7,500	3

Education and Outreach Strategies:

1. Partner with entities with a vested interest in responding to catastrophic events, such as NOAA and other federal, state and regional agencies and entities, to provide them and RBNERR with increased access to information.	I	R	0.15	\$5,000	1
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Performance Measures:

1. Track outputs and products associated with partnering efforts.	N	R	0.015	\$2,500	2
2. Determine trends in long-term planning for habitat migration resulting from climate change and sea level rise.	N	NR	0.1	\$7,500	3
3. Number of requests made by RBNERR staff for data and projections of significant change events.	N	R	0.09	\$3,000	2
4. Number of sites in RBNERR where baseline data is collected.	I	R	0.09	\$2,500	1
5. Track number of times that GIS support is provided for climate change and sea level rise educational and research initiatives.	N	R	0.09	\$2,500	2

Totals			1.65	\$64,500	
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D.2 / Budget Summary Table

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

Estimated Program Costs \$7,623,250		
Public Use	10.50%	\$800,500
Habitat Species Management	59.28%	\$4,519,000
Cultural Resource Management	5.52%	\$421,000
Landuse Impacts	10.87%	\$828,750
Informed Community and Individual Action	11.25%	\$857,500
Global and Regional Change events	2.58%	\$196,500
	100.00%	\$7,623,250

Rookery Bay National Estuarine Research Reserve 5 Year Plan		
Estimated Personnel: 25 FTE's		
Public Use	10%	2.542
Habitat Species Management	33%	8.355
Cultural Resource Management	8%	2.12
Landuse Impacts	22%	5.37
Informed Community and Individual Action	20%	4.935
Global and Regional Change events	7%	1.65
		25.0

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

**Major Accomplishments
Rookery Bay National Estuarine Research Reserve
Management Plan 2000**

Goal: Restore natural freshwater inflow quality and quantity

Accomplishments: RBNERR made significant progress in working collaboratively with USFWS, NOAA, SFWMD, DEP, adjacent landowners, Collier County and local land use planners to:

- a) Successfully acquire key outparcels,
- b) Develop the Belle Meade Stormwater Master Plan, and
- c) Design and construct a hydrologic restoration project for Shell Island Road.

Goal: Protect and restore natural ecological functions and cultural sites

Accomplishments: RBNERR made significant progress in working collaboratively with FWC, DRP, DOF, NOAA and USFWS to:

- a) Establish effective seasonal shorebird nesting protected areas near Cape Romano that rank among the state's largest colonies of least terns,
- b) Establish an effective prescribed burn program with rotational plans for key habitats,
- c) Establish a successful summer sea turtle monitoring and ongoing program, currently implemented annually by trained college interns funded through NOAA.

Goal: Promote compatible public use while minimizing conflicts

Accomplishments: RBNERR worked on partnership with NOAA, FWC, FORB, and Florida Sea Grant to:

- a) Establish new public access sites within RBNERR, including the ELC bridge and boardwalk, South Key Island trails, and Isles of Capri Park,
- b) Develop a successful partnership with FWC law enforcement, including establishing a FWC field office with RBNERR, resulting in a significant increase in public use compliance through enhanced law enforcement presence and education.

Goal: Seek NOAA approval for RBNERR boundary expansion

Accomplishments: RBNERR worked in partnership with NOAA and DEP to:

Secure NOAA and State approval for an expanded RBNERR boundary of 110,000 acres, over a ten-fold increase in the RBNERR boundary.

Goal: Identify natural freshwater inflows needed for long-term conservation of natural biodiversity

Accomplishments: RBNERR successfully implemented the NERRS System Wide Monitoring Program to deploy a network of monitoring stations that inform SFWMD of restoration response in the Ten Thousand Islands estuary.

Goal: Assess effectiveness of invasive plant management, prescribed fire and wetlands restoration activities.

Accomplishments: RBNERR established an effective Geographic Information Systems (GIS) database that informs coastal managers based on analysis of spatial data.

Goal: Increase public awareness of estuaries and coastal issues, assess policymaker information needs and provide training, and provide for compatible public access.

Accomplishments: In partnership with NOAA, DEP, FORB, and local community interests, RBNERR successfully completed construction of the Environmental Learning Center in 2003. The ELC includes interactive exhibits, live specimen aquariums, pedestrian bridge and boardwalk, auditorium, classrooms, and four research labs. The ELC currently receives thousands of visitors annually, serves as the host site for hundreds of school-based education programs, and annual signature events including Estuary Day, Dive Into Oceans, and The Southwest Florida Nature Festival.

RBNERR's Coastal Training Program has served as the national model for the NERRS System, designing and conducting targeted training programs for local policymaker and professionals including:

- **“State of the Coast”** conference for Southwest Florida policymakers,
- **Eco-tour Operator Workshops** to enhance stewardship,
- **Best Management Practice Training for Landscapers** to reduce use of fertilizers and pesticides and reduce stormwater runoff to coastal waters.

Division of State Lands/Acquisition and Restoration Council Requirements

E.1 / Acquisition and Restoration Council Management Plan Compliance Checklist

Management Plan Compliance Checklist - Natural Resource Lands	
Requirements	Page No.
18-2.021 Acquisition and Restoration Council.	
1. Executive Summary. This should be included in the packet and should be the first page.	Ex. Sum.
Management Plans. Plans submitted to the division for ARC review under the requirements of Section 253.034 F.S. should be in a form and manner prescribed by rule by the board and in accordance with the provisions of S. 259.032 and should contain where applicable to the management of resources the following:	
2. The common name of the property.	Ex. Sum.
3. A map showing the location and boundaries of the property plus any structures or improvements to the property.	p. 3
4. The legal description and acreage of the property.	Ex. Sum. & p. 2
5. The degree of title interest held by the Board, including reservations and encumbrances such as leases.	Ex. Sum. & p. 2
6. The land acquisition program, if any, under which the property was acquired.	Ex. Sum. & p. 22
7. The designated single use or multiple use management for the property, including other managing agencies.	Ex. Sum. & p. 50
8. Proximity of property to other significant state/local/federal land or water resources. May be included in the map in item #2.	p. 35 & 37
9. A statement as to whether the property is within an Aquatic Preserve or a designated Area of Critical State Concern or an area under study for such designation. If yes, make sure appropriate managing agencies are notified of the plan.	p. 1-3
10. The location and description of known and reasonably identifiable renewable and non-renewable resources of the property including, but not limited to, the following:	
A. Brief description of soil types, using U.S.D.A. maps when available;	p. 25-26
B. Archaeological and historical resources*;	p.33-34 & 213-215
C. Water resources including the water quality classification for each water body and the identification of any such water body that is designated as an Outstanding Florida Waters;	p. 18 & 26-28
D. Fish and wildlife and their habitat;	p. 29-33 & 174-181
E. State and federally listed endangered or threatened species and their habitat;	p. 174-176
F. Beaches and dunes;	p. 179
G. Swamps, marshes and other wetlands;	p. 31-32 & 180
H. Mineral resources, such as oil, gas and phosphate;	p. 26
I. Unique natural features, such as coral reefs, natural springs, caverns, large sinkholes, virgin timber stands, scenic vistas, and natural rivers and streams; and	Ex. Sum., p. 34-35 & 96
J. Outstanding native landscapes containing relatively unaltered flora, fauna, and geological conditions.	p. 1 & 34
11. A description of actions the agency plans , to locate and identify unknown resources such as surveys of unknown archeological and historical resources.	p. 64-66
12. The identification of resources on the property that are listed in the Florida Natural Areas Inventory. <i>Include letter from FNAI or consultant, where appropriate.</i>	p. 29-32, 96 & 185-188
13. A description of past uses, including any unauthorized uses of the property.	p. 53
14. A detailed description of existing and planned use(s) of the property.	p. 53-56 & 83-87
15. A description of alternative or multiple uses of the property considered by the managing agency and an explanation of why such uses were not adopted.	p. 50
16. A detailed assessment of the impact of planned uses on the renewable and non-renewable resources of the property and a detailed description of the specific actions that will be taken to protect, enhance and conserve these resources and to mitigate damage caused by such uses.	p. 67-72

Management Plan Compliance Checklist - Natural Resource Lands

Requirements	Page No.
17. A description of management needs and problems for the property.	p. 51-77
18. Identification of adjacent land uses that conflict with the planned use of the property, if any.	p. 67
19. A description of legislative or executive directives that constrain the use of such property.	p. 7, 16-20 & 162
20. A finding regarding whether each planned use complies with the State Lands Management Plan adopted by the Trustees on March 17, 1981, and incorporated herein by reference, particularly whether such uses represent "balanced public utilization", specific agency statutory authority, and other legislative or executive constraints.	p. 16-17
21. An assessment as to whether the property, or any portion, should be declared surplus.	p. 22
22. Identification of other parcels of land within or immediately adjacent to the property that should be purchased because they are essential to management of the property. Clearly defined map of parcels can be used.	p. 91-93
23. A description of the management responsibilities of each agency and how such responsibilities will be coordinated, including a provision that requires that the managing agency consult with the Division of Archives, History and Records Management before taking actions that may adversely affect archaeological or historic resources.	p. 64 & 301-302
24. A statement concerning the extent of public involvement and local government participation in the development of the plan, if any, including a summary of comments and concerns expressed.	p. 272-283
Additional Requirements - Per Trustees	
25. Letter of Compliance of the management plan with the Local Government Comprehensive Plan. Letter from local government saying that the plan is in compliance with local government's comprehensive plan.	p. 300
253.034 State-Owned Lands; Uses. - Each entity managing conservation lands shall submit to the Division of State Lands a land management plan at least every 10 years in a form and manner prescribed by rule by the Board.	
26. All management plans, whether for single-use or multiple-use properties, shall specifically describe how the managing entity plans to identify, locate, protect and preserve, or otherwise use fragile nonrenewable resources, such as archaeological and historic sites, as well as other fragile resources, including endangered plant and animal species.	p. 56-75
27. The management plan shall provide for the conservation of soil and water resources and for the control and prevention of soil erosion.	p. 56-75
28. Land management plans submitted by an entity shall include reference to appropriate statutory authority for such use or uses and shall conform to the appropriate policies and guidelines of the state land management plan.	p. 16-19
29. All land management plans for parcels larger than 1,000 acres shall contain an analysis of the multiple-use potential of the parcel, which analysis shall include the potential of the parcel to generate revenues to enhance the management of the parcel.	p. 50
30. Additionally, the land management plan shall contain an analysis of the potential use of private managers to facilitate the restoration or management of these lands.	p. 302
31. A physical description of the land.	p. 22-32
32. A desired outcome.	Ex. Sum., p. 40-41, 45 & 185
33. A quantitative data description of the land which includes an inventory of forest and other natural resources; exotic and invasive plants; hydrological features; infrastructure, including recreational facilities; and other significant land, cultural, or historical features.	p. 23-34
34. A detailed description of each short-term and long-term land management goal, the associated measurable objectives, and the related activities that are to be performed to meet the land management objectives. Each land management objective must be addressed by the land management plan, and where practicable, no land management objective shall be performed to the detriment of the other land management activities.	p. 53-77 & 284-294
35. A schedule of land management activities which contains short-term and long-term land management goals and the related measurable objectives and activities. The schedule shall include for each activity a timeline for completion, quantitative measures, and detailed expense and manpower budgets. The schedule shall provide a management tool that facilitates development of performance measures.	p. 53-77 & 284-295

Management Plan Compliance Checklist - Natural Resource Lands

Requirements	Page No.
36. A summary budget for the scheduled land management activities of the land management plan. For state lands containing or anticipated to contain imperiled species habitat, the summary budget shall include any fees anticipated from public or private entities for projects to offset adverse impacts to imperiled species or such habitats, which fees shall be used solely to restore, manage, enhance, repopulate, or acquire imperiled species habitat. The summary budget shall be prepared in such a manner that it facilitates computing an aggregate of land management costs for all state-managed lands using the categories described in s. 259.037(3).	p. 284-295
37. Each management plan shall describe both short-term and long-term management goals, and include measurable objectives to achieve those goals. <i>Short-term and long-term management goals shall include measurable objectives for the following, as appropriate:</i>	p. 56-64 & 285-289
(A) Habitat restoration and improvement;	
(B) Public access and recreational opportunities;	p. 53-56 & 284-285
(C) Hydrological preservation and restoration;	p. 69-72 & 292
(D) Sustainable forest management;	p. 288
(E) Exotic and invasive species maintenance and control;	p. 60-61 & 287-288
(F) Capital facilities and infrastructure;	p. 285
(G) Cultural and historical resources;	p. 64-66 & 289-291
(H) Imperiled species habitat maintenance, enhancement, restoration, or population restoration.	p. 56-60 & 285-289
253.036 Forest Management.	
38. For all land management plans for parcels larger than 1,000 acres, the lead agency shall prepare the analysis, which shall contain a component or section prepared by a qualified professional forester which assesses the feasibility of managing timber resources on the parcel for resource conservation and revenue generation purposes through a stewardship ethic that embraces sustainable forest management practices if the lead management agency determines that the timber resource management is not in conflict with the primary management objectives of the parcel.	p. 184-212
259.032 Conservation And Recreation Lands Trust Fund; Purpose.	
(10)(a) State, regional or local governmental agencies or private entities designated to manage lands under this section shall develop and adopt, with the approval of the Board of Trustees, an individual management plan for each project designed to conserve and protect such lands and their associated natural resources. Private sector involvement in management plan development may be used to expedite the planning process.	
39. Individual management plans required by s. 259.032(10)(b), for parcels over 160 acres, shall be developed with input from an advisory group - Management plan should list advisory group members and affiliations.	p. 272
40. The advisory group shall conduct at least one public hearing in each county in which the parcel or project is located. Managing agency should provide DSL/OES with documentation showing date and location of public hearing.	p. 280-3
41. Notice of such public hearing shall be posted on the parcel or project designated for management, advertised in a paper of general circulation, and announced at a scheduled meeting of the local governing body before the actual public hearing. Managing agency should provide DSL/OES with copy of notice.	p. 280-3
42. The management prospectus required pursuant to 259.032 (9)(d) shall be available to the public for a period of 30 days prior to the public hearing.	p. 279
43. Summary of Advisory Group Meeting should be provided to DSL/OES.	p. 278
44. Individual management plans shall conform to the appropriate policies and guidelines of the state land management plan and shall include, but not be limited to:	
A. A statement of the purpose for which the lands were acquired, the projected use or uses as defined in s. 253.034, and the statutory authority for such use or uses.	p. 17-19 & 22-23
B. Key management activities necessary to achieve the desired outcomes, including, but not limited to, providing public access, preserving and protecting natural resources, protecting cultural and historical resources, restoring habitat, protecting threatened and endangered species, controlling the spread of nonnative plants and animals, performing prescribed fire activities, and other appropriate resource management activities.	p. 51-77

Management Plan Compliance Checklist - Natural Resource Lands

Requirements	Page No.
C. A specific description of how the managing agency plans to identify, locate, protect, and preserve, or otherwise use fragile, nonrenewable natural and cultural resources.	p. 53-66
D. A priority schedule for conducting management activities, based on the purposes for which the lands were acquired. (Example #10) The schedule must include a goal, an objective, and a time frame for completion.	p. 284-294
E. A cost estimate for conducting priority management activities, to include recommendations for cost-effective methods of accomplishing those activities. <i>Using categories as adopted pursuant to 259.037, F.S., is suggested. These are: (1) Resource Management; (2) Administration; (3) Support; (4) Capital Improvements; (5) Visitor Services/Recreation; and (6) Law Enforcement.</i>	p. 284-295
F. A cost estimate for conducting other management activities which would enhance the natural resource value or public recreation value for which the lands were acquired. The cost estimate shall include recommendations for cost-effective methods of accomplishing those activities. <i>Using categories as adopted pursuant to 259.037, F.S., is suggested. These are: (1) Resource Management; (2) Administration; (3) Support; (4) Capital Improvements; (5) Visitor Services/Recreation; and (6) Law Enforcement. (Example #10) Include approximate monetary cost and cost effective methods. Can be placed in the appendix.</i>	p. 284-295
45. A determination of the public uses and public access that would be consistent with the purposes for which the lands were acquired.	p. 53-56
259.036 Management Review Teams.	
46. The managing agency shall consider the findings and recommendations of the land management review team in finalizing the required 10-year update of its management plan. <i>Can be addressed in the body of the plan or addressed in an appendix. If not in agreement, the managing agency should reply in a statement in the appendix.</i>	p. 303-305
Other Requirements	
47. This checklist table at front of plan (pursuant to request of ARC and consensus agreement of managing agencies.)	
48. Accomplishments (implementation) from last plan (format variable by agency)	p. 295-296
49. FNAI-based natural community maps (may differ from FNAI in some cases)	p. 179-181
50. Fire management plans (either by inclusion or reference)(259.032)	p. 184-212
51. A statement regarding incompatible uses [ref. Ch. 253.034 (9)]	p. 53
52. Cultural resources, including maps of all sites <u>except Native American sites*</u>	p. 33-34 & 213-215
53. Arthropod control plan	p. 41
*While maps of Native American sites should not be included in the body of the management plan, the DSL urges each managing agency to provide such information to the Division of Historical Resources for inclusion in their proprietary database. This information should be available for access to new managers to assist them in developing, implementing and coordinating their management activities.	



COLLIER COUNTY GOVERNMENT

Growth Management Division – Land Development Services Department
• Comprehensive Planning Section • 2800 North Horseshoe Drive • Naples, Florida 34104

December 16, 2011

Mr. Gary Lytton, Director
Rookery Bay National Estuarine Research Reserve
300 Tower Road
Naples, FL 34113

RE: Petition PL20110002346, Comprehensive Plan Consistency Determination for Rookery Bay National Estuarine Research Reserve Management Plan (January 2012 – December 2017).

Dear Mr. Lytton:

Staff reviewed the above referenced document for consistency with the Collier County Growth Management Plan, specifically the Future Land Use Element (FLUE); the Future Land Use Map (FLUM); and the Conservation and Coastal Management Element (CCME), and offers the following comments.

According to the Management Plan, managed areas within the Rookery Bay National Estuarine Research Reserve (RBNERR) total approximately 163,912 acres and are managed by the Florida Department of Environmental Protection (DEP) in cooperation with other agencies. Additionally, the Plan states that "the RBNERR Management Plan is a strategic document that describes natural and cultural resources within the boundaries of RBNERR, identifies priority issues that the DEP staff must address to adequately protect these resources, and the goals, objectives and strategies necessary to support RBNERR's mission of informed stewardship based on science and education."

The areas included within this Plan are designated *Conservation* and *Urban* (Urban Coastal Fringe Subdistrict) on the FLUM, and some areas are also within the Big Cypress Area of Critical State Concern Overlay. According to the FLUE, the purpose of the Conservation designation is "to conserve and maintain the natural resources of Collier County and their associated environmental, and recreational and economic benefits," and the purpose of the Urban (Urban Mixed Use District, Coastal Fringe Subdistrict) designation is "to provide transitional densities between the Conservation designated area and the remainder of the Urban designated area." Relevant to this consistency review, both designations promote and/or allow conservation, preservation, recreation and open space uses.

As provided within the Future Land Use Element and Policies 6.2.3(1) and 7.1.1(1) of the Conservation and Coastal Management Element (CCME), staff finds the RBNERR Management Plan consistent with the overall purpose and intent of the designations referenced through support of the CCME objectives and policies listed below.

Objective 2.4:

Collier County shall continue taking a coordinated and cooperative approach with the Florida Department of Environmental Protection (FDEP) regarding environmental planning, management and monitoring programs for Rookery Bay and Cape Romano – Ten Thousand Islands Aquatic Preserves and their watersheds. As part of this process, the County shall continue to notify FDEP of development projects within the watersheds of these preserve areas.

Policy 2.4.2:

The County shall request the Department of Environmental Protection staff to participate in the development of future coastal and watershed management plans.

Objective 10.3:

Undeveloped coastal barriers shall be maintained predominantly in their natural state and their natural function shall be protected, maintained and enhanced.

Policy 10.3.3:

The highest and best use of undeveloped coastal barriers are as functioning natural systems; therefore the first alternative to development should be consideration of acquisition by or for the public benefit to preserve the natural function.

Policy 10.3.4:

Public expenditures within Collier County's undeveloped coastal barrier system shall be limited to acquisition for purposes of public safety, education, restoration, and removal of exotic vegetation, recreational use, and/or research facilities. Such uses will be allowed only if the establishment of such use would not substantially alter the natural characteristics and natural functions of the undeveloped coastal barrier system.

Policy 10.3.5:

Native or other County approved vegetation shall be required as the stabilizing medium in any coastal barrier vegetation or restoration program.

Objective 10.5:

For undeveloped shorelines, provide improved opportunities for recreational, educational, scientific, and esthetic enjoyment of coastal resources by protecting beaches and dunes and by utilizing or where necessary establishing construction standards, which will minimize the impact of manmade structures on the beach and dune systems.

Policy 10.5.1:

Recreation that is compatible with the natural functions of beaches and dunes is the highest and best land use.

Objective 11.1:

To protect historic and archaeological resources in Collier County.

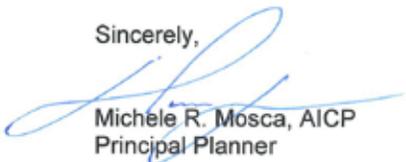
Policy 11.1.1:

Continue in effect regulations regarding development and other land alteration activities that ensure the conservation, sensitive re-use, preservation of significant historic and archaeological resources, or appropriate mitigation in accordance with State standards.

Based upon the foregoing, the Comprehensive and Environmental Planning staffs find that the RBNERR Management Plan *is consistent* with the Future Land Use and Conservation and Coastal Management Elements of the Growth Management Plan.

If I may be of further assistance, please call me at (239) 252-2446.

Sincerely,



Michele R. Mosca, AICP
Principal Planner

Cc: File PL20110002346
Stephen Lenberger, Sr. Environmental Specialist, Stormwater and Environmental Planning

E.3 / Management Prospectus

No prospectus was required or prepared when Rookery Bay National Estuarine Research Reserve (NERR) was purchased.

E.4 / Management Procedures for Archaeological and Historical Sites and Properties on State-Owned or Controlled Lands

(Revised February 2007)

These procedures apply to state agencies, local governments, and non-profits that manage state-owned properties.

A. General Discussion - Historic resources are both archaeological sites and historic structures. Per Chapter 267, Florida Statutes, *'Historic property' or 'historic resource' means any prehistoric district, site, building, object, or other real or personal property of historical, architectural, or archaeological value, and folklife resources. These properties or resources may include, but are not limited to, monuments, memorials, Indian habitations, ceremonial sites, abandoned settlements, sunken or abandoned ships, engineering works, treasure trove, artifacts, or other objects with intrinsic historical or archaeological value, or any part thereof, relating to the history, government, and culture of the state.*"

B. Agency Responsibilities - Per State Policy relative to historic properties, state agencies of the executive branch must allow the Division of Historical Resources (Division) the opportunity to comment on any undertakings, whether these undertakings directly involve the state agency, i.e., land management responsibilities, or the state agency has indirect jurisdiction, i.e. permitting authority, grants, etc. No state funds should be expended on the undertaking until the Division has the opportunity to review and comment on the project, permit, grant, etc.

State agencies shall preserve the historic resources which are owned or controlled by the agency.

Regarding proposed demolition or substantial alterations of historic properties, consultation with the Division must occur, and alternatives to demolition must be considered.

State agencies must consult with Division to establish a program to locate, inventory and evaluate all historic properties under ownership or controlled by the agency.

C. Statutory Authority - Statutory Authority and more in depth information can be found in the following:

Chapter 253, F.S. – State Lands

Chapter 267, F.S. – Historical Resources

Chapter 872, F.S. – Offenses Concerning Dead Bodies and Graves

Other helpful citations and references:

Chapter 1A-32, F.A.C. – Archaeological Research

Chapter 1A-44, F.A.C. – Procedures for Reporting and Determining Jurisdiction Over Unmarked Human Burials

Chapter 1A-46, F.A.C. – Archaeological and Historical Report Standards and Guidelines *The Secretary of the Interior's Standards for Rehabilitation and Guidelines for Rehabilitating Historic Buildings*

D. Management Implementation - **Even though the Division sits on the Acquisition and Restoration Council and approves land management plans, these plans are conceptual. Specific information regarding individual projects must be submitted to the Division for review and recommendations.**

Managers of state lands must coordinate any land clearing or ground disturbing activities with the Division to allow for review and comment on the proposed project. Recommendations may include, but are not limited to: approval of the project as submitted, pre-testing of the project site by a certified archaeological monitor, cultural resource assessment survey by a qualified professional archaeologist, modifications to the proposed project to avoid or mitigate potential adverse effects.

Projects such as additions, exterior alteration, or related new construction regarding historic structures must also be submitted to the Division of Historical Resources for review and comment by the Division's architects. Projects involving structures fifty years of age or older, must be submitted to this agency for a significance determination. In rare cases, structures under fifty years of age may be deemed historically significant. These must be evaluated on a case by case basis.

Adverse impacts to significant sites, either archaeological sites or historic buildings, must be avoided. Furthermore, managers of state property should make preparations for locating and evaluating historic resources, both archaeological sites and historic structures.

E. Minimum Review Documentation Requirements

In order to have a proposed project reviewed by the Division, the following information, at a minimum, must be submitted for comments and recommendations.

Project Description – A detailed description of the proposed project including all related activities. For land clearing or ground disturbing activities, the depth and extent of the disturbance, use of heavy equipment, location of lay down yard, etc. For historic structures, specific details regarding rehabilitation, demolition, etc.

Project Location – The exact location of the project indicated on a USGS Quadrangle map, is preferable. A management base map may be acceptable. Aerial photos indicating the exact project area as supplemental information are helpful.

Photographs – Photographs of the project area are always useful. Photographs of structures are required.

Description of Project Area – Note the acreage of the project, describe the present condition of project area, and any past land uses or disturbances.

Description of Structures – Describe the condition and setting of each building within project area if approximately fifty years of age or older.

Recorded Archaeological Sites or Historic Structures – Provide Florida Master Site File numbers for all recorded historic resources within or adjacent to the project area. This information should be in the current management plan; however, it can be obtained by contacting the Florida Master Site File at (850)245-6440 or Suncom 205-6440.

Questions relating to the treatment of archaeological and historic resources on state lands should be directed to:

Susan M. Harp

Historic Preservation Planner, Division of Historical Resources, Bureau of Historic Preservation
Compliance and Review Section

R. A. Gray Building, 500 South Bronough Street, Tallahassee, Florida 32399-0250

Phone: (850) 245-6333, Suncom: 205-6333, Fax: (850) 245-6438

E.5 / Analysis of Contracting Potential

The following restoration and management activities have been considered for outsourcing to private entities. In general, most day-to-day operations on the RBNERR can be handled more efficiently and at a lesser cost with Florida Department of Environmental Protection (DEP) staff. Projects requiring excavation and engineering must be outsourced. The table below contains potentially outsourced activities with categories as follows: “approved” designates items that DEP does not have expertise to complete and/or those that can be done at less cost with equivalent results by outside sources; “conditional” designates items that can be done by DEP or outside sources for equivalent cost and results; “rejected” designates items that can be done with DEP expertise and/or at less cost than outside sources.

Potential Contracting for Activities on Rookery Bay National Estuarine Research Reserve			
Activity	Approved	Conditional	Rejected
Mowing and landscape maintenance	X		
Cleaning and janitorial services	X		
Interpretive boat, kayak, hiking tours		X	
Translation services for bilingual education materials	X		
Aquarium and life support system maintenance for live exhibits	X		
Nuisance Animal Control		X	
Coastal Vulnerability Assessment	X		
Border Security: Installation of fences, signage, and gates	X		
Visitor-use enhancements: facilities, fencing, boardwalks, roads, gates, and signage.	X		
Species mapping and needs assessment: flora & fauna	X		
Cultural resource surveying, mapping, assessment, and excavation.		X	
Eradication and control of invasive exotic species		X	
Survey and installation of sentinel site infrastructure	X		
Economic valuation study for ecological services of the Reserve	X		
Visitor use study		X	
Environmental restoration projects		X	
Watershed hydrologic modeling and needs assessment	X		

E.6 / Land Management Review Team Recommendations

Land management review teams were established by Section 259.036, Florida Statutes, to evaluate management of conservation, preservation, and recreation lands titled in the name of the Board of Trustees of the Internal Improvement Trust Fund. The teams determine whether the lands are being managed for the purposes for which they were acquired and in accordance with a land management plan adopted pursuant to s. 259.032, Florida Statutes, by the Board of Trustees of the Internal Improvement Trust Fund, acting through the DEP. The managing agency is to consider the findings and recommendations of the land management review team in finalizing the required 10-year update of its management plan.

The RBNERR was evaluated by a land management review team on April 17, 2009. The review team made the following determinations listed below.

The land is being managed for the purpose for which it was acquired, and the actual management practices, including public access, were in compliance with the management plan for this site. The land management review team report, including the CAMA response to that report, is contained below.

Land Management Review: Commendations & Recommendations (with Managing Agency Response)

Name of Site: Rookery Bay NERR **County:** Collier County
Managed by: Department of Environmental Protection **Acres:** 5,850 Acres
Office of Coastal and Aquatic Managed Areas
Review Date: 4/17/09

Consensus Commendations to the Managing Agency

The following commendations resulted from discussion and vote of the review team members.

1. The team encourages the efforts of better defining the natural communities, for example, using the FNAI nomenclature. (VOTE: 8+, 0-) ★★★★★★★★
2. The team commends the manager and staff at Rookery Bay NERR for their outstanding use of limited resources to accomplish their management goals. (VOTE: 8+, 0-) ★★★★★★★★
3. The team commends the manager and staff for the extensive fire management plan draft recently developed. (VOTE: 8+, 0-) ★★★★★★★★
4. The team commends the Rookery Bay staff for their continued treatment of invasive exotic plants and animals. (VOTE: 8+, 0-) ★★★★★★★★
5. The team commends the CAMA staff for the outstanding educational opportunity at the Reserve, especially the Environmental Learning Center and the other educational opportunities, on and off site. (VOTE: 8+, 0-) ★★★★★★★★
6. The team commends the manager and staff for their exemplary monitoring of listed species on and off the Reserve. (VOTE: 8+, 0-) ★★★★★★★★
7. The team commends the manager and staff for their partnerships with other agencies in the area. (VOTE: 8+, 0-) ★★★★★★★★

Consensus Recommendations to the Managing Agency

The following recommendations resulted from a discussion and vote of review team members. The management plan must include responses to the recommendations identified below.

1. The team recommends that in future vegetation maps, points of reference, like roads be included. (VOTE: 8+, 0-) ★★★★★★★★

Managing Agency Response: We already have GIS layers for all roads in the Reserve and will insure that the suggested points of reference be included on all future vegetation maps.

2. The team recommends that more prescribed fire be applied to maintain pyric communities. (VOTE: 8+, 0-) ★★★★★★★★

Managing Agency Response: RBNERR's new Management plan includes a new fire management plan that actively engages the monitoring of fire affects. A draft of RBNERR's new "Fire Management Plan" was presented to the LMR Team members during the review process and we received accolades and very positive feedback on our progress and efforts. Mapping efforts on the reserve will allow RBNERR's new management plan to be well informed in its addressing of fire management activities regarding all plant communities occurring on lands that we manage. Stewardship staff here at RBNERR have already completed a summer burn since the LMR and will be following a vigorous schedule of planned burns that, weather and conditions allowing, will be completed this coming Fall 2009 and Winter 2010. We will be actively continuing burns every year to get our burnable acreages under control and all activities will proceed as guided by our prescribed fire management plan.

3. The team recommends continued efforts at seeking opportunities to develop appropriate rules and regulations to strengthen law enforcement capabilities. (VOTE: 8+, 0-) ★★★★★★★★

Managing Agency Response: CAMA is at present determining needs and setting goals to inform the formulation of its future plans for modifying pertinent agency Rules. The goal is to more closely align the intent and authority of the Rules to enhance our (NERRs and Aquatic Preserves) ability to better manage and protect resources.

4. The team recommends that CAMA staff pursue steps to ensure appropriate levels of freshwater allocation and environmental flow to the Reserve.

(VOTE: 8+, 0-) ★★★★★★★★

Managing Agency Response: RBNERR is presently proceeding through the process of revising our management plan. This revision process is cyclical and we will be completing this process soon. RBNERR's resulting management plan will be well informed in its discussion of all reserve activities addressing watershed resource issues including water concerns related to adjacent properties (specifically freshwater allocations). Rookery Bay has already been heavily involved with Water Management District plans that will affect freshwater allocations for the Henderson Creek watershed. Water Management District meetings are planned for this Fall to address Henderson Creek flow and we are anxious to move forward in cooperation with the District.

In addition, RBNERR staff recently participated in the watershed planning process carried out by the Water Management District regarding the Picayune Restoration Project (part of the overall Everglades restoration Project) that targets water flows, watershed management tools, and water allocations from just south of Marco Island down to the Port of the Isles.

Checklist Findings

The following items received high scores on the review team checklist, which indicates that management actions exceeded expectations.

- Natural Communities, specifically Tropical Hardwood Hammock, Open Water, Mangrove Forest and Sea grasses
- Listed Species, specifically Animal Inventory, Manatee, Sea Turtle, Shore Birds and Crocodile.
- Natural Resources Survey, specifically Sport Fishing or Habitat Monitoring, Listed Species or Habitat Monitoring, Other-non Game Species or Habitat Monitoring, and Invasive Survey/Monitoring.
- Cultural Resources, specifically Cultural Resource Survey and Protection and Preservation.
- Resource Management/Prescribed Fire, specifically Area Being Burned, Quality and Frequency.
- Restoration of Ruderal Areas, specifically Saltwater Marsh, Lely Canal, and Tarpon Bay Hydrologic Restoration.
- Non-native, Invasive and Problem Species, specifically Control of Plants and Animals.
- Hydrologic Geologic Function, specifically Roads, Culverts, Ditches, Hydro Period Alteration, Water Level Alteration, Dams, Reservoirs, or Other Impoundments.
- Surface Water Monitoring, specifically Quality and Quantity
- Resource Protection, specifically Boundary Survey, Gates, Fencing and Signage.
- Adjacent Property Concerns, specifically Expanding Development
- Public Access and Education, specifically Roads, Parking, Boat Access, Wildlife, Invasive Species, Habitat Management Activities, Interpretive Signs and Facilities, Recreational Opportunities, and Management of Visitor Impacts.
- Managed Area Uses, specifically Camping, Trails, Nature Study, Boating, Fishing, Over Night Anchorage, Birding, Environmental Education and Research.

The following items received low scores on the review team checklist, which indicates that management actions noted during the Field Review (FR) were not considered sufficient (less than 2.5 score on average), or that the text noted in the Management Plan Review (PR) does not sufficiently address this issue (less than .5 score on average). The management plan must include responses to the checklist items identified below:

1. Discussion in the management plan regarding Natural Communities, specifically Mesic Flatwoods (FR,PR), Coastal Strand, Coastal Xeric Scrub, Cabbage Palm/Oak Hammock, Saltwater Marsh, Freshwater Marsh (FR,PR), and Cypress Slough/Cypress Prairie (FR, PR). (PR)

Managing Agency Response: At present RBNERR is actively involved in the ground-truthing of plant communities within our boundaries thus supporting our continued GIS mapping efforts. We are also actively engaged in the search for grant funding to augment our mapping efforts. Grant funds will enable us to hire an outside contractor to help with the completion of our ground-truthing of communities and other GIS related mapping efforts within the reserve.

In addition, review team findings in the final LMR report will be addressed in RBNERR's current management plan revision process. The completion of these mapping efforts will allow RBNERR's newly revised management plan to be well informed in its addressing of all management activities regarding all plant communities occurring on lands that we manage.

2. Discussion in the management plan regarding Listed Species, specifically Plant Inventory. (PR)

Managing Agency Response: At present RBNERR is actively involved in the ground-truthing of plant communities within our boundaries thus supporting our continued GIS mapping efforts. Ground-truthing efforts being carried out by RBNERR staff also includes the documentation of all listed species (both flora and fauna) that are observed. Observations of listed species include documentation of location by GPS point data and photographs taken of observed specimens. Data regarding listed species also includes the status of the habitat where the specimen is observed. Stewardship Team staff are also engaged in the updating of RBNERR's "Multi-species Habitat

Management Plan”. The search for grant funding to augment our mapping efforts is actively being pursued. Grant funds would enable us to hire an outside contractor to help with the completion of our ground-truthing of communities (related occurrences of listed species) and other GIS related mapping efforts within the reserve.

In addition, review team findings in the final LMR report will be addressed in RBNERR’s current management plan revision process. The completion of these mapping efforts will allow RBNERR’s newly revised management plan to be well informed in its addressing of all management activities regarding all plant communities occurring on lands that we manage.

3. Discussion in the management plan regarding Natural Resource Survey, specifically Fire Effects Monitoring. (FR)

Managing Agency Response: As previously stated, RBNERR is actively involved in the ground-truthing of plant communities within our boundaries thus supporting our continued GIS mapping efforts. We are also actively engaged in the search for grant funding to augment our mapping efforts. Grant funds will enable us to hire an outside contractor to help with the completion of our ground-truthing of communities and other GIS related mapping efforts within the reserve.

In addition, review team findings in the final LMR report will be addressed in RBNERR’s management plan update to be finalized this year. RBNERR’s new Management plan includes a new fire management plan that actively engages the monitoring of fire affects. A draft of RBNERR’s new “Fire Management Plan” was presented to the LMR Team members during the review process and we received accolades and very positive feedback on our progress and efforts. Mapping efforts on the reserve will allow RBNERR’s new management plan to be well informed in its addressing of fire management activities regarding all plant communities occurring on lands that we manage.

4. Discussion in the management plan regarding Resource Management/Prescribed Fire, specifically Area Being Burned, Frequency and Quality. (FR)

Managing Agency Response: As previously stated, RBNERR is actively involved in the ground-truthing of plant communities within our boundaries thus supporting our continued GIS mapping efforts. We are also actively engaged in the search for grant funding to augment our mapping efforts. Grant funds will enable us to hire an outside contractor to help with the completion of our ground-truthing of communities and other GIS related mapping efforts within the reserve.

In addition, review team findings in the final LMR report will be addressed in RBNERR’s management plan update to be finalized this year. RBNERR’s new Management plan includes a new fire management plan that actively engages the monitoring of fire affects. A draft of RBNERR’s new “Fire Management Plan” was presented to the LMR Team members during the review process and we received accolades and very positive feedback on our progress and efforts. Mapping efforts on the reserve will allow RBNERR’s new management plan to be well informed in its addressing of fire management activities regarding burnable acreages (frequency and quality thereof).

5. Discussion in the management plan regarding Non-Native, Invasive and Problem Species, specifically Prevention of Plants, Animals, Pests/Pathogens and Control of Pests/Pathogens. (PR,FR)

Managing Agency Response: As previously stated, RBNERR is actively involved in the ground-truthing of plant communities within our boundaries thus supporting our continued GIS mapping efforts. We are also actively engaged in the search for grant funding to augment our mapping efforts. Grant funds will enable us to hire an outside contractor to help with the completion of our ground-truthing of communities and other GIS related mapping efforts within the reserve.

In addition, review team findings in the final LMR report will be addressed in RBNERR’s management plan update to be finalized this year. RBNERR’s new Management plan includes an updated Invasive/Exotics management plan that actively engages the data gathered from our mapping activities which will include the mapping of all exotics observed during ground-truthing efforts. Mapping efforts on the reserve will allow RBNERR’s new management plan to be well informed in its addressing of invasive/exotic species management activities. Activities will include non-native, invasive and problem species (prevention and control of plants, animals, pests/pathogens) in all plant communities.

6. Discussion in the management plan regarding Resource Protection, specifically Law Enforcement Presence. (PR)

Managing Agency Response: RBNERR’s new management plan will be well informed in its discussion of all reserve activities addressing resource protection issues and the involvement and presence of Law Enforcement on RBNERR managed lands. During the LMR Team visit it was discussed that RBNERR has worked very hard over the years to create a well established and cooperative relationship with State FWC, and DEP wildlife law enforcement officers (FWC Law Enforcement offices are actually located within our reserve boundary and we communicate and cooperate with them on a constant basis). Local Wildlife Law Enforcement officers from City, County, State, and Federal agencies all get together here at Rookery Bay for their quarterly regional inter-agency meetings.

7. Discussion in the management plan regarding Adjacent Property Concerns, specifically Freshwater Allocation (FR, PR).

Managing Agency Response: RBNERR’s new management plan will be well informed in its discussion of all reserve activities addressing watershed resource issues including water concerns related to adjacent properties (specifically freshwater allocations). Rookery Bay has already been heavily involved with Water Management District plans that will affect freshwater allocations for the Henderson Creek watershed. In addition, RBNERR staff recently participated in the watershed planning process carried out by the Water Management District regarding the Picayune Restoration Project (part of the overall Everglades restoration Project) that targets water flows, watershed management tools, and water allocations from just south of Marco Island down to the Port of the Isles.

Rookery Bay
National Estuarine Research Reserve
Management Plan
January 2012 - December 2017

Rookery Bay National Estuarine Research Reserve
300 Tower Road, Naples, Florida 34113
239-417-6310, Fax: 239-417-6315
info@rookerybay.org • www.RookeryBay.org



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