Apalachicola National Estuarine Research Reserve Management Plan

Florida Department of Environmental Protection
Office of Resilience and Coastal Protection
2600 Blair Stone Road, MS #235
Tallahassee, FL 32399
www.floridacoasts.org

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Executive Summary

Management Plan Purpose and Scope

With increasing development, recreation and economic pressures, our aquatic resources have the potential to be significantly impacted, either directly or indirectly. These potential impacts to resources can reduce the health and viability of the ecosystems that contain them, requiring active management to ensure the long-term health of the coastal ecosystems of the northern Gulf of Mexico. Effective management plans for the National Estuarine Research Reserves (NERRs) are essential to address this goal and each site's own set of unique challenges. The purpose of this plan 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. Furthermore, this plan will be utilized by Reserve staff as a document, which will provide a guide for the integrated program activities that support the implementation of the reserve's goals and objectives.

The NOAA requirements for the preparation of management plans are outlined in the NERR program regulations (Coastal Zone Management Act section 315, and 15 Code of Federal Regulations (C.F.R.) Part 921.13). The federal regulations ensure that NERR management programs are consistent with the goals, objectives, and policies of the NERR System.

Management plan development begins with collecting resource information from historical data, research and monitoring and includes input from NERR staff, area stakeholders, and members of the public. Statistical data, public comment and cooperating agency information is then used to identify management issues and threats affecting the present and future integrity of the site, its boundaries and adjacent areas. This information is used in the development and review of the management plan, which is examined for consistency with the statutory authority and intent of the aquatic preserve 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.

This management plan will serve as an update to the 2014 Apalachicola National Estuarine Research Reserve (ANERR or Reserve) management plan, covering a period of 2024 through 2029. In Florida, management plan updates are required every ten years with an anticipated update needed in 2024. To reduce staff time and resources, this plan presents as a hybrid of the NERR management plan template and the State of Florida template, with intention of satisfying the requirements of both. The Reserve recently completed its CZMA section 312 evaluation in 2021. Through the evaluation process, the Reserve was able to demonstrate considerable advancements in all of the program areas since the last evaluation in 2014. The timing of this new management plan has allowed us to select new section 312, 5-year metrics that align with the new strategic plan and will inform future evaluations. Likewise, the strategic plan has been woven into the annual operations award application, providing continuity between the long-term visioning, short-term annual work plan, and final performance measure reporting.

A. Reserve Context

General Description

ANERR was designated in 1979 and is managed cooperatively with the Florida Department of Environmental Protection's (DEP) Office of Resilience and Coastal Protection (ORCP). Located in Franklin, Gulf and Liberty counties in the Florida panhandle, ANERR is positioned in one of the least populated coastal areas of the state. The Reserve operates primarily out of two facilities: the headquarters is currently located on Island Drive in Eastpoint with a second facility at 350 Carroll Street in Eastpoint, housing the shop and boatyard. The second largest of the 30 existing NERRs, ANERR encompasses 234,715 acres, more than half of which (135,680 acres) are state-owned sovereignty submerged lands. From an administrative standpoint, ANERR is one of the more complex NERRs in the national system. ANERR consists of several independently managed subunits, supports a wide variety of recreational and commercial activities, and is affected by land and water use policies in three states. The boundary of the Reserve includes uplands managed by the Florida Department of Environmental Protection (Dr. Julian Bruce St. George Island State Park), and other state and federal agencies, such as the U.S. Fish and Wildlife Service (St. Vincent National Wildlife Refuge), the Northwest Florida Water Management District, and the Florida Fish and Wildlife Conservation Commission (Box-R Wildlife Management Area and Apalachicola River Wildlife and Environmental Area). Likewise, the Reserve aligns with similar plans for the independently managed areas within and adjacent to the Reserve's boundary. Vital to this is close coordination with representatives from those managing agencies. Two of the managed areas (not managed by the Reserve) within the Reserve boundary have grown considerably over the last eight years; however, the actual Reserve boundary has not changed since the previous management plan update. Preliminary discussions with the land managers have been encouraging to expand the Reserve boundary to include these new land acquisitions, but the boundary expansion process will be handled outside of this management plan update.

B. Coastal Management Issues and Reserve Goals

The Reserve has identified three primary coastal management issues to focus on:

1) **Hydrologic changes in the Apalachicola River and Floodplain** – The Apalachicola-Chattahoochee-Flint River System drains an area of approximately 20,000 square miles. Land use changes within the floodplain, water use changes, water management changes (operation of the federal dams), and modified river channels and distributaries will all have an influence on the timing and magnitude of freshwater inflows into Apalachicola Bay. While there are several forcing factors driving water quality within the bay (tides, winds, time of year), river flow continues to be a contributing factor to water quality in Apalachicola Bay.
2) **Coastal Development** – Over 90% of the land within Franklin County (which surrounds Apalachicola Bay) is held in public ownership (by the agencies listed above), however, much of the coastline along Apalachicola, St. George Island and Eastpoint is privately-held. Cumulative impacts from increasing development could include increasing contaminants in run off and storm water, contaminated groundwater, loss of critical habitats, and physical processes leading to eroding shorelines.
3) **Climate Change and Extreme Events** – Estuaries are dynamic systems, but with rising air temperatures and rising seas, we are poised to see dramatic shifts in the long-term conditions of the bay as well as the species and natural communities. In addition to these longitudinal changes, we continue to have natural and anthropogenic perturbations (drought, hurricanes, oil spills, wildfires) that will shape the future of our environment as well as the communities that surround the bay.

In the development of this plan and the framing of the strategic plan, it was clear to the staff that our natural environment and the human communities were inextricably linked. The Reserve considered how each was connected to the other, how much influence or impact one had on the other, and where the Reserve staff could intervene to make a positive change. Likewise, there was a common theme among the issues which identified a desired or steady state. Sometimes the desired state had

been achieved and our planned actions were conservation or protection. In other cases, we are looking to change something back to a desired condition and so we identify restoration actions. As we work to protect and restore resources, we also recognize that external forces may lead us off course. Planning for potential change required critical thought on what was needed to stay or become more resilient. Thus, resilience is another common theme weaved throughout the strategic plan.

Apalachicola National Estuarine Research Reserve Mission

Through applied research and monitoring, ANERR provides knowledge, data, and tools to educate communities and decisionmakers to improve stewardship, resilience and sustainability of the Apalachicola River and Bay ecosystem.

Apalachicola National Estuarine Research Reserve Vision

A thriving Apalachicola River and Bay ecosystem that supports resilient and sustainable human and natural communities.

The Reserve staff identified three broad goals to guide work over the next several years:

Goal 1: Natural resources within the Reserve are conserved through research, monitoring, and adaptive management.

Goal 2: Thriving natural communities support healthy human communities.

Goal 3: Resilient natural communities enhance local communities' capacity to respond to changing climate.

C. Reserve Programs Overview

To aid in the analysis and development of the management strategies for the site plans, four comprehensive management programs are identified. In each of these programs, relevant information about the specific sites is described in an effort to create a comprehensive management plan. These areas are:

- Research and Monitoring
- Stewardship
- Education
- Coastal Training Program

Research and Monitoring Program

The ANERR Research and Monitoring Program aims to expand our understanding of the ecological processes related to the Apalachicola River and watershed. This program has four key objectives. Firstly, the research program conducts continuous monitoring of weather, climate, sea level, and water quality data to provide and maintain baseline ecological status for the Apalachicola Estuary. Secondly, it provides logistical support to visiting scientists who conduct research in ANERR and its watershed. This support enables them to access and collect data from the field. Third, the program summarizes existing scientific information related to pollutants, habitats, and biological diversity. The goal is to communicate the status and trends of these factors, and to identify areas where further research is needed. Finally, the program initiates new research initiatives and monitoring projects to fill gaps in our understanding of key ecosystem functions related to pollutants, habitats, and diversity. This research helps to improve our understanding of ANERR. The program develops and guides Best Management Practices based on scientific information to ensure the sustainable use of the ANERR and its resources. The ANERR

Research Program has been and will continue to be a central player in gathering and applying scientific information on the Apalachicola River and Bay system, and its efforts have contributed to the protection and management of this unique and valuable ecosystem. Secondly, the program summarizes existing scientific information related to pollutants, habitats, and biological diversity.

The Stewardship/Resource Management Program

The Stewardship Program addresses how the ORCP manages the ANERR and its resources. The ANERR accomplishes its resource management by physically conducting management activities on the resources for which it is directly responsible, and by influencing the activities of others within and adjacent to its managed areas. The ORCP-managed areas are particularly sensitive to upstream water quality and quantity issues, making ANERR especially conscious of potential environmental changes associated with off-site activities. The ORCP works to ensure that the most effective and efficient techniques are utilized in the ORCP management activities.

Education Program

The Education and Outreach Program components are essential management tools used to increase public awareness and understanding about the value of estuaries and to promote informed stewardship by local communities. Programs include on and off-site education activities that prioritize in-field studies for students and teachers; development and distribution of various media; the dissemination of information at local events; the recruitment and management of volunteers; and training workshops for local citizens and decision-makers. The design, planning and facilitation of educational programs incorporate the results of informal market analysis, needs assessments and public requests for topics and types of programs. Programs target participants from all ages and walks of life while recognizing the local community as key stakeholders. The rural nature of the region allows for the unique opportunity to provide depth and sustainability to programming by working every year with every student in the district in grades Pre-K, first, third, fifth, seventh and high school. The scaffolding of activities provides for a continuity of content across the entire K-12 academic experience of local students. Program evaluations are utilized to determine program impacts and discern results gained by program participants with programs consistently adjusted to improve results. These efforts by the Education and Outreach Program allow ANERR to build relationships and convey knowledge to the community, which is invaluable to successful management.

Coastal Training Program

The Coastal Training Program works with decision makers, appointed leaders, and their staff to preserve the Apalachicola Bay and River by offering formal trainings, skill-building opportunities, tools and technical assistance that enable them to continue to implement sound policies based on science that protect the environment. The CTP Coordinator meets regularly with decision makers to strengthen partnerships, further assess needs and forge positive working relationships. CTP also works with industry and professional groups, residents and tourists offering information and training to increase stewardship and resilience throughout the Reserve. Stakeholder’s needs are regularly assessed, and trainings are evaluated.

E. Public Involvement

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

- Meetings of public boards or commissions must be open to the public;
- Reasonable notice of such meetings must be given; and

- Minutes of the meetings must be recorded.

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

ORCP approval date:
ARC approval date:
State approval date:

Office of Resilience and Coastal Protection's Mission and Goals

The Office of Resilience and Coastal Protection's mission statement is: Conserving, protecting, restoring, and improving the resilience of Florida's coastal and aquatic resources for the benefit of people and the environment. The four long-term goals of the Office of Resilience and Coastal Protection's Aquatic Preserve Program are to:

1. protect and enhance the ecological integrity of the aquatic preserves;
2. restore areas to their natural condition;
3. encourage sustainable use and foster active stewardship by engaging local communities in the protection of aquatic preserves; and
4. improve management effectiveness through a process based on sound science, consistent evaluation, and continual reassessment.

Acronym List

Abbreviation	Definition
ACF	Apalachicola-Chattahoochee-Flint River System
ACSC	Area of Critical State Concern
APHIS	Animal and Plant Health Inspection Service
ANERR	Apalachicola National Estuarine Research Reserve
ARSA	Apalachicola Regional Stewardship Alliance
ARWEA	Apalachicola River Wildlife and Environmental Area
C-CAP	Coastal Change and Analysis Program
CISMA	Cooperative Invasive Species Management Area
CFR	Code of Federal Regulations
CFS	Cubic Feet Per Second
CSO	Citizen Support Organization
CTP	Coastal Training Program
CTPC	Coastal Training Program Coordinator
CTPS	Coastal Training Program Specialist
DACS	Department of Agriculture and Consumer Services
DEP	Florida Department of Environmental Protection
DNR	Florida Department of Natural Resources
F.A.C.	Florida Administrative Code
F.A.R.	Florida Administrative Register
FLE	Federally listed endangered
FLT	Federally listed threatened
FNAI	Florida Natural Areas Inventory
F.S.	Florida Statutes
FWC	Florida Fish and Wildlife Conservation Commission
FWC LE	Florida Fish and Wildlife Conservation Commission Law Enforcement
NRC	National Research Council
NERR	National Estuarine Research Reserve
NOAA	National Oceanic and Atmospheric Administration
NWFWMD	Northwest Florida Water Management District
OCM	Office for Coastal Management

Abbreviation	Definition
OFW	Outstanding Florida Water
ORCP	Office of Resilience and Coastal Protection
SLT	State listed threatened
Trustees	Board of Trustees of the Internal Improvement Trust Fund
USFWS	U.S. Fish and Wildlife Service
USACE or USACOE	United States Army Corps of Engineers
USDA	United States Department of Agriculture
UNESCO	United Nations Educational, Scientific and Cultural Organization
WMA	Wildlife Management Area

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Photo 1 / Sunrise on Graham Creek

PART I - Basis for Management

Chapter 1: Introduction to the Apalachicola Reserve

1.1 Introduction to the National Estuarine Research Reserves

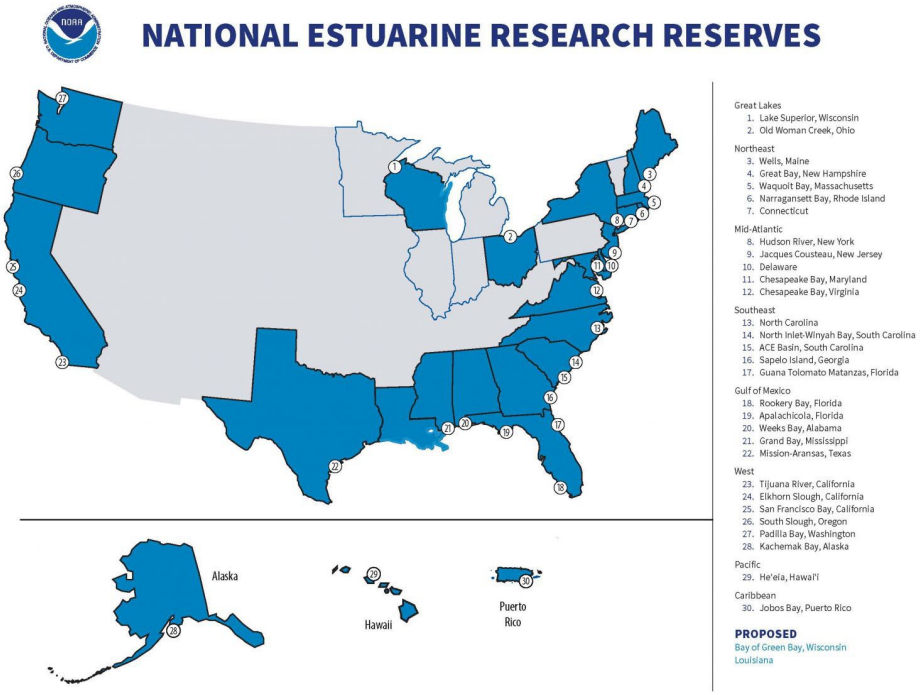
The National Estuarine Research Reserve (NERR) System is a network of 30 protected estuarine areas that represent different biogeographic regions and estuarine types within the United States. Reserves are protected for long-term research, monitoring, education, and coastal stewardship. The NERR System, created by the Coastal Zone Management Act of 1972, currently protects over one million acres of estuarine lands and waters. The system is managed in accordance with federal regulations at 15 CFR Part 921.

Each NERR has a unique boundary based on the nature of its ecosystem. The boundaries include the land and water areas needed to protect an intact ecological unit. NERRs classify their land and water areas as either “core” or “buffer,” which determines the level of protection and the types of activities allowed within each area. Each NERR develops the programming

most appropriate for its location while also delivering required system-wide programs focused on research and monitoring, education, training, and stewardship.

The NERR System is a partnership program between the National Oceanic and Atmospheric Administration (NOAA) and the coastal states. NOAA provides funding, national guidance, and technical assistance for reserve operations and system-wide programs, facilities construction and land acquisition, graduate fellowships, and collaborative science projects. NOAA also leads projects that integrate data or support decision-making at the national level. The state partner manages the reserve's day to day operation and works collaboratively with local and regional partners.

Each NERR is required to develop a management plan that contains the goals, objectives, and strategies for that reserve. Management plans are updated every five years and must be approved by NOAA. These plans enable the NERRs and NOAA to track progress and realize opportunities for growth. Each plan describes how the NERR will carry out its foundational research, education, and training programs. Each plan also outlines administration, resource protection, public access, land acquisition, and facility plans, as well as restoration and resource manipulation plans if applicable. The plans also incorporate strategies designed to help the NERR contribute to the system's national goals. NOAA periodically evaluates NERRs for compliance with federal requirements and their approved management plan.



Map 1 / National Estuarine Research Reserve System

The ANERR is committed to sustaining healthy coasts through environmental stewardship. The most recent strategic plan (*coast.noaa.gov/data/docs/nerrs/StrategicPlan.pdf)*, covering the period 2017-2022, provides an in-depth description of the goals for the Apalachicola Reserve system:

1) To enhance and inspire stewardship, protection, and management of estuaries and their watersheds in coastal communities through place-based approaches. This involves using local knowledge and expertise to develop effective strategies for protecting and managing estuaries and their surrounding ecosystems.

2) To improve the scientific understanding of estuaries and their watersheds through the development and application of reserve research, data, and tools. This involves conducting innovative research and using data-driven approaches to inform management decisions.

3) To advance environmental appreciation and scientific literacy, allowing for science-based decisions that positively affect estuaries, watersheds, and coastal communities. This involves educating and engaging communities to increase awareness and understanding of the importance of estuaries and their role in supporting healthy coastal ecosystems.

By achieving these three goals, the NERRS aims to promote stewardship of coasts and estuaries and ensure the long-term sustainability of these valuable ecosystems.

1.2 Biogeographic Regions

NOAA has identified 11 distinct biogeographic regions and 29 subregions in the U.S., each of which contains several types of estuarine ecosystems (15 C.F.R. Part 921, Appendix I for NERR typology system). These geographic areas are characterized by similar flora and fauna as well as climate. The Apalachicola National Estuarine Research Reserve (ANERR) is within the Panhandle Coast subregion of the Louisianan bioregion. When complete, the NERR System will contain examples of estuarine hydrologic and biological types characteristic of each biogeographic region. As of 2023, the NERR System includes 30 NERRs and two reserves in the process of designation (Louisiana, and Green Bay, WI).

1.3 Designation of the Apalachicola NERR

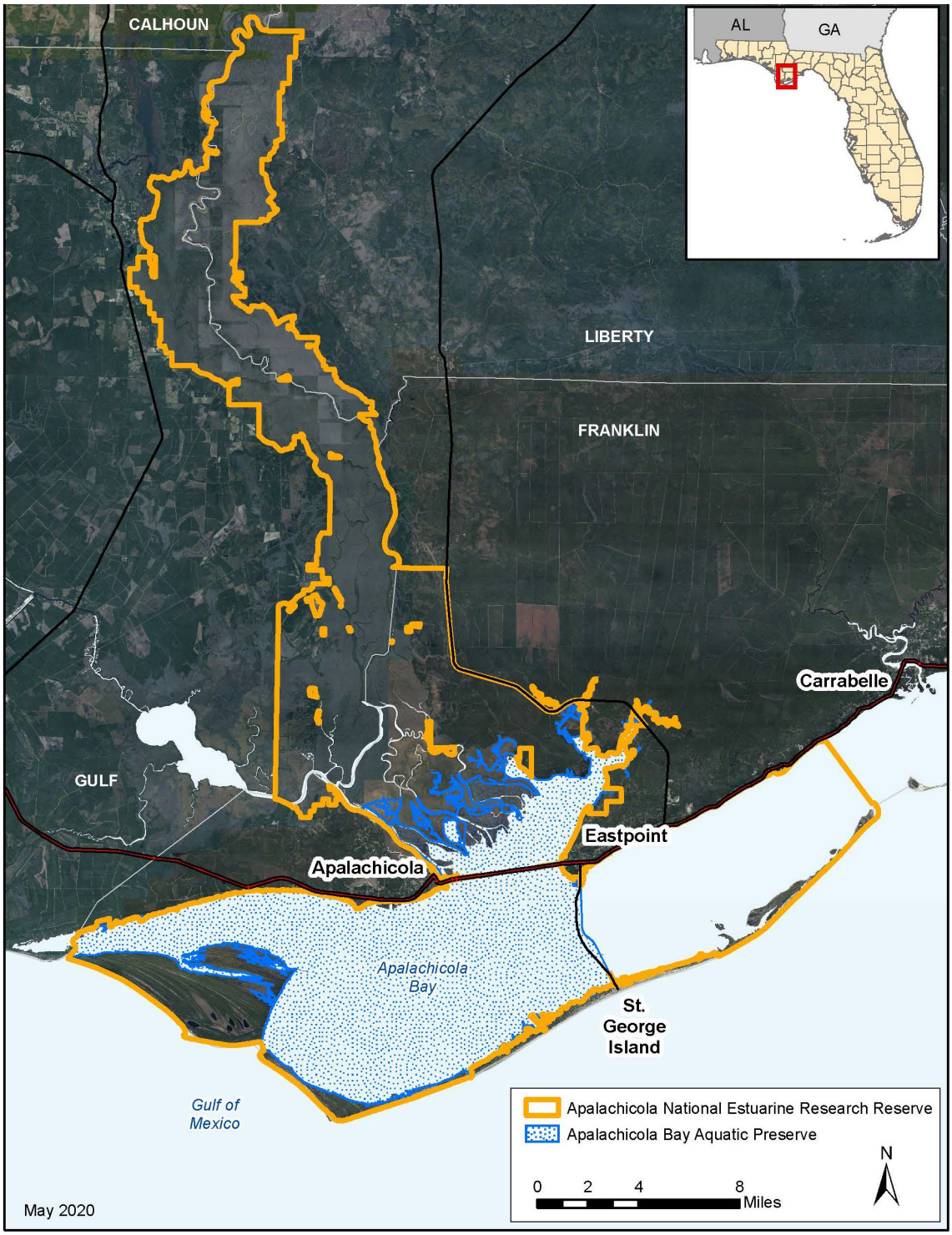
In 1979, the Apalachicola National Estuarine Research Reserve (ANERR/the Reserve) was designated in Franklin County, Florida as a part of the NERR System because of its pristine nature and valued habitat for commercially and recreationally important species. Public lands included within ANERR are the St. Vincent Island National Wildlife Refuge, St. George Island State Park, Apalachicola River Wildlife and Environmental Area, Apalachicola River Water Management Area, and Little St. George Island. The boundaries of ANERR also include the Apalachicola Bay Aquatic Preserve (Map 2). The ANERR headquarters is located in Eastpoint on Cat Point. Highway 98 provides the only access to Apalachicola and Eastpoint, either eastward from Panama City or westward from Crawfordville.

The Florida NERRs are administered on behalf of the state by the Florida Department of Environmental Protection's Office of Resilience and Coastal Protection (ORCP) as part of a network that includes 42 aquatic preserves, three NERRs, the Florida Keys National Marine Sanctuary, and the Kristin Jacobs Coral Environmental Conservation Area. This provides for a system of significant protections to ensure that our most popular and ecologically important aquatic and wetland ecosystems are cared for in perpetuity. Each of these unique places is managed with strategies based on local resources, issues and conditions. The expansive coastline and wealth of aquatic resources of Florida attracts millions of residents and visitors, and the businesses

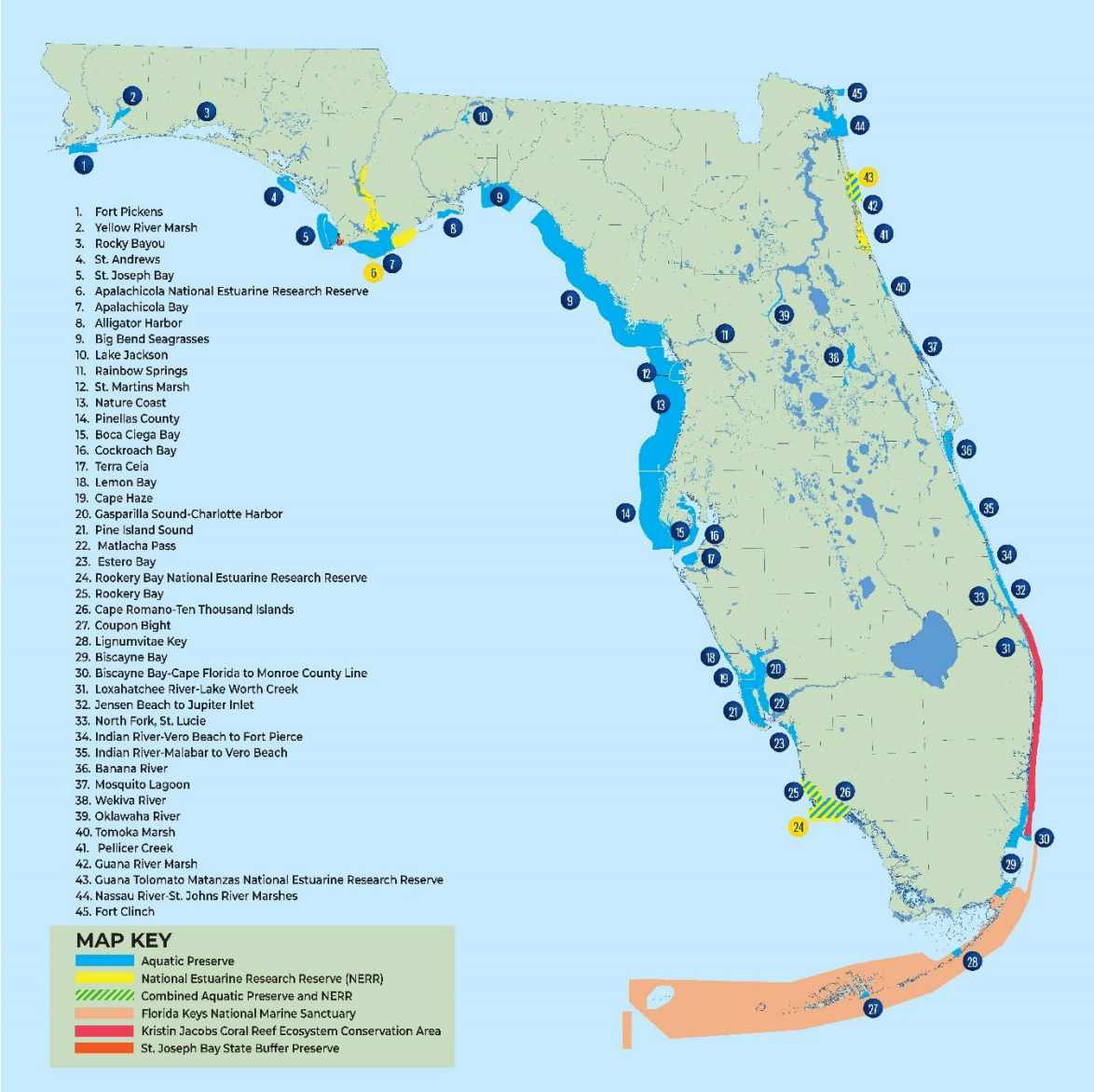
that serve them. Florida's submerged lands play important roles in maintaining good water quality, hosting a diversity of wildlife and habitats (including economically and ecologically valuable nursery areas), and supporting a treasured quality of life for all. In the 1960s, it became apparent that the 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 sovereign lands that have been "set aside forever as aquatic preserves or sanctuaries for the benefit of future generations" due to "exceptional biological, aesthetic, and scientific value" (Florida Aquatic Preserve Act of 1975, §258.36, F.S.).

This tradition of concern and protection of these exceptional areas continues, and now includes: the Rookery Bay NERR in Southwest Florida, designated in 1978; the Apalachicola NERR in Northwest Florida, designated in 1979; and the Guana Tolomato Matanzas NERR in Northeast Florida, designated in 1999. The Office of Resilience and Coastal Protection (ORCP) also oversees the Coastal Management Program, the Coral Reef Conservation Program, the Coral Protection Program, the Clean Boating Program, the Resilient Florida Program, the Beaches, Inlets and Ports Program, Beach Restoration Funding, Joint Coastal Permitting, Coastal Construction Control Line review and co-management of the Florida Keys National Marine Sanctuary.



Map 2 / Boundary of the Apalachicola National Estuarine Research Reserve



Map 3 / Office of Resilience and Coastal Protection system

Photo 2 / An Apalachicola Bay sunset

Chapter 2: Background and Description of Apalachicola National Estuarine Research Reserve Region

2.1 History and Local Management

History of the Apalachicola National Estuarine Research Reserve

Because of its uniqueness, numerous protective designations have been granted to note the importance of and help protect the Apalachicola system. Not only have state and federal agencies been involved, but local participation has been a key element as well. In 1969, Florida designated Apalachicola Bay as one of eighteen aquatic preserves. In 1979, the lower river and bay system was designated a National Estuarine Research Reserve (NERR) by the National Oceanic and Atmospheric

Administration (NOAA). The state of Florida designated the lower Apalachicola River an Outstanding Florida Water (OFW) in 1979 and included the upper river in 1983. Thus, the ambient water quality of the river at the time of designation serves as the standard which cannot be lowered by activities on or near the water. In 1984, the United Nations Educational, Scientific and Cultural Organization (UNESCO) designated the Apalachicola National Estuarine Research Reserve (ANERR) a Biosphere Reserve under the Man and Biosphere program. Due to growing development pressures, in 1985 the State of Florida designated Franklin County an Area of Critical State Concern (ACSC). By 2011, the ACSC designation had been removed from all of Franklin County, except for the city of Apalachicola.

International/National/State/Regional Significance

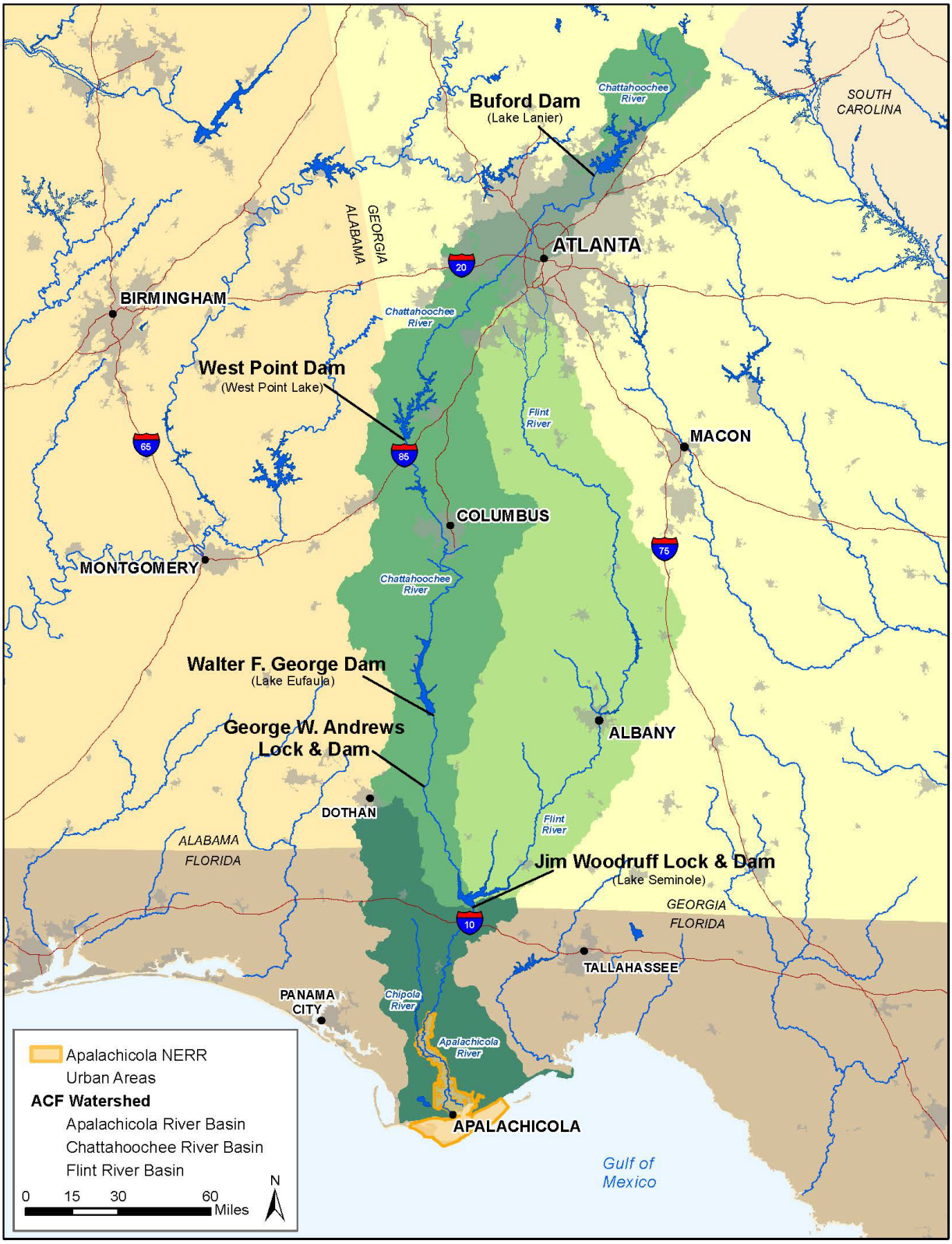
The Apalachicola River system is only one part of the larger Apalachicola-Chattahoochee-Flint River system (ACF). The ACF basin covers the north-central and southwestern part of Georgia, the southeastern part of Alabama, and the central part of the Florida Panhandle. It drains an area covering approximately 19,600 square miles (see Map 4). The Chattahoochee River flows 436 miles from its source in the Blue Ridge Mountains of northern Georgia, drains a land area of 8,650 square miles, and has 13 dams located on the river. The Flint River flows 350 miles from its source south of Atlanta, drains a land area of 8,494 square miles, and has two dams affecting stream flow. The Apalachicola River is formed by the confluence of the Chattahoochee and Flint rivers, flows 107 miles to Apalachicola Bay, and drains a land area of approximately 2,400 square miles (United States Army Corps of Engineers [USACE], 1978).

Through geological, chemical, physical and biological interactions, the Apalachicola River and Bay drainage basin has evolved into a river with the largest flow, the most extensive forested floodplain, and the most productive estuary in Florida (Map 5). ANERR is located in Franklin, Gulf and Liberty counties, on the northwest coast of Florida, in one of the least populated coastal areas in the state.

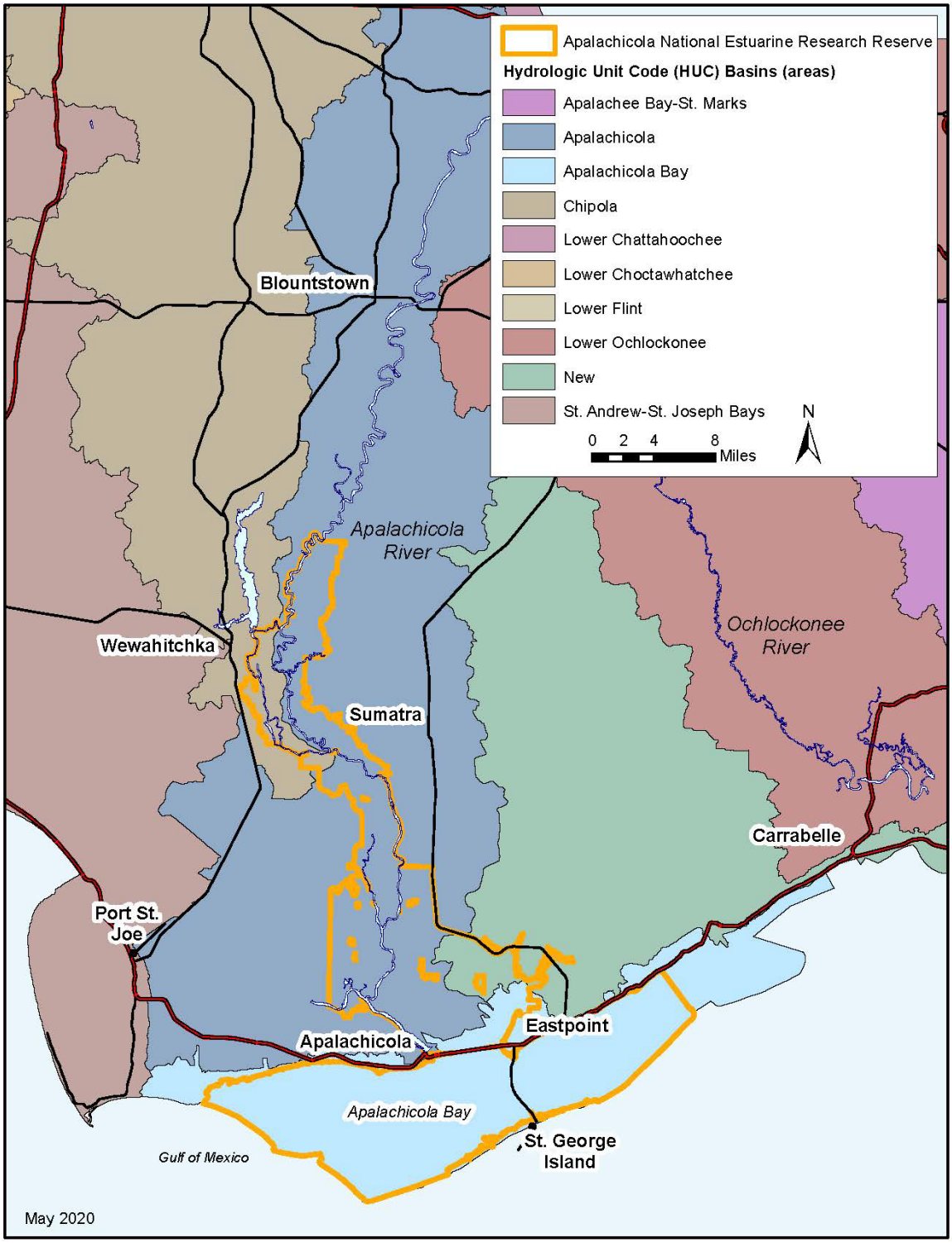
2.2 NOAA's Office for Coastal Management

The Office for Coastal Management (OCM) administers the NERR System. The OCM is part of NOAA's National Ocean Service. The Office establishes standards for designating and operating NERRs, provides support for reserve operations and system-wide programming, undertakes projects that benefit the NERR System, and integrates information from individual NERRs to support decision-making at the national level. As required by section 315(f) of the CZMA and NOAA's NERR regulation at 15 C.F.R. Part 921, Subpart E, Section 921.40, OCM periodically evaluates NERRs for compliance with federal requirements and with the individual NERR's federally approved management plan.

The OCM currently provides support for four NERR system-wide programs: The System-Wide Monitoring Program, the Margaret A. Davidson Fellowship Program, Teachers on the Estuary, and the Coastal Training Program. They also provide support for NERR initiatives on restoration science, invasive species, K-12 education, and NERR specific research, monitoring, education, training, and resource stewardship initiatives and programs.



Map 4 / The Apalachicola-Chattahoochee-Flint River System Watershed



Map 5 / Hydrologic Unit Codes within the Apalachicola NERR and adjacent areas

The NERRS is intended to operate as a federal/state partnership. The state interest is usually represented through one or more state agencies (or a higher education institution or non- profit organization); typically, agencies charged with environmental, wildlife or coastal management responsibilities. The state partners usually administer NERR personnel and day

to day NERR management. For Florida the agency that manages the NERRs, including ANERR, is the Florida Department of Environmental Protection's Office of Resilience and Coastal Protection.

2.3 The Florida Department of Environmental Protection's Office of Resilience and Coastal Protection

The Florida Department of Environmental Protection (DEP) protects, conserves and manages Florida's natural resources and enforces the state's environmental laws. 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. DEP is divided into three primary areas: Regulatory Programs, Land and Recreation, 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 ORCP 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. The ORCP is a strong supporter of the NERR system and its approach to coastal ecosystem management. Florida has three designated NERR sites, each encompassing at least one aquatic preserve within its boundaries. Rookery Bay NERR includes Rookery Bay Aquatic Preserve and Cape Romano-Ten Thousand Islands Aquatic Preserve; Apalachicola NERR includes Apalachicola Bay Aquatic Preserve; and Guana Tolomato Matanzas NERR includes Guana River Marsh Aquatic Preserve and Pellicer Creek Aquatic Preserve. These aquatic preserves provide discrete areas designated for additional protection beyond that of the surrounding NERR and may afford a foundation for additional protective zoning in the future. Each of the Florida NERR managers serves as a regional manager overseeing multiple other aquatic preserves in their region. This management structure advances the ORCP's ability to manage its sites as part of the larger statewide system.

The Florida Keys National Marine Sanctuary, established in 1990 by Congress, and confirmed by the Board of Trustees of the Internal Improvement Trust Fund, covers 2.3 million acres of state and federal submerged lands. The Florida Keys National Marine Sanctuary contains unique and nationally significant marine resources, including the southern portion of the Florida Reef Tract (the world's third largest barrier coral reef), extensive sea grass beds, mangrove-fringed islands and more than 6,000 species of marine life. The ORCP leads state co-management efforts in the Sanctuary in partnership with the Florida Fish and Wildlife Conservation Commission and NOAA.

The Coral Reef Conservation Program coordinates research and monitoring, develops management strategies and promotes partnerships to protect the northern portion of the Florida Reef Tract along the southeast Florida coast, pursuant to the U.S. Coral Reef Task Force's National Action Plan. The Coral Reef Conservation Program also implements Florida's Local Action Strategy, the Southeast Florida Coral Reef Initiative. The program leads response, assessment and restoration efforts and jointly oversees enforcement efforts for non-permitted reef resource injuries (vessel groundings, anchor and cable drags, etc.) in southeast Florida pursuant to the Florida Coral Reef Protection Act (Section 403.93345, F.S.).

The Florida Coastal Management Program is based on a network of agencies implementing 24 statutes that protect and enhance the state's natural, cultural and economic coastal resources. The goal of the program is to coordinate local, state and federal government activities using existing laws to ensure that Florida's coast is as valuable to future generations as it is today. The ORCP is responsible for directing the implementation of the statewide coastal management program. The Florida

Coastal Management Program provides funding to promote the protection and effective management of Florida's coastal resources at the local level through the Coastal Partnership Initiative grant program.

The Outer Continental Shelf Program, a DEP office under the ORCP is responsible for coordinating the state's review, oversight, monitoring and response efforts related to activities that occur in federal waters on the Outer Continental Shelf to ensure consistency with state laws and policies and that these activities do not adversely affect state resources. Reviews are conducted under federal laws, including the Outer Continental Shelf Lands Act, Coastal Zone Management Act, National Environmental Policy Act, Deepwater Ports Act, Marine Protection, Research and Sanctuaries Act, Rivers and Harbors Act, Clean Air and Water Acts and the regulations that implement them.

The DEP's Clean Boating Program includes Clean Marina designations to bring awareness to marine facilities and boaters regarding environmentally friendly practices intended to protect and preserve Florida's natural environment. Marinas, boatyards and marine retailers receive clean designations by demonstrating a commitment to implementing and maintaining a host of best management practices. Via the Clean Boating Program, the Clean Vessel Act provides grants, with funding provided by the U.S. Fish and Wildlife Service, for construction and installation of sewage pump out facilities and purchase of pump out boats and educational programs for boaters.

The Resilient Florida Program's mission is synergizing community resilience planning and natural resource protection tools and funding to prepare Florida's coastline for the effects of climate change, especially rising sea levels. This program is working to ensure Florida's coastal communities are resilient and prepared for the effects of rising sea levels, including coastal flooding, erosion, and ecosystem changes. The program is synergizing community resilience planning and natural resource protection tools; providing funding and technical assistance to prepare Florida's coastal communities for sea level rise; and continuing to promote and ensure a coordinated approach to sea level rise planning among state, regional, and local agencies.

A healthy beach and dune system provide protection for upland development and critical infrastructure, preservation of critical wildlife habitat for threatened and endangered species, and a recreational space that drives the state's tourism industry and economy. In order to protect, preserve and manage Florida's valuable sandy beaches and coastal systems, the state Legislature adopted the Florida Beach and Shore Preservation Act, Chapter 161, Florida Statutes, in 1964. The Act provides for the creation of a statewide, comprehensive beach management program that integrates coastal data acquisition, coastal engineering and geology, biological resource protection and analyses, funding initiatives and regulatory programs designed to protect Florida's coastal system both above and below the mean high water line. This comprehensive approach allows DEP's Beach and Inlet Management Programs to collaborate with coastal communities to address critical erosion caused by altered and managed inlets, imprudent construction, rising seas and storm impacts. DEP's Beach Management Programs consist of the following: Beach Field Services, Coastal Engineering and Geology Group, the Coastal Construction Control Line Program, the Beaches, Inlets, and Ports Program, and the Beaches Funding Group.

2.4 Management Authority (Apalachicola Bay Aquatic Preserve)

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

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

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

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

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

In 1980, the Trustees adopted the first aquatic preserve rule, Chapter 18-18, Florida Administrative Code (F.A.C.), for the administration of the Biscayne Bay Aquatic Preserve. All other aquatic preserves are administered under Chapter 18-20, F.A.C., which was originally adopted in 1981. These rules apply standards and criteria for activities in the aquatic preserves, such as dredging, filling, building docks and other structures that are stricter than those of Chapter 18-21, F.A.C., which apply to all sovereignty lands in the state.

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

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

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

2.5 Statutory Authority

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

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

Management responsibilities for aquatic preserves may be fulfilled directly by the Trustees or by staff of the DEP through delegation of authority. Other governmental bodies may also participate in the management of aquatic preserves under appropriate instruments of authority issued by the Trustees. The ORCP staff serves as the primary managers who implement provisions of the management plans and rules applicable to the aquatic preserves. The ORCP does not “regulate” the lands per se; rather, that is done primarily by the DEP Districts (in addition to the Water Management Districts) which grant regulatory permits. The Florida Department of Agriculture and Consumer Services through delegated authority from the Trustees, may issue proprietary authorizations for marine aquaculture within the aquatic preserves and regulates all aquaculture activities as authorized by Chapter 597, Florida Aquaculture Policy Act, F.S. Staff evaluates proposed uses or activities in the aquatic preserve and assesses the possible impacts on the natural resources. Project reviews are primarily evaluated in accordance with the criteria in the Act, Chapter 18-20, F.A.C., and this management plan.

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

Florida Statutes that authorize and empower non-ORCP programs within DEP or other agencies may also be important to the management of the ORCP sites. For example, Chapter 403, F.S., authorizes DEP to adopt rules concerning the designation of “Outstanding Florida Waters" (OFWs), a program that provides aquatic preserves with additional regulatory protection. Chapter 379, F.S., regulates saltwater fisheries, and provides enforcement authority and powers for law enforcement officers. Additionally, it provides similar powers relating to wildlife conservation and management. The sheer number of statutes that affect aquatic preserve management prevents an exhaustive list of all such laws from being provided here.

2.6 Administrative Rules

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

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

To that end, Chapter 18-21, F.A.C., contains provisions on general management policies, forms of authorization for activities on sovereignty lands, and fees applicable for those activities. In the context of the rule, the term "activity" includes "construction of docks, piers, boat ramps, boardwalks, mooring pilings, dredging of channels, filling, removal of logs, sand, silt, clay, gravel or shell, and the removal or planting of vegetation" (Rule 18-21.003, F.A.C.). In addition, activities on sovereignty submerged lands must be not contrary to the public interest (Rule 18-21.004, F.A.C.). Chapter 18-21 also sets policies on aquaculture, geophysical testing (using gravity, shock wave and other geological techniques to obtain data on oil, gas or other mineral resources), and special events related to boat shows and boat displays. Of particular importance to the ORCP site management, the rule also 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. Chapter 18-18 is specific to the Biscayne Bay Aquatic Preserve and is more extensively described in that site's management plan. Chapter 18-20 is applicable to all other aquatic preserves. It further restricts the type of activities for which authorizations may be granted for use of sovereignty lands and requires that structures that are authorized be limited to those necessary to conduct water dependent activities. Moreover, for certain activities to be authorized, "it must be demonstrated that no other reasonable alternative exists which would allow the proposed activity to be constructed or undertaken outside the preserve" (Paragraph 18-20.004(1)(g), F.A.C.).

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

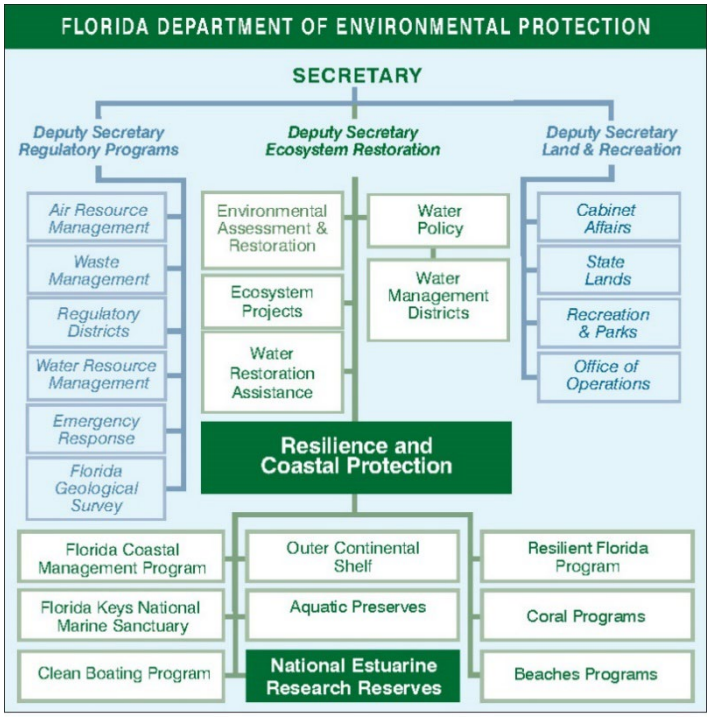


Figure 1 / State management structure

lands within an aquatic preserve. The rule also provides for the analysis of the cumulative impacts of a request in the context of prior, existing, and pending uses within the aquatic preserve, including both direct and indirect effects. The rule directs management plans and resource inventories to be developed for every aquatic preserve. Further, the rule provides provisions specific to certain aquatic preserves and indicates the means by which the Trustees can establish new or expand existing aquatic preserves.

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

2.7 Location/Boundaries

ANERR is situated largely in Franklin County, but its boundary also stretches into Gulf and Liberty counties as well. The boundary includes the lower 52 miles of the Apalachicola River and floodplain, most of Apalachicola Bay and a diverse set of upland and wetland communities around the bay. Public lands managed by the U.S. Fish and Wildlife Service (USFWS), Florida Fish and Wildlife Conservation Commission (FWC), Florida Park Service (DEP), Northwest Florida Water Management District (NWFWMD) and the Florida Department of Environmental Protection's (DEP) Office of Resilience and Coastal Protection (ORCP) are all within the boundary of ANERR.

The coverage of land and open water within the ANERR boundary is in excess of 234,000 acres. Of the non-submerged acreage in ANERR, 6,794 acres are managed by the ORCP, 11,938 acres by USFWS (St. Vincent Island National Wildlife Refuge), 2,024 acres by other DEP agencies (Dr. Julian G. Bruce St. George Island State Park), 36,241 acres by the NWFWMD, and 70,015 acres by FWC. The balance of the total acreage is open water.

2.8 Apalachicola National Estuarine Research Reserve Core and Buffer Areas: Designation and Rationale

Core and Buffer Areas: National Estuarine Research Reserve System Regulations

National Estuarine Research Reserve (NERR) regulations, 15 Code of Federal Regulations (C.F.R.), Section 921.13, outlines requirements for the selection and ranking of "ecologically key land and water areas of the Reserve." These areas (see Map 6)

are to be prioritized based on their relative importance, including “a strategy for establishing long-term state control over those areas sufficient to provide protection for Reserve resources to ensure a stable research environment.

The regulations at 15 C.F.R. Section 921.11 state that 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. In addition, when approving NERRs for designation, NOAA must consider, among other things, the following principles identified in 15 C.F.R. 921.11(c)(3):

- Assurance that the boundaries of Apalachicola NERR (ANERR) “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.” “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.” ”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 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.” The determination of which land and water areas are to be identified as “key” or “core” within a NERR is determined by scientific knowledge of that area and the degree of scientific research occurring within that area.

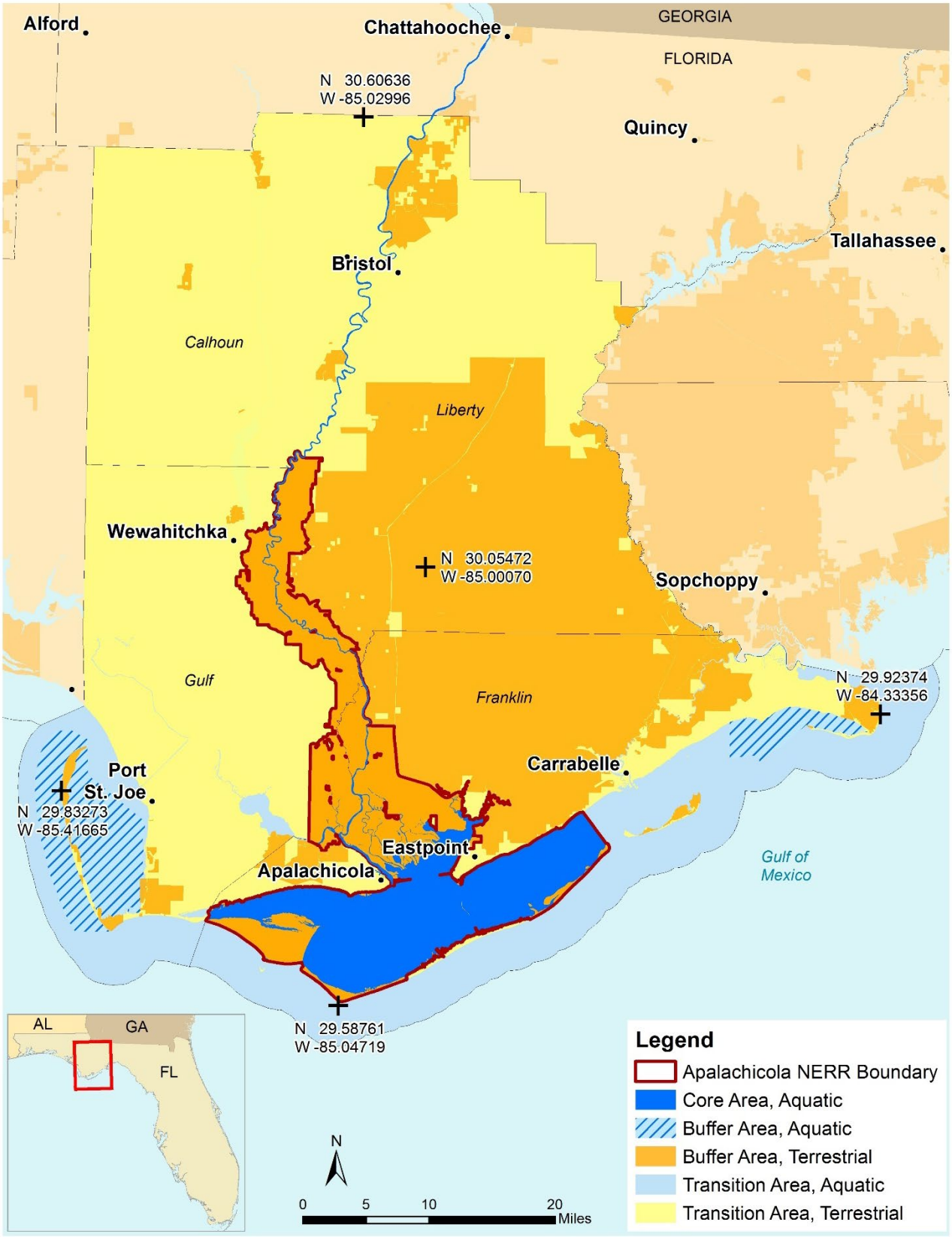
Buffer areas of a NERR are identified as those areas that are “adjacent to or surrounding key land and water areas and are essential to maintaining their integrity. Buffer zones protect the core area and provide additional protection for estuarine-dependent species...” (15 C.F.R. 921.11(c)(3)). NERR regulations also require that a NERR define the biological and ecological characteristics of land and water areas within the NERR. These land and water areas are thus designated as “core” areas, vital to the proper functioning of the entire system; and buffer areas, adjacent to, surrounding, or otherwise essential to the viability of core areas.

Core Area of the Apalachicola National Estuarine Research Reserve

The core areas of ANERR are the estuarine waters and associated marshes, and uplands within the designated boundary of ANERR associated with the barrier islands, estuaries and rivers, as well as, their associated tributaries (Map 6). 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 Apalachicola 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 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



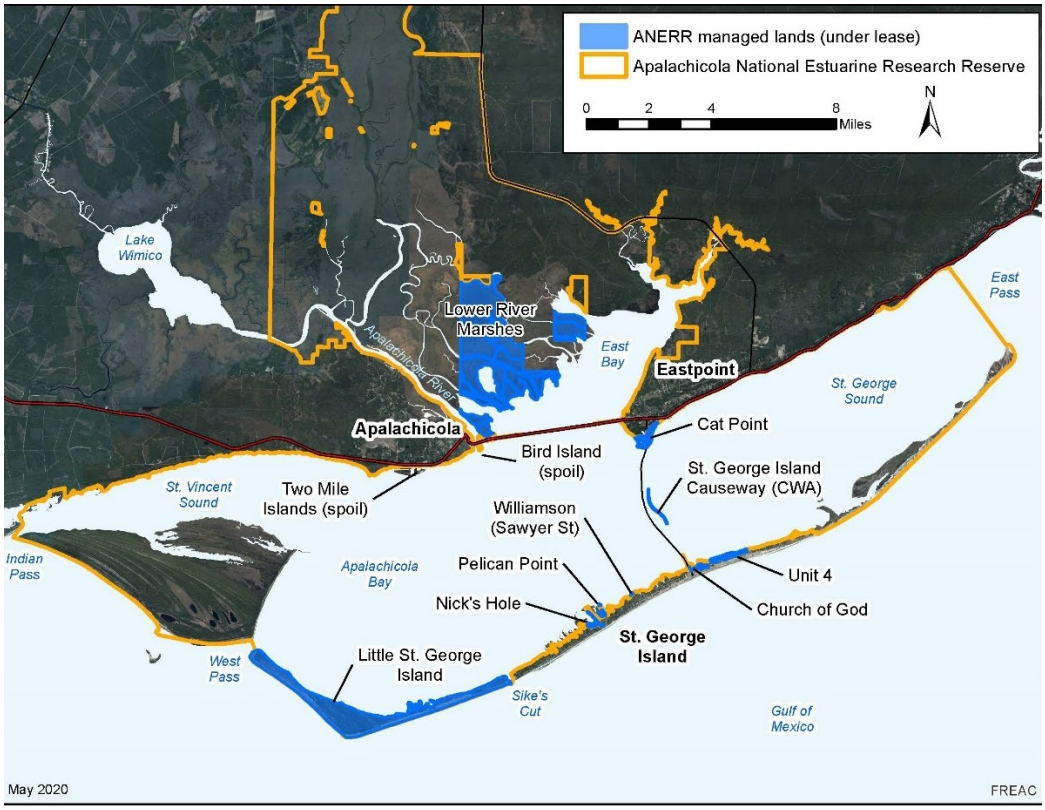
Map 6 / Core Buffer Transitional Zones for the Apalachicola NERR

geomorphological change (i.e., climate change and related sea-level rise). Within ANERR, the Buffer area is comprised of public lands within the boundary that are managed by other state or federal agencies and are not managed by the Reserve.

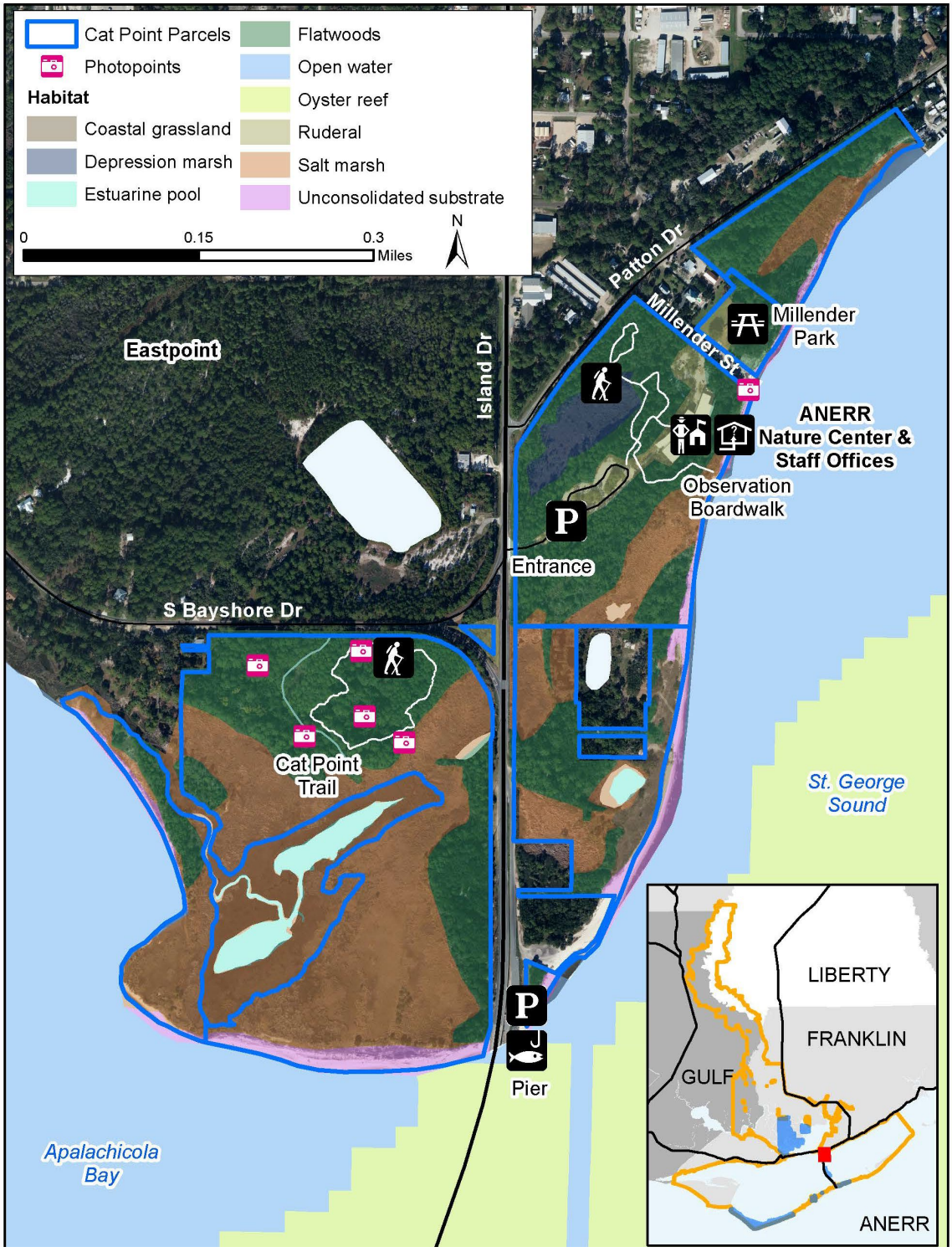
The historic natural watershed that serves as ANERR's buffer area and supports ANERR's core area is defined by both biotic and abiotic aspects including dynamics of natural areas, as well as, areas altered by human urbanization activities such as housing developments, roadways, canals, weirs, dikes and dams. Multiple basins that comprise the areas providing water crucial to ANERR are located within ANERR's watershed. These basins include Carrabelle River, Apalachicola River, Brothers River, Chipola River, Chattahoochee River and Flint River. All the previously mentioned basins feed into the Apalachicola Bay basin which covers the entire ANERR.

2.9 Parcels within the Apalachicola National Estuarine Research Reserve Boundary managed by ORCP

The following describes subunits and individual parcels under Lease #3862 to and managed by the ORCP within the ANERR boundary (Map 7). Except for the Lower River Marshes, Little St. George Island, and the SGI Causeway (accessible by boat only), the Reserve's managed lands are small, highly fragmented, individual parcels, embedded or adjacent to residential communities within Franklin County. Their primary values in public ownership lie in protection from development, reduction of runoff pollutants impacting nearby aquatic resource, and in public access and use. Total Geographic Information System (GIS) acreage for the Reserve's managed lands totals 6,794 acres.



Map 7 / Parcels managed by ANERR/ORCP/DEP

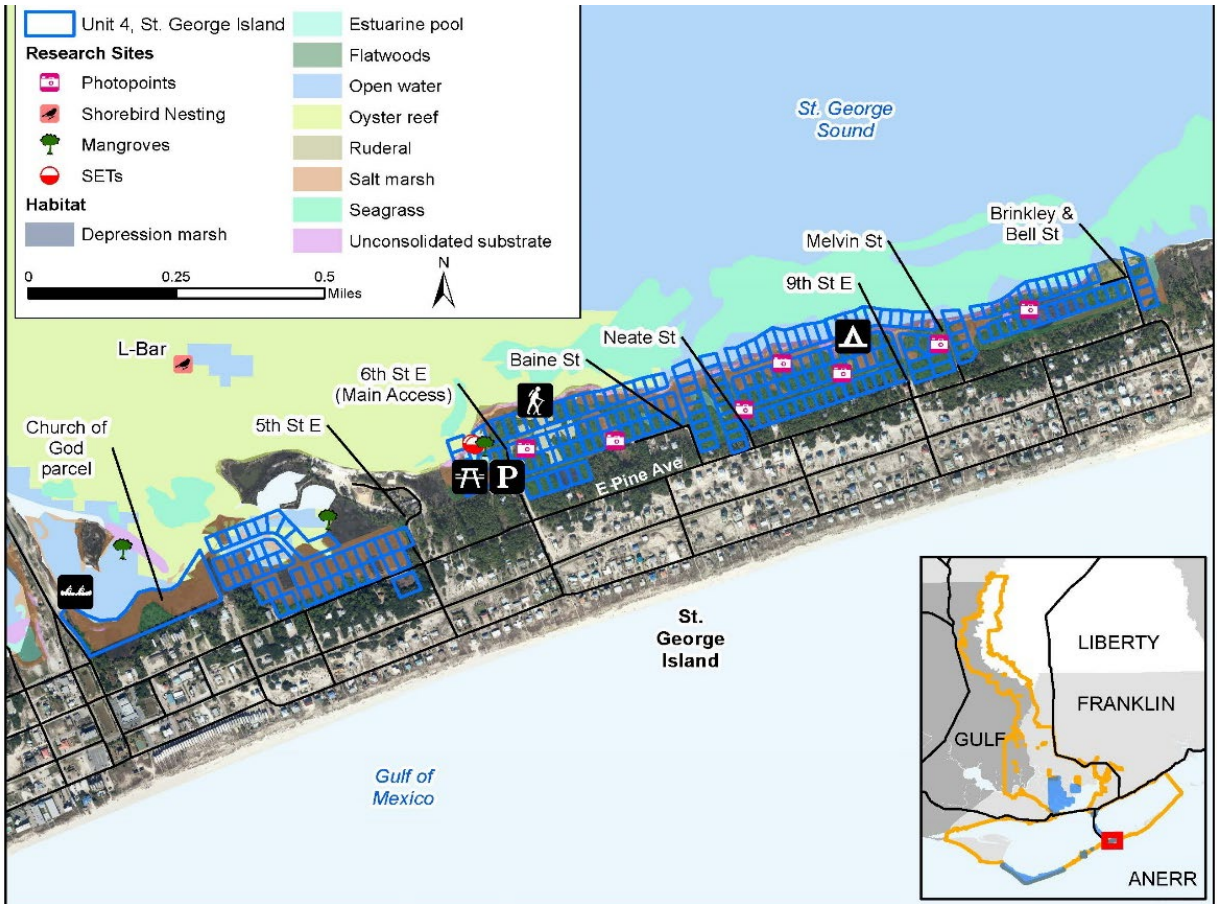


Map 8 / Cat Point parcels managed by ANERR

Cat Point and Millender Tracts, Eastpoint (Map 8): Cat Point is made up of many individual parcels separated by roads, private property and marsh, totaling approximately 100 acres on the mainland at the foot of the St. George Island Bridge in Eastpoint. Millender 1 and 2 parcels (Millender Tract and the parcel the Nature Center/staff headquarters were built on in

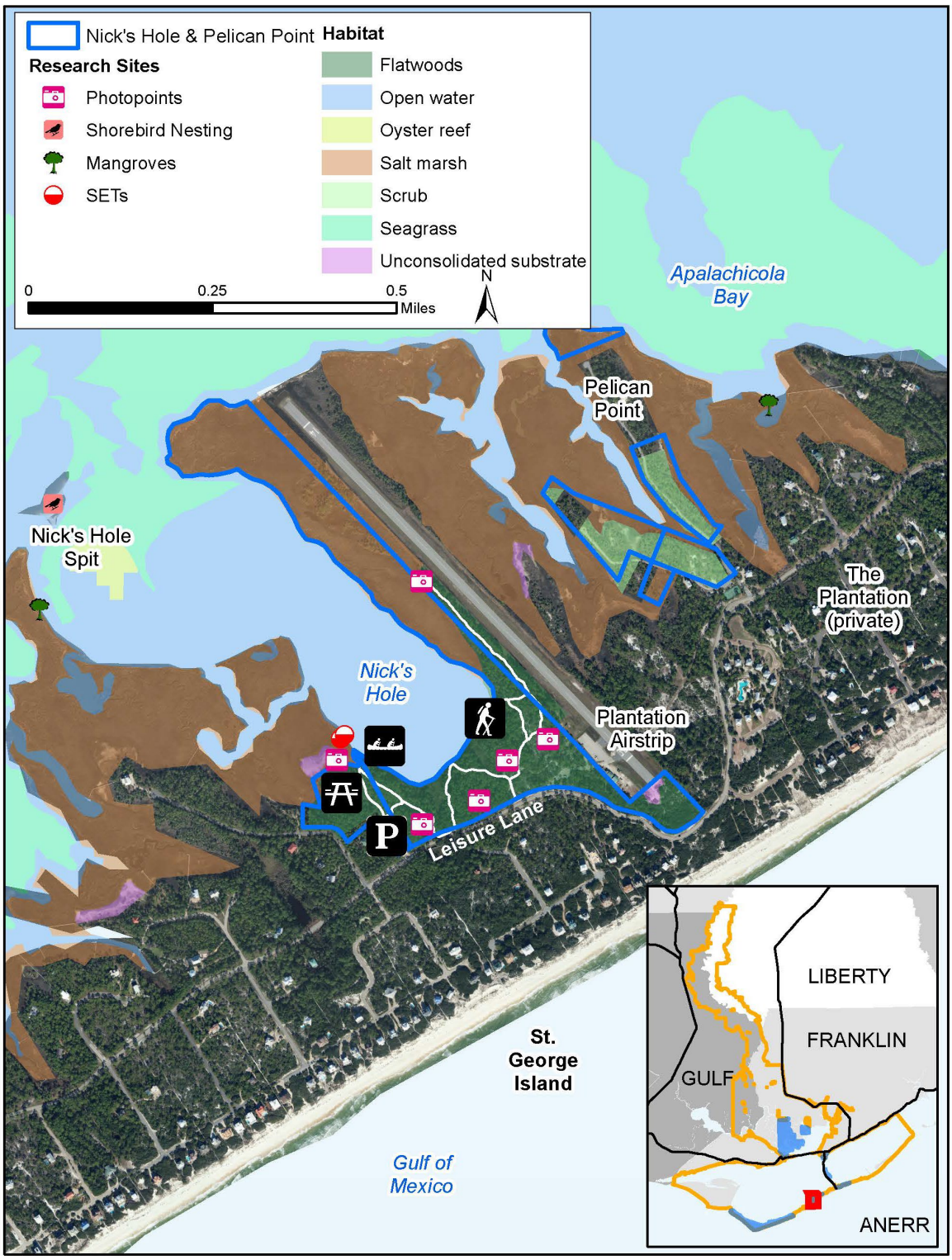
2011) are part of the Reserve's 1990 original lease. Rodrigue, Hunter, Bush, (referring to each of the seller's names, but collectively known today as Rodrigue or Cat Point) and Millender Park parcels were acquired from 2001-2003 with Preservation 2000 funding (Amendments 6, 7, and 9). Natural communities of Cat Point properties include estuarine salt marsh (black needle rush and cordgrass), mesic and scrubby flatwoods (slash pine, live and scrub oaks, and saw palmetto), beach and dunes (sea oats, morning glory, Gulf Coast phragmites, unconsolidated shoreline), and basin marsh (dominated by cattail, sawgrass and bulrush). Exotic species historically documented within Millender, Nature Center, and Rodrigue parcels include Chinese tallow, camphor tree, air potato, Japanese climbing fern, wisteria, and rose. Disturbance from tropical storm surge triggers new infestations, however, and as a result staff treat and monitor for exotics annually. No listed plant or animal species are known to occur at Cat Point, although bald eagles nest in the Rodrigue Tract. Primary resource values of this subunit include protection for adjacent aquatic resources, protection from development, and primitive recreation and access. This subunit is adjacent to the nearby Cat Point Oyster Harvest Area, historically one of the most productive approved oyster harvest areas in the entire Apalachicola Bay system.

Unit 4 at East Hole, St. George Island (Map 9): The Unit 4 subunit stretches east of the St. George bridge along the shorelines of St. George Sound and consists of 251 individual residential building lots (Unit 1 and Unit 4) and a contiguous 7.2-acre parcel (Church of God), totaling just under 95 acres of state land. Specifically, Unit 4 is made up of the following: 224 lots purchased as part of the Environmentally Endangered Lands Program of Florida's Conservation Act of 1972 (part of the original 1990 lease); 24 lots donated in 2000 (Amendment 2); one lot donated in 2006 by the Thompson Family (Amendment 11); and two lots donated in 2010 by the Benda Family (Amendment 14). Natural communities include estuarine salt marsh (dominated by needle rush and cordgrass) and wet flatwoods (dominated by slash pine, wax myrtle and saw palmetto). The primary access point for Unit 4 is a small gated parking area at 6th Street, however, there are four other foot traffic only access points at county right-of-ways. The 7-acre Church of God parcel can be observed from the public boat launch on the side of State Road 300. Few, if any, exotic species known to occur on the property, although Brazilian pepper and Chinese tallow have been found on adjacent sites. Staff treats exotics as they are found and monitors the parcels intermittently. The primary values of this subunit include protection of aquatic resources from reduced development, flood mitigation, wildlife habitat protection (mangroves, bald eagles, L-bar spit for shorebirds), and low-impact recreation use. However, the site remains largely unnatural. The residential lots are fragmented via platted county roads, alleys and canals. Most of the slightly elevated roads appear to have been constructed from a now-flooded borrow pit located on site. The fragmentation of the subunit is compounded by Franklin County ownership of the platted rights-of-way. The roads and pits have likely disrupted the original sheet flow drainage across the unit as well as inhibited implementation of prescribed fire (firebreaks, mechanical thinning), resulting in flooding problems for nearby residents and fuel build up, respectively. Resource management and restoration activities are described in Chapter 10 and 11.



Map 9 / Unit 4 Parcel

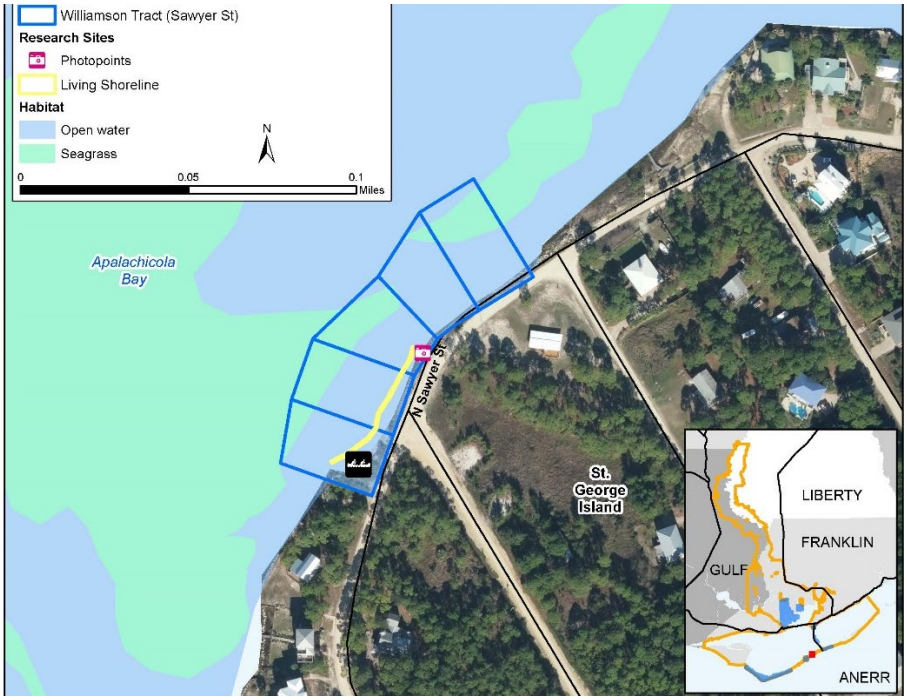
Nicks Hole and Pelican Point, St. George Island (Map 10): Both Nicks Hole and the Pelican Point parcels are located within the private St. George Island Plantation community on the western half of St. George Island. Therefore, access at these sites is limited for the general public, although guests of the Plantation and visitors traveling by water have full access.
The Nicks Hole subunit consists of two parcels totaling approximately 50-acres. Nicks Hole tract is located on the bay shore of Apalachicola Bay and Nicks Hole. The 5-acre “Mahr” parcel was purchased in 2002 (Amendment 8, historically a Boy Scout camp/special use area) and the 22-acre Wilder parcel in 2003 (Amendment 9) with Preservation 2000 funds. Natural communities include scrubby flatwoods (slash pine, scrub oak, rosemary), mesic flatwoods (palmetto, gallberry) and salt marsh (black needle-rush and cordgrass). The salt marshes around Nicks Hole also have increasing occurrences of both red and black mangrove. Overall, the habitats of this subunit are currently in good condition, primarily as a result of a prescribed fire regime being initiated in 2015. The Reserve works with St. George Island Plantation staff and partner agencies to safely conduct prescribed fire, especially with the adjacent airstrip, and to promote awareness in the community. Like the other barrier island subunits, impacts from natural coastal disturbances such as tropical storms are also essential in shaping the natural communities and are taken into consideration when determining appropriate fire regimes. The subunit has historically had only a few, isolation infestations of invasive species, but currently all species are managed and in maintenance mode. Controlled species include salt cedar (*Tamarix* spp.), and showy and smooth rattleboxes (*Crotalaria* spp.). No listed plant or animal species occur in the uplands, but an exposed oyster spit (“Nicks Hole Bar”) located just north of Nicks Hole provides critical nesting habitat for the American oystercatcher. The spit was discovered to be an important nesting site in 2017 and is now posted and monitored annually by shorebird surveyors, Audubon, and FWC.



Map 10 / Nick's Hole and Pelican Point parcels

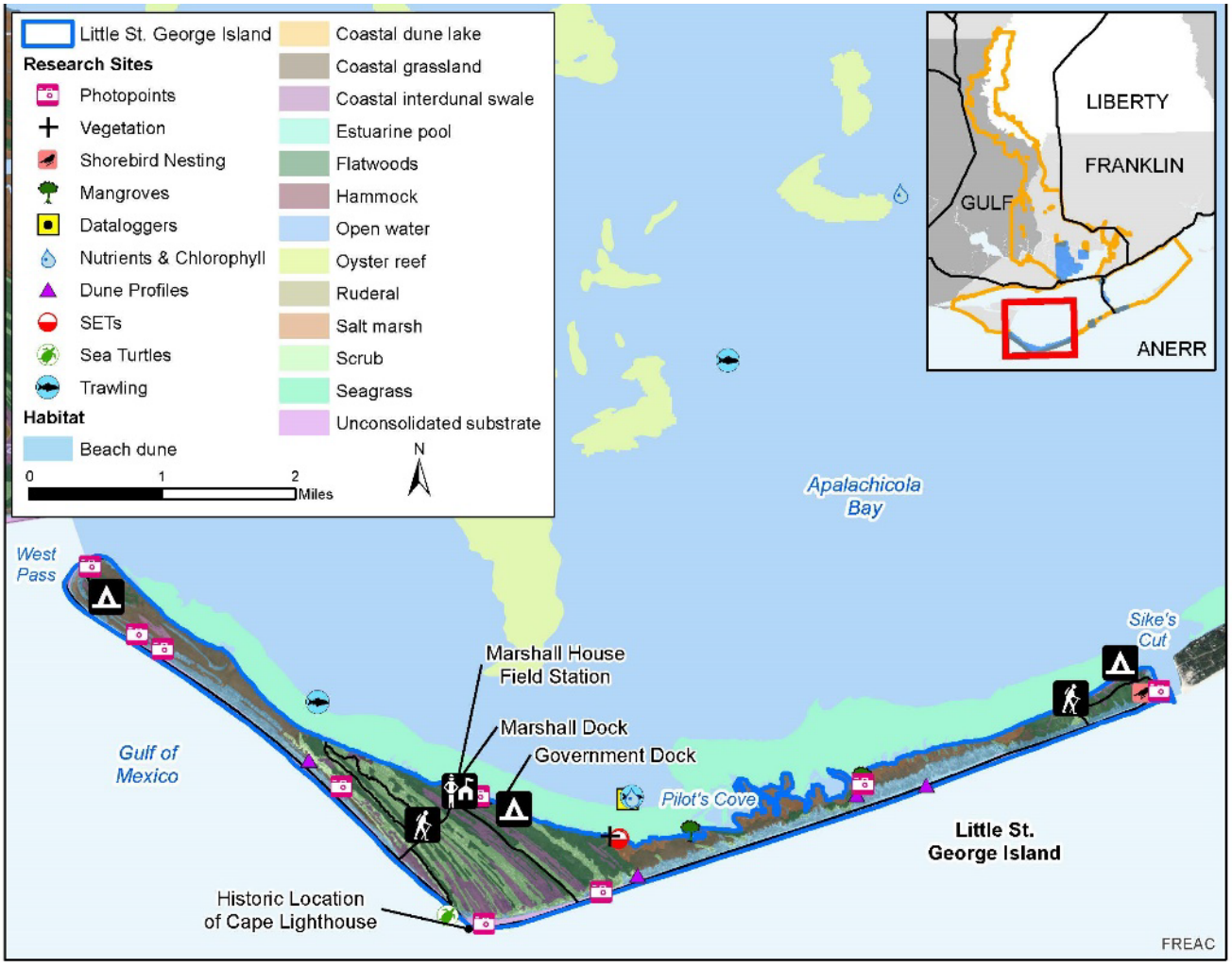
The Pelican Point subunit consists of 15 residential lots in the “Pelican Point” subdivision of the St. George Island Plantation. The lots were purchased by the state from 1996 to 2020 with Preservation 2000 and Florida Forever funds (Amendments 1, 2, 7, 16). Since the St. George Island Plantation and the Pelican Point HOA are both private, gated communities, the state parcels at this site do not have high visitation or access (public access is only by water). In 2019, the Division of State Lands negotiated the purchase of 1.5-acres on St. George Island, part of the Apalachicola Bay Florida Forever Project. The acquisition is at the tip of a peninsula, which is teaming with wildlife as the land is undeveloped and provides habitat for young marine animals/fish and a plethora of wildlife on the Bay side of the island. The Reserve is committed to managing the end of the road and restoration plans are in process. Natural communities include scrubby flatwoods, mesic flatwoods and tidal marsh. The natural communities of this subunit are in fair condition, but are beginning to suffer from saltwater intrusion, sea level rise, as well as fire exclusion. The subunit is mostly exotic free.

Sawyer Street (Williamson Tract), St. George Island (Map 11): This small subunit (< 2 acres) consists of a five-lot donation on St. George Island along the shoreline of Apalachicola Bay and was part of the Reserve’s original lease). The lots have become mostly submerged over time. The lots provided a location for a demonstration shoreline stabilization project constructed in 1993. This project involved the planting of native marsh species, Saltmarsh cordgrass (*Sporobolus alterniflorus),* and the development of an offshore, low-profile breakwater. The successful project remains intact today near the bayside terminal end of Nedley Street on St. George Island, providing protection from erosion and providing habitat for aquatic marine species. In 2018, the Reserve collaborated with the Conservation Corps of the Forgotten Coast to extend the breakwater westward, to create estuarine habitat that was lost due to erosion from storms at the site. Despite the unit’s small size, a considerable infestation of a new invasive species, beach vitex, has taken a hold in the riprap lining the road shoulder. Staff treat the vitex annually in order to keep it in check and use the site for invasive species awareness and education.



Map 11 / Sawyer Street parcels (St. George Island)

Little St. George Island (Map 12): Little (Cape) St. George Island was acquired by Florida in 1977 through the Environmentally Endangered Lands Program of Florida's Conservation Act of 1972 and was part of the Reserve's original lease. The island was initially part of and managed by the Department of Natural Resources. This purchase was made in order to protect the island from development and to contribute to the protection of Apalachicola Bay. The island is at the apex of the barrier island chain and has been an important geographic feature in the history of the bay and communities. Sike's (Government) Cut was dredged in 1954 by the Army Corp of Engineers to facilitate access between the Gulf, bay and river. Little St. George Island is separated from St. George Island to the east by this cut, and from St. Vincent Island to the west by West Pass. The island consists of approximately 2,100 acres at mean high tide with an additional 400 acres of perimeter tidal marshlands and lower beach areas which are inundated by high tidal waters. Little St. George Island has been separating into multiple islands historically as a result of large hurricanes; thus, the west end is known locally as Sand Island. Disturbances on the island have varied over time and include both natural disasters and human impacts.



Map 12 / Little St. George Island

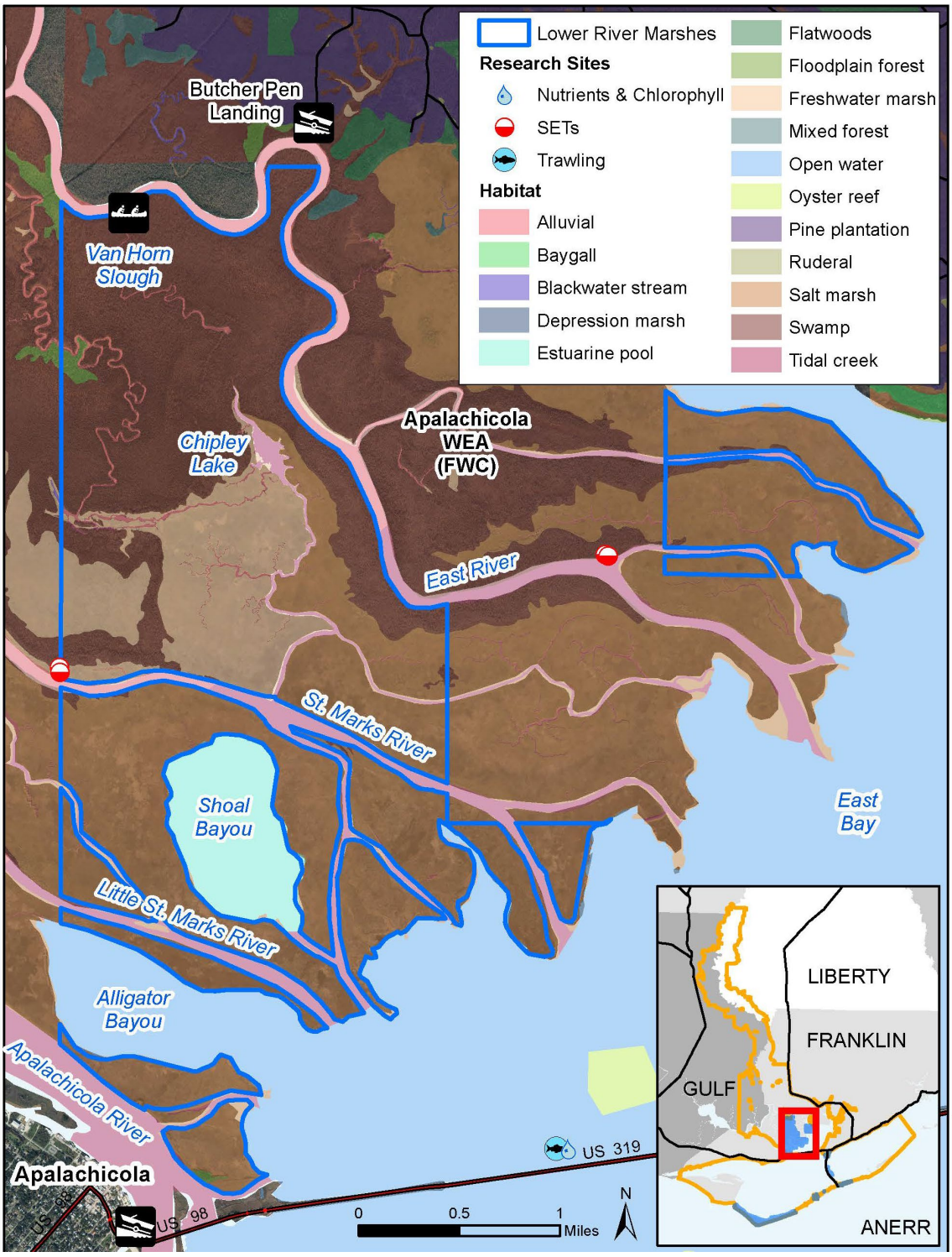
Prehistoric and Native American cultures have utilized the island for thousands of years as evident by documented artifacts and middens scattered along the shorelines. During World War II, from 1939-1945, the U.S. Army occupied the island and used it as a practice gunnery range for B-24 bombers stationed in nearby Apalachicola. Turpentine operations occurred from

1910-1916 and again from 1950-1956. Many of the slash pine trees on the island are cat-faced from these operations and can be still seen today. Until 1977, the island was privately owned and experienced farm animals, family living, real estate ventures, wildfires and hurricanes. The Cape St. George Lighthouse remained on the island until 2005 when it toppled over. In 2016, a 500-foot living shoreline was installed along the bay shoreline to provide further protection of the historic Marshall House, moved and erected in the early 1940s, from the eroding shoreline.

Wildfires, ignited by lightning occurring frequently across the island historically, are still allowed to burn with the intention of fostering a natural fire regime across Little St. George Island. Complementing this fire plan is the establishment of structure protection measures around the Marshall House complex with vegetation management and prescribed fire, as well as having contingency plans in place for adjacent properties on St. George Island and St. Vincent NWR.

Lower River Marshes (Map 13): This subunit lies approximately one to five miles northeast from the City of Apalachicola within the distributary system of the lower Apalachicola River. The Lower River Marshes was a single purchase from the St. Joe Land and Development Company, with a lease acreage of 3,599 acres (Amendment 9 - 7/24/2003 using CARL land trust funds). The subunit remains undeveloped and relatively natural, but human impacts can still be detected including presence of invasive aquatic species, hydrological disturbances (e.g. flow, nutrients, salinity), and marine debris accumulation from tropical systems. The subunit falls within the Apalachicola Bay Aquatic Preserve up to mean high tide. A myriad of river distributaries and tidal creeks occur within the subunit. Emergent natural communities include alluvial forest (dominated by bald cypress, tupelo, sweetgum, water hickory and black willow) and estuarine salt marsh (dominated by sawgrass, bulrush, cattail, needle rush, *Sporobolus* spp. and Gulf Coast *Phragmites*). The open marsh and alluvial forest hydrology fluctuates with both river flow and tide effects. Those portions of the marsh subject to greater marine influence are dominated by salt tolerant plants such as black needlerush. Interior portions of the marsh contain a higher proportion of less salt tolerant species. Sawgrass is found in upper interior regions, less affected by tidal flow, where salinity is very low, and the marsh begins to grade into the adjacent floodplain swamp community.

Documented invasives species within the forested and emergent wetlands include rattlebox (*Sesbania punicea*), rose (*Rosa* spp.), Japanese climbing fern (*Lygodium japonicum*), and Phragmites reed (a native species that has become more prolific and invasive in some areas). In the freshwater distributaries and sloughs, alligatorweed (*Alternanthera philoxeroides*), wild taro (*Colocasia esculenta*), water hyacinth (*Eichhornia crassipes*) are present. More recently, Cuban bulrush (*Oxycaryum cubense*) has established in backwaters. The distributary shorelines surrounding the individual pieces also suffer from some minor erosion exacerbated by boat wakes and noise pollution (i.e. airboats). The tract has historically been managed cooperatively with FWC in terms of prescribed fire, aquatic plant management, regulation of hunting, and cooperative marine debris removal projects.

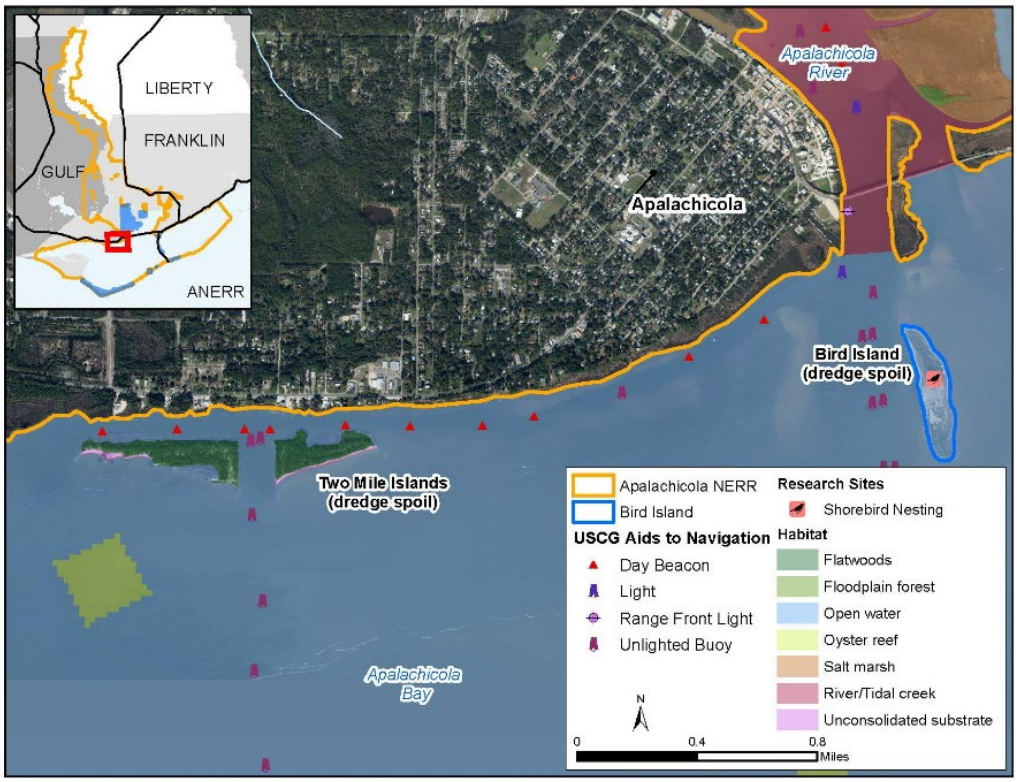


Map 13 / Lower River Marshes

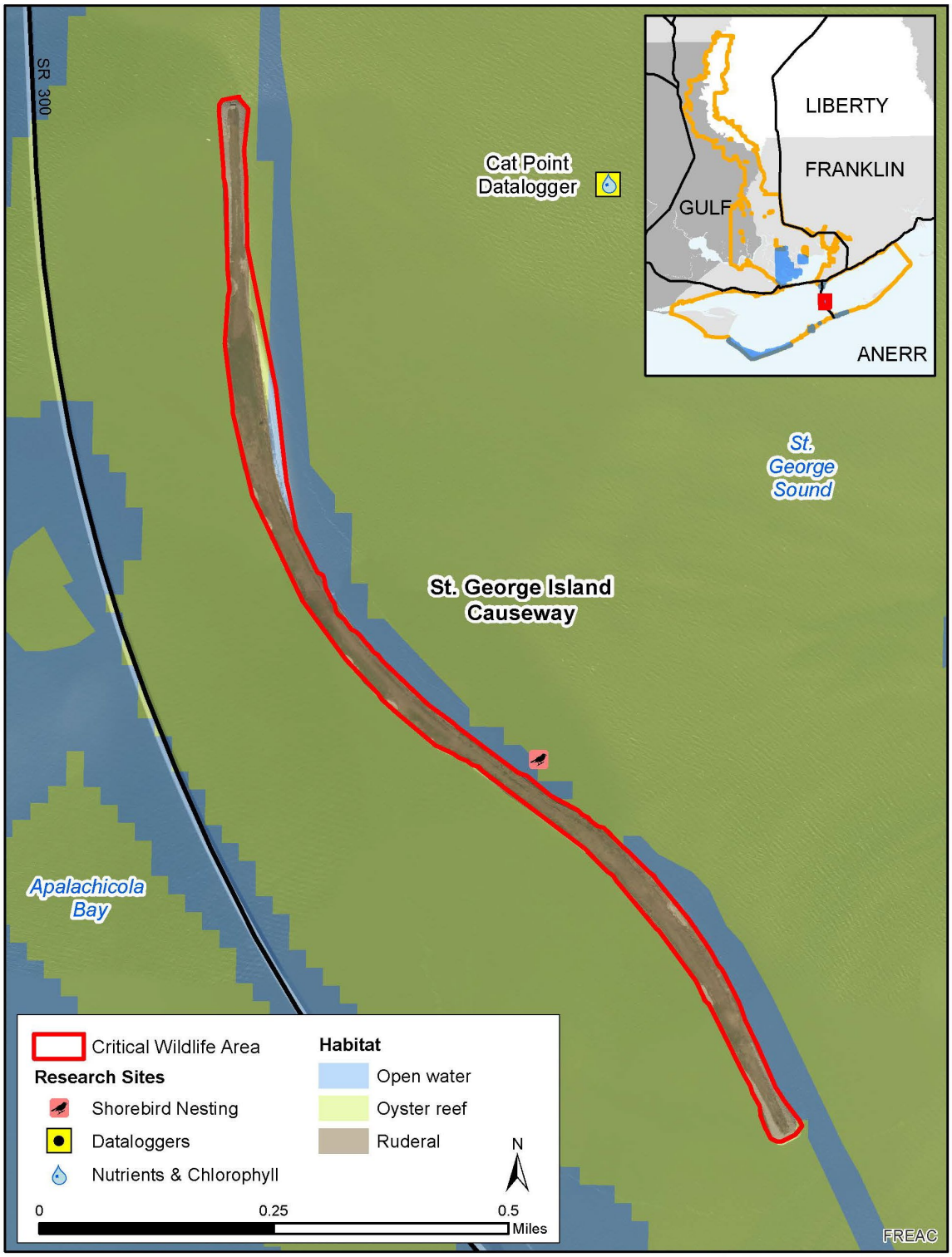
Dredged Spoil Islands and Causeway (Map 14 & Map 15): Although not specifically leased to ANERR, three major dredged spoil sites warrant mention in this plan and are managed by the Reserve. A single spoil site (known locally as “Bird Island”) established for placement of river channel dredge material exists just south from the Apalachicola Bridge and east of the river

channel. The site is often a successful nesting site for American oystercatchers and occasionally least terns. However, species, location, and number of nesting birds has changed over time due to the variability of site characteristics changing with dredging timing and intensity. Reserve staff assist shorebird surveyors, Audubon, and FWC with posting the site during nesting season and working with USACE to place the dredge consistently and beneficially for nesting birds.

The now abandoned causeway portion of the old St. George Island Bridge remains a major shorebird and seabird nesting site in the Apalachicola Bay area. The causeway was constructed in 1965 as part of the original bridges that connected St. George Island to the mainland. The bridges were decommissioned in 2004 and the Reserve assumed the lease in 2012 for the 25+ acre causeway island (State Lands lease #3862 - Amendment 15). The causeway was officially recognized as a priority breeding site when it became a state-designated Critical Wildlife Area in 1990, thereby increasing protection of the habitat and species, as well as enforcing closure from March 1 – September 30. Reserve staff currently assist Audubon and FWC with posting the site, monitoring, and banding birds during nesting season. Waters adjacent to the causeway are very popular for recreational fishing. Overall, the site has a high level of disturbance, with deteriorating seawalls and continued growth of vigorous, hardy vegetation adapted to salt and xeric conditions. ANERR conducts land management activities on the island to increase habitat for nesting birds. However, both mechanical management and prescribed fire have not been very successful to increase exposed shell hash and sand, which birds find most suitable for nesting. The Reserve seeks to work with partners to established long-term habitat monitoring and creative habitat management solutions moving forward. The Reserve worked closely with Audubon to come up with a plan to stabilize the walls of the causeway. Audubon received funding through the National Fish and Wildlife Foundation to fortify over 1000 ft of seawalls, in some cases stabilizing falling seawall and in other cases, completely fortifying the walls. The work was completed in February of 2019. The Audubon will be applying for additional funding to address other portions of the Causeway's shoreline/seawalls which have continued to deteriorate.



Map 14 / Bird Island and Two Mile Islands



Map 15 / St. George Island Causeway Critical Wildlife Area

2.10 Non-ORCP Managed Public Lands within the Apalachicola Research Reserve Boundary (Map 16)

Dr. Julian G. Bruce St. George Island State Park (Franklin County, DEP – Division of Recreation and Parks, 2,024 (GIS) acres)

Located at the east end of (Big) St. George Island Dr. Julian G. Bruce St. George Island State Park contains more than nine miles of beaches and dunes. Other natural communities include slash pine forests, oak-magnolia hammocks, freshwater ponds, sloughs, and salt marsh. Its location on a bird migration route makes the island an important stop-over for many passerine and shorebird species. Camping, hiking, fishing, beach-use and nature study are available at the park. For more detailed information visit: https://www.floridastateparks.org/parks-and-trails/dr-julian-g-bruce-st-george-island-state-park.

St. Vincent National Wildlife Refuge: (Franklin and Gulf counties, USFWS, 11,858 (GIS) acres)

This is an undeveloped barrier island, with an extensive beach dune and swale system. The island supports coastal grassland and scrub, slash pine flatwoods, freshwater lakes, and tidal marsh. The refuge hosts an experimental introduction and breeding program of the red wolf. Hiking, hunting, birdwatching, fishing and boating are activities at the island. For more detailed information visit: www.fws.gov/saintvincent/.

Apalachicola River Wildlife and Environmental Area: (Franklin and Gulf counties, FWC, 63,814 (GIS) acres)

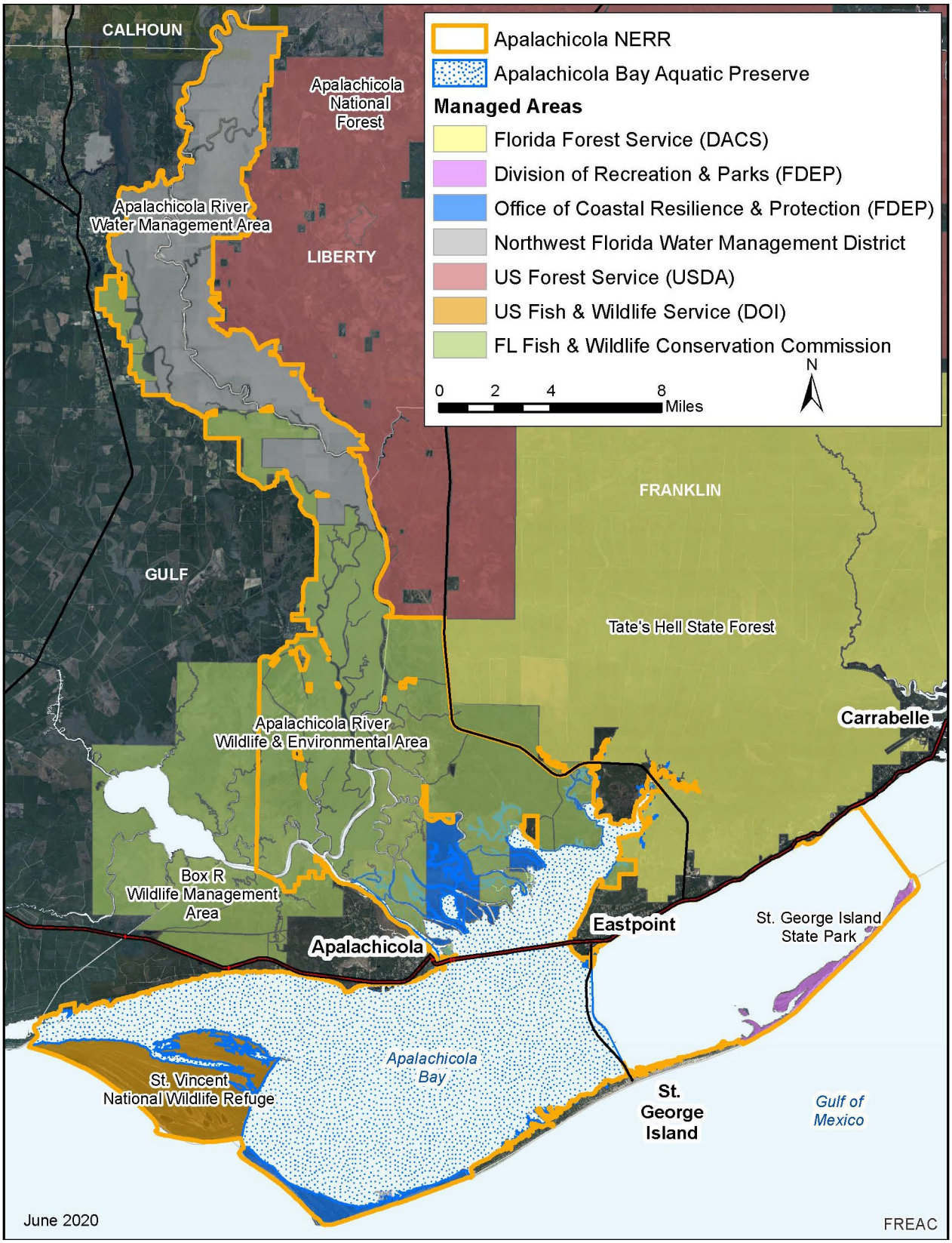
These lands surround eleven miles of the Apalachicola River, the majority of the Brothers River, and the junction of the Jackson and Apalachicola Rivers. Hunting, fishing and boating are activities available at the Wildlife and Environmental Area. For more detailed information visit: http:/myfwc.com/viewing/recreation/wmas/lead/Apalachicola-River.

Box-R Wildlife Management Area: (Franklin County, FWC, 901 acres)

A total of 901 acres within the Box-R WMA south of the Jackson River is included within the ANERR boundary. Over the last ten years, the Box-R WMA has had two significant expansions.

Apalachicola River Water Management Area: (Gulf and Liberty counties, NWFWMD, 34,949 (GIS) acres)

These alluvial forests along 19 miles of the Apalachicola River contain more reptile and amphibian species than any comparably sized area in the U.S. Hunting, fishing and boating are available at the Water Management Area. For more detailed information visit: http://www.nwfwmd.state.fl.us/recreation/www.nwfwmd.state.fl.us/recreation/ apalachicolariver.html.



Map 16 / Conservation lands within and adjacent to Apalachicola NERR

Photo 3 / A bald eagle pair

Part II: Natural, Social and Cultural Resources of the Apalachicola NERR

Chapter 3: Ecological Attributes

Apalachicola Bay lies at the terminus of the Apalachicola River, which originates at the northern border of Florida at the confluence of the Chattahoochee and the Flint Rivers. The Florida portion of the basin encompasses only approximately 12 percent of the entire drainage basin (2,400 square miles), has a low population, and is mostly undeveloped. Because of its large watershed (19,600 square miles), proximity to a major metropolitan area (Atlanta), multiple adjacent land uses, including agricultural and urban, and somewhat modified hydrology, the system has the potential to carry contaminants and cause water quality degradation downstream. Other physical alterations such as damming and dredging directly affect water habitats as well as augment flow regimes and water quality. Due to growth increases in Atlanta and its surrounding areas and agriculture in the watershed, the demand for upstream water use has increased and added pressure to reduce freshwater flows into Florida and the Apalachicola Bay system. A threat to the oyster bars of Apalachicola Bay is related to upstream water diversion from the tributaries of the Apalachicola River. Preliminary modeling efforts have demonstrated that decreased freshwater inflow, especially during drought conditions, could cause a significant increase in oyster mortality due to the

predation by marine organisms entering the bay (Christensen, et al., 1998; Kimbro, 2017). A drought in the ACF system that stretched from 1999 to 2002 caused the loss of oysters on various bars due to increased predation influenced by higher salinities in the bay. Subsequent droughts, coupled with reduced river flows in 2006-2007 and 2011-2012 ultimately contributed to the failure of the Apalachicola Bay oyster fishery in 2012 (National Oceanic & Atmospheric Administration, 2023).

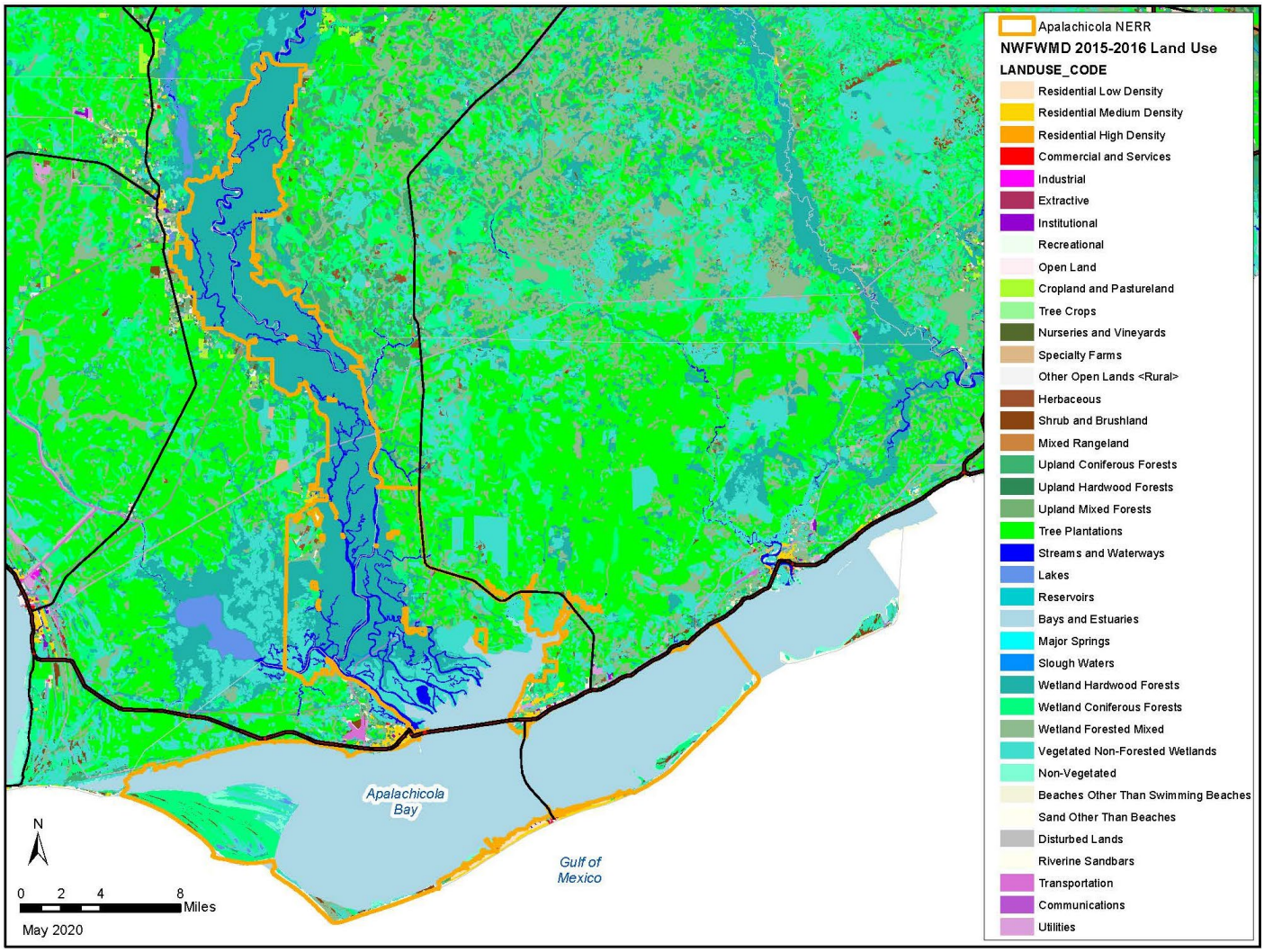
The largest numbers of contaminant sources in the ACF basin come from the Chattahoochee and Flint rivers due to the large population concentrated in these regions, and the amount of urban and agricultural land-uses associated with this population. Urban and suburban areas account for only about five percent of the entire ACF watershed, less than two percent within the Florida portion of the basin; however, they can have a large impact on stream quality. Approximately 29 percent of the watershed, primarily in Georgia and Alabama, is agricultural lands that can impact stream quality (Frick, Buell, & Hopkins, 1996).

Ninety-seven percent of the population within the drainage basin lives in these two upper watersheds and approximately 90 percent of the municipal wastewater discharges are located in these areas. Upstream (Georgia and Alabama) municipal wastewater facilities contribute over 98 percent of the nitrogen and phosphorus loadings in the ACF basin. Agricultural land uses in these watersheds also contribute 95 percent of the nonpoint nutrient loadings to the entire drainage basin. Industrial effluents, stormwater runoff, groundwater inputs, and other sources of contaminants including natural inputs are not included in these estimates. Please refer to tables 31 and 32 in the Apalachicola NERR Site Profile for additional data on contaminant contributors, point and non-point source in the ACF basin. The Site Profile focuses on the natural and cultural resources of the Apalachicola River and Bay system. Its purpose is to provide a synthesis of species and habitat data, identify natural and anthropogenic stressors, and be used to direct new research towards gaps in knowledge. Each reserve within the NERR System is tasked with writing a Site Profile. The ANERR site profile can be found online at https://www.apalachicolareserve.com/wp-content/uploads/pdf/A_River_Meets_the_Bay.pdf.

Two main threats to the Apalachicola River and Bay system that currently confront ANERR are the upstream diversion of fresh water (ACF Water Wars) and increasing local coastal development with associated land use changes. Water diversions have the potential for productivity impacts, biodiversity impacts (river, floodplain, bay), habitat/species loss and economic impacts. Development impacts include the potential for nutrient enrichment, increased coliform bacteria density and distribution (impacting oyster harvest), habitat/ species loss and contaminant increase.

3.1 Adjacent Land Use Characteristics

Land use characteristics (Map 17) influence runoff patterns, types of pollutants, water quality and quantity, and virtually all aspects of riverine and river-dominated estuarine systems. The upper portion of the Apalachicola River basin is dominated by forestry and agriculture while the lower portion is predominantly natural areas with large tracts of managed forests and forested and non-forested wetlands (Rains,1993). The major land use on most of the land surrounding ANERR has historically been forestry operations, predominantly pine plantations. Agricultural/Silvicultural land dominates in all eight counties within the drainage basin, however, only a small number of people are specifically employed in farming or forestry.



Map 17 / Land use within and adjacent to ANERR

In 2014, AgReserves Inc., an affiliate of the Mormon Church, purchased the Deseret Ranch, 383,000 acres in Bay, Calhoun, Franklin, Gadsden, Gulf, Jefferson, Leon, Liberty and Wakulla counties from the St. Joe Company. The majority of the property is located directly west of the Apalachicola River Wildlife and Environmental Area land and north of the Florida Forever Project – St. Joe Timberland. With this purchase, AgReserves Inc. became the largest private landowner in Florida. Their other holdings in central Florida are primarily used for grazing (cattle) and agriculture (citrus). According to their website (https://www.agreserves.com/), the purchase would have preserved much of the timberland that was the historical land use. Some of the lands had been cleared by late 2018 when Hurricane Michael impacted the area, and much of the remaining timber was destroyed by the storm.

Franklin County is predominantly rural with 96 percent of the total county area of 348,800 acres zoned either agriculture (primarily forestry) or conservation lands (Franklin County, 2004). Large areas have been drained, ditched, and diked for silviculture and wetter species such as cypress have been replaced by slash pine (*Pinus elliottii*). The Apalachicola River floodplain was first harvested between 1870 and 1925 and has been logged once or twice since that time. Regrowth has been rapid, however, and much of the floodplain has the general appearance of a mature forest, although the percent of cypress

has been reduced (Clewell, 1977). The development of the local area surrounding ANERR could have the most direct effect on the water quality within the bay. The effects of clearing, ditching, and draining of land surrounding the bay may result in increases in pH and decreases in detrital influx. Increases in pervious surfaces and stormwater runoff could degrade water quality. Additionally, shoreline changes can result in loss of marsh habitat and erosion.

Much of the land away from the coast and outside ANERR boundaries is owned and managed by the state or federal government. Large areas of public lands, including the Apalachicola National Forest and Tate's Hell State Forest that are outside of ANERR's boundaries, limit the amount of private land and potential growth. There has been a significant shift from agricultural lands to conservation lands since 1989, mostly due to the large land purchases by Florida as part of its efforts to protect Apalachicola Bay. The Tate's Hell State Forest, created in 1994, is the second largest state forest in Florida at 202,437 acres, and accounts for most of this change. The Apalachicola National Forest was established in 1936 and includes approximately 570,000 acres. Much of the agriculture and conservation land is also wetlands. The northern and interior portion of the county remains mostly uninhabited. In 2018, more than 1,000 acres were added to the Box-R WMA, filling an in-holding around Depot Creek, protecting important historical and natural resources. In 2020, an additional 6,201 acres was purchased from the Lake Wimico Land Company LLC, bringing Box-R's total to 18,455 acres. In 2020, a total of twenty thousand acres were purchased with the balance added to the Apalachicola River Wildlife Management Area (ARWEA). The planned future use of the remaining property is unknown; however it can be assumed that future management activities will be aligned with the existing management priorities for each of these areas. In 2022, there was a small 200-acre parcel added to the Tate's Hell State Forest Wildlife Management Area. There is one more acquisition in the works, which will extend the northernmost extent of the Apalachicola River Water Management Area (managed cooperatively with the ARWEA). More extensive information about neighboring land areas and partnerships is available in Chapter 12 of this document. With all of these additions and expansions, there is an opportunity to expand the boundary of the Reserve further. The Reserve staff has been in discussions with the various land managers, and they are supportive. The Reserve plans to address the boundary expansion outside of this management plan update.

Most new development within ANERR boundaries is concentrated near the lower reaches of the river floodplain, river mouth, bay, and Gulf of Mexico shoreline, especially along the coast. Potential impacts to these sensitive areas include loss of habitat due to development and declining water quality due to wastewater discharges, stormwater runoff, and increased sediment.

Commercial and residential development typically result in an increase in the number of septic systems that may affect the quality of the nonpoint runoff going into the bay (Livingston, Clewell, Iverson, Means, & Stevenson, 1975). Although many residents in Franklin County are connected to municipal wastewater facilities, there are still large numbers of homes utilizing on-site sewage treatment and disposal systems (OSTDS), primarily aerobic and anaerobic septic systems that may affect the quality of the nonpoint runoff going into the bay. The 2018 Florida Water Management Inventory identified 1,594 (18.8 percent) known or likely parcels on sewer, 4,631 (54.6 percent) parcels known or likely on septic and 2,249 (26.5 percent) unknown parcels (Florida Department of Health, 2021).

The Impaired Waters section (3.1.1) of the 2017 Surface Water Improvement (SWIM) Plan says DEP identified 92 separate impairments in 2009, noting that the "concentrations of septic systems can degrade the quality of groundwater and proximate surface waters. While conventional OSTDS can control pathogens, surfactants, metals, and phosphorus, mobility in the soil prevents complete treatment and removal of nitrogen. Dissolved nitrogen is frequently exported from drain fields through the groundwater (National Research Council, 2001). Additionally, OSTDS in areas with high water tables or soil limitations may

not effectively treat other pollutants." Florida Water Management Inventory data indicate over 23,000 known or likely septic systems in the watershed (Florida Department of Health, 2022; Northwest Florida Water Management District, 2017).

The Northwest Florida Water Management District, working with local municipalities, has made significant progress in retrofitting existing stormwater systems over the last decade (Northwest Florida Water Management District, n.d.). Stormwater master plans have been developed for Apalachicola and Carrabelle, lands have been purchased to act as buffers, and large upland restoration projects are planned. Apalachicola and Carrabelle also have installed water reclamation systems.

Reserve staff works with the municipalities to retain and develop zoning policies that reduce impacts to water quality in the bay and encourage efforts to upgrade OSTDS to wastewater facilities. St. George Island has over 1,962 OSTDS. The Coastal Training Program (CTP) Coordinator has met with the local health department and Franklin County to address OSTDS on St. George Island and seeks to form a workgroup to address issues. We also offer programs designed to educate area decision-makers and residents about low impact development and green infrastructure techniques. The Bay-Friendly Landscaping workshop, offered multiple times per year, incorporates green infrastructure concepts such as rain barrels, rain gardens and swales, living shorelines, water conservation and drought tolerant landscaping. Reserve staff also works with municipalities to improve ordinances to minimized impervious areas and with area marinas to reduce pollution and increase clean boating habitats.

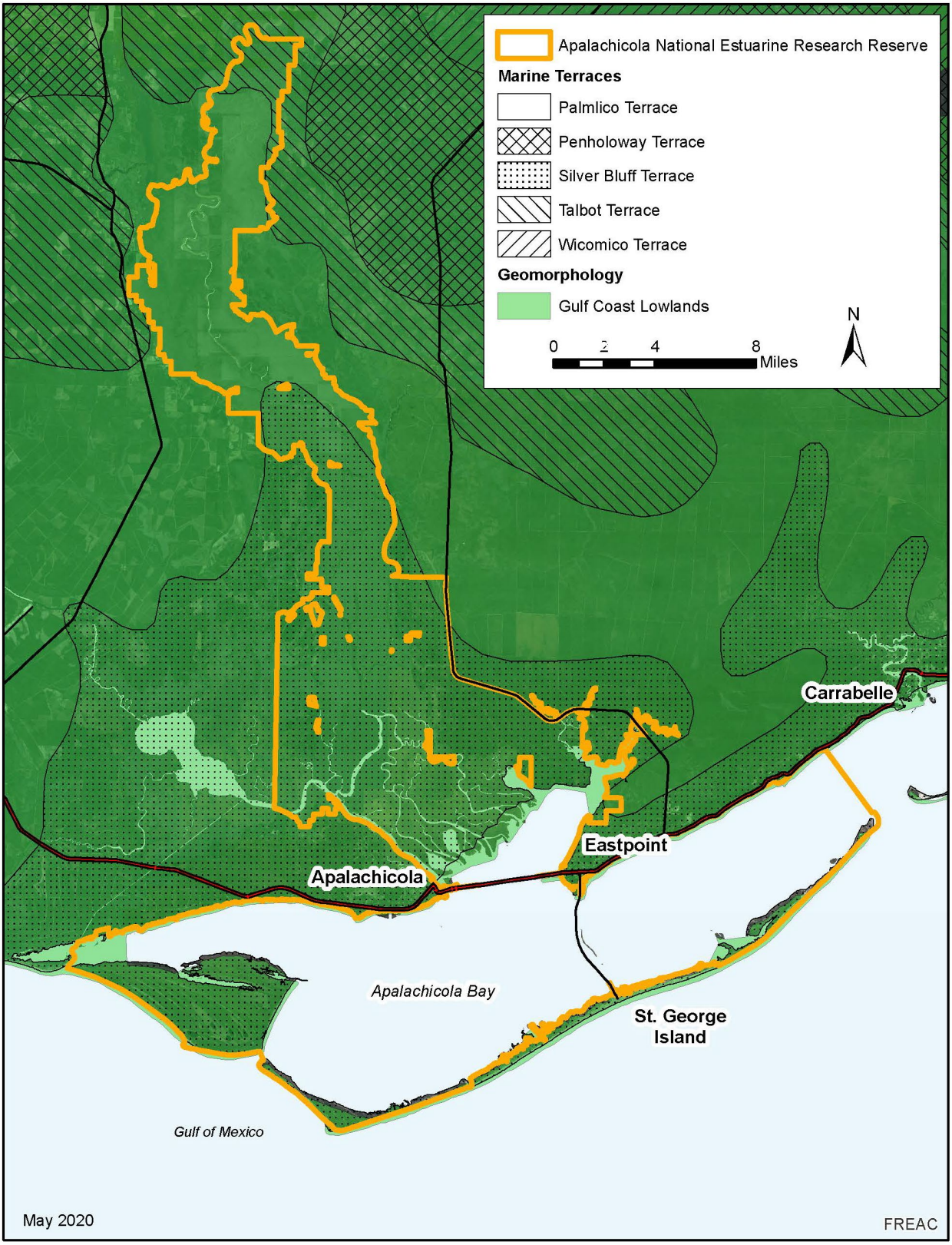
3.2 Topography and Geomorphology

ANERR lies completely within the Gulf Coastal Lowlands physiographic province (Map 18), which is characterized by low elevations and poor drainage. Numerous relict bars and dunes are associated with this province, indicating historic fluctuations in sea level (USACOE, 1978; Clewell, 1986). The Apalachicola Embayment is the major structural feature that dominates the geology of ANERR and the river system. This feature represents a downfallen block of land that is a relatively shallow basin between the Ocala and Chattahoochee uplifts (Schmidt, 1984).

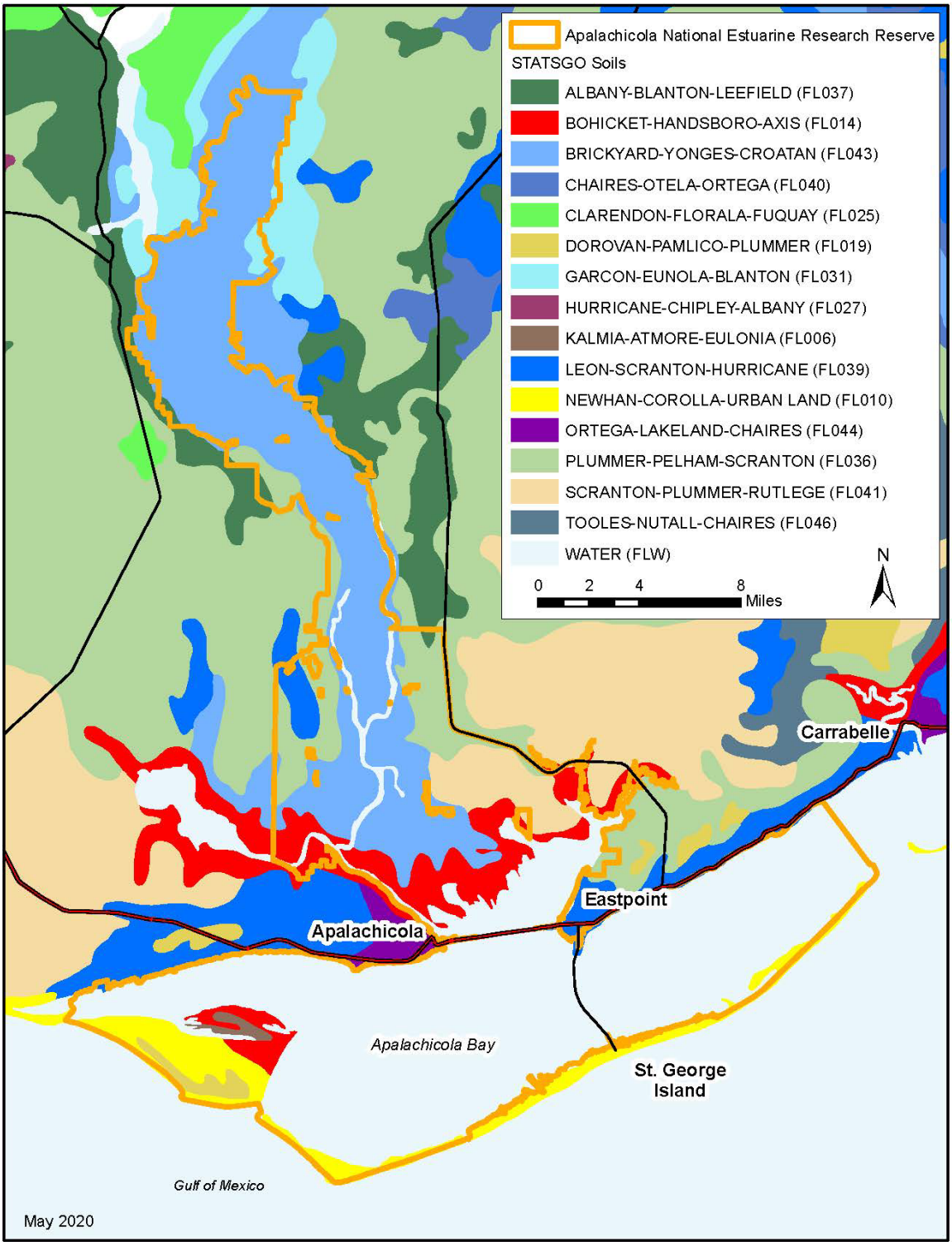
The Gulf Coastal Lowlands are characterized by Pleistocene marine sands near the river mouth and Pliocene sands to the north (Alt & Brooks, 1965). The large cusp of the entire Apalachicola coast is believed to have been built out by the Apalachicola River during the late Tertiary and Quaternary periods and has subsequently been modified by waves and longshore drift. The present structure of the bay system is less than 10,000 years old and the general outline of the bay has been stable over the last 5,000 years, except for the southward migration of the delta into the estuary. The present barrier island chain formation is thought to have occurred approximately 6,000 years ago when sea level reached its modern position (Tanner, 1983).

Minerals

There are no known commercially viable mineral resources on ANERR lands. The lithological log for well #W11425, near the Rodrigue Tract, indicates the Intracoastal Formation (limestone) is reached at a depth of 110 feet. This overburden presumably makes mining uneconomical. Two test wells within five miles of ANERR lands were both plugged and abandoned as dry wells. Neither oil nor gas has ever been produced in the area.



Map 18 / Topography and geomorphology of ANERR



Map 19 / Soils of Apalachicola National Estuarine Research Reserve

Soils

Franklin County and much of the Gulf of Mexico coastal region soils (Map 19) are derived from beach deposits, river alluvium, or marine terrace deposits. Twelve soil associations have been identified in Franklin County that range from deep, excessively drained soils to very poorly drained soils with water tables above the surface (United States Department of Agriculture [USDA], 1994). Approximately 90 percent of the land area is dominated by soil associations that are poorly suited or unsuitable for development and OSTDS use (see Table 2). These soil conditions pose major limitations for development in much of Franklin County (Franklin County, 1991).

Throughout the county, the soil is generally uniform with the color patterns reflecting drainage conditions (dark soils for poor drainage and light colors for areas of good drainage) (Moony & Patrick, 1915). The Scranton-Rutlege Association is the predominant general soil type in the county, comprising approximately 26 percent of the land area. The Apalachicola floodplain and coastal and delta marshes are predominantly comprised of the Chowan-Brickyard-Wehadkee and Bohicket-Tisonia-Diregо Associations. St. Lucie-Kureb- Riminini and Lakeland Associations are found predominantly along the coastal areas while Plummer- Rutledge and Leon-Chipley-Plummer Associations are found in the interior of the county (USDA, 1994).

3.3 Hydrology and Watershed Characteristics

The Apalachicola River is a large alluvial, brown water river. It is the only river in Florida which has its origins in the Piedmont and Southern Appalachians. Characteristics of alluvial rivers include a heavy sediment load, turbid water, large watersheds, sustained periods of high flow, and substantial annual flooding. Upstream rainfall has a much greater influence on river flows than Florida rainfall because the majority of the ACF basin is in Georgia and Alabama (Meeter, Livingston, & Woodsum, 1979; Leitman, Sohm, & Franklin, 1983). However, flows in the lower river can be substantially increased by Florida rainfall during periods of low flow because of inflow from the Chipola River, a spring fed river and the Apalachicola's major tributary.

The mean annual discharge of the river is approximately 25,000 cubic feet per second (cfs) at the Sumatra gage, 21 miles upriver, which includes the discharge of the Chipola River. Minimum and maximum flows average 9,300 cfs and 200,000 cfs, respectively, although yearly flows vary considerably (USACE, 1978). Low flows occur in summer and fall while highest flows occur in winter and spring. McNulty, Lindall, and Sykes (1972) estimate that the Apalachicola River discharge accounts for 35 percent of the total freshwater runoff from the west coast of Florida.

Stream modifications such as dams, channelization and maintenance dredging have altered the historic flow regimes and stage height of most of the river south of the Jim Woodruff Dam. With the construction of the dam in 1957, the United States Army Corps of Engineers (USACE) formed Lake Seminole. While the dam provides services such as recreational opportunities, hydropower and flood navigation, it has reduced the sediment load to the lower river. Maintenance dredging required for navigation purposes has also had a significant influence on the hydrology of the river by straightening curved segments of the river and removing sediments from the main channel. Both practices have resulted in an increase in flow rate and decrease in river height. These factors have contributed to the lowering of water in the main channel of the river. The lower river height has been exacerbated by reduced flow rate recently due to severe drought conditions and increased water diversion caused by population increases and increased agricultural need. Reduced river height translates to reduced inundation into backwater swamp areas which provide an important habitat for many species of fish and invertebrates. These backwater areas are also the source of detritus and nutrients that flow into the bay and provide an important component of the

food web. Also, this reduced inundation is causing documented range shifts in the tree species of the floodplain (Darst & Light, 2008). Several restoration projects have been funded on the Apalachicola River such as efforts to reconnect backwater areas by the removal of dikes and dams. Other targets for restoration efforts are the sand disposal sites located along much of the river channel. Apalachicola Riverkeeper received National Fish and Wildlife Foundation (NFWF) funding for slough restoration along the lower distributaries of the Apalachicola River. Beginning summer 2020, the non-profit initiated dredging of specified channels, including those related to the East River. ANERR is collaborating with the Riverkeeper to install a new water quality site at Butcher Pen Landing. Currently, the site has become a secondary System-Wide Monitoring Program (SWMP) site.

Apalachicola Bay is in an area of transition between the semi-diurnal tides of southwestern Florida and the diurnal tides of northwestern Florida. Its tides are, therefore, classified as mixed, which accounts for the number of tides, ranging from one to five daily. The normal tidal range in the bay is one to two feet with a maximum range of three feet (Dawson, 1955; Gorsline, 1963). Strong winds can modify water movement to the point of obscuring tidal effects. Strong winds may also thoroughly mix the shallow water of the bay, but winds of lesser velocity affect only the surface layer, resulting in stratification of the water column (Estabrook, 1973).

Water currents in the bay system are due primarily to the astronomical tides but are strongly affected by the direction and speed of prevailing winds, river flow, and the physical structure of the bay (Dawson, 1955). Net movement of water is from the east to the west. The more saline gulf water enters through St. George Sound and moves west mixing with the fresher water in East Bay and Apalachicola Bay and eventually moves back out to the Gulf through Sike's Cut, West Pass, and Indian Pass (Ingle & Dawson, 1953; Conner, Conway, Benedict, & Christensen, 1982). In the bay, water velocities rarely exceed 1.5 feet per second, but velocities of 10 feet per second are common in the passes. Roughly 700,000 cubic feet of water per second leaves the bay system at maximum velocity during ebb flow (Gorsline,1963).

Surface Water Classification

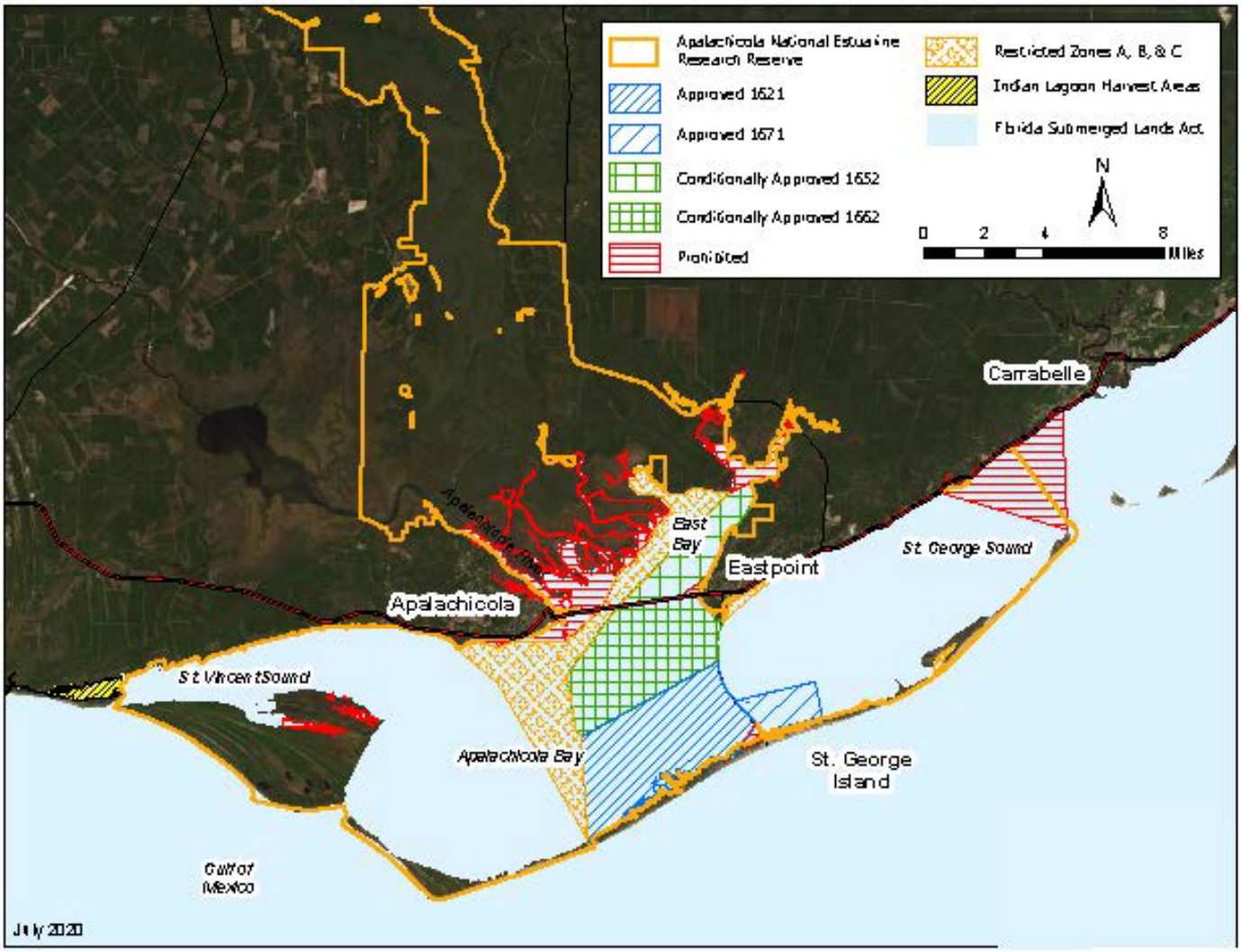
All surface waters of the state have been classified by DEP according to their designated use. Five classes have been defined with water quality criteria designed to maintain the minimum conditions necessary to assure the suitability of water for its designated use (Florida Department of Environmental Protection, 2022). ANERR has two of the five classes of water present, including:

- Class II: Shellfish propagation or harvesting
- Class III: Recreation, propagation and maintenance of a healthy, well-balanced population of fish and wildlife.

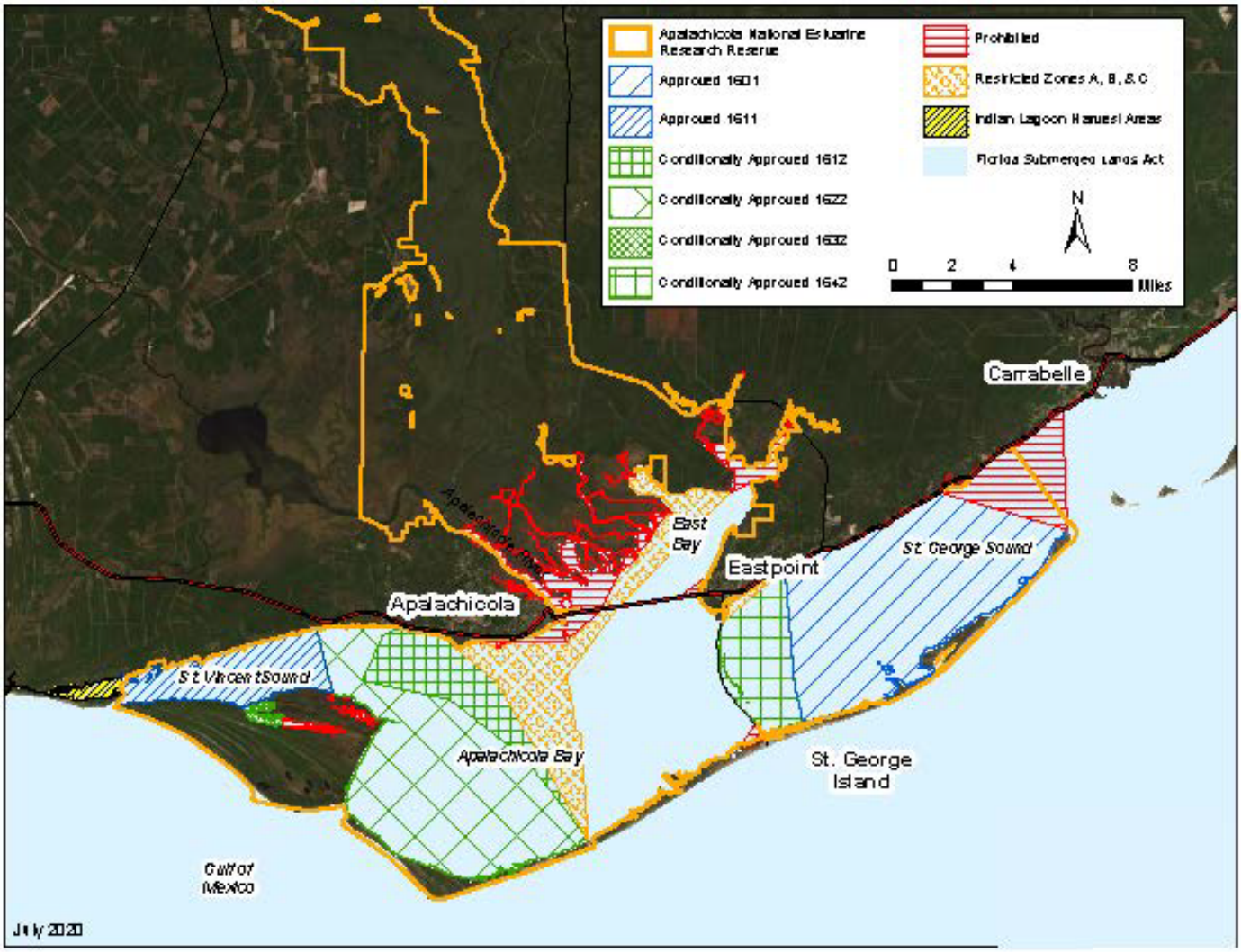
Each of these classes has specific water quality standards for parameters such as bacterial levels, metals, pesticides and herbicides, dissolved oxygen, turbidity, etc., designed to protect and maintain the use of the water body. All surface waters of the state are classified as Class III waters, except those specifically described in Chapter 17-3.161, F.A.C. Class II waters, those used for shellfish propagation or harvesting, include the majority of the brackish water areas in the estuary. The entire bay system from Alligator Harbor through St. George Sound, Apalachicola Bay, East Bay and tributaries, St. Vincent Sound, and Indian Lagoon are Class II waters with the exception of a two-mile radius near Apalachicola and the area north of the Eastpoint breakwater (Map 20 Summer Harvest Areas & Map 21 Winter Harvest Areas). These areas have been closed to shell-fishing for years due to potential pollution from the city of Apalachicola and runoff from Eastpoint. Class II water standards are more stringent concerning bacteriological quality than any other class because shellfish, oysters and clams that

are consumed uncooked by people can concentrate pathogens in quantities significantly higher than the surrounding waters. All Class II waters are additionally classified by the Florida Department of Agriculture and Consumer Services (DACS) as approved, conditionally approved, or prohibited for harvesting based upon these surveys. Localized rainfall and high river flow serve as proxy indicators for increases in bacterial levels due to increased runoff. Following these events, harvesting areas will be closed quickly as a precaution. As conditions change, areas are re-opened based on results from bacterial surveys confirming that the levels are safe for harvesting (DEP, 2022). All other waters in ANERR, which include the river and all its tributaries, distributaries and the two areas in the bay mentioned above, are Class III waters.

Another important designation used by DEP is that of Outstanding Florida Water (OFW). All waters, both fresh and saltwater within ANERR are designated as OFWs. These waters are afforded special protection by the state due to their high quality, recreational or ecological significance, or their location within state or federally owned lands. This designation is intended to preserve the ambient water quality at the time of designation and not allow any degradation. Stringent standards are applied regarding proposed alterations or potentially damaging activities planned for these waters.



Map 20 / Oyster Summer Harvest areas



Map 21 / Oyster Winter Harvest Areas

3.4 Climate

The Reserve experiences a mild, subtropical climate due to its latitude (29 degrees) and the stabilizing effects of adjacent Gulf of Mexico waters (Bradley, 1972). Mean temperatures range from the 40s Fahrenheit in January to the 80s in July (Fernald, 1981). Seasonal and annual temperatures vary greatly, ranging from the upper 90s in the summer to the lower 20s in the winter.

Average annual rainfall ranges from 52 to 60 inches within ANERR boundaries with peak rainfall periods occurring primarily during the summer with a secondary peak in early spring. Apalachicola experiences approximately 73 days of thunderstorms annually, three-quarters of these occurring between June and September. Low rainfall periods occur primarily in the fall and mid- spring. Local rainfall differs from up basin rainfall in the impacts to the salinity of the bay's waters (Jordan, 1984).

Typically, large rainfall in the watershed increases river flow and decreases salinity at all locations in the estuary. Local rainfall has a more limited effect on the salinity of the bay; impacting East Bay and Cat Point areas more than the western portion of

the bay. The local climate is also characterized by seasonal tropical storms and hurricanes. Between 1851 and 2004, 273 hurricanes impacted the U.S. coastline between Maine and Texas. Of these, approximately one third had direct hits on the coastlines of Mississippi, Alabama or the Florida Panhandle (Blake, Jarrell, Rappaport, & Landsea, 2005). The associated high winds, rainfall and storm surge have a tremendous impact on the hydrology and physiography of the area.

From 2006 – 2016, Florida experienced 13 weather and climate-related disasters that exceeded one billion dollars in damages (NOAA, 2017 Florida State Climate Summary), followed by major hurricane impacts from Irma in 2017 and Michael in 2018. In addition to tropical systems, wildfires, droughts, and heat waves have had an impact on the population, critical infrastructure, and valuable natural resources of Florida. Annual average temperatures, maximum temperatures, and minimum temperatures have tied or come close to tying record temperatures within the 125-year record. This is primarily due to the minimum or overnight temperatures continuing to increase. It is anticipated that this trend will continue, and with higher temperatures, the state is expected to experience more droughts and thus, more wildfires. Increases in water temperatures have been observed as well. The Dry Bar SWMP water quality station has recorded a mean increase in temperature of about 0.6°C from 2001 to 2020. In the same period, we have observed increasing CO_2 levels and resultant decreasing pH at the site, indicating the potential for bay acidification in our system.

Shifts in species' ranges are also being documented as well as phenological changes. The impact of climate change on estuarine resources has become an issue of increasing importance for coastal land management. One of the greatest potential impacts to ANERR will be sea level rise, which is currently increasing at a rate of 2.70 mm/year (https://tidesandcurrents.noaa.gov/sltrends/sltrends_station.shtml?id=8728690). Due to the low topography of the area, sea level rise impacts will manifest in several ways. Saltwater intrusion and changes to inundation patterns may change the composition of coastal vegetation communities or may result in complete loss of certain natural communities. Tidal boundaries within the estuary will move closer to the mouth of the river, resulting in conditions that may support faunal or trophic changes. Water level and temperature increases may allow the invasion of native or non-native species, which may be able to out-compete native species. Lastly, as sea level increases, storm surge impacts will also increase (American Geophysical Union, 2017). Latest sea level rise projections were just recently released in the NOAA Sea Level Rise Technical Report: https://oceanservice.noaa.gov/hazards/sealevelrise/sealevelrise-tech-report.html.

3.5 ANERR Ecosystems and Natural Community Distribution

The natural community classification system used in the text of this plan was developed by the Florida Natural Areas Inventory (FNAI) and the DEP. In order to achieve consistency with the NOAA/NERR classification standards the habitat map provided in this plan is based on the Coastal Change and Analysis Program (C-CAP) scheme. C-CAP is a nationally standardized database of land cover and land change information, developed using remotely sensed imagery, for the coastal regions of the U.S. C-CAP products inventory coastal intertidal areas, wetlands, and adjacent uplands with the goal of monitoring these habitats by updating the land cover maps every five years. The development of standardized, regional land cover information enables managers to coordinate the planning of shared resources, facilitating an ecosystem approach to environmental issues that transcends local and state regulatory boundaries. A C-CAP/FNAI crosswalk table is provided to explain the relationship between these two classification systems (see Table 1). Table 2 provides an explanation of the FNAI community types and the ranking system.

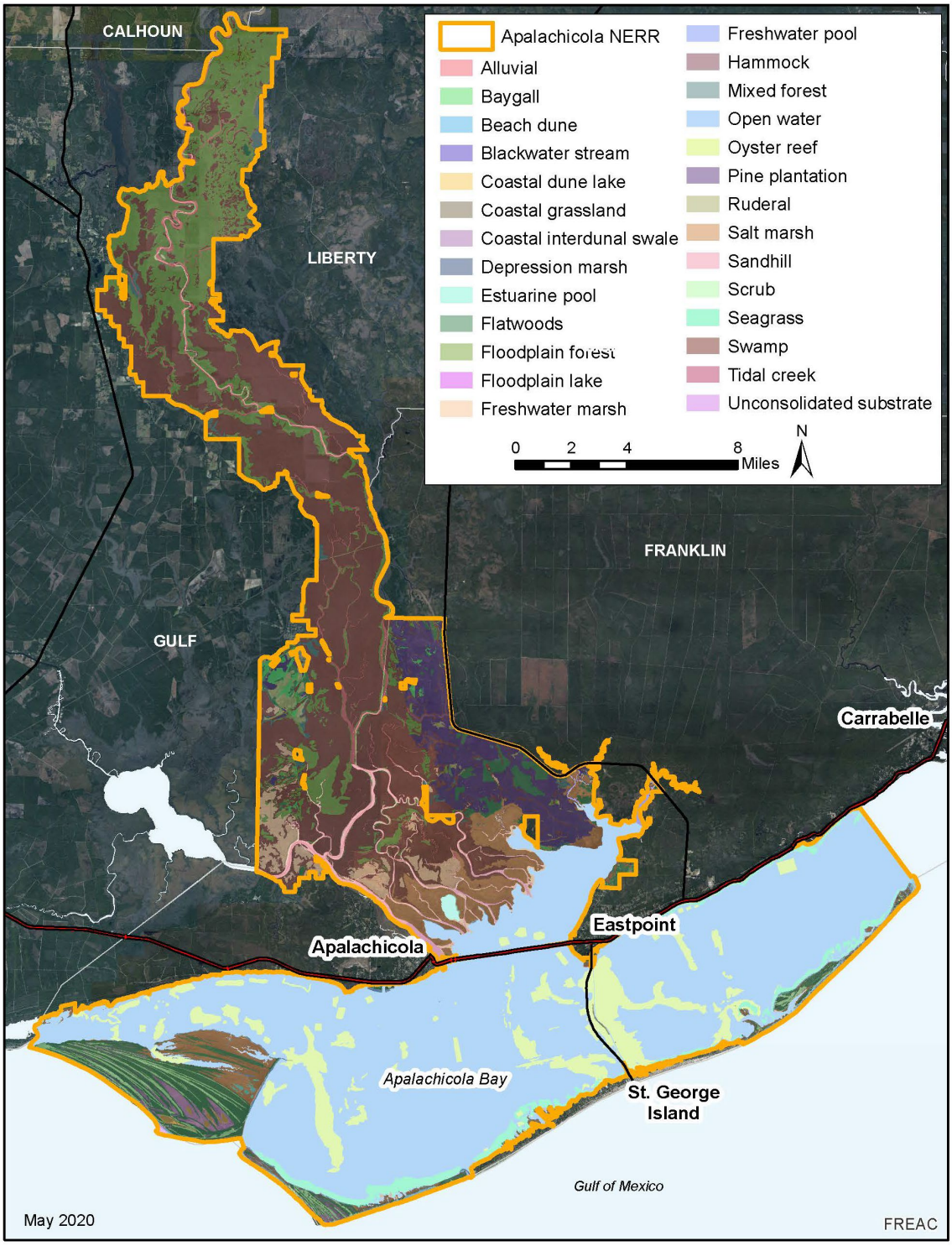
Table 1 / Coastal Change Analysis Program (C-CAP), Florida Natural Areas Inventory Natural Community and NERR Habitat Classification Crosswalk

CCAP Classification	FNAI Classification	NERR Classification
10 Evergreen Forest	Xeric Hammock	6153 Upland Supratidal Forested Broad-leaved Evergreen
10 Evergreen Forest	Sandhill	6154 Upland Supratidal Forested Narrow-leaved Evergreen
10 Evergreen Forest	Mesic Flatwoods	6154 Upland Supratidal Forested Narrow-leaved Evergreen
10 Evergreen Forest	Scrubby Flatwoods	6154 Upland Supratidal Forested Narrow-leaved Evergreen
10 Scrub/Shrub	Scrub	6143 Upland Supratidal Scrub-Shrub Broad-leaved Evergreen
13 Palustrine Forested Wetland	Alluvial Forest	5255 Palustrine Intermittent Forested Mixed
13 Palustrine Forested Wetland	Dome Swamp	5252 Palustrine Intermittent Forested Narrow-leaved Deciduous
13 Palustrine Forested Wetland	Floodplain Swamp	5252 Palustrine Intermittent Forested Narrow-leaved Deciduous
15 Palustrine Emergent Wetland	Basin Marsh	5232 Palustrine Intermittent Emergent Wetland Persistent
15 Palustrine Emergent Wetland	Coastal Interdunal Swale	5232 Palustrine Intermittent Emergent Wetland Persistent
15 Palustrine Emergent Wetland	Depression Marsh	5232 Palustrine Intermittent Emergent Wetland Persistent
15 Palustrine Emergent Wetland	Flatwoods/Prairie/Marsh Lake	5232 Palustrine Intermittent Emergent Wetland Persistent
18 Estuarine Emergent Wetland	Salt Marsh	2261 Estuarine Intertidal Haline Emergent Wetland Persistent
19 Unconsolidated Shore	Marine Unconsolidated Substrate	6123 Upland Supratidal Unconsolidated Sand
19 Unconsolidated Shore	Marine Unconsolidated Substrate	1243 Marine Intertidal Unconsolidated Shore Sand
21 Unconsolidated Shore	Mollusk Reef	2141 Estuarine Subtidal Reef Mollusk
19 Unconsolidated Shore	Estuarine Unconsolidated Substrate	2323 Estuarine Supratidal Haline Unconsolidated Bottom Sand
19 Unconsolidated Shore	Estuarine Unconsolidated Substrate	2253 Estuarine Intertidal Haline Unconsolidated Shore Sand
11 Mixed Forest	Shell Mound	6155 Upland Supratidal Forested Mixed
8 Grassland	Beach Dune	613X Upland Supratidal Herbaceous (1 Grassland and 2 Herbs)
21 Open Water	Estuarine Unconsolidated Substrate	212X Estuarine Subtidal Unconsolidated Btm. (3 Sand and 4 Mud)
21 Open Water	Marine Unconsolidated Substrate	112X Marine Subtidal Unconsolidated Btm. (3 Sand and 4 Mud)
21 Open Water	Alluvial Stream	3112 Riverine Lower Perennial Unconsolidated Bottom Sand
21 Open Water	Blackwater Stream	3113 Riverine Lower Perennial Unconsolidated Bottom Mud
2 High Intensity Developed	Developed	8133 Cultural Developed Residential High Density
3 Medium Intensity Developed	Developed	8132 Cultural Developed Residential Medium Density
4 Low Intensity Developed	Developed	8131 Cultural Developed Residential Low Density

5 Developed Open Space	Developed	8156 Cultural Developed Unconsolidated Cover Cleared Land
6 Cultivated	Agriculture	8181 Cultural Developed Tree Cover Managed Trees
7 Pasture/Hay	Agriculture	823X Cultural Agricultural Herbaceous Cover (2 Pasture and 3 Hay Meadow)
8 Grassland	Agriculture	823X Cultural Agricultural Herbaceous Cover (2 Pasture and 3 Hay Meadow)
13 Palustrine Emergent Wetland	Floodplain Marsh	5232 Palustrine Intermittent Emergent Wetland Persistent
13 Palustrine Emergent Wetland	Freshwater Tidal Marsh	2551 Estuarine Intertidal Fresh Emergent Wetland Persistent
13 Palustrine Forested Wetland	Baygall	5253 Palustrine Intermittent Forested Broad-leaved Evergreen
13 Palustrine Forested Wetland	Hydric Hammock	5253 Palustrine Intermittent Forested Broad-leaved Evergreen
15 Palustrine Emergent Wetland	Wet Prairie	5232 Palustrine Intermittent Emergent Wetland Persistent
13 Palustrine Forested Wetland	Bottomland Forest	5255 Palustrine Intermittent Forested Mixed
12 Scrub/Shrub	Coastal Berm	6143 Upland Supratidal Scrub-Shrub Broad-leaved Evergreen
14 Palustrine Scrub/ Shrub Wetland	Shrub Bog	5241 Palustrine Intermittent Scrub-Shrub Broad-leaved Deciduous
21 Open Water	River Floodplain Lake and Swamp Lake	3113 Riverine Lower Perennial Unconsolidated Bottom Mud

Table 2 / Summary of Florida Natural Areas Inventory natural communities in Apalachicola NERR

FNAI Natural Community Type	# Acres	Federal Rank	State Rank
Floodplain Marsh	3,034	G3	S3
Floodplain Swamp	1,332	G4	S4
Scrubby Flatwoods	589	G2	S2
Coastal Grasslands	557	G3	S2
Scrub	427	G2	S2
Coastal Interdunal Swale	179	G3	S2
Shell Mound	2	G2	S2
Marine Unconsolidated Substrate	179	G5	S5
Beach Dune	165	G3	S2
Salt Marsh	204	G5	S4
Wet Flatwoods	99	G4	S4
Mesic Flatwoods	14	G4	S4
Ruderal	7	Not classified a natural community	
Estuarine Unconsolidated Substrate (tidal)	4	G5	S5
Depression Marsh	2	G4	S4
Mollusk Reef	12,335	G3	S3
Seagrass Meadow	4,418	G3	S2
Estuarine Unconsolidated Substrate (subtidal)	93,558	G5	S5
Alluvial Stream	6,887	G4	S4
Blackwater Stream	287	G4	S3



Map 22 / Natural Communities within Apalachicola NERR

ANERR includes barrier islands, estuarine, riverine, floodplain, and upland environments which are closely interrelated and influenced by each other (Map 22). To understand how each component functions, it is necessary to understand all the various parts of the system and the habitats that make this system unique. The natural communities form a mosaic within the five major ecosystems, as discussed below. Community descriptions are derived from the Florida Natural Areas Inventory Guide to the Natural Communities of Florida – 2010 Edition, available at https://www.fnai.org/species-communities/natcom-guide.

Barrier Island System

A well-developed barrier island complex, composed of St. Vincent Island, Little St. George Island, St. George Island, and Dog Island, lies roughly parallel to the mainland. These islands are located within ANERR, except Dog Island which lies to the east of ANERR boundaries. Primary dunes or the foredunes are the first dunes on the seaward side of the islands. The predominant plant found in the dune plant community is sea oats. They are very effective in building and stabilizing dunes. Other plants of the dune community include largeleaf marshpennywort (*Hydrocotyle bonariensis*), the railroad vine (*Ipomoea pes-caprae*), beach morning glory (*I. imperati*), evening primrose (*Oenothera* spp.), little bluestem (*Schizachyrium scoparium*), and sand coco-grass (*Cyperus rotundus*) (Florida Department of Natural Resources (FDNR), 1983; White, 1977; Livingston et al., 1975). Behind the primary dune is usually a wide, relatively flat sandy plain, containing some small windblown dunes. This interdunal zone is mostly devoid of larger woody plants found in more established scrub areas towards the interior of the island. Plant species of this zone include saw palmetto (*Serenoa repens*), yaupon holly (*Ilex vomitoria*), southern wax myrtle (*Myriceae cerifera*), salt myrtle (*Baccharis halimifolia*), goldenrod (*Solidago canadensis*), marsh elder (*Iva frutescens*) and saltmeadow cordgrass (*Sprobolus pumilus*; White, 1977). Dunes of the older, stabilized strand are larger than those of the overwash dune field and tend to align in a continuous ridge form. With the stabilizing of the seaward ridge, succession is allowed to proceed behind the dune with scrub thickets replacing grasslands (FDNR, 1983).

Behind the dune system a zone of denser vegetation can be found. The understory vegetation of this zone includes mostly scrub species with a few scattered slash pines occurring. This scrub community is generally found on higher, well-drained sites corresponding to old dune ridges (White, 1977) and is excellent for stabilizing dunes. Dominant plant species found in this zone are saw palmetto, rosemary, buckthorn, staggerbush, Chapman oak, myrtle oak, sand live oak, and live oak. Various herbs, lichens and grasses often cover the open areas (Livingston et al., 1975).

Slash pine scrub grades into a broad vegetation zone with a denser cover of slash pine and an understory consisting of scrub species. This slash pine-scrub community generally occupies flat ground on drier sites. Myrtle oaks and sand live oaks also form large patches as they do in the scrub on dunes. Chapman oak and rosemary are present but are not as common as in the dune scrub communities. The open areas located in the slash pine-scrub communities are also covered with herbs, grasses, lichens or low, semi-woody species such as bottlebrush threeawn (*Aristida spiciformis*), beakrush (*Rhynchospora spp.),* October-flower (*Polygonella polygama*), and St. John's wort.

Extensive fresh, brackish, and salt marshes can be found in various areas on all the barrier islands, depending on development, alteration, and the hydrodynamics of the area. Scrub, flatwoods, tidal marshes, and freshwater habitats on the islands provide feeding and resting areas for important resident and migratory bird species such as the peregrine falcon, southeastern American kestrel (*Falco sparverius paulus*), southern bald eagle, osprey (*Pandion haliaetus*), great egret, snowy egret, tricolored heron, and black-crowned night heron. Wildlife found on these barrier islands include American alligators, white-tailed deer (*Odocoileus virginianus*), red wolves (*Canis rufus*) (currently being bred on St. Vincent Island), Florida water moccasin (*Agkistrodon piscivorus conanti*), eastern glass lizard (*Ophisaurus ventralis*), and the southern toad (*Bufo terrestris*).

St. Vincent Island is approximately nine miles long and four miles wide. It is atypical of the other barrier islands found along the northeast Gulf of Mexico coast. Instead of a simple beach and dune structure, the island has a highly complex topographic and physiographic system of ridges and swales, many of which are truncated to form ponds and sloughs (Thompson, 1970; Miller, Griffin, Fryman, & Stapor, 1980). A variety of xeric communities, such as oak scrub and live oak hammock are found on the island ridges. Interspersed between these ridges are xeric to hydric communities consisting of pine flatwoods, hammocks, marshes, ponds, and sloughs (Edmiston & Tuck, 1987). The interspersion of flatwoods and hardwoods as well as abundant freshwater on the island provides a habitat more favorable for wildlife than any of the other barrier islands in the system. Dominant habitats on the 11,938-acre island include: slash pine flatwoods (4,700 acres); tidal marshes (2,900 acres); scrub and hardwood hammocks (2,200 acres); and freshwater marshes and ponds (1,700 acres).

Little St. George Island, managed by ANERR, is approximately nine miles long and varies from 1/4 mile to 1 mile wide. The 2,300-acre island is a coastal dune/dune flat/washover barrier formation of recent geologic origin. The eastern and western sections of the island are narrow terraces subject to occasional overwash by storm surges. The dominant habitats on these sections are overwash zones and grassland communities. Mesic and scrubby flatwoods are located at either end of the island. Most of the tidal marsh is located bayward of the overwash zone on the eastern section of the island. The central, wider part of Little St. George Island is dominated by slash pine flatwoods, scrub, and small swale wetlands (FDNR, 1983).

St. George Island, approximately twenty miles long and averaging less than one-third of a mile wide, has been sparsely settled in the past but has recently been developed more rapidly. This is the only barrier island within ANERR with a bridge connecting it to the mainland. It consists of approximately 7,340 acres of land and an additional 1,200 acres of marsh. Dr. Julian Bruce St. George Island State Park, covering 2,024 acres of the eastern end of the island, is within the boundaries of ANERR. The rest of the island, with the exception of a few parcels owned by the state, is privately owned and outside of ANERR boundaries. On the Gulf side of the island is a narrow band of beaches and low-lying sand dunes that grade into mixed grassland, scrub, mesic and scrubby flatwoods and bayside marshes (Livingston et al., 1975).

The relatively undisturbed miles of Gulf beach and dunes of the barrier islands provide essential habitats for numerous endangered and rare birds. Beaches provide nesting sites for species such as the threatened least tern, royal tern, sandwich tern, as well as threatened black skimmers and American oystercatchers. All of these plus the Caspian tern (*Hydroprogne caspia*), and the eastern brown pelican (*Pelecanus occidentalis*) use sand spits and beach bars for loafing and roosting (FDNR, 1983; Livingston et al., 1975). The threatened southeastern snowy plovers and least terns are present on St. George Island and Cape (Little) St. George Island. Snowy plovers require expansive open, dry, sandy beaches for breeding, and both dry and tidal sand flats for foraging. They are the only Florida bird species which feeds and breeds on open, dry sandy beaches. The beaches and berms of the barrier islands are also used in the summer as some of the most important rookery grounds for the threatened Atlantic loggerhead turtle (FDNR, 1983).

Scrub: Scrub on Little St. George Island is in various stages of succession. Scrubby flatwoods and scrub can be difficult to distinguish on Little St. George because there is so much community transition due to variable microtopography. Since scrub is successively better developed on older ridges, young scrub ridges have a different shrub composition than the older ones.

Beach Dune: In addition to the ocean beach dune community described above, on Little St. George Island the beach dune on the bay side of the island is a low, water-driven dune with the same species as the ocean side dunes with the addition of

coastal sea rocket (*Cakile lanceolata*), shoreline seapurslane (*Sesuvium portulacastrum*), saltmeadow cordgrass, seashore dropseed (*Sporobolus virginicus*), sea blite (*Suaeda linearis*), amaranth (*Amaranthus spp.*), crested saltbush (*Atriplex cristata*), coastal groundcherry (*Physalis angustifolia*) and dock (*Rumex spp.*).

Coastal Grassland: On Little St. George Island, coastal grassland is found between the dunes and other more inland communities such as scrub, or on the slightly higher ridges within coastal interdunal swale communities. The coastal grassland on the eastern arm of the island includes small areas of abundant telegraph weed (*Heterotheca subaxillaris*). Generally, coastal grassland is lacking canopy cover, but occasionally slash pine, and cabbage palm (*Sabal palmetto*) occur. The sparse shrub and vine layers consist of false rosemary (*Conradina canescens*), cockspur pricklypear (*Opuntia pusilla*), earleaf greenbrier (*Smilax auriculata*) and saw palmetto (*Serenoa repens*).

Coastal Interdunal Swale: Salt water intrusion and sand burial during storm overwash may leave coastal interdunal swales vulnerable to invasion by exotic species, principally torpedo grass (*Panicum repens*) and Chinese tallow (*Sapium sebiferum*). Coastal interdunal swale is a widespread community on Little St. George Island and very diverse, therefore two variations were recognized: short hydroperiod and long hydroperiod swale. Short hydroperiod swale is moist grassland dominated by either hairawn muhly or saltmeadow cordgrass and commonly also includes (*Andropogon spp.*), spadeleaf (*Centella asiatica*), wand goldenrod (*Solidago stricta*) and three-square (*Scirpus pungens*). Short hydroperiod swale has a sometimes abundant canopy of slash pine and/or cabbage palm and may be similar to or grade into wet flatwoods. Long hydroperiod swale remains inundated at least half of the year and is dominated by cattail and sawgrass with intermittent patches of needle rush. Torpedo grass has been introduced to coastal interdunal swales in various places throughout the island (possibly from storms transporting rhizomes).

Shell Mound: Shell mounds in the Florida Panhandle support temperate canopy trees such as live oak (*Quercus virginiana*) and cabbage palm (*Sabal palmetto*) as well as calcium-loving temperate species not found in nearby maritime hammocks on sand, including soapberry (*Sapindus saponaria*) and Carolina buckthorn (*Rhamnus caroliniana*) (Johnson, Muller, & Bettinger, 1992). Soil disturbance on shell mounds from old home sites, clearings, potholes from illegal digging, etc. can allow exotic species to invade. Loss of the historical resource can result from illegal digging as well.

Scrubby Flatwoods: Invasive exotic plants that can displace native species in disturbed scrubby flatwoods include natal grass (*Rhynchelytrum repens*) and cogon grass (*Imperata cylindrica*), however neither species is found on ANERR managed lands. Scrubby flatwoods generally have a more developed herbaceous layer than scrub, often including wiregrass. However, the scrubby flatwoods on Little St. George Island do not contain wiregrass.

Mesic Flatwoods: Mesic flatwoods require frequent fire (2-4 year intervals) to control hardwood and off-site pine invasion and several species require fire to reproduce. Red-cockaded woodpeckers, which nest in cavities in mature living pines, will abandon a nesting site if the midstory becomes too tall and dense when fire is excluded for too long (Conner & Rudolph, 1998). The flatwoods salamander prefers a grassy border to its breeding ponds which is maintained against encroaching shrubs by frequent fire (Drewa et al., 2002b). Fire stimulates flowering in many flatwood herbs and frequent fire (1-3 year fire interval) was found specifically to increase species richness and abundance of herbs (Lemon, 1949). Wiregrass often does not withstand ground disturbance associated with planting pine plantations for commercial purposes. In some cases where the goal is to restore pine plantations to mesic flatwoods, there may not be enough wiregrass remaining to restore the herbaceous ground cover by frequent fire and natural seeding (Platt, 1999; Kirkman et al., 2000, Kirkman, Coffey, Mitchell, & Moser, 2004).

In such cases direct seeding may be required to restore the wiregrass ground layer. Care should be taken so that the wiregrass and other seed used for restoration is not only from the same geographic area but also the same habitat type as the restoration site to maintain geographic genetic diversity (Walters, Decker-Walters, & Gordon, 1994) and to improve chances of survival (Kindell, Winn, & Miller, 1996; Gordon & Rice 1998).

Invasive exotic plants that may cause problems in mesic flatwoods include cogon grass, Japanese climbing fern (*Lygodium japonicum*), camphor tree (*Cinnamomum camphora*), and rose natal grass (*Melinis repens*); all listed as Category I exotics (capable of displacing native species) by the Florida Exotic Pest Plant Council. These species have not been documented on Little St. George Island.

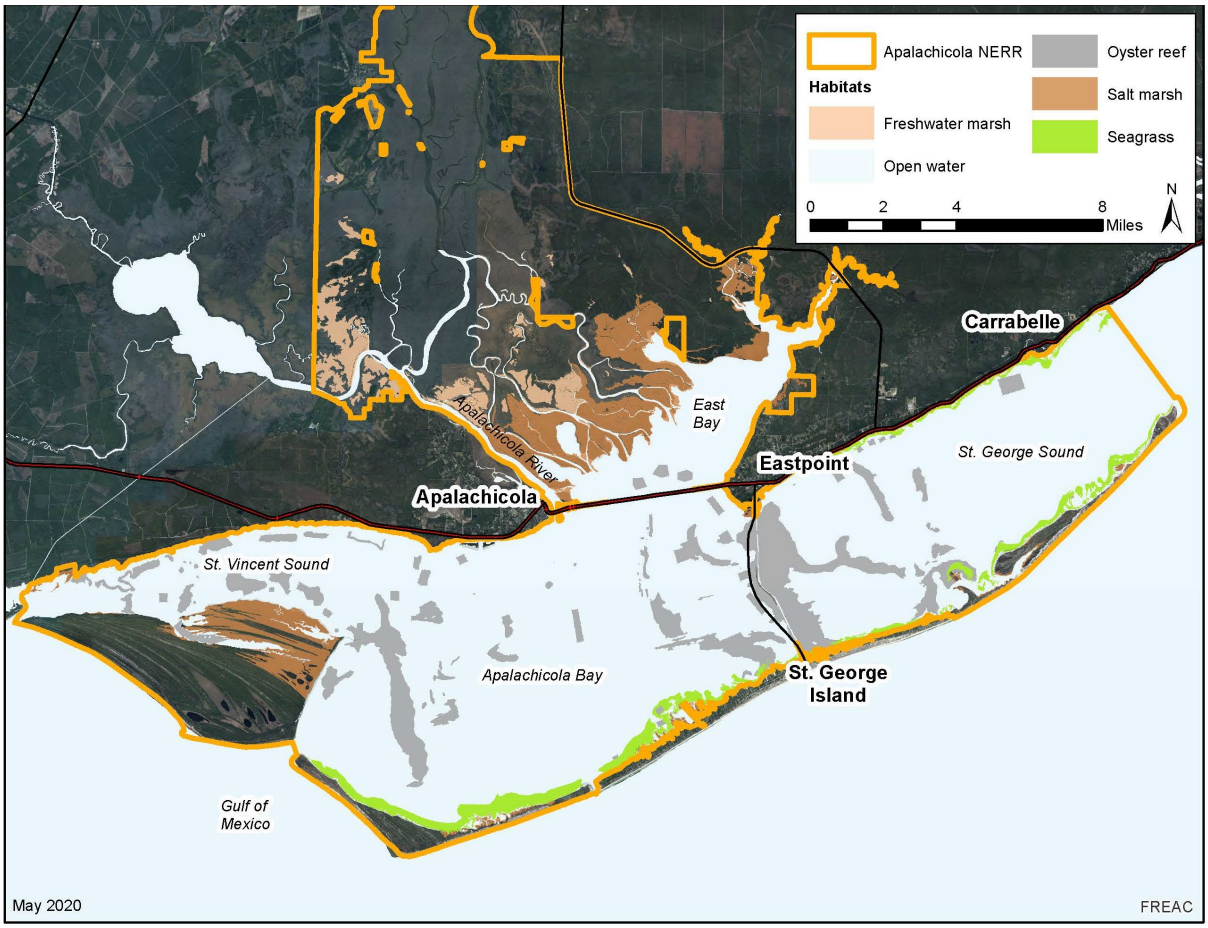
On Little St. George Island, mesic flatwoods are often located in transitional areas between scrub or scrubby flatwoods and coastal interdunal swales. It often has inclusions of wet flatwoods, scrubby flatwoods and coastal interdunal swale due to variations in the microtopography. Mesic flatwoods on Little St. George Island lacks a well-developed herbaceous layer that is more common to inland flatwoods where soils are typically spodosols and fire intervals are likely shorter.

Apalachicola Bay System

The Apalachicola Bay system is a wide, shallow estuary that covers an area of approximately 210 square miles behind a chain of barrier islands (Gorsline, 1963). Its primary source of fresh water is the Apalachicola River. The estuarine system may be divided into four sections based on both natural bathymetry and man- made structural alterations: East Bay, St. Vincent Sound, Apalachicola Bay, and St. George Sound. Major estuarine habitats found within ANERR include oyster bars, submerged vegetation, tidal flats, soft sediment, tidal marshes, and open water habitats (Edmiston & Tuck, 1987). Historically, oyster bars covered over 10,600 acres of submerged bottom within ANERR boundaries. The Eastern oyster is the dominant component on the bars which cover approximately 10 percent of ANERR bay bottom (see Map 23). Current mapping efforts will determine the extent and viability of this important resource.

The submerged vegetation found in the system includes freshwater, brackish, and marine species. Their distribution is confined to the shallow perimeters of the system (Livingston, 1980; Continental Shelf Associates, Inc., 1985) because of high turbidity, which limits the depth of the photic zone. Submerged vegetation covers approximately seven percent of ANERR bay bottom (Table 4), with the majority of it located in regions of high salinity and low turbidity. The shallow bayside regions of Little St. George, St. George, and the mainland areas of St. George Sound support the largest assemblages of true seagrasses (Map 23), with shoal grass being the dominant species. Turtle grass and manatee grass are also found in deeper, higher salinity waters in the eastern reaches of the system. Widgeon grass and tapegrass (*Vallisneria americana*) are found near the mouth of the river and in the upper reaches of the bay.

Tidal marshes found within the boundaries of ANERR include freshwater, brackish, and salt marshes and cover approximately 17 percent of the total aquatic area (Table 4). The most extensive marsh systems are found in East Bay, along the lower reaches of the Apalachicola River, and in the Big Bayou portion of St. Vincent Island (Map 23). An extensive system of tidal creeks and bayous extends northward thereby increasing the shoreline area and regions suitable for marsh development. These marshes support predominantly fresh to brackish water vegetation consisting primarily of sawgrass, cattails, and bulrushes. The dominant species found in the higher salinity regions behind St. Vincent, St. George, Cape St. George islands, and in St. George Sound are black needlerush (*Juncus roemerianus*), cordgrasses, and saltgrass (*Distichlis spicata*) (Livingston, 1984a). ANERR estuarine salt marsh (3,048 acres) occurs in the Lower River Marshes and Cat Point units



Map 23 / Historic Oyster Reef Coverage (Twitchell et al., 2007), current Seagrass and Marsh Coverage in Apalachicola Bay

The largest benthic habitat type found in the Apalachicola Bay system is soft sediment, comprising approximately 70 percent of the estuarine area (Livingston, 1984a). Its composition varies considerably depending on location in the bay (see Map 23). Many of the commercially important benthic invertebrates are harvested from this habitat.

The simplest habitat to physically define and one of the most difficult to measure is the open water. Organisms associated with this habitat include planktonic and nektonic forms. The major component of the nekton in Apalachicola Bay is dominated by estuarine dependent fish. Menzel and Cake (1969) estimated that three-fourths of the commercial catch in Franklin County is dependent on the estuarine habitat and condition of the bay. Important finfish within ANERR include mullet, spotted seatrout, flounder, black drum, spot, croaker, and redfish.

Salt Marsh: Salt marshes are found on the bay side of ANERR where they are protected by the barrier islands and are associated with the shallow, low-energy (wave, tide, etc.) areas (Livingston et al., 1975). Sloughs gradually merge with the salt marsh on the bay side of St. George Island. Livingston and Thompson (1975) attribute plant zonation of such marshes to salinity gradients due to differential evaporation. Brackish or landward areas of marshes are dominated by black needlerush. Needlerush is joined by saltmeadow cordgrass, perennial glasswort, three-square bulrush, sand sedge, and the shrubs, sea myrtle and groundsel, in the high brackish or transitional zone (Edmiston, 2008). Waterward of the transitional zone,

needlerush dominates exclusively to an elevation near mean high water. Waterward of the mean high-water line and the brackish zone lies an area dominated exclusively by smooth cordgrass. This community requires regular tidal inundation and attains its best development on Little St. George Island behind protective sand/oyster bar barriers which have been deposited by bay wave action offshore in the Pilot Cove's area (Florida Department of Natural Resources [FDNR], 1983). The most landward extent of smooth cordgrass is in the margins of small tidal creeks meandering into the needlerush marsh. On Little St. George Island, as the marsh reaches its most inland extent, the dominant vegetation often changes from needlerush to cordgrass, and then to sawgrass, in distinct but narrow bands. The smooth cordgrass of Little St. George marshes is short and lacks vigor.

Mesohaline estuarine waters of Apalachicola Bay account for this contrast in community vigor, as smooth cordgrass prefers tidal environments approaching sea water salinity (FDNR, 1983). Within the salt marshes of Little St. George Island are also small salt flats; slightly higher areas flooded only by storm tides or extreme high tides, and isolated from freshwater influx coming from the surrounding uplands.

These flats become very saline and desiccated due to evaporation and are dominated by species that can tolerate high salinities, such as saltwort (*Batis maritima*), perennial glasswort (*Sarcocornia ambigua*), bushy seaside oxeye (*Borrichia frutescens*) and saltgrass (*Distichlis spicata*).

Seagrass Bed: The shallow, bayside regions of St. George Island and Little St. George Island support the largest assemblages of submerged vegetation in the estuarine system. Shoal grass is the dominant species in these areas. Seagrass habitat is also found along the northern shoreline of the bay extending from Eastpoint (St. George Sound) to Alligator Harbor.

Seagrass beds are extremely vulnerable to human impacts. Many have been destroyed through dredging and filling activities or have been damaged by sewage outfalls and industrial wastes; either physically or as a result of decreased solar radiation resulting from increased water turbidity. Seagrass beds are susceptible to long term scarring from boat propellers, anchors and trawls. Such gouges may require many years to become revegetated. When protected from disturbances, seagrasses have the ability to regenerate and recolonize areas. Additionally, some successful replanting of seagrass beds has been conducted.

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

Mollusk Reef: Reef-building mollusks require a hard (consolidated) substrate on which the planktonic larvae (i.e., spat) settle and complete development. Hard substrates are often limited in estuarine natural communities because of the large amounts of silt, sands and muds that are deposited around river mouths. Typically, oyster mollusk reefs occur intertidally in water salinities from just above fresh water to just below full-strength sea water but develop most frequently in estuarine water with

salinities between 15 and 30 practical salinity units (psu). The unique habitat provided by the Apalachicola Estuary has enabled subtidal populations of oysters to thrive where in most systems, predators, parasites, and diseases of oysters would cause this species to die. Prolonged exposure to low (less than 2 psu) and high (greater than 30 psu) salinities can be responsible for massive mortality of oyster reefs. Thus, significant increases or decreases in salinity levels through natural or unnatural alterations of freshwater inflow can be detrimental to the oyster mollusk reef communities in Apalachicola Bay. Another threat to mollusk reefs is pollution and substrate degradation due, in large part, to upland development. Substrate degradation occurs when silts, sludge and dredge spoils cover and bury the mollusk reefs.

Historically, the entire Apalachicola Bay system provided all of the necessary requirements for mollusk reef establishment as was evidenced by the fact that approximately ten percent of the entire aquatic area in the estuary was covered by oyster bars (Livingston, 1984a). Under suitable conditions, approximately forty percent of the aquatic area has been estimated as suitable for oyster bar development with substrate type being the limiting factor (Whitfield & Beaumariage, 1977). These conditions have enabled Apalachicola Bay's oyster fishery to be credited with producing 90 percent of Florida's production and 10 percent of the nation's output. However, since the development of the last edition of this plan significant declines in oyster productivity have occurred to the point where a fisheries disaster declaration was issued and accepted by the federal government in 2012 (Crist 2007). Loss of suitable conditions to support the oyster fishery has mainly been attributed to declines in freshwater input from the Apalachicola River through increases in human use, and frequency and severity of climate induced droughts throughout the watershed. Recent habitat restoration initiatives have shown that substrate is no longer a limiting factor as these activities have had a very low success rate. New research is being conducted to look at larval recruitment and the use of differing substrates with little success in the identification of a reason for the lack of response of the resource.

Apalachicola River System

The Apalachicola River is the largest in Florida and ranks 21st in the United States in terms of flow, as well as being one of the last remaining undammed large rivers left in the country. The lower 52 miles of the river is also a part of ANERR, as are most of the distributaries which branch off the lower portion of the river and empty into East Bay. The middle and lower river (river mile 78 to river mile 0) flow through lowlands with a maximum land elevation less than 100 feet and is characterized by a floodplain which varies from two to five miles wide (Leitman et al., 1983).

Six distinctive shoreline habitat types have been located within the Apalachicola River along its entire 215-mile shoreline (Ager et al., 1987). These have been catalogued and divided into steep natural bank, gently sloping natural bank, dike field, sandbar, rock, and submersed vegetation. All these habitat types except rock are found in the middle and lower river sections within ANERR. Mid-river habitat, which accounts for a significant portion of the riverine habitat, is less well known but the substrate generally consists of clam shells, clay, detritus, or sand, depending on location (USFWS, 1986; Ager et al., 1987).

Apalachicola River Floodplain System

The floodplain of the Apalachicola River is the largest in Florida and one of the larger floodplains on the Gulf Coast. It encompasses approximately 15 percent of the river's drainage area in Florida, about 144,000 acres (Wharton et al., 1977; Elder & Cairns, 1982). The lower river floodplain, within ANERR, ranges from two to four and a half miles across (Leitman et al., 1983). The natural riverbank levees vary from two to eight feet higher than the surrounding floodplain and average 50 to 150 feet wide. Six forest types and several other categories have been identified on the Apalachicola River floodplain using color infrared photographs and cruise transect data (Leitman,1983; Leitman et al., 1983). The dominant and associated

species found with them are the distinguishing characteristics used to separate these types. Compared to the upper river, the lower 42 miles of the river floodplain is dominated by wet-site species with fewer pine and mixed hardwood types.

The tupelo-cypress with mixed hardwoods forest type dominates the lower river, covering 41 percent of the lower river floodplain. Occupying low flats, sloughs, and hummocky areas which provide small variations in elevations, this is mostly a wet-site forest. Areas occupied by this forest type are inundated or saturated from 50 percent (hummocks) to 100 percent (sloughs and pools) of the year. The tupelo-cypress forest type, which covers 22 percent of the lower river floodplain, is found in areas where the soil is poorly drained, such as backswamps and low flats. Areas in which this forest type is found usually have heavy clay soils which are inundated more than 50 percent of the year and saturated continuously (Leitman, 1983; Leitman et al., 1983).

Mixed hardwood forest type covers 23 percent of the lower 42 miles of the floodplain but is primarily found in the upper 20 miles of this section. Predominant species are water hickory, sweetgum, overcup oak (*Quercus lyrata*), green ash, and sugarberry. All these species are usually associated with levees, terraces, and areas that are inundated only about 5 to 30 percent of the year. The mixed hardwood forest and tupelo-cypress with mixed hardwoods association, which are normally referred to as bottomland hardwoods, combined make up approximately 60 percent of the lower 42 miles of floodplain, almost all of which are managed by other agencies, but are included within ANERR boundaries.

Marsh, which is restricted to the lower ten miles of the river, covers 11 percent of the lower river floodplain. The marsh actually covers almost 100 percent of the last several miles of floodplain, occupying most of the lower river birds-foot delta. Open water accounts for most of the remaining habitat of the lower river floodplain (Leitman, 1983; Leitman et al., 1983).

Less dominant habitat types comprise the rest of the floodplain habitats. Pine forest type covers less than 1 percent of the floodplain and is usually found on islands near upland that are drier than surrounding floodplain. Pine species include loblolly (*Pinus taeda*) and other species. A second pine and hardwood forest type is dominated by loblolly pine, sweetgum (*Liquidambar styraciflua*), sugarberry *(Celtis laevigata*), and water oak (*Quercus nigra*). This type covers about 2 percent of the flood plain and is found in wetland-upland transition areas nest than outer edge of the flood plain. Both pine and pine-and-hardwood forest types are saturated or inundated less than 10 percent of the time. The pioneer zone is common along river margins and new land areas formed by bars, but is narrow and comprises less than 1 percent of the floodplain forest. The pioneer zone is comprised almost completely by black willow (*Salix nigra*). Less than 2 percent of the floodplain is comprised of unidentified or altered habitat types, including those cleared or cultivated by humans (Leitman, 1983; Leitman et al. 1983).

Wet Flatwoods: Wet flatwoods often occur in the ecotones between mesic flatwoods and shrub bogs, wet prairies, dome swamps, or strand swamps. Wet flatwoods also occur in broad, low flatlands, often in a mosaic with these communities. The relative density of shrubs and herbs varies greatly in wet flatwoods. Shrubs tend to dominate where fire has been absent for a long period or where cool season fires predominate; herbs are more abundant in locations that are frequently burned. Soils and hydrology also influence relative density of shrubs and herbs. Soils of shrubby wet flatwoods are generally poorly to very poorly drained sands and include such series as Rutledge/Osier; these soils generally have a mucky texture in the uppermost horizon (Gilbert et al., 1995). Examples of typical soils in grassy wet flatwoods are loamy sands of the Leefield and Plummer Series (USFS, 1984).

Floodplain Swamp: Floodplain swamp communities provide important wildlife habitat, contribute to flood attenuation, and help protect the overall water quality of streams and rivers. Artificial water impoundments on rivers can severely limit the effects of seasonal flooding that maintain the health of these systems, including the stabilization of deposits and flushing of detritus (Wharton et al., 1982). Alteration of the hydroperiod by impoundments or river diversions and the conversion of floodplain communities to forestry or agriculture uses have devastating consequences to river and bay systems. Virtually all cypress/tupelo stands are second growth, having been intensively logged by the first half of the 20th century. Several invasive exotic plants have encroached into floodplain swamp including Japanese climbing fern, alligator weed (*Alternanthera philoxeroides*), water hyacinth (*Eichhornia crassipes*) and wild taro (*Colocasia esculenta*).

Variant: Freshwater Tidal Swamp: As a river approaches the coast, increasing stresses from daily tidal-driven inundation and occasional saltwater intrusion gradually influence vegetation structure. At the lower end of this gradient, cypress becomes much less dominant, replaced by stunted tupelo, pumpkin ash (*Fraxinus profunda*) and sweetbay. The landward extent of this community is difficult to determine but it is roughly defined as occurring between the head of the tide, where the bottom of the stream channel is higher than the mean tide range, and the point of tide reversal, where water flow is always downstream, even during high tide (Day et al., 2007).

Depression Marsh: Depression marshes are generally thought to be maintained as herbaceous communities against woody invasion by hydrologic fluctuations or by fire or by both (Kirkman, Goebel, Drew, & Palik, 2000; Casey & Ewel, 2006). Fires in surrounding communities should be allowed to burn into depression marshes and extinguish naturally or burn through them. Physical disturbance, particularly from hog rooting, livestock, or vehicles (e.g., “mud bogging”) can cause serious damage in marshes; these activities can destroy native species and churn the soil which is often then colonized by pure stands of weedy species. Such physical disturbances can allow invasive exotic plants to get a foothold.

Floodplain Marsh: At ANERR, the floodplain marsh covers approximately 11 percent of the lower floodplain or approximately 9,030 acres. Most of this is tidal fresh water marsh, located in areas where water movement is influenced by tidal fluctuations, and salinity levels are lower than 0.5 psu. The lower marsh, closer to the bay, is a mixture of fresh and brackish water species. All of the marsh area is restricted to the lower 10 miles of the floodplain where it accounts for 51 percent of the floodplain area. Tidal freshwater marsh provides a very diverse wetland community compared to salt marsh areas. Sawgrass is the predominant species although bullrushes, cattails, big cordgrass, softrush, giant cutgrass, and phragmites are also present in the freshwater areas of the river and distributaries (Edmiston, 2008). The most developed marsh systems are found in the lower reaches of the Apalachicola River and East Bay, where brackish water species such as cordgrass and needlerush appear and mix with freshwater species (Leitman, 1983; Livingston, 1984a). An extensive system of tidal creeks and bayous extends northward, increasing shoreline area and suitable regions for marsh development. The Lower River Marshes Management Unit support predominantly fresh to brackish water vegetation consisting primarily of bulrushes, cattails and sawgrass.

Blackwater Stream: Very few blackwater streams have escaped disturbances and alteration. Clearcutting in adjacent forested lands is one of the more devastating alterations for this community. Additionally, the limited buffering capacity of blackwater streams intensifies the detrimental impacts of agricultural and industrial effluents.

Alluvial Stream: The most important characteristics of alluvial streams are the large range of flow rates and sediment loads encountered. Water depth fluctuates substantially and is generally separated into a normal or low flow stage and a flood or

high flow stage. During the normal low flow stage, the water is confined within the stream banks, while during flood stage the water overflows the banks and inundates the adjacent floodplain communities. The flood waters transport detritus, minerals and nutrients from the surrounding uplands to the floodplain communities and beyond. This flushing action removes biological waste materials and simultaneously nourishes the floodplain communities. Marsh elder (*Iva frutescens*), and christmasberry (*Lycium carolinianum*) often marks the transition to upland vegetation or low berms along the seaward marsh edge (Clewell, 1997). Salt marsh soils range from deep mucks with high clay and organic content in the deeper portions to silts and fine sands in higher areas. The organic soils have a high salinity, neutral reaction, and high sulfur content; soil properties of salt flats on higher portions of the marsh are little studied (Coultas, 1997).

Upland System

Uplands within ANERR boundaries, except for the barrier island uplands, are generally managed by other agencies. The two primary upland habitats on the mainland within ANERR boundaries are sand pine scrub and pine flatwoods, both of which are in the northern and eastern areas of East Bay and along the middle and lower river. Sand pine scrub exists on the eastern side of East Bay. Within Franklin County, scrub occurs on dune and beach ridges near the coast with small, isolated stands existing inland on relic shorelines. A dense stand of sand pine forms the overstory while the understory is usually limited to myrtle oak, sand live oak, and rosemary. There is usually little or no herbaceous ground cover and little or no organic matter in the upper soils (Clewell, 1986).

Pine flatwoods dominate the narrow band of uplands north of East Bay and within the ARWEA and lands managed by the NWFWMD. Wet flatwoods or boggy flatwoods are particularly characteristic of the Tate's Hell region of Franklin County (Clewell, 1986). Slash pine usually dominates pine flatwoods in this area. The slash pine-scrub community usually grades into pine flatwoods which tend to occur on poorly drained or wet sites. The major associates include a dense understory of fetterbush, saw palmetto, gallberry, maleberry (*Lyonia ligustrina*), and large-flowered staggerbush (*L. lucida*) (Little St. George). Palmettos form a denser cover than in the scrub communities. Pine flatwoods bordering salt marshes take on a tall understory of live oaks and occasional cedars and cabbage palms (FDNR, 1983).

3.6 Flora and Fauna of the Apalachicola NERR

Native Species

ANERR and the surrounding drainage basin contain barrier islands, as well as estuarine, riverine, floodplain, and upland environments. The many habitats found within these environments support a wide range of plant and animal species. An inventory of threatened and endangered species, mentioned in the management plan, can be found in Appendix B. A more detailed inventory of species found within ANERR can be found in ANERR's site profile, which is located at the following website: https://www.apalachicolareserve.com/wp-content/uploads/pdf/A_River_Meets_the_Bay.pdf.

Florida's natural areas have seen alteration and degradation from a variety of sources. The fragmentation of natural communities from roads and development, coupled with the establishment of vast timber farms, have led to extensive fire suppression; either by static artificial barriers preventing fire spread, or the active suppression of forest fires. Most of Florida's natural communities and many plant and animal species depend on recurring fire for their very survival. Restriction of periodic fires disrupts the natural fire ecology necessary to maintain biodiversity of upland habitats within ANERR. Periodic fires play an important role in maintaining habitat value for wildlife, and species diversity within plant communities. 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. More than 1300 plant species have been identified within the Apalachicola drainage basin with 103 of them listed as threatened or endangered. Also, the largest stand of tupelo trees in the world is found in the lower Apalachicola River floodplain (Apalachicola National Estuarine Research Reserve [ANERR], 2008).

The Apalachicola River drainage basin contains more than 40 species of amphibians and 80 species of reptiles. This is the highest diversity of these animal groups in the United States and Canada. Among these many species are the southern dusky salamander, the gopher frog, Barbour's map turtle, Atlantic loggerhead turtle, Apalachicola kingsnake (*Lampropeltis getula meansi*), and eastern indigo snake (ANERR, 2008).

Mammals also abound within ANERR. More than 50 species, including the Florida black bear, the threatened West Indian manatee, the Indiana bat, and the gray bat are found in the Apalachicola basin (ANERR, 2008). ANERR and surrounding drainage basin are among the most important bird habitats in the southeastern United States. This area lies on the eastern fringe of the Mississippi flyway, thus receiving large numbers of birds from both the Midwest and Atlantic Seaboard during migratory periods. Approximately 300 species of birds have been documented within ANERR or adjacent to ANERR, with several being designated as endangered, threatened, or species of special concern by the FWC (ANERR, 2008).

More than 270 species of fish have been documented from the Apalachicola River and Bay system, of which approximately 90 are strictly freshwater species. The rest utilize the estuary during part or all of their life cycle. The species found within the Apalachicola River system include four endemic species such as shoal bass and bluestripe shiner, and diadromous fish such as the Gulf sturgeon and American eel. Common estuarine and marine species that are of local importance commercially include striped mullet, speckled trout, menhaden, red drum, flounders, and sharks (ANERR, 2008).

Listed Species

Listed species are those which are listed by the USFWS, National Marine Fisheries Service, FWC and FNAI as endangered, threatened or of special concern. Specific management strategies will be addressed later in this plan (see Chapter 7). All management actions will be in compliance with the recovery plans for these species. Many plant and animal species inhabiting ANERR have been listed as either federal or state endangered, threatened or of special concern. For a complete list see Appendix B.4. The following abbreviations are indications of the federal or state status of a particular species: SLE - state-listed endangered, SLT – state-listed threatened, FLT – federally-listed threatened, FLE – federally-listed endangered. Management activities for listed species at ANERR are two-fold. First ANERR identifies, acquires and maintains habitats that support some or all life stages of listed species. Second, ANERR documents the occurrence and abundance of these species through regular surveys and map creation in a Geographic Information System. Refer to Appendix for listed species table. Management and monitoring of upland listed species, included sea turtles and shorebirds, is described in Chapter 7.

ANERR staff coordinates with several agencies to manage aquatic listed species within the boundaries and adjacent areas such as St. Joseph Bay and Alligator Harbor. ANERR staff report marine mammal strandings to the National Marine Fisheries Service and FWC, and sometimes assist with further stranding response. Live and dead stranded sea turtles are reported to FWC, and information is recorded by staff and volunteers who are trained according to FWC Sea Turtle Stranding Network protocols. ANERR assists other agencies and entities with monitoring listed species in the area. This includes providing boat time and vehicle use for accessing remote areas within ANERR. ANERR also assists other agencies with listed species outreach and education by facilitating events such as workshops, seminars and booths at festivals. While not monitored or managed by ANERR, sightings of the federally endangered Gulf sturgeon are reported to USFWS. The Apalachicola River,

south of the Jim Woodruff Dam is an important spawning site for the sturgeon and both the river and bay are important habitats for this species.

Invasive and Nuisance Species

Invasive species are species not native to an ecosystem, and whose introduction to that ecosystem can harm the environment, public health or welfare. Invasive species may constitute the largest single threat to our coastal ecosystem, our coastal economy, and human health in the coastal region. Invasive species often out-compete native species which can result in the catastrophic loss of both plant and animal diversity. Invasive, non-native plant and animal species are present within the bounds of ANERR. On Reserve-managed lands, none are at present a major threat to existing resources due to ongoing monitoring and management efforts. However, partner land managers within ANERR continue to battle infestations; in particular aquatic and vine infestations of natural areas along the river and floodplain are most difficult to control.

High-threat and abundant exotic plant species in the lower Apalachicola basin include Chinese tallowtree (*Triadica sebifera* syn. *Sapium sebiferum*), *Lantana spp*., camphor tree (*Cinnamomum camphora*), Japanese climbing fern (*Lygodium japonicum*), rattlebox (*Sesbania punicea*), and cogon grass (*Imperata cylindrica*). Early Detection Rapid Response species include beach vitex (*Vitex rotundifolia*) and Brazilian pepper (*Schinus terebinthifolia*). Both of these aggressive species have been documented in Franklin County in the last decade. Fortunately, sites where these species have been observed have undergone treatment or are currently receiving treatment. The Gulf Coast variety of common reed (*Phragmites karka*) occurs along the Gulf Coast from Florida to Texas. Although this is a native species of reed, its populations are being monitored as a “native invasive” due to it explosion in the Lower River Marshes and beach areas of Eastpoint, Apalachicola, and the baysides of the barrier islands. Additional information on survey and management of exotic plant species at ANERR is described in Chapter 10 and site description sections.

Wild hogs (*Sus scrofa*) are present within ANERR and are most abundant in the mainland swamps and wetlands of the river floodplain. Historically they were present on Little St. George Island and were eradicated in 2001. Hogs were also present on St. Vincent Island but were recently eradicated island through an intensive removal effort by the USFWS and USDA APHIS 2015-2019. Hogs are still present in all mainland land areas within the Reserve. They can be problematic as their rooting can disturb acres of soil in varied habitat types. This disturbance can sometimes lead to the introduction of invasive, non-native plant species. These hogs are especially hard on ground-nesting birds, sea turtle nests (they consume the eggs) and snakes. Another non-native mammal found in ANERR is the feral house cat (*Felis catus*). Since both Apalachicola and Eastpoint are harbor towns, there are numerous feral house cats that survive on scraps and are prolific breeders. They are very efficient predators and routinely prey upon migratory songbirds and the native rodent population. Annually, several efforts are made across the county to capture, spay and neuter these animals, however the populations remain quite large. ANERR staff educate about threats to native bird and herp species from feral cats.

Marine invasive, non-native species are another threat to the ecological balance of Apalachicola Bay. Lionfish were first reported off Florida's Atlantic Coast near Dania Beach in 1985, although it is unknown when the first release into the environment occurred (FWC, n.d.). The species began to be recorded off the Atlantic coasts of North Carolina, South Carolina and Georgia in the early 2000s, while reports from Bermuda and Florida continued. Lionfish reports have increased rapidly since then and as of 2010, they have expanded into the northern Gulf of Mexico off Pensacola and Apalachicola (FWC, n.d.). FWC sponsored lionfish tournaments and derbies, coupled with local spear-fishing groups have significantly reduced lionfish populations in the panhandle region along with supplying local restaurants with a new fish to serve. Species like the green

mussel (*Perna viridis*), green crab (*Carcinus maenas*), Asian tiger prawn (*Penaeus monodon*), and Australian jellyfish *(Phyllorhiza punctata*) are worrisome, and ANERR keeps vigilant watch for their appearance.

Nuisance species on Reserve-managed lands include coyote, raccoon, and opossum, as well as the invasive mammal, the rat. Populations of these species have become over abundant in natural areas due to human influences. As a result, these species prey upon the listed species nests including sea turtles and shorebirds if their populations are left unmanaged. Selective management of this species and site locations are described in Chapter 10.

3.7 Forest Resources

Sustainable forestry is an important component of Florida's economy and can provide funds for management of lands. Chapter 253, Florida Statutes, requires that plans for 1,000+-acre parcels contain an analysis of multiple-use potential, to include a professional forester's assessment of the resource conservation and revenue-producing potentials of the tract's forests. The ORCP considers forest management consistent with the purposes for acquisition property when the activities contribute to restoration management. An updated Timber Management Assessment was completed in 2023 (Appendix E.8). The timber assessment provides a quantified conditions of upland habitats within ANERR management properties as compared to target FNAI conditions. Repeated quantification of overstory conditions will be valuable to quantify timber damages as a result disturbance events such as tropical systems, pest infestations, and wildfire, and to ultimately assess ecosystem resiliency. The Lower River Marshes, consisting of marshes and alluvial forest, contain no known quantities of harvestable timber. Little St. George Island contains slash pine of harvestable quantity and size. However, most all the harvestable sized trees show "catface" scars from turpentine operations during the early to mid-20th century. Considered cultural artifacts, these trees remain protected from commercial harvest. The remainder of ANERR managed lands, mostly residential building lots, is embedded between and adjacent to private residential areas.

Photo 4 / A local beekeeper collects tupelo honey from hives on a bee dock on the Apalachicola River.

Chapter 4: Social Attributes

4.1 Surrounding Population Data and Future Projected Changes

Franklin County, which surrounds Apalachicola Bay, is a rural county encompassing 348,800 acres (544.3 square miles) of land. According to the U.S. Census Bureau, in 2022 the county's estimated population was 12,498 people county-wide, with less than half of them living in the two incorporated areas of Apalachicola and Carrabelle. The estimated population was projected to increase by 2.7 percent between 2020 and 2025 (Florida Legislature Office of Economic and Demographic Research, 2020). Minorities are projected to continue to comprise a small portion of the overall population of the county. African Americans and Hispanics comprised approximately 19 percent in 2022. Currently ANERR is a partner in the Center for Coastal and Marine Ecosystems at Florida Agricultural and Mechanical University (FAMU), a Minority Serving Institution. ANERR participates in FAMU's summer camps for young adults, summer teacher institute activities, undergraduate research and graduate research. The purpose of the program is to increase the capacity for science education at all levels.

Population and residential development in Franklin and Gulf counties are relatively sparse. The only incorporated municipalities within these counties are Apalachicola, Carrabelle, Port St. Joe, and Wewahitchka. Based on 2020 U.S. Census Bureau data, Apalachicola's population was reported as 2,341, Carrabelle's was 2,606 and the combined population of these four cities was approximately 10,378 in total. Population centers adjacent to ANERR boundaries in Franklin County include Apalachicola, Carrabelle, and the communities of Alligator Point, Eastpoint, Lanark Village and St. George Island in unincorporated Franklin County. The population of the unincorporated Franklin County is estimated to be 7,051 (US Census Bureau, 2022a). Other areas surrounding ANERR are mostly rural with low density, scattered development or are undeveloped.

Growth and new development in Franklin County are primarily concentrated in and adjacent to the cities of Apalachicola and Carrabelle, and the communities of Alligator Point, Eastpoint, Lanark Village and St. George Island. Much of the development on St. George Island is related to vacation rentals, including homes and two small motels. There are roughly 1,800 homes on St. George Island, with approximately half being occupied by full time residents and half on the seasonal rental market. Apalachicola is a traditional fishing village with an historic district. The city strives to manage growth in ways that sustain the historic character, maritime focus and economic viability of the seafood industry.

Many new residents are retirees or professionals who move to the area from other counties in Florida and out of state. In addition, the area is experiencing increased tourism. Although the Franklin County Tourist Development Council does not provide visitation numbers, an estimated 350,000-450,000 tourists visit the area per year. This figure is based on the number of vacation rentals, hotel rooms and the annual visitation at the St. George Island State Park (Eastern Research Group, 2021)

4.2 Socioeconomic Drivers

Historically, the economic base of the eight Florida counties in the watershed included agriculture, forestry, commercial fishing, recreational fishing and hunting (Starnes-Smith, Tonsmeire, & Wagner, 1991). These activities are dependent on the natural resources that support them. Much of the land away from the coast, both inside and outside ANERR boundaries, is owned and managed by the state or federal government. Large areas of public land provide long-term protection of the resources that support the local economy, as well as valuable recreational opportunities. Recreation contributes to the social well-being of the residents and also to the local economy through tourism. Recreational activities within ANERR include boating, fresh and saltwater fishing, camping, nature study and birding, canoeing, kayaking, hiking, picnicking, shelling and other beach activities, swimming, sailing, and hunting. Fresh and saltwater fishing are the primary activities of many visitors. Hunting opportunities during winter and spring are available on all ANERR uplands, State Wildlife Management Areas, in the Apalachicola National Forest, and on St. Vincent National Wildlife Refuge. Recognizing the importance of tourism to the local economy and the growing number of support services, the Reserve has designed programming to connect with local businesses to further stewardship messaging. See the section below on public use and access.

Recreational fishing is vital to the economy of Florida. The American Sportfishing Association estimates that recreational fishing produces over 11.5 billion dollars in economic output and supports over 100,000 jobs throughout the state (American Sportfishing Association, 2023). Estimates for District 2 (covering the coastal counties of Bay, Gulf, Franklin, Wakulla, Jefferson, Taylor, Dixie and Levy) put the economic output at approximately 400 million dollars a year and supporting 3,700 jobs (American Sportfishing Association, 2021). These numbers include both fresh and saltwater anglers, personal and chartered boats, shore fishermen, and all of the supporting services associated with fishing.

Commercial fisheries in the area have been critical to the local economy. Historically, more than 65 percent of the Franklin County work force was employed by the commercial fishing industry, although this number has dwindled over the last several years because of storms, cost of fuel and the collapse of the oyster fishery. Over the last twenty-three years, finfish, shrimp, blue crabs and oysters made up the bulk of Franklin County's catch with an estimated dockside value of nearly $217,000,000 over the past two decades. Historically, ninety percent of Florida's oyster harvest and 10 percent of the United States' total harvest came from the Apalachicola Bay system (FWC, 2020). Oyster landings dropped precipitously in 2012 and have not recovered (Figure 2; FWC, 2023) despite restoration efforts and various management changes. Typical of fisheries data, shrimp, crab and finfish landings have fluctuated quite a bit over the past two decades, but in general, landings-per-trip have remained steady with no significant upward or downward trends; however, the price per pound has increased (Figure 3; FWC, 2023). Note that the "finfish" category includes approximately 50 species, both nearshore and offshore species which are caught using a variety of methods.

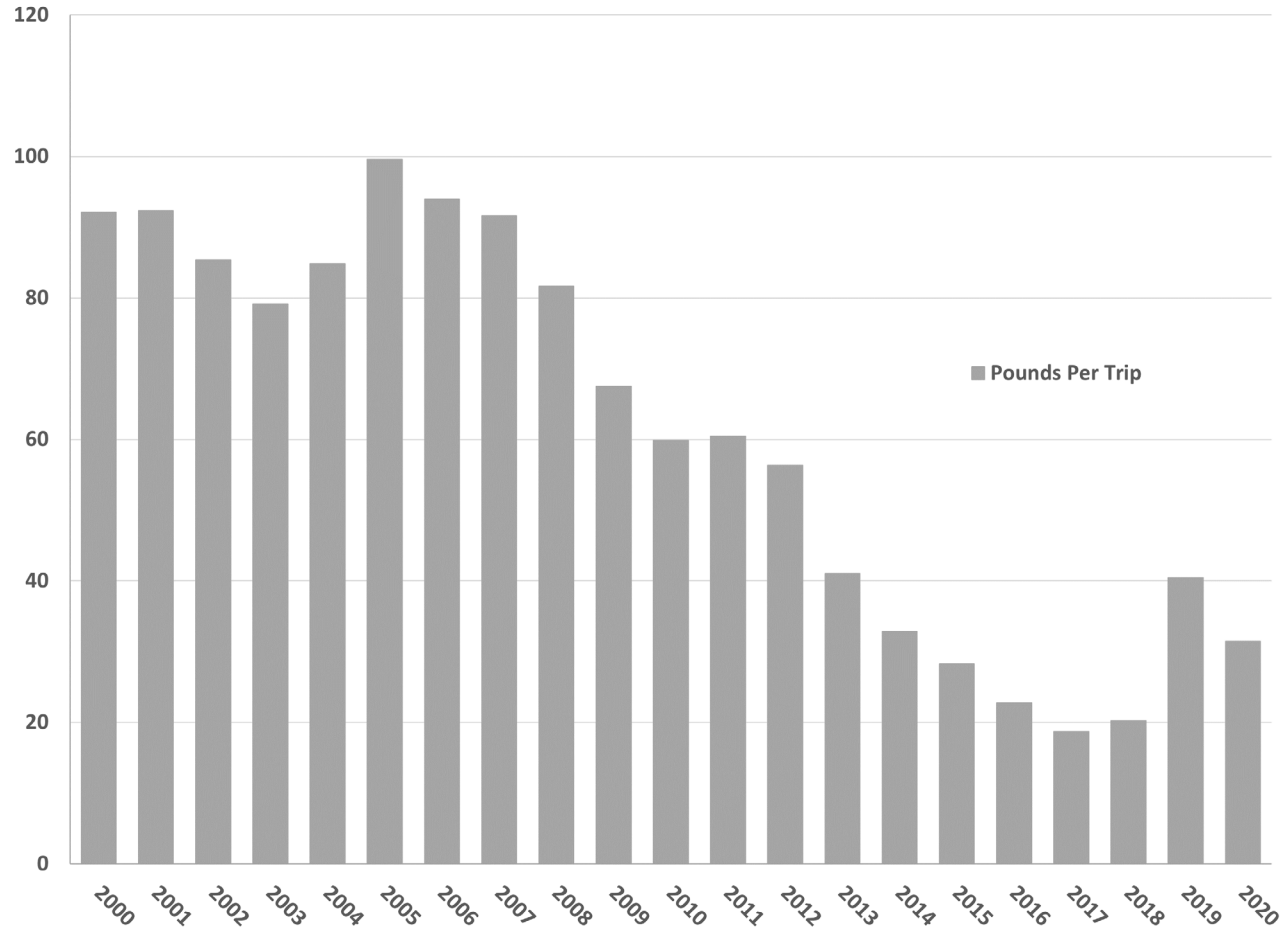


Figure 2 / Annual Commercial Oyster landings for Franklin County from 2000 – 2020. Commercial harvest was put under moratorium in December 2020 and will end in 2025.

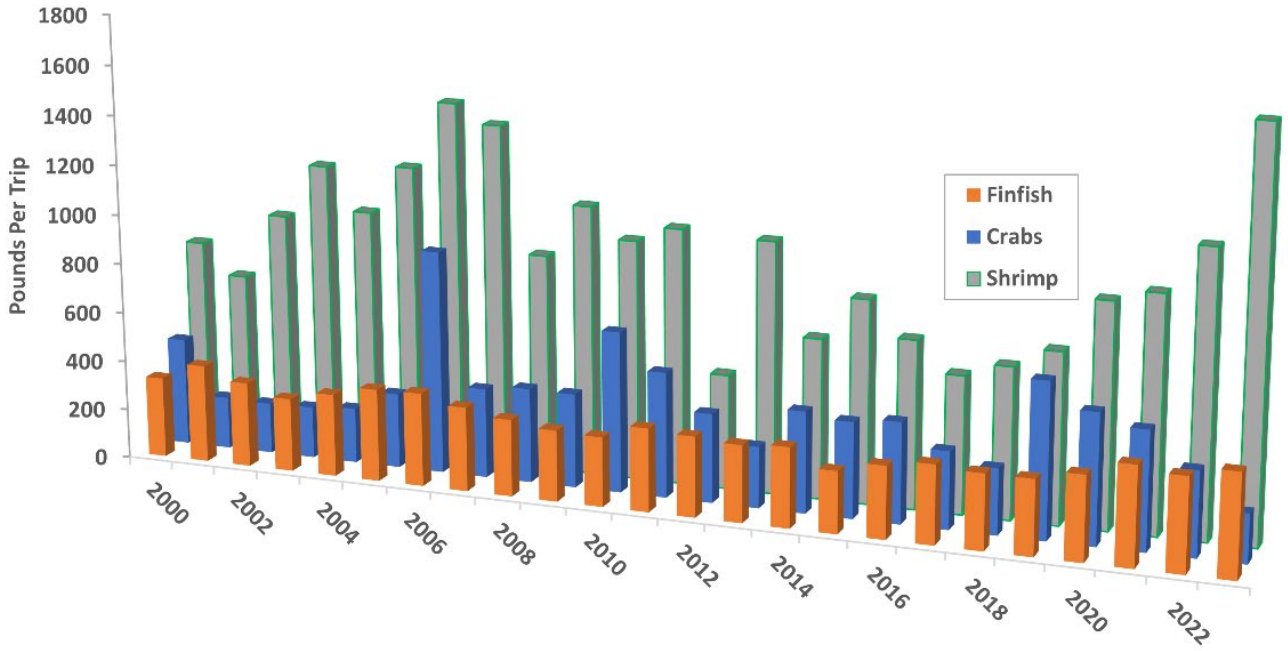


Figure 3 / Annual Commercial landings for finfish, crabs, and shrimps in Franklin County from 2000 – 2023.

Photo 5 / The Marshall House on Cape St. George

Chapter 5: Archaeological and Historical Resources

5.1 Overview of Archaeological and Historical Resources

The Apalachicola River Valley has been occupied by humans for over 14,500 years (Dunbar & Waller, 1983; Tyler, 2008) and is believed to have been an ideal environment for large prehistoric human populations comprised of small hunting-gathering-fishing groups, and later large villages of farming people or aquatic species-based hunter-gatherers on the coast. Paleo-Indian through Mississippian cultural sites are represented, as are protohistoric (Contact and Mission-period) and historic settlements, structures and occupational sites (Henefield & White 1985; White, 1981, 1994a, 1996, 1999). The Archaic cultural period (8000-1000 B.C.) is slightly better known than the earlier Paleo-Indian period (Tyler, 2008) of habitation in the Apalachicola River Valley. Several middle to late Archaic sites have been found in the region (Bullen, 1950 & 1958; Kurjack, 1975; Huscher, 1964; White, 1986, 1994a, 2003a, 2003b; White & Estabrook, 1994). The type of tools used during this period indicates an increasing adaptation to post- Pleistocene climates and newly forming estuarine environments, as well as reliance on smaller game animals. Human populations may have become more sedentary by 1000 B.C., engaging in hunting and

foraging, as well as possibly the beginnings of plant cultivation. Many large shell midden sites began to be occupied during this time, building up higher ground in the wetlands that was more attractive for human occupation.

The next cultural period, known as the Woodland, lasted from 1000 B.C. to 1000 A.D. The hunter- gathering lifestyle was changing to more dependence on cultivated plants and settlements were becoming more permanent (White, 2003a, 1994a). In Northwest Florida, the early Woodland adaptation is known as the Deptford Period. Deptford components, once assumed to be mostly associated with coastal swamps and estuaries (Milanich, 1994), have been located at numerous inland sites in the region (Bullen, 1950; Huscher, 1964; White, 1986). One site in particular on the Apalachicola River suggests more than an occasional occupation with the Deptford component extending several hundred meters along the riverbank (Ward, 1989). Deptford components are also prevalent at estuarine shell mounds (White, 1986, 1987, 1991, 1994a, 1994b, 1994c).

During the Middle Woodland period, the Swift Creek-early Weeden Island cultural adaptation, developed in the basin by A.D. 200 and lasted until about A.D. 700. Construction of burial mounds and elaborate mortuary rituals characterized this time period, when the honored dead were buried with beautiful pottery of many types and other grave goods of exotic raw materials such as mica and copper; there are also humble campsites and shell middens (Frashuer, 2006; Milanich, 1994; White, 1981, 1992, 1994a).

By Late Woodland or late Weeden Island times (A.D. 700-1000), burial mounds had mostly disappeared, and people continued obtaining wild resources of the interior and the coast, but also began to intensify food production. Sites are characterized by linear riverine or estuarine shell middens with mostly plain pottery. The Fort Walton cultural adaptation, the Apalachicola Valley variant of southeastern Mississippian culture, developed by A.D. 1000. It was characterized by large villages with flat-topped temple mounds, as well as remote farmsteads and continued production of shell mounds in coastal and estuarine areas. Individual societies were true chiefdoms; complex political systems supported by maize agriculture and interacted widely with other groups across the Southeast while maintaining a distinctive material culture and identity (Marrinan & White, 2007).

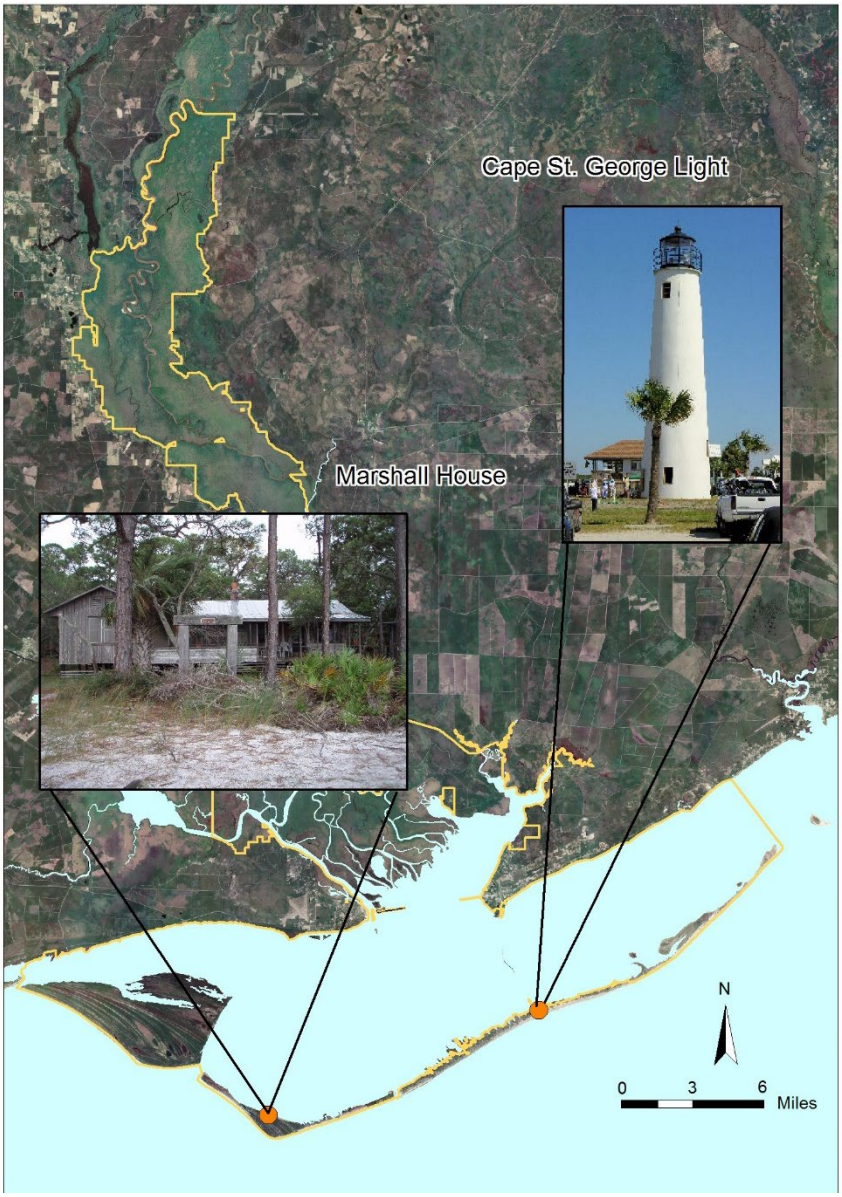
These Fort Walton populations were the first to have contact with Spanish explorers, who did not reach the Apalachicola valley in the sixteenth or early seventeenth century, but their artifacts, accompanying germs, and slave hunters did. There is evidence that the Fort Walton people hung on and added a few Spanish items to their material culture until they disappeared in the late 1600s or early 1700s. The Spanish had organized a chain of missions from 1670 to 1685, but barely reached the Apalachicola and did not last long in the valley nor travel far below the forks of the Flint and Chattahoochee (Jones, 1973; Marrinan & White, 2007). By the mid-seventeenth century, native cultures were disrupted, and populations had declined severely, mostly because of the introduction of European diseases and the destruction of the Spanish missions by British and Creek Indian forces from Georgia in 1704. Indigenous populations were either killed off or absorbed by the invaders or dispersed westward to Alabama and Louisiana.

As they departed, Creeks and other Native Americans began moving downriver from Georgia to settle, bringing their distinctive Lamar culture, now dated to the early 1700s. By the later eighteenth and early nineteenth century, Creeks were changing to Florida's Seminole Indians, were living in the valley and dealing with American aggression. The First Seminole War centered on the Apalachicola valley; ultimately all these natives were removed to Indian Territory west of the Mississippi in the 1830s. Several types of significant early historic Euro-American and African American sites in the valley include Seminole War and

Civil War remains (White, 1999), sawmills, turpentine camps and stills, shipwrecks, and other standing structures such as the Cape St. George Lighthouse.

5.2 Archaeological and Historical Resource Sites

The Apalachicola River and Bay Drainage Basin, which includes ANERR, contains over 1,000 archaeological sites and numerous historic structures. Dredge-and-fill activities and shoreline erosion associated with coastal navigation projects pose a threat to some of these cultural resources. Likewise, silvicultural practices, such as streamside cutting and clearcutting, cause erosional problems which disturb site integrity. Staff review and comment on permit applications adjacent to or within ANERR. In addition, staff works with other agencies on best management practices to minimize site disturbance.



Map 24 / Historic and Cultural Sites

Several systematic intensive surveys have been accomplished or are ongoing within the boundaries of ANERR. An archaeological study funded by the Department of State's Division of Historical Resources (DHR) investigated the impact of record 1994 flooding on 24 newly located and 67 previously located sites within the Apalachicola River Drainage Basin (White, 1996). Several sites exposed by flooding, hurricane- generated wave action or coastal erosion were surveyed within ANERR. Staff assisted in the logistics required for this survey, helped record sites, and conducted educational programs in conjunction with this survey. In 1998, another DHR-funded survey of remote areas within ANERR was conducted (White, 1999), locating more previously unknown sites and recording adverse impacts to them, as well as to known sites.

Locations of known cultural sites within the ANERR-managed lands can be seen in Map 24 although sensitive sites have been omitted. Staff monitor sites annually on Reserve-managed lands only. However, these likely represent only a small percentage of all the archaeological sites that may be present in the area (N. White, per comm.). The following general site descriptions are for recorded archaeological and historical sites on lands

that ANERR manages (White, 1996). Management and monitoring of these sites are described in the Stewardship section.

8FR24, Cape St. George Island Site No. 2 (aka St. George West), late Fort Walton Midden, recorded by Glenn T. Allen in 1952. This site has been heavily eroded since its discovery.

8FR69, currently, the 1852 Cape St. George Lighthouse site includes a .08 acre outparcel on the cape of Little St. George Island. Ownership of this site was transferred from the U.S. Coast Guard to ANERR in 2004. The lighthouse succumbed to erosional processes and fell on October 21, 2005. The St. George Lighthouse Association raised more than $100,000 in donations and financed recovery efforts for the lighthouse. The structure has since been rebuilt and relocated to St. George Island with the state maintaining ownership. On December 1, 2008, the lighthouse was opened to public. There is a lease agreement in place with Franklin County for the present location and the St. George Lighthouse Association manages the site for tourist visitation as a 501C3 organization affiliated with ANERR.

8FR744, Van Horn Slough, a prehistoric midden of late archaic and Fort Walton periods in the Lower River Marsh tract recorded first in 1983. Site has experienced attempted looting (digging) in the past, despite that no burial artifacts have ever been discovered. Site is very remote and accessible only by small boat or kayak.

8FR745, Hendrix #2, prehistoric occupation, dating to possibly late Weeden Island or Fort Walton.

8FR746, Pilot's Cove, prehistoric shell midden in a coastal hammock, time period unrecorded.

8FR747, Lighthouse keeper's house and outbuildings. A single-story wood frame house was built for the caretaker in 1880 and several small outbuildings including a generator building, an oil building, a storeroom, a stable, a privy, several underground cisterns and a pump house were built between 1890 and 1939. In 1961, many of these structures were destroyed in a fire. Only the lighthouse tower, the walls of a brick storage building, the caretaker's house and an adjacent storage building remained standing at that time. The latter two structures collapsed during Hurricane Opal in October 1995. Some historic brick material from the site has been collected as required by DHR and stored away from the beach to avoid its loss to erosional processes. The site is not monitored currently.

8FR748, Government Dock, a 19th - 20th Century restored standing structure of historical interest. This dock is currently used by ANERR staff for ingress/egress and by recreational visitors to the Cape. Reconstruction in the footprint of the dock has been untaken in the last decade.

8FR749, Turpentine Camp, site of early 20th Century standing structures (houses and other buildings) and probably archaeological remains. This site has potential for a more depth survey if funding becomes available, as the site has great potential for documentation of a poorly represented segment of society for this period.

8FR804, Hendrix #1, a late prehistoric/Fort Walton midden site on the bay shore probably representing repeated, intermittent occupations -- likely for shellfish collecting (A.D. 1000-1500).

8FR807, Nicks Hole, a redeposited site on Nicks Hole shore on St. George Island. Site is mostly scattered, low- density prehistoric artifacts. Low-impact recreation activities currently take place on the site with minimal disturbances

8FR857, Cape St. George Shipwreck, a post-1830s seagoing vessel discovered in late winter-early spring by ANERR staff. The possible identity of the approximately 100-foot ship has been researched but so far no record correlates with this time period. At the time of initial investigation (July 21, 1996) less than fifteen feet of the wreck was visible. One plank located perhaps one quarter mile farther west was brought to ANERR for curation. Earlier, ANERR personnel recovered a sample of the metal pins. The wreck was videotaped and photographed. A later visit revealed that 43 feet of the wreck was exposed following a July 1996 storm. More photographic evidence was taken, and samples were removed by underwater archaeologist Roger Smith for inspection. Within a couple years of its exposure, the wreck was gone, either buried again or floated out to sea (White, 2006).

Should any of it become extant again, ANERR staff will stress education and preservation of the vessel concurrent with other duties to try and prevent people from removing pieces of it whenever possible. Though the island is remote and accessible by boat only, many visitors put in there so the potential for vandalism exists.

8FR915, Millender Tract site, a prehistoric campsite on the beach of Cat Point in Eastpoint. First documented in 1977. Midden, historic refuse/dump, and scattered artifacts have been recorded both in terrestrial and submerged areas. A unique artifact was submitted to DHR's collection in 2016 from this site.

8FR1300, Marshall House Field Station, this 1940s homestead site was added to the historic register in anticipation of seeking historical restoration funding. The site includes a house, barn, and several outhouses on the bayside of Little St. George Island. The site is used by staff as a field station base.

8F1380, Lewis LeLand Headstone/Gravesite, a mid-1800s American era headstone on Little St. George Island. This site was officially documented in 2015 and submitted for inclusion as a cultural resource site in 2019. Little is known about this headstone and the site would be excellent for further surveying and historical research.

A comprehensive field survey has not been done so most recorded sites are probably those located in more accessible locations, areas attractive to visitors or visited by ANERR staff in conjunction with research projects.

No sites are currently identified for the Magnolia Bluff, Pelican Point parcels, Unit 4, Williamson (Sawyer St) or Rodrigue Tract (White & Yuellig 2004) in Eastpoint, although homesteads from the mid-19th century are likely present at Rodrigue based on historical maps. A list of sites within and directly adjacent to ANERR boundaries, but not managed by ORCP, is available in Appendix B.5.

Upon discovery or informant information on any new sites on ANERR managed lands, staff will abide by the guidelines in the *Management Procedures for Archaeological and Historical Properties on State-owned or Controlled Land* (Revised June 2021) by DHR (Appendix E.2)

Photo 6 / Summer education program on St. George Island drives home the importance of the estuary for visiting families with hands-on investigations into oyster reefs, fish populations, and global human impact on natural systems.

Chapter 6: Threats and Stressors

6.1 Natural and Anthropogenic Stressors

The Reserve faces threats and stressors similar to other estuarine systems, however due to the large amount of public lands within the Apalachicola River watershed and strict local land use codes, Apalachicola Bay does not have as many coastal management issues as other areas. For the management plan, the Reserve has identified three primary coastal management issues to focus on:

Hydrologic changes in the Apalachicola River and Floodplain: The Apalachicola-Chattahoochee-Flint River System drains an area of approximately 20,000 square miles. Land use changes within the floodplain, water use changes, water management changes (operation of the federal dams), and modified river channels and distributaries will all have an influence on the timing and magnitude of freshwater inflows into Apalachicola Bay. While there are several forcing factors driving the

properties of water within the bay (tides, winds, time of year), river flow is the largest contributing factor to the conditions in Apalachicola Bay. Please see sections 3.1 and 4.3 for a complete description of hydrologic change impacts.

Coastal Development: Over 90% of the land within Franklin County (which surrounds Apalachicola Bay) is held in public ownership (agencies listed above), however much of the coastline along Apalachicola, St. George Island and Eastpoint is privately-held. Cumulative impacts from increasing development could include: increasing contaminants in run off and storm water, contaminated groundwater, loss of critical habitats, and physical processes leading to eroding shorelines. Please see sections 3.3 and 4.3 for a more complete description of potential coastal development impacts.

Climate Change and Extreme Events: Estuaries are dynamic systems, but with rising air temperatures and rising seas, we are poised to see dramatic shifts in the long-term conditions of the bay as well as the species and natural communities. In addition to these longitudinal changes, we continue to have natural and anthropogenic perturbations (drought, hurricanes, oil spills, wildfires) that will shape the future of our environment as well as the communities that surround the bay. Please see section 3.4 for a more complete description of potential climate and extreme event impacts.

6.2 Disaster Preparedness, Response and Recovery

On April 20, 2010, the offshore oil drilling platform Deepwater Horizon exploded, killing 11 people and injuring 17 others. Fifty miles off the coast of Louisiana, the damaged platform sunk, dislodging the riser and breaking loose from the well head at a depth of approximately one mile, causing the largest oil spill in U.S. history. Over 87 days, an estimated 134 million gallons of oil seeped into the Gulf of Mexico, impacting over 1,300 miles of shoreline across Texas, Louisiana, Mississippi, Alabama, and Florida (NOAA, 2016).

Over the following weeks, the Reserve staff were called upon to serve in many capacities including sampling of water and sediments across the Florida Panhandle (to assess the condition of estuaries and embayments before impacts were seen), supporting data acquisition and reporting through GIS, and providing onsite information to governments and emergency responders. After the initial response, DEP staff were trained to participate in Shoreline Cleanup Assessment Teams and served for months across Walton, Bay, Gulf, Franklin and Wakulla counties to guide in the cleanup of our managed areas and beaches. In addition to regular duties, the staff also helped move sea turtle eggs from nests that were anticipated to be impacted by oil. The staff also responded to reports of oil across Gulf and Franklin counties for many months. Although there were no direct impacts of oil on Apalachicola Bay, the physical and emotional toll on the people of Franklin County and the staff was evident.

The local economy saw some large fluctuations with the fisheries closed for a period of time and the tourism business slow. BP made payments to individuals and businesses impacted by the spill within weeks, so many opted to stop working or take advantage of the economy driven by the response activity. The hotels and rental houses became full of contractors working on the spill response. Local commercial and guide fishermen were recruited to go out and surveil for oil and deploy boom. These Vessels of Opportunity made several thousands of dollars in a week; much more than they normally would make. The Franklin County Board of County Commissioners fought to have boom installed across the bay. Years of coordination with the Coast Guard paid off when identifying critical areas to protect.

There were many lessons-learned from the oil spill and it has shaped how the Reserve now functions. Partnerships with many agencies have become stronger and mutually-beneficial. Some of these agencies include the local Emergency Operations Center, State Department of Emergency Management, the Coast Guard, NOAA's Office of Response and Restoration, and now the NOAA Disaster Preparedness Program. Also, within the ORCP, formerly the Office of Coastal and Aquatic Managed Areas, the office worked together in an orchestrated fashion as well as improving communication and coordination with other parts of DEP. The capacity of the staff to prepare for and respond to natural and man-made disasters has increased through additional training, equipment purchases and funding over the years since the oil spill.

The Reserve created a Disaster Response Plan in 2014, which includes a hurricane plan that is updated annually (the plan is available by contacting the Reserve). This plan accounts for how all facilities, equipment and data sources are to be protected in the event of a storm, and provides for the relocation of vehicles, vessels, and sensitive equipment. The Disaster Response Plan addresses a multitude of potential disasters, whether natural or man-made. Most importantly, it connected the Reserve to local and regional emergency response agencies and established the Reserve as the go-to entity for ecological resource information. As learned from the Deepwater Horizon oil spill in 2010, it is vital that local knowledge is shared with response staff, whether it is part of the initial response and clean up or following with the assessment teams. Additional training such as Incident Command System, Hazardous Waste Operations and Emergency Response (HAZWOPER), Shoreline Cleanup Assessment Techniques and Natural Resources Advisor Training has allowed the Reserve staff to support local response and resource protection following the oil spill and hurricanes.

The Reserve staff has also participated in the NERR Disaster Resilience Working Group, that focuses on supporting planning, response, and recovery efforts at each of the NERRs. After experiencing several natural and man-made disasters over the last several years, the Reserve System is pulling together lessons-learned to build capacity and become more resilient to future disasters. The Coast Guard Sector Mobile just completed an update to the Area Contingency Plan (MOBACP - Homepage (floridamarine.org) which includes water of the Reserve. Included in the plan are geographic response maps that provide local contacts, response assets, and sensitive habitats. The Reserve continues to work with the Coast Guard and FWC to update these maps regularly.

Natural resource damages, civil penalties, and criminal penalties resulting from the Deepwater Horizon accident have provided funding for resource restoration and economic recovery across the Gulf over the last ten years. Funding is administered through three main programs: The Natural Resources Damage Assessment (NRDA) Trustee Council, the Gulf Coast Ecosystem Restoration (RESTORE) Council, and the National Fish and Wildlife Foundation (NFWF) Gulf Environmental Benefit Fund. Many of these projects (listed below in Table 3) have benefited Apalachicola Bay and Franklin County either directly or indirectly. All of the projects are from Deepwater Horizon except for the bottom two which are noted. The projects where the Reserve has been a partner or has benefitted directly are highlighted. This funding has supported priority restoration in the bay such as oyster reefs and protection of listed species. Projects that have focused on the protection and conservation of protected species have benefitted the Reserve tremendously, as they free up staff time to conduct other priority activities. As part of the Comprehensive Panhandle Bird Conservation grant to Audubon, repairs were made to the old St. George Island Causeway, helping preserve one of the most productive rookery areas in the Panhandle. It is anticipated that some of these projects will continue over the next decade and new ones will continue to be funded to further restoration efforts.

Table 3 / Restoration Projects Funded in Apalachicola Bay over the last ten years.

Funding Source	Year	Name of Project	Project Lead	Partners	Amount Funded	Description/ Notes
Deepwater Horizon Funding						
NFWF - GEBF	2013	Eliminate Light Pollution on Sea Turtle Nesting Beaches	Sea Turtle Conservancy	Several, FWC, USFWS	$1,500,000	Walton, Gulf, Franklin
NFWF - GEBF	2019	River Slough Restoration	Apalachicola Riverkeeper	UF; ANERR	$5,357,000	NERR will assist with WQ monitoring
NFWF - GEBF	2019	MK Ranch Hydrologic Restoration	Ducks Unlimited	FWC	$21,997,000	
NFWF - GEBF	2013	Apalachicola Bay Oyster Restoration Phase I	FWC	UF; DACS	$4,189,400	
NFWF - GEBF	2019	Apalachicola Bay Oyster Restoration Phase II	FWC	FSU	$20,057,000	
NFWF - GEBF	2020	Franklin - 98 Living Shorelines	ARPC		$8,312,000	* matched w/$7,000,000 from NFWF Coastal Resilience Fund
NFWF - GEBF	2014	Florida Shorebird Conservation Initiative	FWC/Audubon	Several	$1,606,639	Florida Gulf Coast
NFWF - GEBF	2016	Restoring FL's Shorebird and Seabird Populations	FWC/Audubon	Several	$11,250,000	Florida Gulf Coast
NFWF - GEBF	2013	Comprehensive Panhandle Bird Conservation	Audubon	Several	$4,685,842	Includes old SGI Causeway Stabilization
NFWF - GEBF	2018	Improve Sea Turtle Hatchling Survivorship through Pred. Man.	Sea Turtle Conservancy	USFWS; FWC	$4,000,000	Florida Gulf Coast

Funding Source	Year	Name of Project	Project Lead	Partners	Amount Funded	Description/ Notes
NRDA	2012	Avian Breeding Habitat	FWC	Several	$4,321,165	Florida Gulf Coast
NRDA	2014	Oyster Cultch Placement	DEP - DWH	CPAP	$5,370,596	3 Bays: Pensacola, St. Andrews, Apalachicola
NRDA	2014	Cat Point Living Shoreline	DEP - DWH	CPAP	$775,605	
NRDA	2012	Restoring the Night Sky - Reduce Lighting Affecting Sea Turtles	FWC	Several	$4,321,165	Florida Panhandle
NRDA	2014	St. Joseph Bay Seagrass Restoration	DEP DWH	CPAP	$2,691,867	
NRDA	2018	Waterfront Parks, Piers, Ramps - Franklin County	DEP - DWH	Franklin County	$1,477,135	Recreational Use; multiple projects: 38,40,41
NRDA	2019	St. Vincent NWR Predator Control	DOI - USFWS		$580,772	
RESTORE Pot 1	2015	Money Bayou Wetland Restoration	DOC - NOAA	SJBBP	$387,726	Gulf-wide; planning Phase I
RESTORE Pot 1	2015	Apalachicola Bay Oyster Restoration	DEP - DWH	DACS; CPAP	$4,680,000	
RESTORE Pot 1	2015	Apalachicola Watershed Agriculture WQ Imp.	FDACS		$2,219,856	Irrigation system efficiency
RESTORE Pot 1	2015	Tates Hell Strategy I	USDA		$7,000,000	Hydrologic Restoration
RESTORE Pot 2	2016	Gulf Coast Conservation Corps	NOAA	TNC	$8,000,000	Gulf - wide

Funding Source	Year	Name of Project	Project Lead	Partners	Amount Funded	Description/ Notes
RESTORE Pot 4		Gulf-wide Assessment of Habitat Use of Nekton in Turtlegrass	FWC	Several		NOAA Science Program; Gulf - wide
Triumph	2019	Apalachicola Bay System Initiative (ABSI)	Florida State University	Several	$8,000,000	
NOAA (Federal Fishery Disaster Funding)	2014	Federal Fishery Disaster Assistance Funding	(DEO) FWC		$6,316,533	Included approximately $60,000 for Cat Point WQ Tower
NFWF ECRF (Hurricane Michael Recovery)	2020	Franklin County Living Shoreline (Franklin - 98)	ARPC		$7,444,000	Emergency Coastal Resilience Fund (Hurricane Michael)

6.3 Marine Debris

The Florida Panhandle was impacted by Hurricane Michael on October 10, 2018, when it made landfall as an unprecedented Category 5 Hurricane. The storm caused catastrophic damage from wind and storm surge from Bay to Franklin counties along the coast. Staff conducted initial assessments of Apalachicola Bay and St. Joseph Bay Aquatic Preserves, while assessing damage to St. Joseph Bay State Buffer Preserve which received funding to conduct a Catastrophic Debris Clean-up, resulting in the removal of approximately 30,000 cubic yards of various debris being removed from the uplands and adjacent wetland islands. Marine debris still exists in sensitive areas, including seagrass and marsh, within the aquatic preserves and in Apalachicola River/Bay and its tributaries. Removing this marine debris will prevent further harm to resources and will provide benefits for human communities and benefits for fish and wildlife/habitat. The UF/IFAS Extension Bay County has applied for a NFWF grant to assess, remove and dispose of marine debris from Bay to Franklin County which includes areas managed by the Reserve. The Reserve will support UF/IFAS by providing assistance and resources as needed.

Part III – Strategic Plan

The Reserve staff began the strategic planning process in early 2019 with assistance from NOAA staff. The three main components of plan development include 1) identifying priority coastal management issues, 2) identifying target audiences, and 3) assessing the skills and capacity of the Reserve Programs (NERR Management Plan Guidelines_2019_2024_June 2019). During the initial steps of the planning process, the staff defined the vision of the Reserve and updated the mission statement. Existing and emerging coastal management issues were identified, and ten long-term outcomes were defined based upon these issues. These ten outcomes fit into three broad goals: tying the themes back to the mission statement.

Each of the program areas defined their target audiences and assessed their skills and capacity to serve those audiences. This was completed through a SWOT (strengths, weaknesses, opportunities, and threats) analysis. The staff then worked through each coastal management issue, defining the short-term (1 year) outcomes, mid-term (2-4 year) outcomes leading to the desired future condition (long-term outcome) at the end of the 5-year management plan cycle. The SWOT analysis was particularly helpful in defining the Reserve's role (strengths) and gaps (weaknesses), where the Reserve needed to identify partners and/or collaborators to further the process. Our responsibilities, and the basis for our annual workplan, are outlined in the strategies/actions listed under each objective and outcome. Performance measures are reported on semi-annually for NOAA and quarterly for the Department of Environmental Protection. Performance measures are available on demand from the Reserve.

Apalachicola National Estuarine Research Reserve Mission

Through applied research and monitoring, ANERR provides knowledge, data, and tools to educate communities and decisionmakers to improve stewardship, resilience and sustainability of the Apalachicola River and Bay ecosystem.

Apalachicola National Estuarine Research Reserve Vision

A thriving Apalachicola River and Bay ecosystem that supports resilient and sustainable human and natural communities.

The Reserve staff identified three broad goals to guide work over the next several years:

Goal 1: Natural resources within the Reserve are conserved through research, monitoring, and adaptive management.

Objective 1.1: Diversity, abundance and productivity of natural communities and species within ANERR are maintained.

Objective 1.2: Impacts to Apalachicola Bay, resulting from modified hydrology in the Apalachicola-Chattahoochee-Flint watershed, are reduced.

Objective 1.3: Water quality and sediment conditions are maintained at current or optimal levels.

Goal 2: Thriving natural communities support healthy human communities

Objective 2.1: Land use practices are sustainable and compatible with the long-term preservation of the Apalachicola Bay and River System.

Objective 2.2: Public use of Reserve lands is sustainable.

Objective 2.3: The local community is knowledgeable about and vested in their local natural resources.

Objective 2.4: Apalachicola Bay supports a thriving, sustainable, natural resource-based economy.

Goal 3: Resilient natural communities enhance local communities' capacity to respond to changing climate

Objective 3.1: The Apalachicola River and Bay ecosystem is resilient in response to climate change and extreme events.

Objective 3.2: Local coastal (human) communities are resilient in response to climate change and extreme events.

Objective 3.3: Cultural and historical resources are conserved.

Goal 1: Natural resources within the Reserve are conserved through research, monitoring, and adaptive management.

Objective 1.1: Diversity, abundance and productivity of natural communities and species within ANERR are sustainable.

Habitats can change because of altered hydrology, adjacent land use and development practices, climate change, fire exclusion, invasive species, and natural disasters. Monitoring data can be used to inform resource managers, decision-makers, residents, and visitors about appropriate strategies to protect and manage habitats

Table 4 / Strategic Plan Goal 1, Objective 1.1, Outcomes and Strategies and Actions

Outcomes:	**Strategies/Actions:**
1.1.1 Submergent and emergent natural communities within ANERR (including oyster reefs, submerged aquatic vegetation, salt marsh, brackish marsh and freshwater marsh) are monitored, maintained and restored towards historic conditions.	1.1.a Maintain the Reserve Habitat Mapping and Change Plan and complete change analysis at regular intervals. **(S, R)** 1.1.b Maintain a comprehensive mapping and monitoring program that enables ANERR to establish conditions and determine changes in the lower Apalachicola River and Bay system. Identify important submerged and emergent habitats within ANERR through remote sensing and physical ground truthing. **(S, R)**
1.1.2 Upland natural communities are managed towards historic (at designation) conditions.	1.1.c Maintain a Spatial Database and provide GIS-based products in support of decision-making. **(S, R)** 1.1.d Facilitate the natural fire regime on ANERR-managed properties and conduct prescribed burning or mechanical treatment where appropriate. **(S)** 1.1.e Identify, monitor, and reduce the presence and abundance of invasive/exotic species. **(S)**
1.1.3 State and Federally protected species are conserved through focused habitat management, monitoring, education and outreach.	1.1.f Identify and monitor the presence and abundance of state and federally protected species. Contribute to statewide databases **(S)** 1.1.g Incorporate the conservation of listed species theme into education and outreach programs. **(T, E)**
1.1.4 Local agencies and NGOs work collaboratively to manage natural communities and species cohesively by sharing data, research, lessons-learned, and resources.	1.1.h Reserve provides data, analyses, and training for state, local, and federal partners on the health of the system and future implications of proposed use. **(R, T)**

	1.1.i Promote research and monitoring efforts within ANERR through the development of agreements with other entities within DEP, other research organizations and universities, and other state and federal agencies. **(R)**
1.1.5 Monitoring, research, and peer-reviewed literature are used to support science-based decision-making and promote Best Management Practices (BMPs).	1.1.j Provide scientific information and recommendations on methods to reduce or eliminate threats to protected species and pursue the removal of nuisance species. **(S, R)** 1.1.k Hold a periodic symposium that highlights research and monitoring within the Reserve as it relates to natural resource management (similar to ARSA, but to include species management, climate change impacts, etc.). **(R)** 1.1.l Provide training and technical assistance on techniques, funding sources, and benefits of restoration. (**T**) 1.1.m Work with stakeholders to identify, promote and support restoration efforts for aquatic and upland habitats; seeking funding for projects not covered under normal funding allowances. (**T, S**)
1.1.6 The Reserve's audiences have a sense of stewardship of the natural resources.	1.1.n Engage local (Franklin and Gulf County) schools in restoration projects. **(E)** 1.1.o Continue to offer education and training programs, that highlight the importance of conservation and management of submerged and upland habitats and provide additional information via signage and various media. **(T, E)**

S = Stewardship, R = Research, T = Coastal Training, and E = Education

Goal 1: Natural resources within the Reserve are conserved through research, monitoring, and adaptive management.

Objective 1.2: Impacts to Apalachicola Bay, resulting from modified hydrology in the Apalachicola-Chattahoochee-Flint watershed, are reduced.

One of the most pressing issues for ANERR has been and continues to be water quantity. Since the majority of the watershed that contributes to river flow is outside of Florida, the state does not have direct control of freshwater flow into the system. This issue is being addressed largely through scientific, legal and political processes. Monitoring, partnerships and training can address how land use and altered hydrology impact water quantity. The quantity and seasonality of river flow impacts the habitats and species along the river and aquatic resources within the bay.

Table 5 / Strategic Plan Goal 1, Objective 1.2, Outcomes and Strategies and Actions

Outcomes:	**Strategies/Actions:**
1.2.1 Impacts to Apalachicola Bay, resulting from modified hydrology in the Apalachicola-Chattahoochee-Flint watershed, are investigated and synthesized.	1.2.a Characterize and monitor the physical, chemical, and biological characteristics of waters within the bay as it relates to the flow regime of the Apalachicola River. **(R)** 1.2.b Support research that investigates the impacts, whether detrimental or beneficial, of dredging activities along the Apalachicola River and Gulf Intercoastal Water Way. **(R)**
1.2.2 Research that links hydrology/productivity in the floodplain to productivity in the bay is conducted.	1.2.c Facilitate research and monitoring programs that help identify natural variability (highs and lows) in flows and levels necessary to protect the natural resources of ANERR. **(R)**
1.2.3 Resource managers and stakeholders come together regularly to share information, maintain institutional knowledge, and discuss priority research and restoration. 1.2.4 Resource managers and stakeholders throughout the Apalachicola River and Bay System work collaboratively to reduce impacts of modified hydrology.	1.2.d Maintain partnerships with state and federal agencies, especially Northwest Florida Water Management District, FWC, US Fish and Wildlife Service, and the US Army Corps of Engineers, to help determine water flow needs of habitats and species within the NERR. **(R, T)** 1.2.e Provide scientific information from Reserve research and monitoring programs to local, regional, and state decision-makers that will assist in effective water management. **(T)** 1.2.f Develop outreach and educational programs about the importance of maintaining water quality and the detrimental effects of reduced water flows on local resources utilizing Reserve data products. **(T, E)**
1.2.5 Priority hydrologic restoration projects are identified within the Surface Water Improvement and Management (SWIM) Plan and funding is identified.	1.2.g ANERR works with the Northwest Florida Water Management District (NWFWMD) to recommend priority restoration projects. **(T, R)**

S = Stewardship, R = Research, T = Coastal Training, and E = Education

Goal 1: Natural resources within the Reserve are conserved through research, monitoring, and adaptive management.

Objective 1.3: Water quality and sediment conditions are maintained at current or optimal levels.

Most existing and new development along ANERR's boundaries is concentrated along the bay shore and barrier islands. Potential impacts include declining water quality due to wastewater discharges, stormwater runoff, increased sediments, heavy metals and other contaminants. Water quality is affected by land use patterns, development, and stormwater management practices on land adjacent to ANERR. River flow may also have an effect water quality. ANERR would monitor and record changes in water quality throughout the Apalachicola Bay system.

Table 6 / Strategic Plan Goal 1, Objective 1.3, Outcomes and Strategies and Actions

Outcomes:	**Strategies/Actions:**
1.3.1 Impacts to and change in the condition of Apalachicola Bay are characterized by monitoring physical, chemical, and biological water quality parameters. 1.3.2 Important submergent and emergent habitats within ANERR, including oyster reefs, submerged aquatic vegetation, salt marsh, brackish marsh, freshwater marsh, mangroves are monitored as indicators of changing water quality. 1.3.3 Water samples are taken at the appropriate time and location, in conjunction with other agencies (such as DACS, FWC, NWFWMD, NOAA and EPA) to make informed decisions about the presence of contaminants and Harmful Algal Bloom-forming organisms.	1.3.a Coordinate with the multiple agencies/entities monitoring for contaminants to ensure that monitoring is of sufficient frequency and proximity for detection. **(R)** 1.3.b Work with federal and state regulators on the Total Maximum Daily Load determinations and Impaired Waters status. **(R)** 1.3.c Continue long-term monitoring programs within and adjacent to the NERR to determine the status of water quality parameters, potential threats to water quality, and impacts of water quality changes on resources. **(R)** 1.3.d Facilitate research and engage with partners to address water quality changes due to surface water contamination and the resultant effects on the biota of the estuary. **(R)** 1.3.e Monitor nutrient availability in Apalachicola Bay by the collection of monthly discrete water samples identifying concentrations of total nitrogen, nitrate, nitrite, orthophosphate, and chlorophyll a. **(R)** 1.3.f Continue long-term monitoring programs within and adjacent to the NERR to determine the status of submergent and emergent habitats, potential threats to submergent and emergent habitats, and impacts of water quality changes on submergent and emergent habitats. **(R, S)** 1.3.g Attract and support researchers addressing early detection of harmful algal blooms in Apalachicola Bay. **(R)**
1.3.4 Point and nonpoint sources of surface water contaminants are identified and mitigated.	1.3.h Use monitoring and research to inform decision-makers of point and nonpoint source impacts within the watershed. **(R, T)** 1.3.i Point and nonpoint sources of contaminants are mitigated through priority construction and remediation projects. **(R,T)**
1.3.5 Stakeholders are informed about the impacts of contaminants or water quality on reserve habitats or coastal human communities.	1.3.j Communicate information to the public, managers, and decision-makers (especially local governments) about the importance of maintaining water quality, the detrimental effects of reduced water quality, and methods that can be used to minimize impacts to water quality. **(T, E)** 1.3.k Develop outreach and educational programs for teachers about the importance of water quality and the detrimental effects of reduced water quality. **(E)**

S = Stewardship, R = Research, T = Coastal Training, and E = Education

Goal 2: Thriving natural communities support healthy human communities

Objective 2.1: Land use practices within the watershed are sustainable and compatible with the long-term conservation of the Apalachicola River and Bay System.

Infrastructure demands such as road construction, power line installation, wastewater treatment, and increased impervious surfaces may impact the natural resources within the Reserve. Residential and commercial development projects in the watershed (increased density, development related to working waterfront [ports, marinas]) may also impact natural resources. The goals of land management are to conserve and restore coastal natural communities and protect the water quality of the bay. State-owned lands have the added benefit of providing public access, recreation, and educational opportunities. There are two existing priority parcels identified for acquisition, consisting of 50 and 122 acres. The identified priority parcels consist of vulnerable natural communities and important archaeological sites. Acquiring these parcels would provide water quality protection, wildlife habitat and travel corridors, rare species protection, protection of prehistoric cultural artifacts, public access, and education. The Reserve will encourage stakeholders and decision-makers to utilize best management practices such as nature-based infrastructure.

Table 7 / Strategic Plan Goal 2, Objective 2.1, Outcomes and Strategies and Actions

Outcomes:	**Strategies/Actions:**
2.1.1 Priority properties (identified through Florida Forever, Apalachicola Regional Stewardship Alliance, ANERR) are acquired by the State of Florida.	2.1.a Ensure public input into potential boundary expansion and acquisition of priority land parcels. **(All)**
2.1.2 Sustainable land use planning strategies and BMPs are utilized for areas adjacent to ANERR (at watershed and county level).	2.1.b Partner with other agencies such as the Water Management District and the USDA Soil and Water District to better understand how land use/agricultural use may impact the river and bay. **(R)** 2.1.c Assist local governments with appropriate input on comprehensive plan development, point and nonpoint source controls, setbacks, development issues, etc. **(T)** 2.1.d Incorporate education themes into K-12 programs that address use of BMPs at home and school where teachers and students can be involved in protecting water quality. **(E)** 2.1.e Contribute to land management by participating in land management reviews, Florida Forever surveys and ARSA projects. (S)
2.1.3 Infrastructure demands such as road construction, power line installation, wastewater treatment, and increased impervious surfaces do not impact the natural resources within the Reserve.	2.1.f Provide current science, tools, and maps to local and state entities to consider infrastructure impacts on ANERR ecosystems. **(T, R)** 2.1.g Provide training and technical assistance relating to stormwater systems and support research to address effects of stormwater. **(T)**
2.1.4 Residential and commercial development projects in the watershed (increased density, development related to working waterfront [ports, marinas]) utilize best management practices such as nature-based infrastructure.	2.1.h Promote and support research of innovative, environmentally sensitive development and land use practices through training programs, technical assistance, demonstration sites, and public outreach. **(T, R)** 2.1.i Coordinate with clean marina/clean boating program. **(T)** 2.1.j Provide education materials for the public at the Nature Center related to BMPs for homeowners to protect water quality. **(E)**

2.1.5 Reserve data and expertise is utilized by local, regional, and state entities to inform rules, statues, and laws.	2.1.k Work with regional groups to provide planning and technical assistance on restoration projects such as nature-based infrastructure for improved resilience to extreme storms and other impacts. **(T)**

S = Stewardship, R = Research, T = Coastal Training, and E = Education

Goal 2: Thriving natural communities support healthy human communities

Objective 2.2: Sustainable Public Use of Reserve Lands

ANERR is comprised of sensitive upland, wetland, and aquatic habitats. Increasing public access and use can have adverse impacts on some sensitive areas and species. Excessive or unmanaged uses can cause impacts to resources; nesting shorebirds and sea turtles can be disturbed by beachgoers, and the litter created by those tourists and beachgoers can create unattractive or unsafe conditions. However, living near natural areas enhances peoples' well-being and is a huge draw for residents and tourists. The balance of increased access for the public and protection of the resources is a challenge for ANERR. Public use opportunities can be increased, and impacts minimized, through appropriate management of access and use areas, and through education and training efforts.

Table 8 / Strategic Plan Goal 2, Objective 2.2, Outcomes and Strategies and Actions.

Outcomes:	**Strategies/Actions:**
2.2.1 Public access to ANERR-managed areas and sustainable recreational opportunities are enhanced, while impacts to natural and cultural resources are minimized.	2.2.a Designate areas for, and types of, public use that are compatible with the resource management goals of ANERR. **(S)** 2.2.b Install and maintain signage (kiosks; brochures) within areas that present opportunities for instruction and education about the resources and objectives of ANERR. **(S)** 2.2.c Maintain effective relationships with local law enforcement, FWC, LE, Florida Forest Service, and other agencies to ensure environmentally sensitive lands are protected as well as the health and safety of visitors. **(S)** 2.2.d Identify and resolve urban/conservation land interface conflicts (S)
2.2.2 Sustainable hunting and fishing practices are allowed on designated ANERR-managed lands.	2.2.e Allow dove hunting on Little St. George Island consistent with FWC regulations and seasons. Notify the public of hunting regulations on LSGI through appropriate signage. **(S)** 2.2.f Allow game hunting on the Lower River Marshes consistent with FWC regulations and seasons for the Apalachicola River Wildlife and Environmental Area (ARWEA). **(S)**
2.2.3 An informed public that is aware of environmental issues and has a sense of stewardship (develops stewardship ethos or "cares") for resources within ANERR.	2.2.g Offer Coastal Training Program classes that highlight ANERR habitats and their management. Promote Best Management Practices (BMPs) that minimize impacts. **(T)** 2.2.h Publicize resource-related recreational opportunities on ANERR-managed resources (land and waters) at the ANERR Visitor Center, in the ANERR newsletter, ANERR websites, and other social media. **(T, E)**

S = Stewardship, R = Research, T = Coastal Training, and E = Education

Goal 2: Thriving natural communities support healthy human communities

Objective 2.3: Residents, stakeholders, and decision-makers are involved in the conservation of the Apalachicola River and Bay system's resources.

The support and involvement of community members and officials is critical to ANERR and the conservation of the Apalachicola River and Bay system resources. Increasing awareness of the region's resources, and issues impacting them, will foster stewardship and support within the local communities. With increasing visitor numbers and demand for programs it is also important to build opportunities for interns, students, and volunteers at the Reserve.

Table 9 / Strategic Plan Goal 2, Objective 2.3, Outcomes and Strategies and Actions

Outcomes:	**Strategies/Actions:**
2.3.1 ANERR's capacity increases through new and existing opportunities (monitoring, restoration, invasive species removal, native plantings, education that engage community members, volunteers, and students directly in ANERR programs. 2.3.2 Strong partnerships are built with the Friends of the Reserve, volunteer organizations, researchers, stakeholders, and others that ensure community involvement in accomplishing of ANERR programs.	2.3.a Implement volunteer program at the reserve supported by a full-time volunteer coordinator. **(E)** 2.3.b Identify and offer specific activities and opportunities for interns, spring break volunteers, students, and community members. Manage and track volunteers online. **(All)** 2.3.c Promote ANERR programs to build public support and stewardship. Promote more community involvement in ANERR programs by targeting community organizations. **(T)** 2.3.d Identify community needs and develop strategies to engage under-represented community members in targeted programs or activities. **(T)**
2.3.3 Awareness of the importance of Apalachicola River and Bay system and priority issues is increased among residents, stakeholders, and decision-makers. The local community is educated and vested in protecting/conserving the local natural resources.	2.3.e Use a variety of media to provide accurate and current technical information about the importance of the Apalachicola River and Bay system and the threats it faces. **(T)** 2.3.f Highlight positive stewardship actions by local community members. **(T)** 2.3.g Support priority conservation actions by non-governmental groups with applicable science and expertise. **(S, R)** 2.3.h Continue participating in community (both formal and informal) meetings to stay current on environmental issues of public concern. **(T)**
2.3.4 Local youth pursue a career pathway that supports the protection and conservation of Apalachicola River and Bay. 2.3.5 Volunteers, interns, and Conservation Corps members are aware of, and have the appropriate skill set for, employment opportunities in the environmental science field.	2.3.i Provide field experiences (summer or volunteer projects) for volunteers, student interns, and Conservation Corps members. **(R, S, E)** 2.3.j Identify and support citizen science that furthers the management of the Apalachicola system. **(R, S, E)** 2.3.k Work with programs that encourage or support volunteers or interns (such as the Conservation Corps of the Forgotten Coast, AmeriCorps, etc.) **(S, R)**

S = Stewardship, R = Research, T = Coastal Training, and E = Education

Goal 2: Thriving natural communities support healthy human communities

Objective 2.4: Apalachicola Bay supports a thriving, sustainable, natural resource-based economy.

Historically, the economy of Franklin County has been centered around the commercial fishing industry. Now, with the collapse of the oyster fishery and reductions in other fisheries, the primary economic driver is tourism. With increasing tourism, there are increasing threats to our natural resources. Environmentally conscious tourism is paramount to protecting Apalachicola Bay. Many aspects of the business sector, which includes realty, vacation rentals, boating, recreational fishing, and restaurants, could have positive effects on the health of the bay and assist in building stewardship of the resources.

Table 10 / Strategic Plan Goal 2, Objective 2.4, Outcomes and Strategies and Actions

Outcomes:	**Strategies/Actions:**
2.4.1 The reserve works with partners (public, professionals, decision-makers, non-government organizations (NGOs), and natural resource managers) to ensure the long-term management of the bay's (fishery) resources. 2.4.2 The reserve supports the development and implementation of priority strategies identified in the ABSI Oyster Management Plan (and other fisheries management plans) and continues to track the health and diversity of managed species.	2.4.a Reserve shares data with partners, decision makers, industry, residents and visitors on resource issues. **(R,T)** 2.4.b Reserve works with partners (stakeholders, state and federal agencies, academia and NGOs) to monitor, restore, and increase the productivity of fisheries in the Bay. **(R)** 2.4.c Facilitate research and education that supports the increase of historical fisheries knowledge and support innovative practices. **(R, T, E)** 2.4.d Oyster harvesters are knowledgeable about innovative fishery practices. **(T, E)** 2.4.e Opportunities to diversify the fishing industry (i.e. aquaculture) are explored to reduce pressure on the wild fisheries. 2.4.f Develop programs for K-12 and adults on aquaculture, in collaboration with DACS, other schools, FAMU, WEI, private businesses, and SeaGrant. **(T, E)**
2.4.3 Ongoing restoration projects support the revitalization of wild fisheries and implementation of conservation measures to ensure sustainability of the fisheries.	2.4.g Facilitate research related to restoration science and provide assistance in engaging stakeholders in the process and data dissemination. **(R, T, E)** 2.4.h Support the development of an oyster shell recycling program (working collaboratively with DACS and Conservation Corps). **(T, E)**
2.4.4 Professional audiences promote stewardship in their messaging to tourists; communicating the connection of the ecological health of Apalachicola Bay and its economic value to the local, regional, national, and international communities.	2.4.i Reserve provides information about the value, history and preservation efforts over time of the Apalachicola ecosystem to the tourism industry and residents. **(T, E)** 2.4.j Communicate with professionals and explore new opportunities to work with service providers who will connect with stakeholders. **(T)** 2.4.k Continue to participate in the UNESCO Man and the Biosphere Program which links healthy ecosystems and sustainable local economies. **(All)** 2.4.l Continue to recruit new members to the Reserve Advisory Board that represent the broad business community in the county. **(All)** 2.4.m Continue to support efforts to understand socioeconomic linkages to our natural resources. **(R, T)**

S = Stewardship, R = Research, T = Coastal Training, and E = Education

Goal 3: Resilient natural communities enhance local communities' capacity to respond to changing climate

Objective 3.1: The Apalachicola River and Bay Ecosystem is resilient in response to climate change and extreme events.

ANERR and the surrounding region are frequently impacted by natural processes such as drought, floods, and hurricanes. The impact of climate change on natural resources and local communities is also an issue of increasing importance. The greatest climate change impact to ANERR will likely be sea level rise. Due to the low topography of the area, sea level rise impacts such as saltwater intrusion and changes to inundation patterns may change the composition of coastal vegetation communities or result in loss of certain natural communities all together. Water level and temperature increases may allow the introduction of non-native species, which may be able to out-compete native species. Sea level increases will also increase storm surge impacts. ANERR's ability to monitor and characterize these processes and changes is important to understanding, planning for, and adapting to potential changes.

Table 11 / Strategic Plan Goal 3, Objective 3.1, Outcomes and Strategies and Actions

Outcomes:	**Strategies/Actions**
1.1.1 Potential effects of climate change (increased temperature, tropicalization, sea level rise, ocean acidification) on the resources of ANERR are identified. 1.1.2 Potential impacts on ANERR resources related to extreme events (hurricanes, wildfires) are understood.	3.1.a Continue long-term monitoring programs within and adjacent to ANERR to determine the status of water quality parameters, potential threats to water quality, and impacts of water quality changes on resources. **(R)** 3.1.b Identify the potential implications of climate change on estuarine species and habitats through research, monitoring and modeling. **(R, S)** 3.1.c Maintain Sentinel Stations (WQ, Water level, WX, sediment elevation tables (SETs), porewater and vegetation monitoring) at two locations. Monitor additional surface elevation tables. **(R, S)** 3.1.d Identify changes in species composition of natural communities (HMCP) – migration, expansion and reduction. **(R, S)** 3.1.e Improve understanding of impacts on ANERR resources related to extreme events. **(R, S)** 3.1.f Build partnerships with local emergency management and city/county government to increase coordination during extreme events and exercise the reserve disaster plan regularly. **(All)**
1.1.3 Natural resource managers, elected officials and the public are aware of potential impacts and have the tools needed to plan for sea level rise and nuisance flooding. 1.1.4 Natural resource managers, elected officials and the public utilize adaptive measures to conserve natural communities and reduce shoreline erosion (strategies for restoration, protection or retreat).	3.1.g Consider demonstration sites, including surface elevation table to show types of monitoring. **(E)** 3.1.h Provide formal education, training programs and technical assistance related to extreme events and climate change; including planning, mapping and decision support tools. **(T, E)** 3.1.i Facilitate coordination, communication and training programs relating to climate change research. **(T)** 3.1.j Provide training and technical assistance on techniques, funding sources and benefits of habitat- friendly shoreline stabilization **(S, T)** 3.1.k Utilize vulnerability assessments to guide management planning to identify strategies for mitigation, migration or retreat. **(T)** 3.1.l Engage teachers in K-12 programs at local schools to incorporate habitat restoration projects into their curriculum. **(E)**
3.1.5 Land is acquired to mitigate storm damage and allow natural communities to migrate in response to sea level rise.	3.1.m Identify land acquisition funding sources to purchase lands (identified by Florida Forever and ARSA plan) which would allow for the migration of important estuarine habitats. **(R, S)**

Goal 3: Resilient natural communities enhance local communities' capacity to respond to changing climate

Objective 3.2: Local coastal (human) communities are resilient in response to climate change and extreme events.

Planning mitigates potential future impacts of climate change and creates resilient communities that have thriving economies. Vulnerability assessments and adaptation action plans guide decision makers, residents, professionals, and visitors in adapting to the effects of extreme events, coastal flooding, erosion, sea level rise, and ecosystem changes.

Table 12 / Strategic Plan Goal 3, Objective 3.2, Outcomes and Strategies and Actions

Outcomes:	**Strategies/Actions:**
3.2.1 Local communities are prepared for the effects of extreme weather events, climate change, and ecosystem changes. 3.2.2 Local communities are aware of, value and implement resilience measures to reduce the effects of climate change and extreme events, preferentially choosing nature-based solutions.	3.2.a Provide stakeholders with the best available data and tools to prepare for and recover from extreme events. **(T)** 3.2.b Provide local training opportunities for stakeholders on vulnerability, adaptation and implementation strategies. **(T)** 3.2.c Work with decision-makers and partners to inform property owners about measures they can take to improve resilience. **(T)** 3.2.d Provide training and data on the effectiveness of nature-based solutions and methods to implement nature-based solutions. **(T)**
3.2.3 Comprehensive plans (Adaptation Action Plans), informed by Vulnerability Assessments, address new development and infrastructure, incorporating resilience measures/practices that decrease exposure to coastal flooding.	3.2.e Build relationships with city and county decision makers and planners by serving on committees, attending meetings and collaborating across agencies. **(T)** 3.2.f Work with local governments to conduct Vulnerability Assessments to develop Adaptation Action Plans to be included in their Comprehensive Plans. **(All)**
3.2.4 Local governments implement actions/strategies identified in their Comprehensive Plans (comprehensive plan) by first integrating adaptation actions/strategies into existing municipal plans, ordinances and land development codes.	3.2.g Attract, support, and encourage scientists conducting community resilience research (or applied research) that emphasizes science to management applications. **(R)** 3.2.h Utilize community resilience research products, planning, mapping, and decision support tools in training programs and public outreach related to coastal hazards. **(T)** 3.2.i Inform community decision makers about benefits of resilience practices and funding opportunities. **(T)**
3.2.5 Priority mitigation projects are identified through participation in the Local Mitigation Strategy committee and ranked for funding preference.	3.2.j Build and maintain relationships with local Emergency Operations Center by serving on the LMS committee and sharing information with stakeholders.
3.2.6 Reserve facilities, assets and staff are more resilient to climate change impacts and extreme events.	3.2.k Staff update the Reserve's Disaster Response and Recovery plans and maintain relationships with local EOC, Coast Guard and federal partners to assist with post-disaster efforts. **(Admin)** 3.2.l Conduct post-disaster evaluations share information with stakeholders, and revise disaster plan accordingly. **(All)** 3.2.m Reserve to consider resilience to future flooding a/o storm surge when planning new Reserve facility and infrastructure construction.

S = Stewardship, R = Research, T = Coastal Training, and E = Education

Goal 3: Resilient natural communities enhance local communities' capacity to respond to changing climate.

Objective 3.3: Cultural and historical resources are conserved.

Cultural (historical and archaeological) resources within ANERR boundaries have been identified. These resources are susceptible to loss due to natural processes such as erosion and storm events, as well as human disturbance. ANERR will collaborate with appropriate partners to educate the public and manage these resources.

Table 13 / Strategic Plan Goal 3, Objective 3.3, Outcomes and Strategies and Actions

Outcomes:	**Strategies/Actions:**
3.3.1 The local, cultural identity is promoted through programs, exhibits and partnerships. Traditional uses (historical and cultural) of the Apalachicola River and Bay are understood by the local community and tourists.	3.3.a Upgrade existing exhibits at the Center to provide increased awareness of historical and archaeological resources. **(E)** 3.3.b Work with partners (Florida Department of State – Division of Historical Resources, FPAN, other experts) to develop outreach to local community members (especially students) about the importance of conserving and protecting cultural resources. **(T, E)** 3.3.c Offer training programs that include information on and the importance of conservation and protection of cultural resources, local history and cultural practices. **(T)** 3.3.d Look for opportunities to weave historical concepts into existing science-based curricula to educate the local youth about the local history and culture. **(E)**
3.3.2 The public is aware of the occurrence of archeological sites on Reserve properties and their legal protections.	3.3.e Provide educational information (kiosks, signs, brochures) at public access points describing archaeological resources and their protections. **(S)** 3.3.f Boundary signs include “protection” language. **(S)**
3.3.3 Archaeological resources on ANERR-managed lands are monitored and threats are assessed.	3.3.g Monitor status of archaeological sites on ANERR-managed lands annually. **(S)** 3.3.h Maintain institutional knowledge of staff and provide regular training on monitoring and managing cultural resources (Historical and Archaeological Resource Training). **(S, T)**
3.3.4 Threats to historical (St. George Island Lighthouse and the Marshall House) and archaeological resources are addressed through mitigation or protection.	3.3.i Implement appropriate management actions based on monitoring. **(All)** 3.3.j Maintain appropriate buffer around Marshall House to discourage fires and maintain pump/water systems near Marshall House to facilitate fire suppression. **(S)** 3.3.k Continue to stabilize the shoreline in front of the Marshall House. 3.3.l Sustain Memorandum of Agreement with the St. George Island Lighthouse Association to provide access to, and maintenance of, the lighthouse. **(Admin)**

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Photo 7 / Reserve staff measuring dune elevation on Little St. George Island to calculate erosion and accretion rates.

Part IV: Research, Monitoring and Mapping

Chapter 7: The NERRS Research and Monitoring Program

National Estuarine Research Reserves are created to provide a stable platform for long-term research on estuarine conditions and relevant coastal management issues. The System-Wide Monitoring Program (SWMP) delivers standardized measurements of short-term variability and long-term changes in water quality and biological systems, and maps land use and land cover characteristics across all reserves. The effort is focused on three ecosystem characteristics: abiotic characteristics (water temperature, salinity and quality, and weather); biotic characteristics (habitat types and species); and watershed and land use characteristics (land cover and elevation changes). Reserve-generated data meet federal geographical data standards and are available via the Reserve System's Centralized Data Management Office. Reserves also serve as sentinel sites for observing how coastal habitats respond to changing water levels. This program is guided by the reserves' System-wide Monitoring Program Plan, the Reserve Habitat Mapping and Change Plan, and Sentinel Sites Guidance.

The Reserve System also supports applied research through its Science Collaborative program and the Margaret A. Davidson Graduate Fellowship program. The Science Collaborative funds competitive research projects that engage end-users in the

project design and address system-wide NERR research and management needs. The goal of the Davidson Fellowship is to build the next generation of leaders in estuarine science and coastal management. The fellowship provides opportunities for graduate students to conduct research within a reserve under the guidance of a mentor who also supports their professional development.

The Reserve System Strategic Plan outlines research objectives to maintain and expand biophysical and socioeconomic monitoring to track environmental change, increase the use of collaborative research to address decision-maker needs, and ensure that scientific, education, and management audiences can use the data, research results, and tools developed by the system.

The Research and Monitoring 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. Adaptive management, as defined by the U.S. Department of the Interior, is a decision process that promotes flexible decision making that can be adjusted in the face of uncertainties as outcomes from management actions and other events become better understood (Williams, Szaro, & Shapiro, 2009). From the State's perspective, the ORCP ensures that, when applicable, consistent techniques are used across sites to strengthen Florida's ability to assess the relative condition of coastal resources. This enables decision-makers to prioritize restoration and resource protection goals more effectively. In addition, by using the scientific method to create baseline conditions of aquatic habitats, the Research and Monitoring Program allows for objective analyses of the changes occurring in the state's natural and cultural resources.

Reserves are created to provide a stable platform for long-term research on estuarine conditions and relevant coastal management issues. The System-Wide Monitoring Program delivers standardized measurements of short-term variability and long-term changes in water quality and biological systems, and maps land use and land cover characteristics across all reserves. The effort is focused on three ecosystem characteristics: abiotic characteristics (water temperature, salinity and quality, and weather); biotic characteristics (habitat types and species); and watershed and land use characteristics (land cover and elevation changes). Reserve-generated data meet federal geographical data standards and are available via the Reserve System's Centralized Data Management Office. Reserves also serve as sentinel sites for observing how coastal habitats respond to changing water levels. This program is guided by the reserves' System-wide Monitoring Program Plan, the Reserve Habitat Mapping and Change Plan, and Sentinel Sites Guidance. The Reserve System Strategic Plan outlines research objectives to maintain and expand biophysical and socioeconomic monitoring to track environmental change, increase the use of collaborative research to address decision-maker needs, and ensure that scientific, education, and management audiences can use the data, research results, and tools developed by the system.

To establish an effective research and monitoring program that provides the information necessary for natural resource protection, it is essential to have a good understanding of the resources that have made reserve designation so important, as well as the issues and problems that affect them. ANERR has utilized national regulations and guidelines as well as local needs, and issues to develop an ambitious program designed to address issues, data gaps, and threats to the system.

Administration of the research program at ANERR is directed by the Research Coordinator, with assistance from the ANERR Manager, and in consultation with outside researchers, appropriate NOAA's Office for Coastal Management staff, DEP's ORCP, and other interested parties. The Research Coordinator convenes ad hoc committees as needed to review Davidson

Research Fellowship proposals, advise ANERR of new techniques and technologies, and make recommendations on management strategies, etc. These committees are only convened as needed and are generally short-lived. Membership varies based on the issue addressed, type of research reviewed, or conflict of interest concerns. Research opportunities within ANERR are available to any qualified scientist without regard to manner or source of funding. However, both the Research Coordinator and the researcher are expected to follow certain guidelines designed to promote the open dissemination of research results and maintain high quality research, especially research related to current management issues.

Some of Stewardship and Research sectors' field programs overlap. Therefore, facilitation of the Reserve's research initiatives requires intersectional collaboration between Reserve sectors Collaborating research teams are from Louisiana State University, US Geological Survey Lafayette Louisiana, University of Georgia, Florida State University (FSU), and Saint Leo University. Research projects are investigating the timeline of mangrove presence/absence, genetics, microbiome of mangrove propagules, and freeze/temperature thresholds in Apalachicola Bay and Franklin County. In addition, red and black mangrove vouchers were collected from sites spanning the county and will be included in FSU's Robert K. Godfrey Herbarium in Tallahassee.

7.1 ANERR's Research and Monitoring Program

An effective and scientifically rigorous research and monitoring program is an essential element in any successful effort to manage and protect complex environments such as estuarine ecosystems. The Apalachicola River and Bay system, because of its size, the diversity of species and habitats present, and its ownership patterns, represents an especially difficult task. Therefore, it is especially important to have a research and monitoring program that can provide a base of support for in-house monitoring as well as to visiting researchers to provide clear, concise scientific information and expertise to programs within and outside ANERR. A sound research and monitoring program will provide information to help in coastal decision-making, including local, state, regional, and national entities. A brief synopsis of the ANERR Research and Monitoring Program is described below. For an in-depth description of the data and research surrounding the Apalachicola NERR, the Reserve's Site Profile is an excellent resource for those who are interested in research within the system.

Strategies:

1.1.k Hold a periodic symposium that highlights research and monitoring within the Reserve as it relates to natural resource management (similar to ARSA, but to include species management, climate change impacts, etc.). (R)

2.4.g Facilitate research related to restoration science and aid in engaging stakeholders in the process and data dissemination. (R, T, E)

2.4.m Continue to support efforts to understand socioeconomic linkages to our natural resources. (R, T)

7.2 ANERR's System-Wide Monitoring Program and Other Monitoring

ANERR implements the System-Wide Monitoring Program (SWMP), initiated by the Estuarine Reserves Division in 1989, and as outlined in the ANERR system regulations and strategic plan, as directed in the NERRs Research and Monitoring plan and the Centralized Data Management Office's SWMP Manual. 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 program focuses on three different ecosystem characteristics:

- **Abiotic Variables** (water quality, nutrients and meteorology)

- **Biotic Variables:** The NERR System is focusing on monitoring biodiversity, habitat and population characteristics by monitoring organisms and habitats as funds are available. Currently, Research is collecting biological data on fisheries (juvenile fishes and macroinvertebrates), zooplankton and oyster populations, marsh vegetation, and seagrass expansion/contraction.
- **Sentinel Site Application Module – 1 (SSAM – 1):** This program integrates the water quality, surface elevation tables, vegetation monitoring, pore water monitoring, and changes in sea level to evaluate how well our marshes are responding to climate and sea level change and will be the described in detail in Chapter 8.

All the data are compiled electronically, both in-house and at the Centralized Data Management Office (CDMO) at the Belle W. Baruch Institute for Marine Biology and Coastal Research of the University of South Carolina. Currently, ANERR is in full implementation of SWMP including functional water quality monitoring stations, a weather station and monthly water nutrient sampling. ANERR completed the site profile, or resource inventory, in the fall of 2008. ANERR has strong biological monitoring programs, which are outlined in more detail below. ANERR has also completed the Habitat Mapping and Change Plan, which highlights land use throughout ANERR.

Strategies:

1.1.h Reserve provides data, analyses, and training for state, local, and federal partners on the health of the system and future implications of proposed use. (R, T)

2.3.b Identify and offer specific activities and opportunities for interns, spring break volunteers, students, and community members. Manage and track volunteers online. (All)

2.3.i Provide field experiences (summer or volunteer projects) for volunteers, student interns, and conservation corps members. (R, S, E)

2.3.j Identify and support citizen science that furthers the management of the Apalachicola system. (R, S, E)

2.3.k Work with programs that encourage or support volunteers or interns (such as the Conservation Corps of the Forgotten Coast, AmeriCorps, etc.) (S, R)

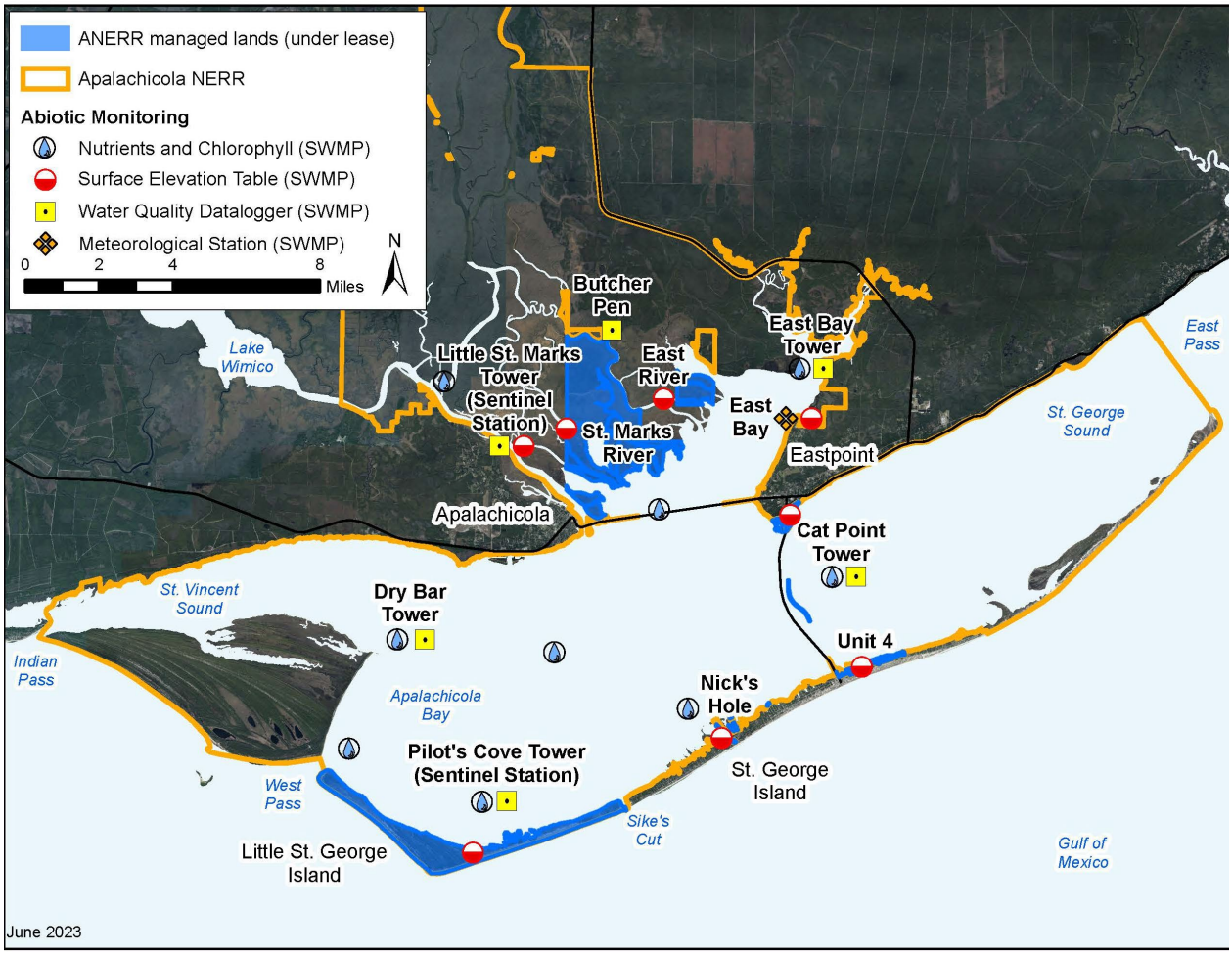
2.1.f Provide current science, tools, and maps to local and state entities to consider infrastructure impacts on ANERR ecosystems. (T, R)

2.1.h Promote and support research of innovative, environmentally sensitive development and land use practices through training programs, technical assistance, demonstration sites, and public outreach. (T, R)

2.4.a Reserve shares data with partners, decision makers, industry, residents and visitors on resource issues. (R,T)

Abiotic Variables (Map 25)

ANERR collects water quality parameters (temperature, salinity, dissolved oxygen, specific conductivity, depth, pH, and turbidity) at 15-minute intervals using YSI dataloggers. Dataloggers are calibrated and maintained to collect data at four primary SWMP stations and two secondary SWMP stations, which then are formatted and transmitted in accordance with standard operating procedures per CDMO protocols. A seventh water quality site was installed in the East River distributary using SWMP protocols in June 2020; therefore, the Research Coordinator will apply for secondary station status during this funding cycle making a total of seven SWMP stations at the Reserve. ANERR collects meteorological parameters (air temperature, relative humidity, barometric pressure, wind speed, wind direction, photosynthetic active radiation, and total precipitation) at 15-minute intervals from one station.



Map 25 / Abiotic monitoring locations

ANERR collects nutrient parameters (orthophosphate, ammonium, nitrate, nitrite, nitrate + nitrite, chlorophyll-a, and biological oxygen demand) at the four SWMP water quality stations and seven additional stations in Apalachicola Bay monthly.

Strategies

1.2.a Characterize and monitor the physical, chemical, and biological characteristics of waters within the bay as it relates to the flow regime of the Apalachicola River. (R)

1.2.b Support research that investigates the impacts, whether detrimental or beneficial, of dredging activities along the Apalachicola River and Gulf Intercoastal Water Way. (R)

1.2.c Facilitate research and monitoring programs that help identify natural variability (highs and lows) in flows and levels necessary to protect the natural resources of ANERR. (R)

1.3.a Coordinate with the multiple agencies/entities monitoring for contaminants to ensure that monitoring is of sufficient frequency and proximity for detection. (R)

1.3.b Work with federal and state regulators on the Total Maximum Daily Load determinations and Impaired Waters status.

1.3.c Continue long-term monitoring programs within and adjacent to the NERR to determine the status of water quality parameters, potential threats to water quality, and impacts of water quality changes on resources. (R)

1.3.d Facilitate research and engage with partners to address water quality changes due to surface water contamination and the resultant effects on the biota of the estuary. (R)

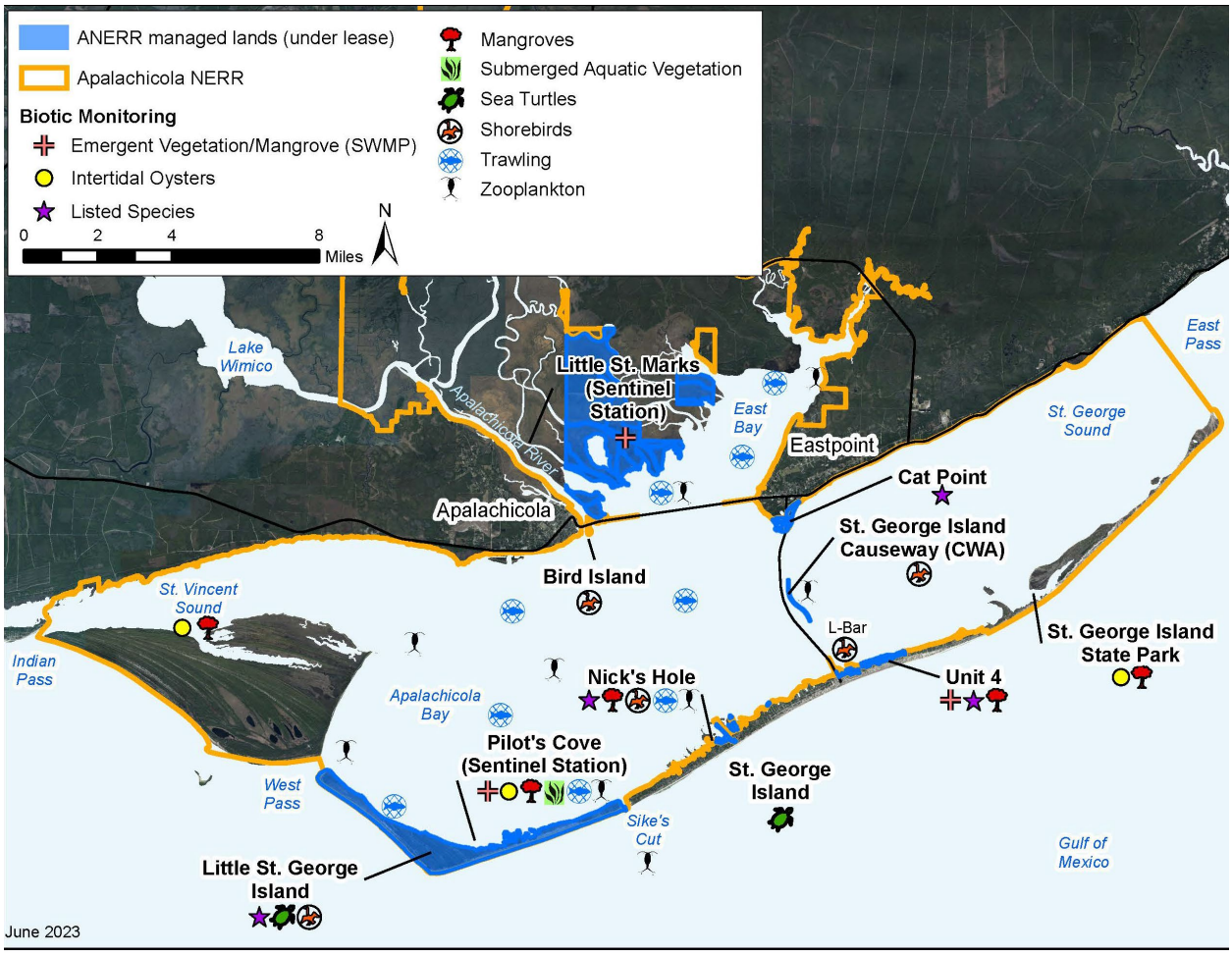
1.3.e Monitor nutrient availability in Apalachicola Bay by the collection of monthly discrete water samples identifying concentrations of total nitrogen, nitrate, nitrite, orthophosphate, and chlorophyll a. (R)

1.3.i Point and nonpoint sources of contaminants are mitigated through priority construction and remediation projects. (R)

3.1.c Maintain Sentinel Stations (WQ, Water level, WX, SETs, porewater and vegetation monitoring) at two locations. Monitor additional surface elevation tables. (R, S)

Biotic Variables (Map 26)

Juvenile fishes and macroinvertebrates: ANERR began a long-term trawling program in 2000 and now has more than 23 years of fish and benthic macro-invertebrate data. The sampling program was designed to mimic that of a long-term study done in the bay by Florida State University (FSU) researchers from 1972 to 1984. Originally, the project sampled monthly at 12 stations around the bay. In 2014, the Reserve changed the program to quarterly sampling at nine sites utilizing many of the same sampling locations were utilized in the original program. Currently, 45 trawls are performed quarterly at nine stations with various habitat and salinity regimes associated with them. Fish species and number are collected from each site, along with water quality measurements.



Map 26 / Biotic Monitoring Locations

Dunes, shoreline accretion and erosion: After Hurricane Opal impacted the area in 1995, a shoreline erosion and dune recovery study was instituted. The research section monitored beach and bay shoreline transects on Cape St. George Island quarterly at six sites until 2016 when the project ceased. In 2017, Research staff began working with researchers at Texas A&M University to utilize ground-based LIDAR to monitor shoreline changes on the island. The group has come back yearly to conduct additional surveys. Both the LIDAR and beach profile data are part of a GIS, which will be used to record past changes and model future changes based upon the data. The surveys became especially important to quantify the effects of Hurricane Michael in 2018. The Reserve plans on continuing the surveys into the future.

Photo 8 / The Reserve contains a variety of habitats within its 234,715 acres. Aerial imagery by MANTIS, Texas A&M University-Corpus Christi.

Intertidal oysters: Research initiated a long-term intertidal oyster reef condition and spatfall monitoring program in August 2018. Substantial research has been conducted on the subtidal population of oysters in Apalachicola Bay; however, limited research has been conducted to document the condition, status, and trends related to the intertidal oyster populations. Using standardized methods research staff began the monitoring program to better understand the current and long-term status of intertidal oyster populations and associated reef habitats in the bay. To fulfill that objective, staff have proposed the following questions:

- What is the status and condition of intertidal oyster populations in the Apalachicola Bay system?
- Is the status and condition of intertidal oyster populations in Apalachicola Bay changing over time? If so, how are they changing?

- What is the status and condition of oyster predators and invasive species (specifically gastropods and arthropods), associated with intertidal oyster reefs in the Apalachicola Bay system?
- Is the status and condition of oyster predators and invasive species (specifically gastropods and arthropods) changing over time? If so, how are they changing?
- After initiation in 2018, staff intend to visit the sites at least once per year indefinitely. Universities and other government agencies have already expressed interest in the project.

Zooplankton Communities: The Research Reserve has been monitoring spatiotemporal trends in zooplankton communities in Apalachicola Bay. Zooplankton communities play an integral role in estuarine and coastal food webs and an understanding of long-term changes in community structure on both spatial and temporal scales are necessary to gain an understanding of the linkages between primary producers, and secondary/tertiary consumers. Although these phenomena are well studied in other systems, the subject is under-studied in the Apalachicola Bay estuary. In the early 1970s, a master's thesis was conducted in Apalachicola Bay, which documented the first data collected on zooplankton community structure; however, the data only comprised a period of 13 months (citation). In the 1990s and early 2000s, studies were conducted relative to copepod abundances, but they were short-term and did not address whole-community structural relationships (citations). Therefore, in December 2015, ANERR began a quarterly zooplankton study performed in conjunction with our system-wide nutrient monitoring. Initial objectives for the study are to 1) collect baseline information on bay-wide macrozooplankton species composition and abundance (community structure) 2) determine seasonal patterns in macrozooplankton community structure, and 3) identify presence/absence of spatial differences in macrozooplankton community structure within the Apalachicola Bay estuary. Samples are collected on a quarterly basis in conjunction with our SWMP nutrient sampling.

Submerged Aquatic Vegetation and Seagrass: Reserve staff collaborate with the Central Panhandle Aquatic Preserves to monitor submerged aquatic vegetation (SAV) and seagrass inside the Reserve. The project was orchestrated in an effort to detect changes in fresh and brackish SAV species caused by changes in the salinity regime. These changes could be due to natural events such as droughts or floods or man-made alterations to the historic flow regime caused by proposed upstream water diversions or changing reservoir operations. Staff monitor seagrass to determine distribution and abundance at randomly selected locations. Species are identified, and the percent coverage is determined using Braun-Blanquette method. In situ water quality information, including, dissolved oxygen, salinity, temperature, turbidity, pH and photosynthetic active radiation are collected at each location.

Marsh: The Stewardship Program facilitates emergent marsh monitoring with the help of a contracted botanist company. During fall and spring survey windows, marsh monitoring is completed across six transects at Pilot's Cove and Little St. Marks sites. Transects and plots were established in 2014 and are located adjacent to SETs, pore water wells, and datalogger stations. The quantity and quality of marsh vegetation is measured in accordance with the Vegetation Monitoring Standard Operating Procedure for Long-term Monitoring of Estuarine Vegetation Communities, Version 1.1 (NOAA, February 2020) as part of the Reserve's SWMP and Sentinel Site Program. Research staff prepare metadata and data annually for submission to CDMO.

Mangroves: Tropicalization of coastal habitats along the Northern Gulf of Mexico is becoming more of interest to coastal managers and communities. Therefore, indicator species such as mangroves, are a high priority to map and monitor on long-term basis. Stewardship has taken a lead role in the baseline mapping of mangroves regionally. Initiated in 2008, mangrove

field reconnaissance in the Reserve and adjacent sites has expanded into a county-wide baseline map of mangrove population. ANERR is a primary site within the Mangrove Sighting Network, a project which seeks to study the recruitment and spread of mangroves the Florida Panhandle and Northern Gulf of Mexico, with twenty established transects monitored by staff. The Reserve is an active part of FWC's Coastal Habitat Integrated Mapping and Monitoring Program (CHIMMP), established in 2014 as a state-wide summary of marsh and mangrove maps and data. CHIMMP resulted in several in-person workshops and a published technical report (FWC, 2017). Mangrove monitoring is also a developing part of the NERR's Habitat Mapping and Change Plan and SWMP vegetation monitoring. The addition of mangrove plots to the existing vegetation transects established at Pilot's Cove on Little St. George Island is planned for future monitoring, as described in the Vegetation Monitoring SOPs addendum on mangroves (NERRS, 2020).

Shorebirds and Seabirds: Stewardship staff serve as a liaison and partner in conservation for local shorebird and seabird activities. Listed shorebird and seabird monitoring within the Reserve focuses on many sites: Bird Island, a dredge spoil island located just south of the Apalachicola Bridge; the old St. George Island bridge causeway; several elevated oyster spits including Nicks Hole Bar, L-Bar, and Pilots' Cove; the Eastpoint breakwaters; Flag Island; and the Gulf beaches of St. Vincent Island, St. George Island and Little St. George Island. Species such as the state-listed threatened American oystercatcher, black skimmer, least tern, and snowy plover, as well as other key species including the Wilson's plover, Caspian tern, royal tern, sandwich tern and brown pelican utilize these dynamic sites as both critical nesting and foraging habitat. Many of the species prefer sandy soil, rocky or shell substrates, and therefore habitat management strategies incorporate removal of vegetation down to shell hash by mechanical means or with use of prescribed fire. Since the Gulf Inter-Coastal Waterway continues to be dredged, and Bird Island is an active spoil site, ANERR works with the USACE to appropriately place material on the island, maintaining the best substrate and habitat for the species utilizing that area. Before nesting season, Audubon, FWC, and ANERR staff temporarily post precautionary signs at all active nest locations or sites, notifying potential users that those areas are closed for the nesting season. March – September shorebird nesting site awareness is also pushed in kiosk content and boat launch signage. Audubon, FWC and volunteers conduct breeding and nonbreeding surveys of nesting sites. Additional protection status has been designated to Flag Island and St. George Causeway as Critical Wildlife Areas, with closures year-round and March - September, respectively. Over the last several years, Audubon has been conducting surveys specifically as part of a project funded by Deepwater Horizon restitution funding.

Sea Turtles: Stewardship and Education staff hold FWC Marine Turtle Permits in order to conduct sea turtle nest monitoring, stranding and salvage on several county and Reserve-managed beaches. The beaches of St. George Island and Little St. George Island are critical nesting beaches for the federally Threatened loggerhead sea turtle (*Caretta caretta*) and green sea turtle (*Chelonia mydas)*, and leatherback sea turtles (*Dermochelys coriacea*) nest on local beaches on occasion. The federally Endangered Kemp's ridley sea turtle (*Lepidochelys kempii*) and hawksbill sea turtle (*Eretmochelys imbricata*) can be found in the bay and nearshore waters. Kemp's ridleys are rarely documented nesting along Panhandle beaches but have never been documented nesting on Reserve-managed beaches; hawksbills do not nest in the Panhandle area. Habitat management for these species generally falls into land acquisition for upper and lower beach habitat protection, as well as marine debris and lighting disturbance controls.

On Little St. George Island, the turtle eggs are subjected to high predation pressure from coyotes and raccoons (see section below on Nuisance Species). St. George Island and Little St. George Island are monitored at regular intervals for the presence of new nests between the months of May and October. All activities are conducted under guidance from FWC's Marine Turtle Conservation Handbook (FWC, 2016). New nests are confirmed by ANERR staff and marked with signage provided by FWC.

On Little St. George Island, the nests are screened to deter predators. After the incubation period and hatching, the nests are evaluated for hatch success. Since Little St. George Island is uninhabited, anthropogenic influence is minimal. Because dogs may be attracted to sea turtle nests (as well as bird nests and adults), ANERR requests that dogs be leashed if they visit the island.

On St. George Island, the turtle population is somewhat impacted by the human population. The issue of greatest concern is the amount of light pollution on the island. Turtles require a light cue (the moon reflecting off the water) to navigate to the ocean after hatching. When there are brighter lights from behind the dune, the turtles will disorient away from the water and are likely not to survive. Franklin County has a lighting ordinance (Franklin County Ordinance 2015-01), but it is not always enforced and often the brightness of the light is due to the cumulative effect of several lights and not a single individual or business. People walking on the beach with flashlights add additional light pollution and cause disorientations as well. The lighting problem is being addressed through various public education campaigns including billboards, public service announcements, presentations by ANERR staff, literature placed in rental houses and the distribution of red filter flashlight covers. Various other anthropogenic stressors affecting the sea turtle population include feral and domesticated predators, obstructions such as chairs and umbrellas left on the beach overnight and well-meaning individuals on the beach disrupting nesting and hatching activities. Lastly, over wash from storms and other natural stressors may severely impact nesting success.

Other Listed and Threatened Species: In addition to shorebird and sea turtle monitoring and protection, Stewardship also monitors and facilitates research on several other species. Staff monitor gopher tortoise (federally threatened) burrow sites on Little St. George Island with assistance from permitted USGS researchers, and under guidance of FWC's Gopher Tortoise Management Plan (FWC, 2012). The researchers were able use a camera to scope all known tortoise burrows in 2020, which were identified originally by stewardship staff from 2014-2018. The USGS team plan to return to the island to conduct line-distance sampling in order to determine tortoise populations as part of regional project investigating gopher tortoise population dynamics. The Reserve plans to use this information toward better habitat management on the island. The same USGS research team also performed preliminary surveys for diamondback terrapins in Apalachicola Bay Aquatic Preserve, although terrapins are not listed in Florida. Stewardship staff are working with the USGS team by using wildlife cameras to identify terrapin nesting areas on the bayside of Little St. George; current use is unknown. Stewardship staff monitor pre-nesting activities of the bald eagle across all Reserve managed lands each year from December through May. Staff also participate in regional Bachman's sparrow surveys (Tall Timbers Land Conservancy), Christmas Bird Counts (Audubon), and winter shorebird surveys (FWC).

Strategies

1.1.j Provide scientific information and recommendations on methods to reduce or eliminate threats to protected species and pursue the removal of nuisance species. (S, R)

1.1.f Identify and monitor the presence and abundance of state and federally protected species. Contribute to statewide databases. (S)

1.3.f Continue long-term monitoring programs within and adjacent to the NERR to determine the status of submergent and emergent habitats, potential threats to submergent and emergent habitats, and impacts of water quality changes on submergent and emergent habitats. (R, S)

2.4.b Reserve works with partners (stakeholders, state and federal agencies, academia and NGOs) to monitor, restore, and increase the productivity of fisheries in the bay. (R)

2.4.c Facilitate research and education that supports the increase of historical fisheries knowledge and support innovative practices. (R, T, E)
3.1.b Identify the potential implications of climate change on estuarine species and habitats through research, monitoring and modeling. (R, S)

7.3 Coordination with Other Agencies/Universities

Numerous other studies occur over shorter time periods ranging from six months to several years but have defined ending dates. These are generally associated with visiting researchers, grant funded research, graduate student projects, partnerships with other agencies, or state required studies and projects. These collaborations are just a small example of all of the projects at ANERR. The Research and Stewardship Coordinators work daily with outside researchers to conduct research projects with Reserve staff. These projects typically benefit both the outside researchers and the Reserve by collecting information, which is in need by stakeholders. Monthly, seasonal, and annual analyses of the data will be available to researchers, decision-makers, school groups, and the general public. Additional stations, parameters, and projects will be added as new management concerns arise and as staff time and equipment become available.

Agencies, universities, and institutions that have been involved heavily in research and monitoring within or in cooperation with ANERR within the past five years include:

- Collaboration with Florida Agricultural and Mechanical University (FAMU) Environmental Sciences Institute and NOAA to help train under-represented minorities in marine science, develop a conceptual model of Apalachicola Bay to help in management decisions, and fill in data gaps about the system.
- Florida State University (FSU): Departments of Oceanography, Biology and Geology. ANERR also works closely with researchers from FSU's Coastal and Marine Lab. The Research staff provides technical and logistical support for visiting researchers at ANERR.
- Shellfish Environmental Assessment Section (SEAS) of the Florida Department of Agriculture and Consumer Services (DACS): SEAS and ANERR share water quality data and coordinate on any issues or events that might impact oyster resources in the bay.
- U.S. Fish and Wildlife Service: Division of Ecological Services and Division of Fishery Services; and St. Vincent National Wildlife Refuge (NWR): ANERR works with the Division of Fishery Services on listed species, in particular the Gulf sturgeon in the river. ANERR provides technical input to the Division of Ecological Services on dredge and fill permit applications, habitat alteration proposals, and issues related to freshwater diversion on the river. St. Vincent NWR and ANERR coordinate on research activities that occur in or adjacent to the Refuge and provide logistical and technical support to each other whenever needed.
- Florida Fish and Wildlife Conservation Commission (FWC): ANERR works jointly with FWC staff on listed species protection and management, habitat alteration analysis, and freshwater diversion issues on the river. A FWC Fisheries Independent Monitoring program currently exists at ANERR facility with FWC staff monitoring fish and benthic macro-invertebrates in the area as part of their recreational fisheries assessment program.
- Northwest Florida Water Management District (NWFWMD): NWFWMD is a major landowner within the boundaries of ANERR and has been active in the Apalachicola Basin since 1988. ANERR works with NWFWMD on technical issues

related to freshwater diversion in the river. NWFWMD has funded numerous projects within the bay in the past and staff is currently working with them on a marsh restoration project in the bay.

- U.S. Geological Survey (USGS): ANERR staff coordinates with USGS on issues related to impacts of freshwater diversion on species within the river as well as dredging impacts from the navigation project on the river.
- NERR System Science Collaborative: This organization funds collaborative research within the NERRs.
- Florida Forest Service (FFS): The FFS is a major land manager within Franklin County and the local drainage basin affecting the East Bay area of ANERR. They currently manage over 80,000 acres locally, which have been incorporated into Tate's Hell State Forest. ANERR staff provides input on matters related to their lands that may impact ANERR waters.
- Staff are also involved with many other agencies and universities on research and monitoring projects as well as oil spill planning, land development regulations, resource inventories, and other projects such as local science fairs, advisory committees and planning committees. These entities include but are not limited to many of the regulatory programs within DEP, Florida Department of Transportation, Apalachee Regional Planning Council, Department of Community Affairs, U.S. Coast Guard, U.S. Army Corps of Engineers (USACE), The Nature Conservancy, University of Florida, Auburn University, University of West Florida and the University of South Florida.
- Multi-agency collaboration with FSU to assess the potential drivers of the oyster fishery collapse and failure to rebound in Apalachicola Bay. This is part of a multi-million-dollar grant awarded to FSU.
- The Margaret A. Davidson Fellowship will provide funding to the Reserve and graduate students for two-year increments to conduct relevant research in the system.

Strategies:

1.1.i Promote research and monitoring efforts within ANERR through the development of agreements with other entities within DEP, other research organizations and universities, and other state and federal agencies. (R)

1.2.d Maintain partnerships with state and federal agencies, especially Northwest Florida Water Management District, FWC, US Fish and Wildlife Service, and the US Army Corps of Engineers, to help determine water flow needs of habitats and species within the NERR. (R, T)

1.2.g ANERR works with the NWFWMD to recommend priority restoration projects. (T, R)

1.3.f Continue long-term monitoring programs within and adjacent to the NERR to determine the status of submergent and emergent habitats, potential threats to submergent and emergent habitats, and impacts of water quality changes on submergent and emergent habitats. (R, S)

1.3.g Attract and support researchers addressing early detection of harmful algal blooms in Apalachicola Bay. (R)

1.3.h Use monitoring and research to inform decision-makers of point and nonpoint source impacts within the watershed. (R, T)

2.1.b Partner with other agencies such as the NWFWMD and the USDA Soil and Water District to better understand how land use/agricultural use may impact the river and bay. (R)

2.3.g Support priority conservation actions by non-governmental groups with applicable science and expertise. (S, R)

3.1.a Continue long-term monitoring programs within and adjacent to ANERR to determine the status of water quality parameters, potential threats to water quality, and impacts of water quality changes on resources. (R)

7.4 Research Assets

ANERR has an extensive collection of field sampling gear and infrastructure available to staff and outside researchers for use. The Reserve has research vessels, laboratories, and multiple other items to collect scientific data. Another valuable tool available for researchers and the general public at ANERR is the research library located at the Eastpoint facility. The ANERR library consists of more than 6,000 publications pertaining to research and monitoring studies conducted within ANERR and other related topics, which are organized using a computerized bibliographic indexing system. A variety of computers are available for data storage and management. Also, a GIS with pertinent data layers is available. A brief list of items available at the Reserve are compiled in Table 12 below.

Table 14 / Research and monitoring assets

Asset	Type	Monitoring program
Water sampling bottles	Field and Sampling Gear	SWMP
Grab samplers	Field and Sampling Gear	SWMP
Hand-held YSI DSS pro	Field and Sampling Gear	SWMP, Biomonitoring
Plankton nets	Field and Sampling Gear	Biomonitoring
Otter Trawls	Field and Sampling Gear	Biomonitoring
Dip nets	Field and Sampling Gear	Biomonitoring
Seines	Field and Sampling Gear	Biomonitoring
Li-Cor	Field and Sampling Gear	SWMP, Biomonitoring
FlowCAM plankton identification system	Field and Sampling Gear	Biomonitoring
Stereo and compound microscopes	Field and Sampling Gear	Biomonitoring
YSI EXO II data sondes	Field and Sampling Gear	SWMP, SSAM-1
Trimble Geo XT unit	Field and Sampling Gear	Mapping
Aquatroll 200	Field and Sampling Gear	SSAM-1
Aquatroll 500	Field and Sampling Gear	SSAM-1
Campbell meteorology system	Field and Sampling Gear	SWMP
Telemetry systems	Field and Sampling Gear	SWMP
ISCOs	Field and Sampling Gear	SWMP
Vacuum pump	Field and Sampling Gear	SWMP
40 ft landing craft	Vessel	All Programs
28 ft Parker	Vessel	All Programs
25 ft CHawk	Vessel	All Programs
24 ft Twin Vee	Vessel	All Programs
19 ft Skiff	Vessel	All Programs
Sea Ark	Vessel	All Programs
SWMP Towers	Infrastructure	SWMP, SSAM-1
SETs	Infrastructure	SSAM-1
Motus Tower	Infrastructure	Biomonitoring

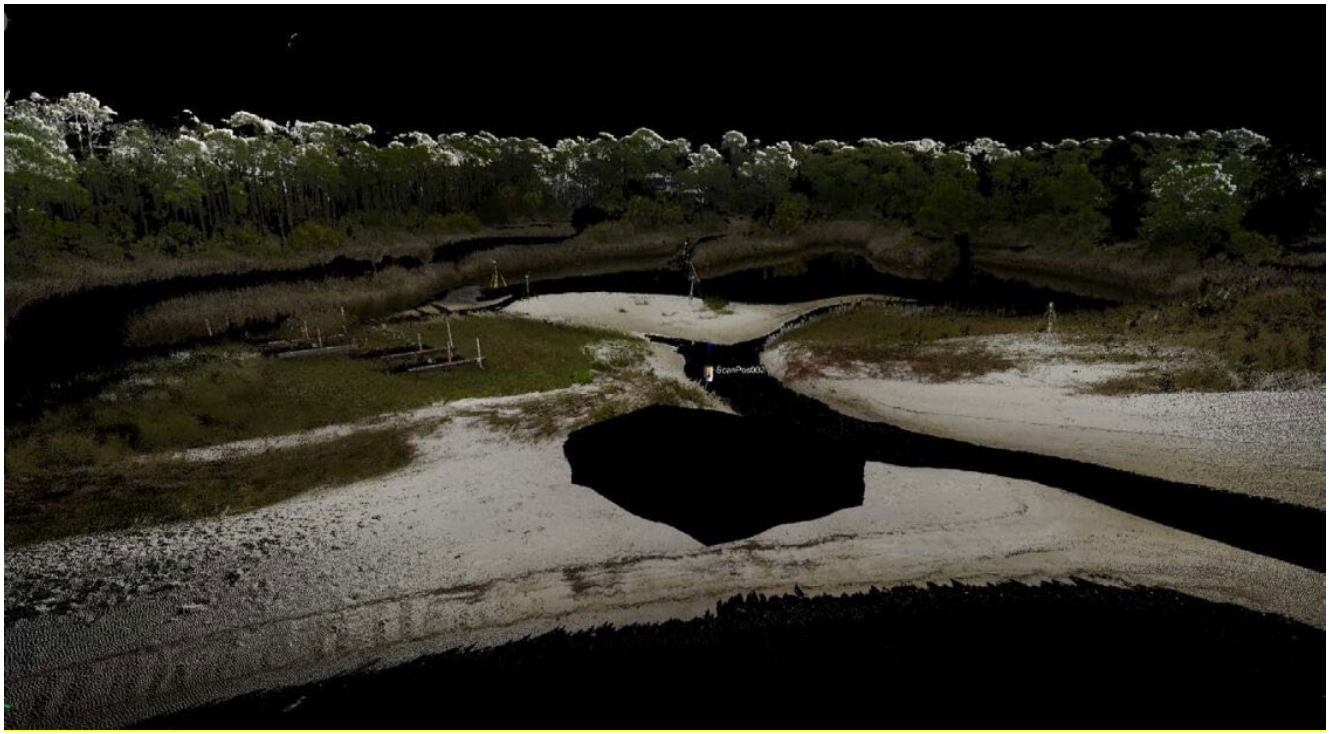


Photo 9 / Ground based LiDAR image – Unit 4 SETs / Texas A&M University

Chapter 8: Sentinel Site Application Module One (SSAM – 1)

8.1 Background of SSAM – 1

In 2011, ANERR initiated NOAA's Sentinel Site program (SSAM-1). The SSAM-1 program's primary focus is addressing the impacts of climate, sea level change, and coastal inundation. Surface elevation tables have been installed to track elevation changes of the marsh surface. SWMP stations (components of SSAM-1 are identified on Maps 25 and 26) have been installed adjacent to the marshes. Vegetation transects, and pore water wells have been installed in the marshes. These and other parameters are all monitored relative to measured changes in local sea level, which will provide valuable information of how vulnerable our marshes, coastline, and community will be. Currently, the Sentinel Site program at the Reserve is jointly operated by the Research and Stewardship sections with support from the Coastal Training and Education programs. The System-Wide Monitoring portion of the Sentinel program is managed by the Research Coordinator who oversees three Environmental Specialists and a staff biologist. Environmental Specialists are responsible for all water quality data collection and water sampling for nutrient analysis. Meteorology is also maintained by these staff. The Research Coordinator oversees the Surface Elevation Table (SET) monitoring with all staff trained in measuring the SETs. In addition to emergent vegetation, submerged aquatic vegetation and pore water quality are monitored. The Stewardship Coordinator oversees mangrove monitoring associated with the Sentinel Site effort. Final data storage and analysis products are managed by the Research and Stewardship Coordinators. The Coastal Training Coordinator, along with the other coordinators, are tasked with taking data collected from this effort and translating it to be more easily consumed by audiences with less scientific backgrounds so that local sea level rise data (and the resulting implications) are available and understood.

Surface Elevation Tables (SETs) and vegetation transects were completed in 2012. SETs are monitored twice per year in spring and fall and vegetation monitoring occurs once per year in the spring. Currently, twenty-two paired SETs at eleven

locations are being monitored. The data are provided to researchers so that it can be used in biological feedback models for sea level rise including the models created for the Ecological Effects of Sea Level Rise (EESLR) project, Marsh Equilibrium Model (MEM) and future Sea Level Affecting Marshes Model (SLAMM) modeling. Following our Sentinel Site plan, ANERR now has the needed minimum of five years of data need to be collected to detect any trends in the surface elevation and is working with other NERRs to process the SET data as part of a NERR's Science Collaborative Project and are publishing a ten-year SET analysis in a peer-reviewed journal. The Research Coordinator works with the Program for the Local Adaption to Climate Effects: Sea Level Rise (PLACE:SLR formerly the Northern Gulf of Mexico Sentinel Site Cooperative) to address questions for the Northern Gulf of Mexico region and work collectively with Sentinel Site buildout and analysis with regional staff. The manager, Research Coordinator and the Environmental Specialist II Research Assistant are working with state and federal partners to work out a plan to level the water quality towers to maintain compliance with CDMO.

Implementation and execution of the SSAM-1 plan has been and will continue to be completed by the Reserve staff and supported through the annual Reserve's operations grant award. Under the award, Research staff stay up to date with the most recent CDMO technician training on protocols related to the SWMP components of the Sentinel Site effort. Research and Stewardship staff have been trained in the use of the SET arm to measure marsh sediment accretion.

Apalachicola NERR has a total of 22 surface elevation tables located at eleven sites around the system:

- Little St. Marks, Apalachicola River Distributary (Primary Sentinel Station)
- Pilot's Cove, Little St. George Island (Primary Sentinel Station)
- St. Marks, Apalachicola River Distributary
- East River, Apalachicola River Distributary
- East Middle and North, East Bay (Morris)
- East Bay Dock and South (Morris)
- Unit 4, St. George Island (Bay Side)
- Nicks Hole, St. George Island, (Bay Side)
- Bay-side in front of the Visitors' Center

Two locations have been established within the NERR to serve as sentinel stations. The Little St. Marks sentinel station is located halfway up one of the distributaries of the Apalachicola River, which is the dominant freshwater input to the system. The site lies at the marsh/forested floodplain interface where the tree species are at their upper tolerance for salinity. Salinities, measured by our Little St. Marks SWMP station range from 0-15, but typically average around 5 practical salinity units (psu). The local tides are approximately 1.64 ft. The surrounding marsh is dominated by species that are tolerant of these lower salinities. The dominant environmental stressor at the location is loss of freshwater input from anthropogenic use upstream, and climatological loss of water to the watershed from increased drought. As the distributary becomes more saline, the expectation is that the trees would start to show signs of stress and die, and current observations are exhibiting those characteristics. Likewise, the species composition of the marsh would become dominated by species tolerant to higher salinities.

The Pilot's Cove sentinel station is located Little St. George Island, a barrier island which forms the southern border of the NERR. The location is comprised by tidal salt marsh plant and animal communities with less tolerant upland vegetation at the upland limit of the site. Tides are about 1.64 ft, and salinities range from 15-34, with average salinities of about 20 psu;

however, salt pans are located at this site and the species found within those areas are tolerant of greater salinities. Like the Little St. Marks site, the dominant input of freshwater is from the Apalachicola River. Likely changes/impacts to this site would come from sea level rise, increasing inundation time, wave impacts, and storm surge. Future changes at this site may not be from a loss of species (or change), but possibly migration of the habitats further inland.

Strategies:

3.1.b Identify the potential implications of climate change on estuarine species and habitats through research, monitoring and modeling. (R)

3.1.c Maintain Sentinel Stations (WQ, Water level, WX, SETs, porewater and vegetation monitoring) at two locations. Monitor additional surface elevation tables. (R)

3.1.d Identify changes in species composition of natural communities (HMCP) – migration, expansion and reduction. (R, S)

3.1.e Improve understanding of impacts on ANERR resources related to extreme events. (R, S)

3.1.f Build partnerships with local emergency management and city/county government to increase coordination during extreme events and exercise the reserve disaster plan regularly. Reserve Disaster Plan identifies critical natural resources to protect. These are included in the Coast Guard Area Contingency Plan. (All)

3.1.m Identify land acquisition funding sources to purchase lands (identified by Florida Forever and ARSA plan) which would allow for the migration of important estuarine habitats. (S)

3.2.f Work with local governments to conduct Vulnerability Assessments to develop Adaptation Action Plans to be included in their Comprehensive Plans. (All)

3.2.g Attract, support, and encourage scientists conducting community resilience research (or applied research) that emphasizes science to management applications. (R)

3.2.l Conduct post-disaster evaluations, share information with stakeholders, and revise disaster plan accordingly. (All)

Emergent vegetation

Quantification of habitat changes within the Reserve System is an important NERR System goal. Research and Stewardship will conduct an annual survey of the quantity and quality of marsh vegetation in accordance with SWMP biological monitoring protocols for emergent vegetation at the two Sentinel Stations as part of the NERRS Sentinel Site Program. Sampling will be conducted in the spring by a contracted consulting group with a botany specialty and the assistance of ANERR staff. Repeated measures analysis will be used to evaluate changes in plant metrics over time and among sites. Staff will complete metadata requirements and will submit data to CDMO on an annual basis. In 2022, the Reserve expanded vegetation monitoring to be conducted at the Unit 4 location. Transects and pore water wells were added in a manner comparable to the two sentinel sites. Vegetation monitoring will be conducted once-per-year along with Pilot's Cove and Little St. Marks sites. Research will also be expanding pore water monitoring at the location. Currently the Reserve does not intend to add a water quality station, which would qualify the site as a third sentinel site.

The Research Coordinator will continue to collaborate with multiple NERR sites on a funded NERR System Science Collaborative (NSC) project to analyze SSAM-1 vegetation transect datasets. The project, titled "Detecting Impacts from Climate Change across Multiple Scales: A National Synthesis of Tidal Marshes" was designed to build upon two NSC catalyst projects that established a prototype methodology for standardizing, visualizing, and analyzing tidal marsh monitoring data. The Research Coordinator will continue collaboration with multiple NERR sites to evaluate Marsh Decomposition Rates in a study titled "Tea Time: A Study of Belowground Decomposition Rates across the National Estuarine Research Reserve System."

Marsh Sediment Pore Water

Three pore water monitoring wells at each of the two Sentinel Stations have been deployed to collect information on sediment salinities. The data will be used to track changes in salinity as sea levels increase. These data will also be used to correlate with the vegetation transects to identify factors affecting changes in the vegetation communities along the transects.

Mangrove Mapping and Monitoring

Mangrove mapping efforts began in 2009 to document their presence and determine distribution of black (*Avicennia germinans*) and red mangroves (Rhizophora mangle) in the area. A reduction in the intensity, duration, and frequency of extreme winter weather events is allowing mangroves to establish, reproduce and even thrive throughout the Apalachicola region's coastal wetlands. Mangrove stands will continue to be researched and monitored to measure community composition and abundance changes over time. Stewardship staff will continue to monitor 20 transects across marshes throughout Franklin County as part of the Mangrove Sighting Network at least biennially. The Mangrove Sighting Network project extends across the Northern Gulf of Mexico region and within multiple Reserves and is part of a growing interest in monitoring mangrove expansion and recruitment in the region. The SC and GIS Specialist will update the Coastal Habitat Integrated Mapping and Monitoring Program (CHIMMP) funded by Florida's State Wildlife Grants Program in order to support the study of high priority coastal habitats, minimize duplicate efforts, and identify data gaps, needs, and priorities statewide. As part of ANERR's Habitat Mapping and Change Plan (2014), mangrove stands, and mixed mangrove-marsh habitats will be accounted for in future map assessments. To compliment mapping efforts, staff will work with FWC's Florida Cooperative Land Cover Program to update statewide land cover datasets to include a new mixed salt marsh/mangrove classification and description to accurately capture mangrove expansion and migration. Staff will also collaborate with ongoing mangrove research projects and support prospective mangrove studies that seek to monitor long-term changes in coastal habitats. Current monitoring and research on local populations of mangroves will be disseminated through outreach opportunities such as articles, social media stories, radio spots, poster or public presentations. Finally, the Research Coordinator and Stewardship Coordinator will work to establish permanent mangrove monitoring plots for a least two sites using drafted NERR mangrove monitoring protocols, and the effort will be integrated into the current SSAM-1 vegetation monitoring program. Monitoring will commence annually with the assistance of an experienced botany contractor who collects the vegetation data for the SSAM-1 program. Metadata will be prepared for these new sites and data will be submitted to CDMO on an annual basis.

Strategies:

1.3.2 Important submergent and emergent habitats within ANERR, including oyster reefs, submerged aquatic vegetation, salt marsh, brackish marsh, freshwater marsh, mangroves are monitored as indicators of changing water quality. (R,S)

3.1.1 Potential effects of climate change (increased temperature, tropicalization, sea level rise, ocean acidification) on the resources of ANERR are identified. (R)

3.1.2 Potential impacts on ANERR resources related to extreme events (hurricanes, wildfires) are understood. (R,S)

8.2 Sentinel Site Application Module – 2 (SSAM-2)

During fall 2021, the Research Coordinator developed a sampling protocol for an early implementation of SSAM-2, which provided the addition of SAV (seagrass) monitoring at the Pilot's Cove Sentinel Station. The impetus for this early application was because of the results of the SET data at the site, which has shown subsidence of the marsh at the lower SET. The SET is now subtidal as a result of increasing sea level and the vegetation has switched from marsh to seagrass habitat. The

Research Coordinator has implemented yearly benthic mapping of the area surrounding the location to identify expansion or contraction of the grass bed using a GIS. Plant species distribution, percent cover, and macrophyte growth will be conducted each year at the end of the grow season to ground truth the results of the mapping effort.

Strategies:

1.1.1 Submergent and emergent natural communities within ANERR (including oyster reefs, submerged aquatic vegetation, salt marsh, brackish marsh and freshwater marsh) are monitored, maintained and restored towards historic conditions.(R)

1.3.2 Important submergent and emergent habitats within ANERR, including oyster reefs, submerged aquatic vegetation, salt marsh, brackish marsh, freshwater marsh, mangroves are monitored as indicators of changing water quality.(R,S)

3.1.1 Potential effects of climate change (increased temperature, tropicalization, sea level rise, ocean acidification) on the resources of ANERR are identified. (R,S)

3.1.2 Potential impacts on ANERR resources related to extreme events (hurricanes, wildfires) are understood. (R,S)

Photo 10 / Ground-truthing for Habitat Mapping and Change plan.

Chapter 9: Habitat Mapping and Geographic Information Systems

9.1 Background

Climate change is an important regional issue along the Gulf coast. A clear understanding of current and historic vegetation communities is important as ANERR tracks ecological change associated with changes in climate. For this reason, habitat mapping remains a priority topic for the stewardship staff at ANERR. A standardized classification scheme and NERR protocols are used to map reserve habitats, as described in Recommended Guidelines for Adoption and Implementation of the NERR System Comprehensive Habitat and Land Use Classification System (NOAA 2005) and SWMP Phase III: Land Use, Land Cover, and Habitat Change Plan for the National Estuarine Research Reserve System (NOAA 2009).

9.2 Current Status and Future

The Reserve's 234,715 acres of habitat were identified and mapped through heads-up imagery delineation in ArcGIS and completed in 2014. An accuracy assessment was conducted on most of the habitats currently mapped. A written summary report was generated along with a finalized shapefile submitted to CDMO. Habitat mapping data is disseminated to local and

state researchers and agencies as requested. GIS staff participate in the Habitat Mapping & Change Analysis working group with other NERRs to develop, test, and execute map updates and products.

This baseline habitat map generated by this effort will be used to measure future change through a change analysis protocol within ten years of initial mapping using the amended Standard Operating Procedures for Mapping Land Use and Habitat Change in the National Estuarine Research Reserve System (NOAA 2015). Landscape-scale changes over time will be assessed with subsequent mapping efforts as part of the Habitat Mapping and Change Analysis program. Stewardship staff will continue to utilize ArcGIS to identify and digitally map key habitats/species on ANERR-managed lands to assist in directing management decisions for restoration, prescribed burns, stewardship, and land acquisition projects.

Strategies:

1.1.a Maintain the Reserve Habitat Mapping and Change Plan and complete change analysis at regular intervals. (S, R)

1.1.b Maintain a comprehensive mapping and monitoring program that enables ANERR to establish conditions and determine changes in the lower Apalachicola River and Bay system. Identify important submerged and emergent habitats within ANERR through remote sensing and physical ground truthing. (S, R)

1.1.c Maintain a Spatial Database and provide GIS-based products in support of decision-making. (S, R)

2.1.a Ensure public input into potential boundary expansion and acquisition of priority land parcels. (All)

2.1.e Contribute to land management by participating in land management reviews, Florida Forever surveys and ARSA projects. (S)

3.1.d Identify changes in species composition of natural communities (HMCP) – migration, expansion and reduction. (R, S)

3.1.m Identify land acquisition funding sources to purchase lands (identified by Florida Forever and ARSA plan) which would allow for the migration of important estuarine habitats. (R, S)

3.2.f Work with local governments to conduct Vulnerability Assessments to develop Adaptation Action Plans to be included in their Comprehensive Plans. (All)

Photo 11 / Stewardship staff managing a prescribed burn

Part V: Stewardship - Resource Management, Restoration, Public Use and Access

Chapter 10: Resource Management

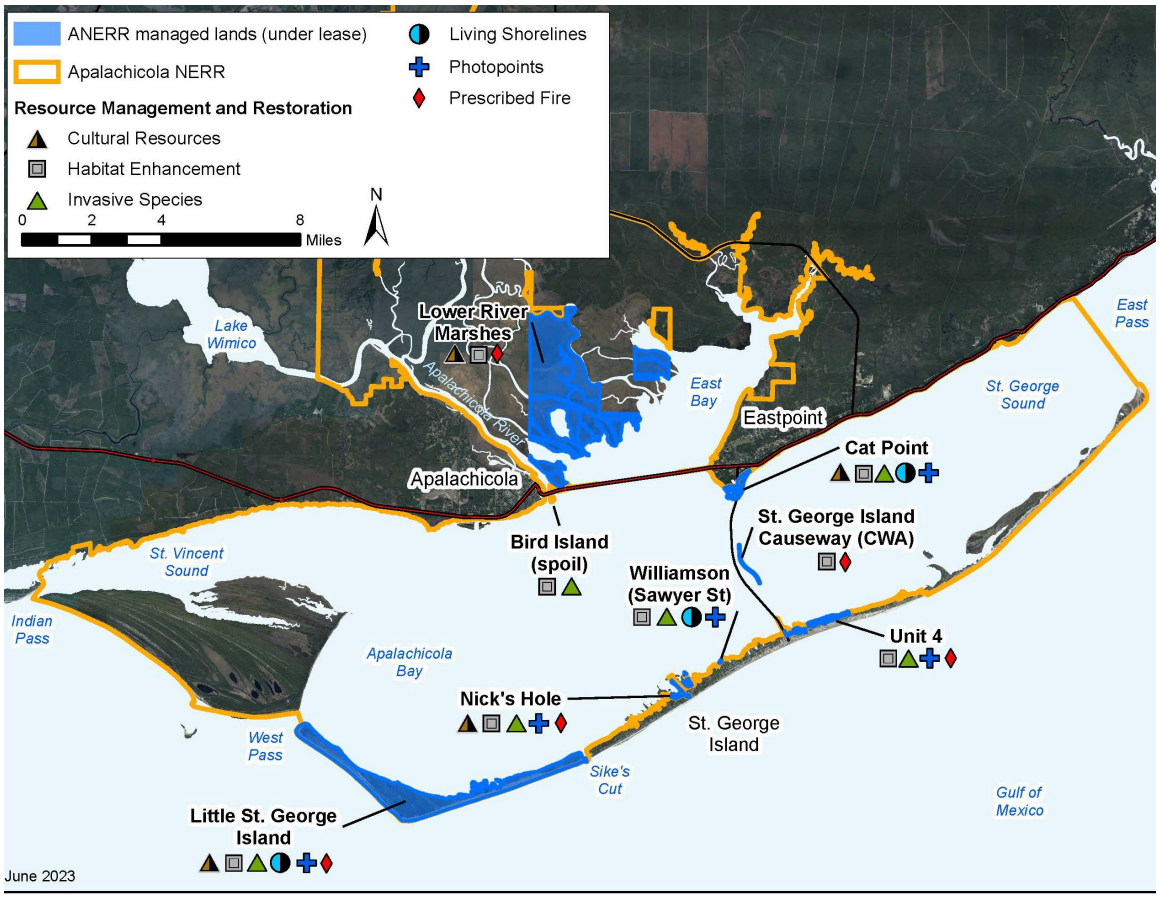
The Stewardship Program (a/o Resource Management Program) addresses how the ORCP manages the Apalachicola NERR and its resources. The primary concept of resource management projects and activities are guided by the ORCP's mission statement: "To protect Florida's coastal and aquatic resources." The ORCP's 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 watershed. These activities, and the resultant changes in environmental conditions, affect the condition and management of the resources within their boundaries. Coastal watersheds are especially sensitive to upstream activities affecting water quality and quantity.

The NERR's Stewardship Programs integrate science, monitoring and communities to protect, manage, and restore coastal habitats (NOAA, 2007). The health of Florida's ecosystems depends on dynamic natural processes associated with fire, hydrology and a delicate ecological balance between native species. A successful coastal management program begins with stewardship. The mission of the Apalachicola National Estuarine Research Reserve Stewardship Program is to protect, conserve and restore the lands and waters of the Reserve. This is accomplished through partnerships with other public and private land managers within the Reserve and by hands-on management and restoration.

10.1 Current Status

ANERR's Stewardship Program is responsible for implementing science-based management strategies to conserve natural biodiversity for over 6,800 acres of upland and wetland communities in Franklin County. Today, the Reserve lands face numerous challenges that make effective stewardship challenging, such as hydrological alteration, historic fire suppression, invasive species, and implications with climate change such as extreme weather events and sea level rise. In order to have an effective resource management program, staff must have a good understanding of the natural resources and the threats they face, as well as how to prepare or adapt resources for future conditions. This is where the integration of research, monitoring, education, and training hits the ground.

The primary strategies in resource management, which are described in this chapter, revolve around habitat manipulation through the use of prescribed fire, mechanical fuel reduction, and invasive species management, as well as cultural resource protection. The resource management program is also blended with restoration activities (marine debris removal, living shorelines, oyster reef restoration, and hydrological restoration) and public use and access maintenance on Reserve managed lands (recreation, interpretive materials, signage, boundary maintenance). These complementary programs are described in Chapter 11 Restoration Activities and Chapter 12 Public Use and Access, respectively. Activities highlighted in Chapters 10 and 11 are shown on Map 28.



Map 27 / Resource Management Locations

10.2 Resource Management Partnerships

The Stewardship Program focuses on partnerships with other land managers and conservation groups (public and private) to accomplish common goals of conservation land restoration. ANERR has been instrumental in the development of the Apalachicola Regional Stewardship Alliance (ARSA). The ARSA Cooperative Invasive Species Management Area (CISMA) was established in 2003 by The Nature Conservancy Northwest Florida Program and other stakeholders in the Apalachicola River region with concerns related to non-native invasive species. The primary reason for the creation of the CISMA was to facilitate a network for land managers to address the growing threat of non-native invasive species in the region. Other valuable partnerships include but are not limited to FWC, DEP, FFS, NWFWMD, U.S. Fish and Wildlife Service (USFWS), U.S. Forest Service, Bureau of Land Management, and the National Interagency Prescribed Fire Training Center. The Reserve has partnered with the Conservation Corps of the Forgotten Coast since 2016 to conduct resource management activities and to restore coastal resources. This valuable partnership has helped the Reserve accomplish critical conservation goals, while providing young adults with an opportunity to learn about environmental issues and challenges.

10.3 Prescribed Fire Program

Burning is the single most effective tool for restoration of Florida's many pyrogenic natural communities. The maintenance, and in some cases reintroduction, of fire through a complex prescribed burn program aims to mimic historically and naturally occurring fire. ANERR staff from both Stewardship and Research conduct prescribed burning on Reserve-managed lands

through the use of appropriately trained burn staff, regional partner agencies, and resource sharing. The Reserve's Fire Management Plan describes burn goals for each parcel in more depth (Appendix E.7).

ANERR's properties have a complex history of acquisition, wildfire, and prescribed fire reintroduction (Table 4). Fire is introduced only after mechanical methods are used to reduce the understory and install appropriate firebreaks along all private-public boundaries. In February 2012, ANERR partnered with FFS to burn approximately 15 acres of ANERR-managed lands at the Unit 4 parcel on St. George Island. This area was previously burned in 1999 and is in need of continued fire restoration to help prevent the spread of future wildfires in this urban interface area, as experienced in 2017 when two wildfires (one major) occurred on the property. Current methods of management at Unit 4 include firebreak maintenance and understory thinning to reduce impacts of wildfire. Staff are working to re-introduce fire once again and are developing a burn prescription for the site, however the site requires extensive preparation before fire can be safely applied. The Cat Point area (Nature Center area, Millender Park and Rodrigue Tracts) are currently managed utilizing mechanical methods to reduce understory and maintain firebreaks. Three successful prescribed fires and outreach campaigns have been conducted at Nicks Hole, located within the St. George Island Plantation, with the assistance of the FFS.

Table 15 / Fire history and management on Reserve-managed parcels 1999 through present.

Tract	**Wildfires (acres)**	**Rx Fires (acres)**	**Mechanical**	**Lead Agency**
Little St. George Island	1999 (1,356) 2007 (2,000) 2009 (230) 2017 (65)	2016 (5) 2019 (2.5)	None	DEP, FFS
Cat Point	2008 (5) 2022 (0.25)	None	2017 2020 2022 2023	DEP, FFS
SGI Causeway	None	2015 (20) 2016 (20) 2017 (20)	Various	DEP
Unit 4	2006 (1) 2017 (55) 2017 (1)	1999 (35) 2012 (15)	2017 2018 2020 2022	DEP, FFS
Nicks Hole	None	2015 (40) 2018 (40) 2021 (40)	None	DEP, FFS
Lower River Marshes	2007 (100) 2008 (3) 2012 (0.1) 2013 (75) 2015 (75) 2016 (125)	2003 (2,400) 2022 (3,100)	None	FWC

Staff also cooperate with FWC to burn the Lower River Marsh parcel. This parcel is only accessible by boat and is burned in conjunction with the adjacent ARWEA lands. In addition, ANERR has the unique opportunity to practice natural fire regime management on Little St. George Island. This 2,182-acre island consists of mostly slash pine cover and experiences occasional lightning strikes. Staff remain on the island to protect structures and ensure visitor safety during fires, and follow the Wildfire Suppression Agreement, In-house, Standard Operating Procedures (Buffer Preserve 2020), a document describing chain-of-command and protocols followed in fire emergencies (i.e. wildfires). Facilities are also protected by conducting prescribed fires every two to three years around the Marshall House Field Station (five acres). If severe conditions exist, action will be taken to extinguish the fire. There are no privately-owned assets on the island. Dendrochronological techniques were used to precisely date fire-scars from 52 slash pines on Little St. George Island in 2004 and have provided the first step in addressing some of the questions surrounding fire management of barrier islands. These data provided information on historic fire frequency, fire season, and gave some indications of the spatial extent of fires, thus elucidating the historic role of fire on a Gulf Coast barrier island (Huffman, Platt, Grissino-Mayer & Boyce, 2004).

Stewardship monitors the effects of management activities on habitat more generally using a variety of methods. The effects of prescribed burning and tropical storm impacts are monitored through the use of photo-points established in order to gather long-term visual changes to the landscape. Currently there are more than thirty photo point monitoring stations across Reserve-managed lands.

Strategies:

1.1.d Facilitate the natural fire regime on ANERR-managed properties and conduct prescribed burning or mechanical treatment where appropriate. (S)

3.3.j Maintain appropriate buffer around Marshall House to discourage fires and maintain pump/water systems near Marshall House to facilitate fire suppression. (S)

10.4 Invasive and Nuisance Species

ANERR's Stewardship Program continually monitors its land for invasive species infestations through both incidental observations and planned transect surveys. Invasive plants that are found are mapped and either chemically treated with the appropriate herbicide or physically removed by hand. The Reserve's invasive plant management is guided by information from the UF/IFAS Center for Aquatic and Invasive Plants, FWC's Upland Invasive Plant Management Program and Herbicide Bank Handbook (FWC 2017), as well as the regional Cooperative Invasive Species Management Area (ARSA incorporates the region's CISMA) within the Florida Invasive Species Partnership. Cogon grass, Japanese climbing fern and Brazilian pepper are species being surveyed for through Early Detection Rapid Response protocols since they are not prominent on Reserve managed lands. Chinese tallow, camphor tree, purple sesban, showy and smooth rattlebox, tamarisk (salt cedar) and beach vitex are the current focus for management. These species are generally in maintenance condition on Reserve managed lands. Researchers anticipate that climate change will encourage the local introduction of species otherwise found further south.

The management of Little St. George Island by ANERR staff includes the removal of nuisance species including coyote, feral hog, raccoon, armadillo, and opossum. These species prey upon the listed species nests including sea turtles and shorebirds if their populations are left unmanaged. In addition to direct egg depredation, raccoons and coyotes will also harass mother turtles as they are depositing their eggs. Sea turtle nests on the island are screened as soon as possible during surveys with

self-releasing screens that exclude large predators while allowing hatchings to emerge. The screening has been an effective deterrent, although occasionally individual coyotes will discover how to dig underneath. Once the hatchlings emerge, they are again susceptible to predation as they make their way to the water.

Since 2006, staff has been coordinating with USDA APHIS predator management to monitor and manage coyotes, hogs, and meso-predators only if they are significantly negatively affecting listed species nests. This program has been successful at reducing problem individual or groups of coyotes, as well continuing to eradicate feral hog occurrences. Staff will work with the Sea Turtle Conservancy to achieve ongoing management activities. The Sea Turtle Conservancy was awarded a grant through National Fish and Wildlife Foundation Gulf Environmental Benefit Fund entitled “Long-Term Sea Turtle Predation Management (FL)” with the goal to provide an annual funding source to reduce predation rates and increase sea turtle nest and hatchling survival on Florida’s nesting beaches.

Strategy:

1.1.e Identify, monitor, and reduce the presence and abundance of invasive/exotic species. (S)

10.5 Archaeological and Historical Resource Protection

The management of cultural and historical resources is often complicated because these resources are irreplaceable and extremely vulnerable to disturbances. Coastal erosion and vandalism threaten the integrity of ANERR’s cultural resources. Monitoring of all cultural and historic sites will be implemented on a regular schedule to ensure protection of these resources. In addition, all land management activities involving ground disturbance components will undergo a cultural resources assessment using best management practices by the Florida Department of State Division of Historical Resources (DHR) and will follow Management Procedures for Archaeological and Historical Sites and Properties on State-owned or Controlled Lands (Appendix E.6).

Currently, Stewardship staff visit twelve cultural resource sites annually (8FR69 Cape St. George Lighthouse, 8FR747 Lightkeeper’s House and 8FR749 Turpentine Camp are sites where the buildings and structure do not exist anymore due to fire and storms and therefore are not monitored by staff on Reserve lands). The majority of sites on Reserve-managed lands are adjacent to shorelines (fresh or salt water) and are being degraded by flooding or coastal erosion. However, techniques for halting or slowing bank/shore erosion will not normally be considered in natural coastal shoreline areas. A list of real and potential threats to historical resources should be developed to assist in prioritizing sites for research requests and to implement protection or recovery plans for them.

For annual site checks, at least two archaeological monitors are certified by DHR within the Stewardship Program staff. Training includes site conservation BMPs and salvage using criteria acceptable to DHR in order to protect known sites and to document newly discovered sites. Cultural site physical changes from flooding, vandalism and natural disasters are documented whenever possible, along with photographs. All site data is recorded in a database.

Many of the prehistoric sites are not attributable to any specific peoples, however the Reserve endeavors to connect and engage with Tribal Nations that may have occupied the lands around Apalachicola Bay and have a vested interest in the management of these public lands. Through the USFWS archaeological staff and through the NERR national program, the Reserves are forging connections to Tribal Nations to capture local/historical ecological knowledge to better manage our

coastal resources. In addition to indigenous populations, the Apalachicola Reserve is interested in better understanding the connection between the various cultures that make up our population and the natural resources that we value so highly. In 2023, the Reserve was awarded a NERRS Science Collaborative grant titled “People of the Apalachicola System: Exploring Cultural Heritage as a Vector for Ecosystem Planning, Management, and Adaptation.” This project will utilize a multi-pronged approach including integrating digital modeling, recording of heritage sites, and community engagement.

All projects involving land clearing ground disturbing activities, new construction, renovations, or alterations involving or that may involve historic structures require review of the DHR Compliance Review Checklist. DHR is contacted to see if review is required when proposed ground disturbances are minimal or if the project involves routine maintenance of a historic structure. Rules found in the Florida Administrative Code (1A-44 and 1a-32) will guide ANERR activities when unmarked human burials are discovered or when submitting/evaluating archaeological research requests. Management action will include notifying the appropriate law enforcement personnel, impact assessment and testimony in the event looting is noted on ANERR lands.

The Marshall House Field Station is located on the northern side of the Little St. George Island facing Apalachicola Bay. Constructed sometime after 1945, this residence is the unification of structural materials salvaged from the Apalachicola Army Airfield and the lighthouse keeper’s residence formerly located at the southern apex of the island facing the Gulf of Mexico. It is a purely frame-vernacular form comprised mostly from cypress and pine lumber. The Marshall House was constructed by Herbert Marshall for his wife and family to live in while on Cape St. George Island. His wife, Pearl Porter Marshall, bears a direct connection to the island as the former lighthouse keeper’s daughter. Her father, Edward Gibbs Porter, served as the lighthouse keeper for Cape St. George Lighthouse from 1893 until 1913 (Anderson, 2023).

The state of Florida purchased the land from Pearl Marshall in 1977 through the Environmentally Endangered Lands program. Stewardship staff maintain the homestead and keep an appropriate buffer around the house to protect the structure from fire. Staff also maintain pumps and water systems near the house to facilitate fire suppression. The Marshall House was documented as a historic structure on the State of Florida DHR’s Master Site File Database in October 2014 (DHR 8FR01300). In 2019, staff worked with local contractors to replace the 20+ year old roof on the house and began interior renovations. Interpretive signage and kiosks have been installed to increase awareness of the history and value of the island site. Over the next five years, the Reserve will continue to maintain and enhance the historical Marshall House site on Little St. George Island. Staff will continue to monitor the effectiveness of the living shoreline adjacent to the homestead to provide continued protection from erosion and will maintain fire lines to protect the structures in case of a wildfire. Interior renovations are complete, and the site will continue to be used as a field station for staff conducting monitoring on the island and for visiting researcher opportunities.

Strategies:

3.3.e Provide educational information (kiosks, signs, brochures) at public access points describing archaeological resources and their protections. (S)

3.3.f Boundary signs include “protection” language. (S)

3.3.g Monitor status of archaeological sites on ANERR-managed lands annually. (S)

3.3.h Maintain institutional knowledge of staff and provide regular training on monitoring and managing cultural resources (Archaeological Resource Management Training). (S, T)

3.3.i Implement appropriate management actions based on monitoring. (All)

3.3.j Maintain appropriate buffer around Marshall House to discourage fires and maintain pump/water systems near Marshall House to facilitate fire suppression. (S)

3.3.k Continue to stabilize the shoreline in front of the Marshall House. (S)

Photo 12 / An oyster bar in Apalachicola Bay

Chapter 11: Restoration Activities

Healthy coastal ecosystems provide critical social and environmental benefits. The diverse habitats that comprise the coastal environment provide tangible benefits such as buffering coastal communities against the effects of storms and sea level rise, minimizing erosion of uplands, protecting property and infrastructure, improving water quality by removing pollutants, nutrients and sediments, providing habitat that supports commercial and recreational fisheries, serving as nesting and foraging habitat for birds and other wildlife and providing opportunities for people to learn about and enjoy nature. As our coastal habitats continue to be threatened by numerous stressors that can compromise their ability to adapt to environmental changes, it is important for the Reserve to use data and expertise to test innovative restoration strategies and to expand research on habitat degradation and marsh health to identify potential adaptive management solutions that will conserve and protect our vibrant coastal economies. Degradation of coastal habitats has led to major declines in oyster reefs and coastal wetlands and restoration efforts and habitat enhancements are critical to restoring these habitats. When habitats are damaged or destroyed, the ecosystem services they provide suffer as well. By protecting and restoring coastal habitat, the Reserve can help to conserve these important benefits.

11.1 Current Status

Restoration at ANERR blends resource management with habitat manipulation and strong research and monitoring components. Activities are accomplished through the use of management tools such as surveying, monitoring, hydrologic restoration, debris cleanups, habitat creation (e.g. reefs), living shorelines, and regulatory review. The Reserve provides an exceptional platform to put science to work for coastal communities and will continue to develop effective approaches to testing innovative technology for restoration; monitoring restoration response; serving as local reference or control sites; translating and transferring restoration information; providing scientific and technological advice; building support of restoration science and coordination regionally along the Gulf. Specific projects described in the Chapter are identified on Map 28 in Chapter 10.

11.2 Restoration Partnerships

The Reserve works closely with stakeholders on projects that will result in the protection, restoration and enhancement of coastal habitats that sustain the Bay's health. Partnerships with the USFWS, Conservation Corps of the Forgotten and Emerald Coasts, and the Apalachee Regional Planning Council, have led to new projects that will improve the bay's health and productivity. The Panhandle Estuarine Restoration Team (PERT) was established in 2017 to help members collaborate on restoration projects in the Florida panhandle. Restoration practitioners in the region wanted to establish a forum to focus on restoration efforts and better communication/collaboration after learning about two other Estuarine Restoration Teams in Florida. PERT's mission is to facilitate partner-based initiatives focused on restoration and enhancement of estuarine habitats along the Florida Panhandle from Perdido Bay to Alligator Harbor. The PERT approach is to provide a platform for coastal restoration practitioners in the Florida Panhandle to collaborate and share knowledge, ideas and resources.

The Florida Estuarine Restoration Teams (FLERT), Northeast, East Central, Southwest, and Panhandle, are led by state, federal and regional agencies and non-profit organizations, and are composed of a Steering Committee and broader Membership. A fifth ERT, the Big Bend ERT, is currently under development and is expected to join (FLERT) once developed. These teams share a common vision of creating healthy, thriving estuarine habitats of sufficient quantity and quality in their respective regions, and provide increased communication, collective experience, group problem-solving, more efficient use of resources, and constructive feedback. FLERT will serve as subject matter experts to assist in the development of a meta-analysis of living shoreline applications along Florida's coasts and aid in the development of the Statewide Coastal Restoration Plan including a specific Living Shoreline chapter.

In May 2021, Governor Ron DeSantis signed Senate Bill 1954, Statewide Flooding and Sea Level Rise Resilience, into law. This comprehensive legislation ensures a coordinated approach to Florida's coastal and inland resilience and will yield the largest investment in Florida's history to prepare communities for the impacts of sea level rise, intensified storms and flooding. The Resilient Florida Program enhances our efforts to protect our inland waterways, coastlines and shores, which serve as invaluable natural defenses against sea level rise. The program has collaborated with Florida's Reserves and Aquatic Preserves statewide, as well as other stakeholders, to produce a Living Shoreline Database that includes information on projects throughout Florida. A Living Shoreline Outreach Story Map was also developed to be interactive and to provide information on living shoreline project leads, benefits, successful outcomes, challenges and public feedback.

Strategy:

2.1.k Work with regional groups to provide planning and technical assistance on restoration projects such as nature-based infrastructure for improved resilience to extreme storms and other impacts. (T,S)

11.3 Living Shorelines

The Reserve provides an ideal setting to investigate various approaches to restoring shorelines to near natural, unaltered conditions. Living shorelines maintain continuity of the natural land-water interface and reduce erosion while providing habitat value and enhancing coastal resilience. Living shorelines have been demonstrated as a natural and effective technique to restore and protect eroding shorelines along the coast. Coastal communities face constant challenges from shoreline erosion. To test and demonstrate the effectiveness of living shoreline methods, the Reserve has installed seven living shorelines throughout the bay over the last 20 years (see Table 5) utilizing natural habitat elements for erosion control through careful site evaluation and strategic placement of habitat components along the upland-water interface. By maintaining a vegetated coastal edge with necessary tidal exchange, living shorelines preserve natural coastal processes that not only maintain coastal habitats, but can serve to protect and enhance nursery and critical feeding habitats for coastal and estuarine species. The Reserve provides an exceptional platform to put science to work for coastal communities and will continue to develop effective approaches to and testing innovative technology for restoration; monitoring restoration response; serving as local reference or control sites; translating and transferring restoration information; providing scientific and technological advice; building support of restoration science and coordination science regionally along the Gulf.

The Reserve has collaborated with the Conservation Corps network since 2016 to help protect vulnerable shorelines and create essential habitat through the installation of living shorelines. This valuable partnership has helped the Reserve accomplish critical conservation projects while providing young adults with an opportunity to learn about environmental issues and challenges. Together, these teams of Corps members and Reserve staff have established a co-managed native plant nursery and an oyster shell recycling program to continue to provide materials to local/regional restoration efforts in the Panhandle. In 2021, the Reserve helped establish the OysterCorps, a training academy based within the Conservation Corps of the Forgotten and Emerald Coasts. The program goals are oyster habitat restoration, strengthening coastal resilience and economic diversification through aquaculture. Specific components of the program include working with the local community to recycle oyster shells for use in living shoreline breakwaters and for spat on shell to be used in the restoration oysters in the bay. The group started with 5 restaurants picking up multiple 5-gallon buckets twice per week. The program has grown to include Bay and Gulf counties adding an additional three restaurants. The Reserve provides mentoring, expertise, technical assistance and resources to the program to support the development of future environmental stewards, future corps members, and potentially future professional coastal restoration experts.

Over the past few years, numerous stakeholders have discussed the need to develop offshore reefs and intertidal marsh as a means to improve coastal resiliency along a portion of Highway 98, between Carrabelle Beach and Eastpoint. Due to the importance of this highway as a designated hurricane evacuation route, millions of dollars have been spent trying to protect the roadway. This section of shoreline is vulnerable to damage from major storms and was hit hard during Hurricane Michael in 2018. Previous attempts to protect and stabilize this shoreline have included armoring, including vertical concrete seawalls, rock riprap, concrete rubble, and articulated, concrete block mats, which have significantly diminished habitat function and value. In a collaboration between multiple entities, the Reserve has partnered with the ARPC, with the goal of increasing coastal resilience using living shorelines along this stretch of highway. ARPC and WSP collected and analyzed site-specific

data and completed a Coastal Conditions Analysis to help inform the project design and facilitate permitting. Multiple meetings were hosted to engage stakeholders in developing a clear understanding of the need and benefits of these coastal habitats. In addition to the valuable ecosystem services provided by emergent marshes, submerged grasses, and oyster reefs, this green infrastructure can also reduce erosion by absorbing wave energy.

Table 5. Living Shoreline Timeline

Location	Year	Materials	Size	Partners
SGI- Sawyer Street East	1984 (Site 1 of 2)	Rock breakwater; Spartina (.1ac)	150x6’	ANERR US EPA
ANERR headquarters- Cat Point	2004 (Site 1 of 3)	Rock/concrete breakwater; Spartina (.6ac)	500x6’	ANERR
Indian Creek Park	2009	Rock breakwater; Spartina; juncus; upland veg (.3ac)	300x6’	Riverkeeper ANERR USFWS Franklin County
ANERR headquarters- Cat Point	2012 (2 of 3)	Bagged oyster shell; Spartina (.28ac)	188x3’	ANERR Flatwoods Environmental Consultants (mitigation for SGI powerline project)
Little St. George Island	2016	Bagged oyster shell; rock; Spartina (.2ac)	400x4’	ANERR Conservation Corps
SGI- Sawyer Street West	2018 (site 2 of 2)	Bagged oyster shell; rock/concrete; Spartina (.1ac)	250x4’	ANERR Conservation Corps
ANERR headquarters- Cat Point	2018 (3 of 3)	Marine mattress with rock; Spartina (1ac)	1500x5'	ANERR RESTORE/NRDA Central Panhandle Aquatic Preserves

Strategies:

1.1.m Work with stakeholders to identify, promote and support restoration efforts for aquatic and upland habitats; seeking funding for projects not covered under normal funding allowances. (T, S)

2.3.g Support priority conservation actions by non-governmental groups with applicable science and expertise. (S, R)

2.3.i Provide field experiences (summer or volunteer projects) for volunteers, student interns, and conservation corps members. (R, S, E)

2.3.k Work with programs that encourage or support volunteers or interns (such as the Conservation Corps of the Forgotten Coast, AmeriCorps, etc.) (S, R)

3.1.j Provide training and technical assistance on techniques, funding sources and benefits of habitat- friendly shoreline stabilization. (S, T)
3.3.k Continue to stabilize the shoreline in front of the Marshall House. (S)

11.4 Oyster Reef Restoration

Restoration of oyster reefs in Apalachicola Bay is a priority conservation goal for the state of Florida. As a result of the Deepwater Horizon oil spill and associated response activities, oyster and benthic secondary productivity along Florida's Panhandle suffered adverse impacts. Closely following the oil spill in 2010, long term drought and reduced river flows created conditions in the bay conducive for the proliferation of oyster predators and dermo disease. By the opening of the winter harvest season in 2012, oyster densities were low enough to trigger management changes to the fishery. Despite severe harvesting restrictions, the oyster populations continued to decline and in 2013, the National Marine Fisheries Service declared a fishery disaster. The Reserve provided the environmental data showing the conditions leading up to the fisheries failure as well as continuing to provide water quality data pertinent to restoration efforts. Restoration plans utilized maps based on surveys completed by the Reserve, Woods Hole and USGS, funded by the NOAA Coastal Services Center in 2006.

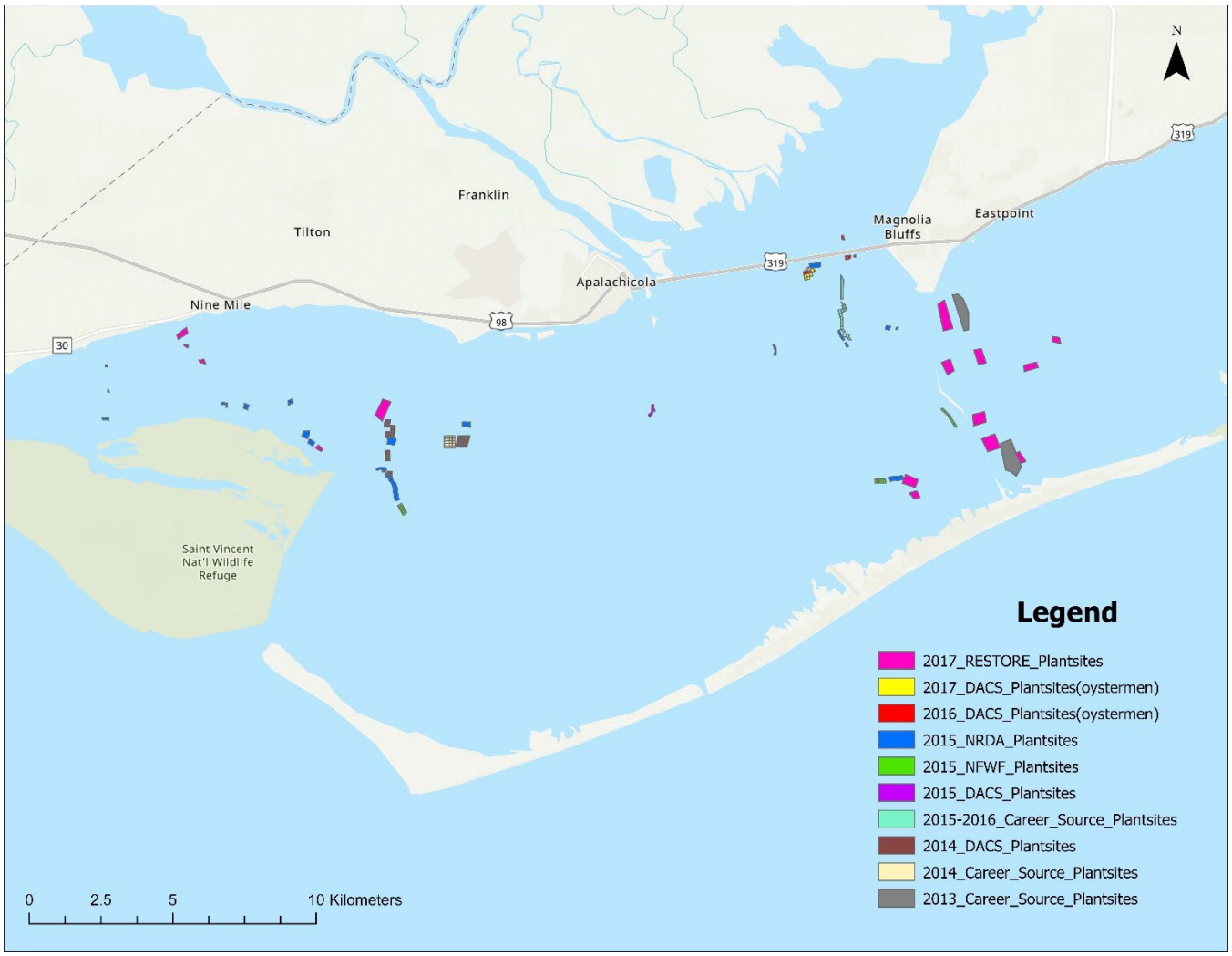
The Gulf Environmental Benefit Fund, administered by the National Fish and Wildlife Foundation (NFWF), supports projects to remedy harm and eliminate or reduce the risk of harm to Gulf Coast natural resources affected by the 2010 Deepwater Horizon oil spill. In 2013, FWC received NFWF/Gulf Environmental Benefit Funding for an Apalachicola Bay Oyster Restoration project. This project enhanced approximately 18 acres and improve the management of approximately 3,000 acres of degraded oyster reef habitat across a range of salinity levels and other conditions to better understand the optimal conditions for promoting oyster resiliency to various future disturbances (e.g., increased salinity levels, sedimentation due to storms, etc.). A key objective of the proposed five-year oyster restoration and research project is to provide important information to inform the design and management of future oyster reef restoration projects.

The Florida Oyster Cultch Placement Project was awarded in 2014 through the NRDA Phase III Deepwater Horizon restoration projects to foster oyster reef habitat and benthic secondary productivity. The restoration work included the placement of suitable cultch material on existing or previously constructed oyster bars by barge for the settling of native oyster larvae and oyster colonization. Approximately 24,840 cubic yards of shell was placed on 16 debilitated oyster reefs over an approximately 124-acre area in Apalachicola Bay. Monitoring has been and will continue to be conducted by the Central Panhandle Aquatic Preserves office, under the purview of the Reserve.

In 2019, FSU was awarded an $8 million Triumph Gulf Coast grant for the Apalachicola Bay System Initiative (ABSI) https://marinelab.fsu.edu/absi. The project's mission is to gain insight into the root causes of decline of the bay's ecosystem and the deterioration of oyster reefs and develop management and restoration plans for the oyster reefs and the overall health of the bay. ABSI is community driven stakeholder process https://marinelab.fsu.edu/absi/cab/documents/. The Community Advisory Board will transition to a permanent successor group fall 2023. The successor group will work to oversee the long-term implementation of the Apalachicola Bay System Ecosystem-Based Adaptive Management and Restoration Plan. It will evaluate regulatory and enforcement processes, reestablish the cultch program, monitor current restoration experiments, and work to protect and highlight the local community's culture and heritage. FSU was awarded a NERRS Science Collaborative grant in 2023, which will enable the group to hire staff needed to launch the group and serve as a one-year bridge of support

from the current ABSI project to long-term sustainable funding sources. The successor group will take over leadership of the Apalachicola Bay restoration program starting January 2024.

In 2020, FWC received a $20 million from the Gulf Environmental Benefit Fund for Phase II of the Apalachicola Bay Oyster Restoration Project to implement up to 1,000 acres of oyster reef restoration in Apalachicola Bay to enhance the resiliency of a fishery that once included more than 10,000 acres of reefs. A restoration pilot study will be conducted first to inform larger restoration activities. In addition, the Florida legislature awarded another $10 million during the 2023 session for oyster restoration work in Apalachicola Bay. These funds will increase the scope of the pilot study and future restoration efforts.



Map 28 / Recent restoration and restoration research reefs in Apalachicola Bay

Strategies:

1.1.m Work with stakeholders to identify, promote and support restoration efforts for aquatic and upland habitats; seeking funding for projects not covered under normal funding allowances. (T, S)

2.3.g Support priority conservation actions by non-governmental groups with applicable science and expertise. (S, R)

2.3.i Provide field experiences (summer or volunteer projects) for volunteers, student interns, and conservation corps members. (R, S, E)
2.3.j Identify and support citizen science that furthers the management of the Apalachicola system. (R, S, E)
2.3.k Work with programs that encourage or support volunteers or interns (such as the Conservation Corps of the Forgotten Coast, AmeriCorps, etc.). (S, R)
3.1.j Provide training and technical assistance on techniques, funding sources and benefits of habitat- friendly shoreline stabilization. (S, T)

11.5 Other Restoration Activities

Marine Debris Removal: Marine debris can cause deleterious effects on people, ecosystems, and our economy. Marine debris injures and kills marine life, interferes with navigation safety, and poses a threat to human health. Our waterways are polluted with a wide variety of marine debris ranging from soda cans and plastic bags to derelict fishing gear and abandoned vessels.

The Reserve hosts an annual marine debris removal event for International Coastal Cleanup Day with the help of volunteers, the Conservation Corps and staff. Additional clean-ups along managed areas and shorelines are conducted with volunteer groups and to target select areas at specific times of year, e.g. scout groups, alternate spring break groups, shorebird volunteers prior to nesting season. Lost and abandoned blue crab traps pose a concern in the bay as they can damage sensitive habitats and become hazards to navigation. The Reserve is currently working with the Apalachicola Bay Aquatic Preserve to conduct a derelict crab trap removal event, as they've done in the past. Following Hurricane Michael, the Reserve coordinated with FWC and UF/IFAS to identify and remove derelict vessels and large debris in the Apalachicola River and Bay.

Hydrological Restoration: The Unit 4 tract on St. George Island is one of ANERR's most altered managed areas within the Reserve. The platted roads and pits have likely disrupted the original sheet flow drainage across the unit as well as inhibited implementation of prescribed fire (firebreaks, mechanical thinning), resulting in flooding problems for nearby residents and fuel build up, respectively. In 2017, the Reserve worked with Atkins Consultants to conduct a Hydrologic and Habitat Assessment for the purpose of planning a future hydrological restoration of the tract. Atkins conducted on-site field visits to determine the current and historic surface water flows of the site. Based on these data, and a field-based inventory of wetland resources onsite, Atkins provided restoration recommendations to restore, maintain and protect hydrological functions related to the quality and quantity of water resources and the health of associated wetland and aquatic natural communities.

Attempts to have Franklin County abandon the rights-of-way have not been successful in the past, however, staff continue to push towards the goal of one intact unit for resource management purposes. The county-owned platted roads are both obstacles and benefits towards wildfire mitigation and prescribed fire implementation. When adequately maintained, the rights-of-way provide essential firebreaks and access to the site. However, appropriate maintenance cannot be undertaken by Reserve staff until they are state-owned and maintained.

The Reserve will continue to work with the Apalachicola River Keeper, researchers at Florida State and Birmingham Southern Universities, and a local consultant to conduct slough restoration along the southern Apalachicola River distributaries. The

project, which was funded by the NFWF was intended to re-establish historical hydrological connectivity to Douglas Slough, Spiders Cut, and the East River distributaries. To quantify pre and post slough restoration flows, the researchers needed to have high quality information on water quality. In 2019 the Reserve added a new secondary SWMP water quality site at Butcher Pen landing (29.80329, -84.96714), which is a state managed recreational site along the lower East River distributary. The site became an official secondary NERRs SMWP site in 2020. The Reserve intends to continue collecting data at the site as part of its larger, long-term baseline water quality monitoring program.

Photo 13 / A public marina on Apalachicola Bay at sunset

Chapter 12: Public Access and Visitor Use

Another part of the Stewardship Program is to maintain, enhance and promote public use and access opportunities on ANERR-managed lands while minimizing impacts to the natural and cultural resources. The goal for public access management in the ORCP managed areas is to “promote and manage public use of our preserves and reserves that supports the research, education, and stewardship mission of the ORCP.” While access by the general public has always been a priority, the conservation of the Reserve’s sites is the primary management concern for the ORCP. It is essential for staff to analyze existing public uses and define management strategies that balance these activities where compatible in a manner that protects natural, cultural and aesthetic resources. This requires gathering existing information on use, needs and opportunities, as well as a thorough consideration of the existing and potential impacts to critical upland, wetland and submerged habitats. One of the ORCP’s critical management challenges during the next ten years is balancing anticipated increases in public use with the need to ensure preservation of site resources. This section explains the current status of our public use efforts. The Roadmap to Recreation – a guide to exploring the recreation opportunities of the Apalachicola River and Bay Basin - was developed to showcase our conservation lands and the recreational activities these areas provide. The Roadmap can be downloaded at Apalachicola National Estuarine Research Reserve - Eastpoint, Florida (apalachicolareserve.com) and there are no fees for admission to the nature center or for any lands managed by ANERR. Primitive camping, hiking, nature observation and paddling are just a few ways to utilize and enjoy ANERR’s managed lands,

as described in the sections below. Activities that are approved are allowed on all ANERR-managed lands. Those that are rejected are not allowed on any ANERR lands. Conditional activities are those which are only allowed in specific locations, at specific times or require special permitting.

Strategies:

2.2.a Designate areas for, and types of, public use that are compatible with the resource management goals of ANERR. (S)

2.2.b Install and maintain signage (kiosks; brochures) within areas that present opportunities for instruction and education about the resources and objectives of ANERR. (S)

2.2.c Maintain effective relationships with local law enforcement, FWC, LE, Florida Forest Service, and other agencies to ensure environmentally sensitive lands are protected as well as the health and safety of visitors. (S)

2.2.d Identify and resolve urban/conservation land interface conflicts. (S)

2.2.e Allow dove hunting on Little St. George Island consistent with FWC regulations and seasons. Notify the public of hunting regulations on LSGI through appropriate signage. (S)

2.2.f Allow game hunting on the Lower River Marshes consistent with FWC regulations and seasons for the Apalachicola River Wildlife and Environmental Area (ARWEA). (S)

12.1 Current Status of Resource-Based Recreational Activities

The environment within the Reserve's boundary and on Reserve-managed lands (Maps 8-15) provides a wide variety of outdoor resource-based recreational opportunities. Popular activities include freshwater and saltwater fishing, boating, hunting, hiking, camping, nature study, birding, canoeing, kayaking and stand-up paddle-boarding, shelling, beach activities, swimming, and photography. Most of these activities are low-impact and align with management and monitoring priorities.

Low impact public recreation on ANERR lands is encouraged for a variety of reasons including instilling a sense of ownership and appreciation for the lands, contributing to individual and social well-being, benefiting as an informal educational tool, promoting family values, providing economic benefit to the local economy through ecotourism and making good use of publicly owned lands.

Access to many points within ANERR is only by boat as approximately two thirds of the acreage is submerged bottomlands and roads do not exist in many floodplain areas. As with many other coastal and aquatic based areas, increased use leads to additional pressures on the resource, which normally leads to degradation of the resource. "The Department of Environmental Protection is directed by the Florida Legislature to cooperate with state and federal agencies, private organizations and commercial and industrial interests in the promotion of a statewide outdoor recreation system. Florida continues to develop a diverse, connected and balanced system of outdoor recreational resources, facilities and programs." In order to guide public use and access, the Reserve utilizes DEP's Statewide Comprehensive Outdoor Recreation Plan (SCORP) (2019).

Fishing: Fishing is enjoyed by both visitors and locals in the Apalachicola River and its distributaries, in Apalachicola Bay, off the barrier island beaches, at the passes between the barrier islands and in smaller lakes and tidal creeks within ANERR boundaries. Freshwater species taken include bass, bream, other panfish and catfish. Saltwater species include flounder, redfish, trout, tripletail, sheepshead, pompano, tarpon, mullet, and Spanish mackerel. Fishing methods include traditional hook and line, cast netting, gigging and spearfishing, with traditional hook and line being the most popular. Recent local trends show an increase in interest in saltwater fly-fishing. Articles in national fishing publications highlighting the quality of Apalachicola

Bay fisheries have resulted in an increasing guide service industry. Management of recreational fishing activity is through enforcement of licenses and fishing regulations by FWC.

Hunting: Hunting is a popular activity in the forested floodplain, waters, and some uplands of the Reserve. Regulations vary with management area and managing agency. Hunting within the Lower River Marshes tract for white tailed deer, small game, wild hog and waterfowl are managed by FWC. Dove hunting is allowed on Little St. George Island during specific seasons and is consistent with and is also managed by FWC regulations. Other hunting opportunities exist in FWC-managed hunt areas, timber company lands, Tate's Hell State Forest, Apalachicola National Forest, St. Vincent National Wildlife Refuge, NWFWMD lands and private hunt leases. Hunting information publications are available through the appropriate agency offices.

Hiking: When not on the water, visitors can enjoy primitive hiking trails on St. George Island, St. Vincent Island, and Little St. George Island. On the mainland, trails also extend across Apalachicola National Forest and at sites within ARWEA and Tate's Hell State Forest. Regionally, around 555 miles of hiking trails are provided by local, state and federal governments and private landowners.

Camping: Campgrounds with facilities are established at St. George Island State Park (sixty improved sites), and three private campgrounds in Franklin County. Primitive campsites exist in ARWEA, Apalachicola National Forest, and Tate's Hell State Forest. Several sites have also been established for thru-paddlers as part of Florida's Circumnavigational Saltwater Paddling Trail. ANERR maintains sites on Little St. George Island, Nicks Hole, and Unit 4.

Canoeing and Kayaking: The Reserve's aquatic resources provide excellent opportunities for use of paddle craft, including kayaks, canoes, and Stand Up Paddleboards. In recent years, kayak rental and trip companies have initiated new businesses in the area, complementing the guide fishing community. The bay environment, lower river marshes, numerous tidal creeks and freshwater streams and the Apalachicola River corridor are ideal for canoe and sea kayak use. Paddle sports are a well-accepted and popular recreational user activity. Day trip paddle opportunities exist in the form of creeks feeding the river corridors and East Bay areas. Many areas of the bay are readily accessible for trips of short duration as well. The Reserve's Roadmap to Recreation (apalachicolareserve.com) and ARWEA Paddling Trail System brochure have been essential as paddler's guide and maps for different paddling trip lengths (day or multi-day trips). ANERR maintains sites for canoe and kayak launching at Nick's Hole, Unit 4, Cat Point, and Sawyer Street.

Table 16 / Analysis of Multiple-Use Potential for the Apalachicola National Estuarine Research Reserve.

Activity	Approved	Conditional	Rejected
Protection of endangered and threatened species	•		
Ecosystem maintenance	•		
Soil and water conservation	•		
Hunting		•	
Fishing	•		
Wildlife observation	•		
Hiking	•		
Bicycling	•		

Activity	Approved	Conditional	Rejected
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	•		
Canoe/Kayaking	•		
Boating	•		

12.2 Recreation Opportunities on Reserve-Managed Lands

Cat Point: The Nature Center, Millender Park and Rodrigue Tracts: The Reserve's headquarters property, which includes the area around the Nature Center, Millender Park, and Cat Point parcels, provides outdoor opportunities to explore approximately 100-acres of coastal and upland habitats in Eastpoint. Although this area consists of several fragmented parcels intertwined with developed sites, it nevertheless showcases common natural communities found along Florida's Gulf coast and serves as a wildlife corridor for an array of wildlife being situated at the apex of East Bay, St. George Sound, and Apalachicola Bay. All Cat Point sites are open to foot traffic only, and firebreaks and trailheads have gates with signage to inform visitors and protect the natural resources. Popular actives include hiking, wildlife observation, picnicking, and beach walking.

Nearly half a mile of elevated boardwalks (installed in 2014 and reconstructed in 2019 following H. Michael) meander through the natural communities surrounding the Nature Center allowing visitors to explore marsh and flatwood habitats and associated wildlife. An observation platform is found at the end of the boardwalk and provides an expansive view of St. George Island and Sound. Along the Nature Center trail, the Watershed Walk (completed in 2020) runs from the butterfly garden to the bay overlook. The 265-foot boardwalk is scaled 6-inches to the mile to match the 530 river miles from the headwaters of the Chattahoochee and Flint rivers to the mouth of the Apalachicola River where it empties into Apalachicola Bay. Interpretive signage addresses water usage within the watershed, and mile markers help track your journey downstream. In addition to the Watershed Walk, there are plant guides and inspirational quotes on the Nature Walk boardwalk trail to enjoy as you experience the flora and fauna of our area.

The Reserve's largest established picnic area, Millender Park, is located adjacent to the staff office complex. The site provides several covered, ADA accessible picnic pavilions, and is a focal area for outdoor education and festivities including ANERR's annual Estuaries Day. Future improvements to the site include the addition of an ADA-compliant observation platform/pier, kayak launch, and improved interpretational signage. ANERR will continue to work with the county on road improvements at the end of Millender Street, which is an ideal access point to showcase the three independent living shoreline projects that exist at the site and are used to test and demonstrate the effectiveness of living shoreline methods.

Across Island Drive from the Nature Center, a half-mile primitive loop trail was installed in the center of the Rodrigue Tract (2019) after land management activities opened up the habitat, reduced fuel and invasive species were treated. The trail is accessed from the trailhead off South Bayshore Drive; marked with informational kiosk and blazes. Rodrigue Tract is connected to the Nature Center complex on foot via crosswalks and sidewalks. The area is popular among birders and has a unique history of turpentining, old homesteads, and hurricane disturbance. Lastly, a fishing pier, remnant from the now replaced old St. George Island Bridge and causeway, is located centrally near the St. George Island Bridge and is maintained by Franklin County along with a kiosk, small parking area, and bathrooms.

Unit 4: Unit 4 at East Hole, St. George Island is among the most visited access points within the Reserve's managed uplands. Popular actives include wade fishing, wildlife observation, and beach walking. The primary access point is a small parking area and driveway at 6th Street East which provides visitor access to St. George Sound and is a site featured on the Great Florida Birding and Wildlife Trail. There are four other foot traffic only access points at county rights-of-way, primarily used by local walkers and birders. In the natural communities between the park and private lands to the east, firebreaks and understory vegetation are maintained for the primary purpose of wildfire mitigation and prescribed fire implementation, but this activity also increases habitat value, wildlife viewing, and even recreational access.

Nicks Hole and Pelican Point: Both Nicks Hole and the Pelican Point parcels are located within the private St. George Island Plantation community on the western half of St. George Island. Therefore, the general public has limited access, although guests and residents of the Plantation have full access to the sites amenities as well as visitors traveling from the water (e.g. paddlers along Florida's Circumnavigational Saltwater Paddling Trail). Popular activities include wildlife observation, kayak fishing, hiking, picnicking and primitive camping.

The main access for Nicks Hole is a driveway off Leisure Lane with a small parking lot, vehicle turn around (kayak drop off area), and informational kiosk. The day use area inside the gate has several picnic tables, fire rings, two primitive kayak launches, and an observation platform improved in 2016 that used to be an old dock. Nicks Hole is popular among kayak fishermen, boat fisherman, and birders. Two primitive campsites with potable water are available for paddlers stopping along the Florida Circumnavigational Saltwater Paddling Trail. Just over 1.5 miles of primitive walking trail meander throughout the property with signage.

Sawyer Street: The "Williamson" parcels that make up Sawyer Street are mostly underwater today, but popular activities at this site include kayaking, fishing, wildlife observation, and sunset viewing. The launch is very popular with locals. The site has a designated kayak launch and informational kiosk (2019) about the ongoing living shoreline restoration project.

Little St. George Island: The island offers "off-the-beaten-path" recreation and exploration opportunities including inshore and offshore boating, long distance kayaking, waterfowl hunting (in adjacent state waters), dove hunting, primitive camping, day trip picnicking, shelling, hiking and beach walking. Two docks are the primary access points which allow for boats to pull up to the uninhabited island, most often traveling from boat ramps located in Apalachicola and St. George Island. Boats frequently pull up at Sike's Cut and West Pass as well, though onshore waves make conditions unfavorable for beaching boats on the Gulf side in most weather. From the Marshall House Dock and Field station to the island's southern apex on the Gulf beach (historic site of the Cape St. George Lighthouse), there are over five miles of primitive trail and roads to traverse the middle part of the island. Primitive trails include "West Pass Trail," "Island Ridge Trail, "Government Dock Trail," and "Sike's Cut Trail."

Each trail is accompanied by trailhead maps, habitat information, and wooden directional signs. Eight primitive campsites are distributed across the island primarily for paddlers along the Florida Circumnavigational Paddling Trail: West Pass (2), Government Dock (2), Sike's Cut (2), at the Marshall House (1), as well as on the Gulf beach pavilion (1). Nine miles of undeveloped beach front extend from West Pass to Sike's Cut – both deep, fast channels connecting the Gulf to Apalachicola Bay, and often harboring excellent fishing from the Cut's jetties to the bayside shallows. Informational kiosks are located at these two ends of the island, as well as the Marshall and Government Dock access points, to inform visitors about their experience. Popular access points harbor signage to inform visitors about closed areas in order to protect listed species including shorebirds and sea turtles. The island's visitation has increased over recent years and is a site with growing popularity with both locals and visitors. Dove hunting is allowed under FWC regulations and seasons.

Lower River Marshes and Distributaries: All kinds of boating, paddling, hunting, and fishing are popular in the Lower River Marshes area. For the forested wetland habitats of this tract, game hunting is allowed and fall under FWC regulations and seasons within the Apalachicola River ARWEA. There is a cooperative agreement between FWC and DEP that designates the lower Apalachicola area as a Type I Wildlife Management Area. FWC does not require a Management Area Permit to hunt those lands. However, a Florida hunting license and other permits/stamps may be required depending on the type of hunt: quota permits for wild hog-dog season, archery permits, muzzle loading, gun permit, deer, wild turkey, migratory birds, waterfowl (state and federal) permit.

12.3 Regional Recreational Initiatives and Conservation Areas

ANERR sits amongst many neighboring conservation lands and waters, which offers unique opportunities to be part of larger recreational networks and leverage partnerships with managing entities. Residents and visitors to ANERR may be drawn to the area to enjoy multiple opportunities. This section briefly includes descriptions of regional recreational and conservation initiatives and where to find more information about these opportunities.

Big Bend Scenic Byway

Portions of the 220-mile Big Bend Scenic Byway borders ANERR along State Road 65 as it extends north from the coastal U.S. Highway 98, down across the bay on State Road 300 to St. George Island. The scenic byway, which starts in Tallahassee, highlights Tate's Hell State Forest, the Apalachicola National Forest, and ARWEA down to St. George Island State Park. For more information visit: http://www.floridabigbendscenicbyway.org.

Paddling Trails

The Apalachicola River Paddling Trail System was designated as a National Recreation Trail in 2008. Excellent opportunities for canoeing and kayaking entice paddlers with all levels of ability to enjoy a variety of scenic waterways along the lower estuary of the Apalachicola River. Eleven trails totaling about 100 miles in distance range from short, easy trips meandering through tupelo swamps to a variety of multi-day river trips flowing into open bays embracing the Gulf of Mexico. For more information visit: https://myfwc.com/recreation/lead/apalachicola-river/paddling. The Florida Circumnavigational Saltwater Paddling Trail is an established 1,515-mile sea kayaking trail that parallels the entire coast of Florida from Pensacola to the Keys, and up the Atlantic Coast to the Georgia state line. The trail touches coastal habitats including barrier island dune systems to salt marsh to mangroves, as well as numerous historical sites and points of interest along the coast's fishing communities and urban centers. Five designated sites have been established on Reserve-managed lands for paddlers making

the journey in the Panhandle segment. For more information visit: https://floridadep.gov/parks/ogt/content/florida-circumnavigational-saltwater-paddling-trail.

Great Florida Birding and Wildlife Trail

The Great Florida Birding and Wildlife Trail is a program of the Florida Fish and Wildlife Conservation Commission, supported in part by the Florida Department of Transportation and the Fish and Wildlife Foundation of Florida, and is a network of 510 wildlife viewing sites. Several locations within ANERR have been designated as sites within the trail, including: St. Vincent National Wildlife Refuge, Apalachicola River, ARWEA Cash Bayou, ARWEA Sand Beach Area, ARWEA old agricultural fields (Gulf County), ARWEA Bloody Bluff Tract, Apalachicola National Forest Fort Gadsden, St. George Island State Park, and St. George Island Unit 4. For more information visit https://floridabirdingtrail.com/

T.H. Stone Memorial St. Joseph Peninsula State Park (Gulf County, DEP-Division of Recreation and Parks, 2,791 acres)
The park contains the western end of the St. Joseph barrier spit and includes white sand beaches, well- developed dunes, sand pine scrub, and pine flatwoods. There are also areas of coastal hammocks. This is an important site for migratory birds. St. Joseph Bay Aquatic Preserve surrounds the park. For more detailed information visit: https://www.floridastateparks.org/parks-and-trails/th-stone-memorial-st-joseph-peninsula-state-park.

Apalachicola National Forest (Liberty, Wakulla, Leon and Franklin Counties, U.S. Forest Service, 576,054 acres)
Established in 1936, Apalachicola National Forest is the largest federal forest in Florida at 573,521 acres, which includes 2,735 acres of water. This forest includes vast expanses of longleaf pine sandhills and flatwoods and harbors a large population of red-cockaded woodpeckers and prodigious botanical diversity. Wet prairies, seepage slopes, ravines, numerous blackwater creeks, and swamplands are also found here across six watersheds. Recreation highlights include the Florida National Scenic Trail, Leon Sinks Geological Area, Silver Lake, and Prospect Bluff at Fort Gadsden. For more detailed information visit: https://www.fs.usda.gov/apalachicola

Tate's Hell State Forest (Franklin and Liberty counties, DACS- Florida Forest Service and the Florida Fish & Wildlife Conservation Commission, 212,269 acres)
This land was purchased as forested watershed protection for Apalachicola Bay and for rare species protection. As of 2020, 70 active red-cockaded woodpecker clusters have been found across the forest. Other listed animal species include gopher tortoise, Little blue heron, Marian's marsh wren, and frosted flatwoods salamander (historic). Listed plants such as white birds-in-a-nest (*Macbridea alba*), Godfrey's butterwort (*Pinguicula ionantha*), Florida skullcap (*Scutellaria floridana*), pitcher plants, fringed orchids, and others are also present. Today, Tate's Hell State Forest is a site for several restoration projects since the majority of the land was harvested, drained, and planted to slash pine plantations in the 1960s and 1970s before state acquisition. Of the 29 basins outlined in the NWFWMD hydrologic restoration plan for Tate's Hell State Forest, three have undergone restoration through the use of low-water crossings, culverts, and ditch blocks to restore flow to its historical pathways and improve wetlands. Twelve basins are currently in progress, funded by the RESTORE Act. Logging occurs on more than 3,000 acres in a year, resulting in improved forest structure for prescribed burning and more open habitat management. Fifteen percent of revenue is directly returned to the Franklin and Liberty County school boards. Longleaf pines are planted in areas deemed suitable as funds and appropriate areas are available. For more detailed information visit: https://www.fdacs.gov/Forest-Wildfire/Our-Forests/State-Forests/Tate-s-Hell-State-Forest.

Bald Point State Park (Franklin County, DEP, Division of Recreation and Parks 4,876 acres – need to add Dickerson Bay addition)
This site is important for migratory shorebirds and songbirds. Located on Alligator Point where Ochlockonee Bay meets Apalachee Bay, Bald Point offers a multitude of land and water activities. Coastal marshes, pine flatwoods, and oak thickets foster a diversity of biological communities that make the park a popular destination for birding and wildlife viewing. Every fall, bald eagles, other migrating raptors, and monarch butterflies are commonly sighted as they head south for the winter. Bald Point offers access to two Apalachee Bay beaches for swimming, sunbathing, and fishing. Other activities include canoeing, kayaking, windsurfing, and hiking. Facilities include a fishing dock, campground and picnic pavilions. For more detailed information visit: https://www.floridastateparks.org/parks-and-trails/bald-point-state-park.

John S. Phipps Preserve (Franklin County, The Nature Conservancy, 40 acres)
Located on the west end of a small, rapidly changing peninsula known as Alligator Point, this privately owned preserve includes marsh, pine forest, and beach dune. It is an important stop-over point for migrating birds as well as nesting habitat during the summer months. The Preserve is designated as a Critical Wildlife Area and is closed to boat landings February – August annually. Focal species that nest each year include snowy plover, Wilson's plover, American oystercatcher, and least tern.

Ochlockonee River State Park (Wakulla County, DEP-DRP, 538 acres)
Picnic facilities and a swimming area are located near the scenic point where the Ochlockonee and Dead rivers intersect. Ochlockonee, which means "yellow waters," is a mix of brackish, tidal surge, and fresh water. Pristine and deep, the river empties into the Gulf of Mexico. Trails allow visitors to explore the park and see the diverse wildlife, including the red-cockaded woodpecker, and natural communities such as pine flatwoods and oak thickets. A boat ramp provides easy access to the river. Both freshwater and saltwater fish inhabit the waters around the park, including largemouth bass, bream, catfish and speckled perch. For overnight visitors, there are full-facility campsites with access to restrooms and showers. Youth group camping is also available. For more detailed information visit: https://www.floridastateparks.org/parks-and-trails/ochlockonee-river-state-park.

Jeff Lewis Wilderness Preserve (Franklin County, The Nature Conservancy, 1,077 acres)
The Nature Conservancy owns approximately 60 percent of Dog Island - primarily the east end, while the rest is privately owned and residential. The preserve is an important nesting area for shorebirds and sea turtles, and has one of the oldest known populations of black mangroves in the Panhandle.

Dead Lakes Park (Gulf County, Gulf County, 84 acres)
This county park (formerly a state park) was named after the Dead Lakes, which were formed when the Apalachicola River blocked the Chipola River downstream, flooding the river swamp and eventually killing trees. The Park contains longleaf pine-wiregrass areas and offers picnicking and camping, and water access for boaters and kayakers. For more information visit: https://www.visitgulf.com/local-listing/dead-lakes-park/.

St. Joseph Bay State Buffer Preserve (Gulf County, ANERR-ORCP-DEP, 5,188 acres)
The property lies along the east and southwest coasts of St. Joseph Bay and consists of three tracts. State Road 30 bisects the southeastern tract. West of State Road 30 the land is mostly slash pine flatwoods and black needlerush marsh, while east of the highway the land rises onto old dunes with sandhill and scrub, lower areas are occupied by cypress swamps and bogs.

Many rare plants are found on the preserve including telephus spurge (*Euphorbia telephioides*), Panhandle spiderlily (*Hymenocallis henryae*), thick-leaved water-willow, and bog tupelo. For more information visit: https://floridadep.gov/rcp/state-buffer-preserve/locations/st-joseph-bay-state-buffer-preserve.

Box R Wildlife Management Area (Franklin, FWC, 18,455 acres)
Box R Wildlife Management Area, (Formerly Box R Ranch) is located to the northwest of the City of Apalachicola and includes about 13.4 miles of frontage along Lake Wimico and the Jackson and Apalachicola Rivers. Box R's tidal marshes, creeks, floodplain swamps, hammocks and pine uplands are essential components of a complex ecological system that accounts for the productivity of Apalachicola Bay to the south. The area is critical to the health of recreational and commercial fisheries, a major component of the local culture and economy. Box R is popular for hunting and bike riding. For more detailed information visit: https://myfwc.com/recreation/lead/box-r/.

St. Marks National Wildlife Refuge (Jefferson, Taylor and Wakulla Counties, US Fish and Wildlife Service, 80,000+ acres)
This refuge represents a large area of protected coast from the Aucilla River to Ochlockonee Bay as part of the North Florida Refuges Complex. It encompasses over 80,000 acres including about 43 miles along the Gulf Coast of northwest Florida. Natural communities include estuarine salt marsh, coastal hammock, wet flatwoods, dome swamps, depression marshes and others. The refuge has extensive artificial impoundments managed for waterfowl and used by many other bird species. The refuge is also actively involved in the recovery of both the red-cockaded woodpecker and frosted flatwoods salamander. Habitat management towards restoration and maintenance of native habitats and listed species involves prescribed fire, longleaf planting, invasive species control and collaborative conservation research programs. One of the most photographed landmarks on the Gulf coast, the St. Marks Lighthouse is the second oldest lighthouse in Florida and the oldest on the Gulf coast. The current tower was completed in 1842. Renovations to the keeper's house and tower were completed in 2017-18. In 2020 the light shown once more after a replica 4th order Fresnel lens was installed in the tower in 2019. For more detailed information visit: https://www.fws.gov/refuge/st_marks/.

Photo 14 / A group of students in a field exercise

Part VI: Education, Training and Outreach

Chapter 13: Education Program

The National Estuarine Research Reserve System seeks to enhance public awareness and understanding of estuarine areas and provide suitable opportunities for public education and interpretation. The reserve system increases estuary literacy among students, teachers, and the public through the K-12 Estuarine Education Program (KEEP) and Conservation Action Education programs.

The K-12 Estuarine Education Program helps educators bring estuarine science into the classroom through hands-on learning, experiments, fieldwork, and data explorations using grade-appropriate lessons, activities, and videos. Reserves also offer teacher development programs that use established coastal and estuarine science curricula aligned with state and national science education standards. Teachers on the Estuary (TOTE) workshops give teachers the opportunity to explore coastal habitats and conduct field investigations, learn how to integrate local and national monitoring data into the classroom, and gain hands-on experience using estuary education resources.

Conservation Action Education programs focus primarily on fostering and modeling behavioral change that leads to resource conservation and advances the mission of the reserve. Such programs are specifically designed with the intention of creating behavior change and/or fostering wise stewardship of estuaries. The ultimate goal is to help audiences make personal choices and collective actions that help them conserve, protect and restore our estuaries and their associated watersheds. Target

audiences include, but are not limited to, residents of the watershed and surrounding communities, watershed residents and recreational users of the reserve. Participants in the reserve's coastal training program and K-12 audiences are not included in this category.

Reserves integrate research and monitoring into their educational and outreach efforts, providing a multi-faceted, locally focused approach aimed at engaging the community.

The Reserve System Strategic Plan outlines education objectives designed to increase the public's awareness of and participation in stewardship activities; improve educators' and students' understanding and use of the Reserve System and NOAA resources for place-based and inquiry-based learning; and grow and motivate the next generation of coastal professionals through access to programs and facilities that facilitate research, resource management, and educational opportunities.

13.1 Education Program Context

Following is a brief history of landmark activities that have led to the current structure and function of ANERR's Education and Outreach Program. ANERR completed and signed an Administration Agreement with its state, federal and local partners in 1986. The stated objective in the original Administration Agreement was: "to establish and manage, through federal-state-local cooperation, a permanent National Estuarine Reserve to provide opportunities for long-term research and education." One of the four stated goals in the plan to achieve this objective is to: "enhance public awareness and understanding of the estuarine environment through education programs in the public school system and on-site interpretation within ANERR." To these ends, ANERR established the Reserve Advisory Committee and signed its charter in April of 1987.

The first management plan (1993) outlined educational goals, objectives, resources, implementation strategy and other area environmental education programs. The implementation strategy section outlined all active and potential future programming related to education and outreach at ANERR. Education and Outreach at the Apalachicola site prioritized day long programs for K-12 students and regular lectures across a wide diversity of topics for the general public. Visitation averaged less than one quarter of visitation at the new center.

13.2 Current Status of the Education Program

Public Programs, Exhibits and Outreach

A significant milestone in the Reserve's history occurred with the move into its new facility in Eastpoint, Florida. This facility was much larger than the former visitor center in Apalachicola. The new facility, located directly on Apalachicola Bay, was more visible and accessible and resulted in a threefold increase in visitation. With additional visitation and new resources, the Reserve re-tooled its educational strategy to address a greater demand for on-site programming and content targeted for visitors. A significant percentage of the additional visitation included vacationers from Georgia who reside within the Apalachicola watershed. This audience demographic was recognized as a valuable opportunity to target for programming and exhibits to facilitate understanding of the importance of maintaining water quality, and quantity, and the detrimental effects of reduced water flows on local resources and the ecology of Apalachicola Bay.

Photo 15 / Nature Center interior.

The Visitor Center was rebranded to the Nature Center. This naming was more applicable and newer highway signage was also installed to direct visitors to the center. A watershed film was created, and new indoor and outdoor exhibits and signage were installed throughout the property to establish a cohesive message about the value of estuaries. The concept of interconnections, particularly relevant to the confluence of habitats in an estuary, was adopted as a theme to be reflected in all exhibits and programs. An extensive survey of commercial tourist review sites, and a formal three-year survey conducted by the Reserve, consistently demonstrated very high satisfaction from visitors.

Outreach programs are a regular function facilitated by education staff with assistance as needed from staff from the other Reserve sectors. The outreach programs reach a diverse audience with some programs sponsored by the Reserve designed to facilitate education activities while others simply provide an opportunity for Reserve outreach as an outlet to distribute educational materials. Examples of these programs include Estuaries Day at the Reserve, the Florida Seafood Festival, Science fairs and Career days at local schools and “Family Friday”, and a half-day summer camp program. The majority of attendees being visitors from Georgia who reside within the watershed.

Updates to the new Reserve Strategic Plan reflect a strong focus on engaging the local community to participate in a wide range of initiatives that will lead to a greater understanding of, and value for, estuaries. Existing exhibits at the Nature Center will be upgraded to provide interactions that will increase awareness of the value of estuaries. Updated exhibits will provide information about historical and archaeological resources as well as past and future research, and real time SWMP data.

Strategies:

1.3.k Develop outreach and educational programs for teachers about the importance of water quality and the detrimental effects of reduced water quality.

2.2.h Publicize resource-related recreational opportunities on ANERR-managed resources (land and waters) at the ANERR Nature Center, in the ANERR newsletter, ANERR websites, and other social media.

2.4.i Reserve provides information about the value, history and preservation efforts over time of the Apalachicola ecosystem to the tourism industry and residents.

2.1.j Provide education materials for the public at the Nature Center related to BMPs for homeowners to protect water quality.

3.1.g Consider demonstration sites, including surface elevation table to show types of monitoring.

3.3.a Upgrade existing exhibits at the Center to provide increased awareness of historical and archaeological resources.

3.3.b Work with partners (Department of State – Division of Historical Resources, Florida Public Archaeology Network, other experts) to develop outreach to local community members (especially students) about the importance of conserving and protecting cultural resources.

3.3.d Look for opportunities to weave historical concepts into existing science-based curricula to educate the local youth about the local history and culture.

K-12 Programs

Pre-K-12 programming is focused on providing onsite field experiences at the shoreline in front of the Reserve. The proximity of the estuarine habitat to the Nature Center allows the education team to design content focused activities in the field with manageable logistics and authentic hands-on, minds-on experiences. Building on this opportunity additional K-12 programs were designed to scaffold content with repeated student participation across multiple grade levels. Every student in the Franklin County School District, across grades pre-K, 1, 3, 5, 7, and high school participates in a Reserve education program every other year. This sustained approach allows for the immersion and depth of content necessary to develop authentic understanding and the value of estuaries (Monroe, 2007) The provision of these continued, scaffolded experiences are ideal for connecting students to both the ‘place” as represented by the estuary and the “place” as represented by the community. Two Reserve education programs focused on fostering estuarine stewardship include the 5th grade living shoreline program and the high school oyster spat settlement program.

The structured scaffolding of content in these field experiences, with guiding themes of stewardship, resilience and connection, established a continuity of curriculum that is reflected across all exhibits and ANERR education programming. A specific example is represented in students constructing and monitoring the living shoreline across multiple grade levels, and learning about the value of living shorelines, incorporates an understanding of ecological resilience and individual stewardship into the curriculum.

Specific activity descriptions by grade level

Pre-K: A House for Hermit Crab, an adapted activity from the Eric Carle children's book. The program facilitates each student's interactions with the characters in the text through modeling and participation in the story. The primary learning outcome is exposure to and awareness of the relationship and interdependence of sea creatures.

1st Grade: Estuaries, Beach Scavenger Hunt and Nature Center Tour. This series of activities was designed to introduce students to estuaries and provide direct experiences in the salt marsh with representative estuarine animals. The primary learning outcome is understanding that estuaries are where fresh and saltwater meet and mix to create an important nursery habitat for many animals, and highlight how the community depends on these habitats and animals.

3rd Grade: Oyster Discovery Dig and Marsh Seining. This set of activities is designed to immerse students in the life of an oyster bar and a salt marsh. Students taking part in the Oyster Discovery Dig investigate and classify the myriad of animals that inhabit and depend on oyster bars for habitat. The Marsh Seining activity is a similar investigation conducted by the students with a large seine net. The diversity of the marsh is discussed with the range and quantity of juvenile animals caught. The primary content outcome of these activities is understanding the tremendous productivity of estuaries and its role as a nursery habitat.

5th Grade: Living Shoreline and *Sporobolus* Adaptations. Fifth graders annually assist with shoreline restoration by planting saltmarsh cordgrass (*Sporobolus alterniflorus*) to the marsh area behind the Nature Center. As a longitudinal monitoring component and to track ongoing success, students assess the density of cordgrass in plots. Students also participate in lab activities investigating saltmarsh cordgrass biology. Learning content outcomes from these activities align with a wide range of national science standards. Also, these activities serve as a valuable opportunity for students to build pro-environmental behaviors and connections to place

7th Grade: Saltmarsh Food Web and Monarch Life Cycles. Using the smooth cordgrass restoration site, students assess the development of habitat (created by 5th graders) by counting marsh periwinkle snails (*Littoraria irrorata*) across measured transects. Measurements of the snail function as a proxy for measuring the productivity of the habitat. Students also use dichotomous keys to explore the life cycles of monarch butterflies from egg to adult with discussions on parasites, pesticides, host plants and conservation strategies. Adult butterflies are tagged and released. Learning outcomes from these activities focus on the interdependence within natural systems as well as providing further opportunity to foster stewardship of the estuary and their role in creating new habitat.

High School: The Biology of Oysters. Initially, this activity served as an on-going substrate experiment where students would measure the yearly oyster spat (*Crassostrea virginica*) settlement rates on different materials. This activity was concluded after multiple years of the decline of oysters and after damage from Hurricane Michael. This highly successful program is in the process of being replaced with another program that also addresses oyster biology. Program design is underway in partnership with Apalachicola Bay System Initiative. Anticipated content will include a review of the historical status of oysters in Apalachicola Bay, ACF Water Wars Litigation, and the biology and physics of living shorelines.

Strategies:

1.1.g Incorporate the conservation of listed species theme into education and outreach programs.

1.1.n Engage local (Franklin and Gulf County) schools in restoration projects.

1.1.o Continue to offer education and training programs that highlight the importance of conservation and management of submerged and upland habitats and provide additional information via signage and various media.
2.3.b Identify and offer specific activities and opportunities for interns, spring break volunteers, students, and community members. Manage and track volunteers online.
2.3.j Identify and support citizen science that furthers the management of the Apalachicola system.
2.3.l Provide field experiences (summer or volunteer projects) for volunteers, student interns, and Conservation Corps members.
2.4.c Facilitate research and education that supports the increase of historical fisheries knowledge and support innovative practices.
2.4.f Develop programs for K-12 and adults on aquaculture, in collaboration with DACS, other schools, FAMU, WEI, private businesses, and SeaGrant.

13.3 Teachers on the Estuary (Teacher Professional Development)

Teachers on the Estuary (TOTE) is a system-wide education program designed to facilitate hands-on, field-based, professional teacher development opportunities. Program outcomes include increasing knowledge and appreciation of estuarine environments and, acquiring the necessary skills to act as stewards of estuary resources. In 2018, a Market Analysis and Needs Assessment was completed to qualify for facilitation of the TOTE programs. Since completing a Apalachicola NERR Market Analysis and Needs Assessment, the Reserve has annually delivered the TOTE programs. Program participants have consistently reported high satisfaction as evidenced by program evaluations.

One challenge experienced by the Reserve in offering the TOTE professional development opportunities has been the lack of local teacher participation. Efforts to address this challenge have included trying to specifically address the needs of the local teachers such as offering training opportunities around the local school calendars and careful coordination with district administration. These efforts have still resulted in needing to cancel programs due to lack of attendance. The Reserve believes the main issue is related to an incredibly high administrative and teacher turnover rate.

The Reserve acknowledges and is committed to supporting the low-performing local school district (Franklin County) using long-term creative solutions. An example of a solution is built on the stability of the pre-K-12 field trip series as an opportunity to engage teachers *while* they are on-site with their students. The reserve creates short summary videos of each trip that highlight examples of the students engaged in the activities that teach the intended content. Attending teachers are asked to participate as observers and identify additional content alignment between the activities and other disciplines such as math, language, history, and civics. These videos serve as a personalized, authentic reference of student experiences. The video library will be developed independent of consistent, year to year teacher participation. There is administrative support within the school district for this strategy.

Professional development for pre-K - 12 teachers is facilitated through the program, and, consistent with the system wide goals of TOTE, ANERR workshops are designed to immerse teachers in high quality estuarine education experiences as a catalyst for engaging their students in similar activities. Facilitated over the summer months, participants at TOTE programs at ANERR, despite intensive recruitment, have been almost exclusively teachers from outside of the local school district. While program evaluations consistently demonstrate very high satisfaction with the workshops recruiting local teacher in the program has been a challenge. High teacher turnover locally is a primary issue as well as a minimal pool from which to recruit with just

two public schools serving the District. New TOTE guidelines have been implemented at the national level that prioritize the value of place-based decisions to support a localized approach for designing teacher professional development outside of the previously required multi-day design. Going forward, the Education Program will facilitate sessions with local teachers and administrators to accommodate for current restraints to teachers. These include opportunities for sessions during the school year, across content disciplines and specifically aligned to current student programming already incorporated across multiple grade levels.

Strategies:

2.1.d Incorporate education themes into pre-K-12 programs that address use of Best Management Practices at home and school where teachers and students can be involved in protecting water quality.

3.1.l Engage teachers in pre-K-12 programs at local schools to incorporate habitat restoration projects into their curriculum.

1.3.k Develop outreach and educational programs for teachers about the importance of water quality and the detrimental effects of reduced water quality.

Education Program Capacity

The Reserve's education program has a full-time Education Coordinator and three full-time Education Specialists. Other Reserve staff support education programs through collaborations between sectors, nature center operations and administrative functions. Volunteers also serve a vital role in offering education programming and as docents for the Reserve's Nature Center. An on-site RV site typically hosts two individuals who work regular shifts at the desk in the Reserve Nature Center. These hosts also serve an essential role in daily maintenance tasks. The support and involvement of the local is critical to the Reserve's education program meeting its goals and objectives. Increasing awareness of the region's resources, and issues impacting them, can foster stewardship and support within the local communities. With increasing visitor numbers and demand for programs, it is also important to build opportunities for interns, students and volunteers at the Reserve.

Strategies:

2.3.a Implement volunteer program at the reserve supported by a full-time volunteer coordinator.

2.3.b Manage and track volunteers online.

2.3.l Provide field experiences (summer or volunteer projects) for high school and college students.

13.4 Education Program Coordination with Other Agencies and Groups

On the national level, the Education Coordinator works across sectors and other reserve staff by participating in NOAA workgroups focusing on Program Evaluation, TOTE, Conservation Action, Program Metrics and Curriculum development. The Florida Park Service serves as a primary local partner for the Reserve's education program. This partnership allows the Reserve's education groups to enter the St. George Island State Park with no fee. Annually, the education program works cooperatively with state and federal agencies at many local festivals and events, some sponsored by ANERR, and others sponsored by other agencies (e.g., FWC, the US Fish and Wildlife Service, and Florida State University.) The Reserve also partners in educational efforts with the Apalachicola Riverkeeper non-profit group.

Photo 16 / The Reserve's Coastal Training Program brings together individuals and groups responsible for making decisions regarding our natural environment.

Chapter 14: Coastal Training Program

The Coastal Training Program (CTP) provides up-to-date scientific information and skill-building opportunities to coastal decision-makers on relevant coastal management issues. Target audiences may vary for each reserve, but generally include local elected or appointed officials, managers of both public and private lands, natural resource managers, coastal and community planners, and coastal business owners and operators. They may also include such audiences as farmers, watershed councils, professional associations, recreation enthusiasts, researchers, and more.

The place-based nature of reserves makes them uniquely positioned to deliver pertinent information to these audiences. Each reserve conducts an analysis of the training market and assessment of audience needs to identify how best to deliver relevant training on priority issues to their area.

Partnerships are integral to the program's success. Reserves work closely with a host of local partners, as well as several NOAA programs, to determine key coastal resource issues and the appropriate target audiences and expertise needed to deliver relevant and accessible programs.

The Reserve System Strategic Plan outlines coastal training objectives designed to ensure that coastal decision-makers and environmental professionals understand and effectively apply science-based tools, information, and planning approaches that support resilient estuaries and coastal communities.

14.1 Background

The Reserve's CTP section has been offering formal trainings, skill-building opportunities, tools and technical assistance to coastal decision makers since 2007 enabling them to implement sound policies based on science to protect the environment. In our rural area typical professional CTP audiences are very small, and training is usually accomplished through one-on-one technical assistance, and sharing tools and resources. CTP staff regularly attends meetings and collaborates with decision makers and their staff to assess current and emerging needs. Training courses and technical assistance are selected based on an initial needs assessment, regular face-to-face meetings with decision-makers, input from the Reserve Advisory Committee, information gathered from evaluations of the previous trainings, and other planning documents that focus on the watershed. The CTPC reports to the Reserve Advisory Committee about training programs at least three times per year and invites their input on training programs. We have a very small population utilize the Reserve Advisory Committee rather than having a separate a committee to avoid committee member burn-out. We also host a virtual monthly Sci-Café to share Reserve science and resources. CTP staff addresses priority issues with three distinct audiences:

Elected Officials and Staff: The CTP Coordinator meets regularly with elected officials to strengthen partnerships, further assess needs and forge positive working relationships. This group of decision makers include elected and appointed leaders, county and city staff, land use planners, public works, code enforcement officers, law enforcement officers, City of Apalachicola Planning and Zoning staff, and Planning and Zoning committees and state partners. We provide pertinent trainings and technical assistance, data, tools and models developed by the Reserve and other experts to address priority issues and consider management options. This group makes legal decision generally at the county or city level.

Professional/Industry Groups: The CTP provides science-based information and trainings on coastal management issues to professional/industry groups such as planners, land managers, seafood industry dealers and harvesters, emergency management personnel, floodplain administrators, realtors, homeowner associations, environmental consultants, marine contractors, boaters, landscape professionals, and those employed by the tourist industry such as ecotour/fishing guides, vacation rental and hotel staff, and the tourist development council. CTP staff forms and maintains working relationships with local professionals to increase stewardship through understanding of the value of protecting our coastal and estuarine resources within the watershed.

Residents, Second Homeowners and Visitors: Our Stewardship Series provides education for residents and visitors to enhance their understanding of coastal ecosystems and community resilience. This series seeks to increase knowledge resulting in increased stewardship and preservation of habitats, natural and cultural resources and community coastal resilience. This group makes decisions at the neighborhood level affecting their interactions with the estuary, the consumption of resources, and the development of property.

14.2 Current Status and Future Work

The Reserve's small population (see Chapter 4) provides CTP the opportunity to form one-on-one relationships with decision-makers and stakeholders. It also limits the number of decision-makers we can offer trainings to and there are few potential advisory community members to recruit in an advisory committee capacity. We offer between 20-30 workshops per year that range in length from one to four hours and often include a field component. Each year we partner with OCM to provide trainings, plus we work with DEP, FWC and other state agencies to provide training opportunities. Reserve staff teaches the Stewardship Series classes. Current programing is based on Reserve issues, goals, and objectives reflected in the CTP Program Strategy 2018-2023 and this management plan. The CTP Coordinator contributes to the overall strategic planning process for the Reserve working closely with the Reserve Manager, Stewardship, Research, and Education sections to develop goals and objectives, and integrated strategies to resolve issues. Through regular bi-weekly meetings, the CTP contributes to the Reserve's workplan and collaborates with other sections to meet the Reserve's goals and systemwide goals and objectives.

Reserve trainings are evaluated after each workshop to gauge their effectiveness. Participants are asked to complete a 9-question evaluation about the training they attended. The evaluation asks the participant to rate the effectiveness of the training, whether they will use the training in their work and what topics they would like to see us offer in future trainings. CTP staff also regularly seek input from the Reserve Advisory Committee.

Reserve training programs are marketed through two ANERR websites, emailed directly to the Reserve's extensive training database, through the DEP press office, multiple social media sites, and Eventbrite, as well as advertised locally in newspapers, on the radio, through newsletters and on flyers. Trainings and programs are also promoted through local chambers, civic organizations and the tourist development council. CTP also shares success stories with the NERR Association, DEP and our local media.

Integrated Strategies of the Coastal Training Program

Goal 1: Natural Resources within the Reserve are conserved through research, monitoring and adaptive management.

Diversity, abundance and productivity of natural communities and species within ANERR are maintained.
CTP will provide data, tools and training to local, state and federal partners on the health of the Apalachicola River and Bay system and future implications of the effects of altered hydrology. We will work collaboratively with Reserve staff, decision-makers and stakeholders to identify and resolve urban/conservation land interface conflicts, providing tools, data and the best management practices to resolve issues. We will maintain relationships through regular communication and sharing science and resources and trainings will expand knowledge and result in increased stewardship and preservation of habitats, natural resources. CTP will also develop and deliver educational trainings for homeowner associations, residents, local civic groups and visitors on reduction of non-point source pollution and bay friendly landscaping practices.

CTP will continue to develop and deliver trainings and technical assistance for decision-makers, land managers, non-profits and professional groups on the importance of conservation and management of upland habitats that includes restoration techniques, funding sources, benefits of restoration, conservation of listed species, the importance of fire and the control of invasive species. We will coordinate with the Reserve Stewardship section, area land managers and partners such as ARSA

CISMA to provide training on the identification and elimination of invasive species using best management practices for land managers and homeowners.

Strategies: (T=Training, E= Education. S=Stewardship, R= Research)
1.1.g Incorporate the conservation of listed species theme into education and outreach programs. (T, E)
1.1.h Reserve provides data, analyses, and training for state, local, and federal partners on the health of the system and future implications of proposed use. (R, T)
1.1.I Provide training and technical assistance on techniques, funding sources, and benefits of restoration. (T)
1.1.m Work with stakeholders to identify, promote and support restoration efforts for aquatic and upland habitats; seeking funding for projects not covered under normal funding allowances. (T, S)
1.1.o Continue to offer education and training programs that highlight the importance of conservation and management of submerged and upland habitats and provide additional information via signage and various media. (T, E)

Impacts to Apalachicola Bay, resulting from modified hydrology in the Apalachicola-Chattahoochee-Flint watershed, are reduced.
The CTP will coordinate with the Research section and other agencies to gather and interpret data for decision makers, stakeholders and residents on the impacts of altered hydrology, and the importance of maintaining water quantity, the detrimental effects of reduced water flows on local resources, and the importance of seasonality of river flow and impacts on habitats and species along the river and aquatic resources within the bay. We will provide scientific information on the optimal quantity and seasonality of river flows impacts the habitats and species along the river and aquatic resources within the bay and develop training programs and technical informational about the importance of maintaining water quantity and the detrimental effects reduced water flows have on local resources.

CTPC will assist in the development of a long-term oyster management plan that brings together decision makers and stakeholders to build consensus on the managing commercial species in Apalachicola Bay. We will also help build capacity to ensure the group is sustainable by helping them find resources, and to make informed decisions.

Strategies:
1.2.d Maintain partnerships with state and federal agencies, especially Northwest Florida Water Management District, FWC, US Fish and Wildlife Service, and the US Army Corps of Engineers, to help determine water flow needs of habitats and species within the NERR. (R, T)
1.2.e Provide scientific information from Reserve research and monitoring programs to local, regional, and state decision-makers that will assist in effective water management. (T)
1.2.f Develop outreach and educational programs about the importance of maintaining water quality and the detrimental effects of reduced water flows on local resources utilizing Reserve data products. (T, E)
1.2.g ANERR works with the NWFWMD to recommend priority restoration projects. (T, R)

Water quality and sediment conditions are maintained at current or optimal levels.
Using monitoring and scientific results decision makers will be informed of point source impacts within the watershed. Technical assistance and trainings will be developed and deliver to communicate this data to the public, land managers, and especially local governments on the importance of maintaining water quality, the detrimental effects of reduced water quality, and methods that can be used to minimize impacts to water quality. We will also provide training and technical assistance to

adjacent landowners, businesses and visitors on ways they can improve water quality on Reserve lands and understand the effects that pollutants, marine debris and microplastics have on estuarine/commercial species.

Strategies:

1.3.h Use monitoring and research to inform decision makers of point and nonpoint source impacts within the watershed. (R, T).

1.3.i Point and nonpoint sources of contaminants are mitigated through priority construction and remediation projects. (T)

1.3.j Communicate information to the public, managers, and decision-makers (especially local governments) about the importance of maintaining water quality, the detrimental effects of reduced water quality, and methods that can be used to minimize impacts to water quality. (T, E)

Goal 2: Healthy natural communities support healthy human communities.

Land use practices within the watershed are sustainable and compatible with the long-term conservation of the Apalachicola River and Bay System.

Current science tools, and maps will be provided to local and state entities to consider infrastructure impacts on ANERR ecosystems. We will assist local governments with appropriate input on comprehensive plan development, point and non-point source controls, setbacks, and development issues and provide training and technical assistance relating to stormwater systems and support research to address effects of stormwater. The CTP will promote and support research of innovative, environmentally sensitive development and land use practices through training programs, technical assistance, demonstration sites and public outreach by partnering with other agencies such as the Water Management District and the USDA Soil and Water District, the CTP will better understand how land use, such as, agriculture, may impact the river and bay and work to inform decision makers and stakeholders on these issues. We will coordinate with clean marina/clean boating program and the US Coast Guard to bring resources and best management practices to area marinas and offer periodic trainings for priority audiences.

Strategies:

2.1.a Ensure public input into potential boundary expansion and acquisition of priority land parcels. (All)

2.1.c Assist local governments with appropriate input on comprehensive plan development, point and nonpoint source controls, setbacks, development issues, etc. (T)

2.1.f Provide current science, tools, and maps to local and state entities to consider infrastructure impacts on ANERR ecosystems. (T, R)

2.1.g Provide training and technical assistance related to stormwater systems and support research to address effects of stormwater. (T)

2.1.h Promote and support research of innovative, environmentally sensitive development and land use practices through training programs, technical assistance, demonstration sites, and public outreach. (T, R)

2.1.i Coordinate with clean marina/clean boating program. (T)

2.1.k Work with regional groups to provide planning and technical assistance on restoration projects such as nature-based infrastructure for improved resilience to extreme storms and other impacts. (T)

Public use of Reserve lands is sustainable.

Coastal Training Program workshops that highlight ANERR habitats and their management will be offered to increase stewardship within Reserve managed areas. Trainings and resources will be provided on Best Management Practices (BMPs) that minimize impacts and increase the public's knowledge resulting in increased stewardship and preservation of habitats, and natural and cultural resources.

Strategies:

2.2.g Offer Coastal Training Program classes that highlight ANERR habitats and their management. Promote Best Management Practices (BMPs) that minimize impacts. (T)

2.2.h Publicize resource-related recreational opportunities on ANERR- managed resources (land and waters) at the ANERR Visitor Center, in the ANERR newsletter, ANERR websites, and other social media. (T, E)

Residents, stakeholders, and decision-makers are involved in the conservation of the Apalachicola River and Bay system's resources.

Trainings will be developed and offered to expand knowledge and result in increased stewardship and preservation of habitats, and natural resources. Strategies will be developed to engage community members in targeted programs or activities. Stakeholder's understanding of the environmental, social and economic consequences of human activities on coastal ecosystems will be increased and result in greater stewardship for the resources on Reserve-managed lands. Positive stewardship actions by local community members will be highlighted. We will continue participating in formal and informal community meetings to stay current on environmental issues of public concern and Reserve programs will be promoted to build public support and stewardship and community involvement in ANERR programs by targeting community organizations.

Strategies:

2.3.b Identify and offer specific activities and opportunities for interns, spring break volunteers, students, and community members. Manage and track volunteers online. (All)

2.3.c Promote ANERR programs to build public support and stewardship. Promote more community involvement in ANERR programs by targeting community organizations. (T)

2.3.d Identify community needs and develop strategies to engage under-represented community members in targeted programs or activities. (T)

2.3.e Use a variety of media to provide accurate and current technical information about the importance of the Apalachicola River and Bay system and the threats it faces. (T)

2.3.f Highlight positive stewardship actions by local community members. (T)

2.3.h Continue participating in community (both formal and informal) meetings to stay current on environmental issues of public concern. (T)

Apalachicola Bay supports a thriving, sustainable, natural resource-based economy.

CTP will share data with decision makers, industry, residents and visitors on resource issues and environmentally conscious tourism and provide information and trainings to decision makers, tourism industry professionals, residents and visitors that address threats to our natural resources and reduce impacts from tourism and increasing development. We will deliver information and training about the Reserve's unique history and preservation efforts that have occurred over many decades including designations such as UNESCO Biosphere. This information will be shared with the tourism industry, residents and visitors on an ongoing basis communicating the area's unique position in the tourism world. CTP in conjunction with the DACS will offer training and resources to oyster harvesters to help them become knowledgeable about innovative ways to diversify

their harvest. ANERR also supports the development of an oyster recycling program working collaboratively with DACS and Forgotten Coast Conservation Corps.

CTP will build relationships and collaborate with area businesses exploring new opportunities to communicate the Reserve's stewardship messages connecting with stakeholders in non-traditional settings such as chamber and other professional meeting settings. We will hold events and awareness raising campaigns to increase knowledge of best practices, communicate with professional audiences and explore new opportunities to work with service providers who will connect with stakeholders. Offer information on reducing impacts on Reserve lands and species, reducing marine debris and sharing information about the unique nature of the Reserve.

Strategies:

2.4.a Reserve shares data with partners, decision makers, industry, residents and visitors on resource issues. (R, T)
2.4.c Facilitate research and education that supports the increase of historical fisheries knowledge and support innovative practices. (R, T, E)
2.4.d Oyster harvesters are knowledgeable about innovative fishery practices. (T, E)
2.4.e Opportunities to diversify the fishing industry (i.e., aquaculture) are explored to reduce pressure on the wild fisheries.
2.4.f Develop programs for K-12 and adults on aquaculture, in collaboration with DACS, other schools, FAMU, WEI, private businesses, and SeaGrant. (T, E)
2.4.g Facilitate research related to restoration science and provide assistance in engaging stakeholders in the process and data dissemination. (R, T, E)
2.4.h Support the development of an oyster shell recycling program (working collaboratively with DACS and Conservation Corps). (T, E)
2.4.i Reserve provides information about the value, history and preservation efforts over time of the Apalachicola ecosystem to the tourism industry and residents. (T, E)
2.4.j Communicate with professionals and explore new opportunities to work with service providers who will connect with stakeholders. (T)
2.4.k Continue to participate in the UNESCO Man and the Biosphere Program which links healthy ecosystems and sustainable local economies.
2.4.l Continue to recruit new members to the Reserve Advisory Committee that represent the broad business community in the county. (All)
2.4.m Continue to support efforts to understand socioeconomic linkages to our natural resources. (R, T)

Goal 3: Resilient natural communities enhance local communities' capacity to respond to changing climate

The Apalachicola River and Bay Ecosystem is resilient in response to climate change and extreme events.
CTP will develop and offer trainings and tools that help facilitate the local community's understanding of possible impacts of climate change and the resulting rise in sea level and weather-related changes such as drought, increase in the intensity and frequency of storms, and impacts on natural resources and the built community. We will share data and information on nature-based solutions for shoreline protection and enable local communities to utilize vulnerability assessments to guide planning and to identify strategies for mitigation, migration or retreat.

CTP will also build partnerships and share resources and tools with local emergency management and city/county government to increase coordination during extreme events. Our programs will communicate the importance of preserving the functioning floodplain and natural shorelines and the value these functions provide in protecting the community from the effects of sea level rise and increasing storms. We will provide training programs and technical assistance relating to extreme events and climate change; including planning, mapping and decision support tools, and leverage partnerships with NOAA, DEP Office of Resilience and Coastal Protection, FEMA, to provide resources and tools.

Provide training and technical assistance on techniques, funding sources and benefits of habitat- friendly shoreline stabilization. Continue to work with regional groups such as the Panhandle Estuarine Restoration Team to further the use of living shorelines in the region.

Strategies:

3.1.a Continue long-term monitoring programs within and adjacent to ANERR to determine the status of water quality parameters, potential threats to water quality, and impacts of water quality changes on resources.

3.1.f Build partnerships with local emergency management and city/county government to increase coordination during extreme events and exercise the reserve disaster plan regularly. Reserve Disaster Plan identifies critical natural resources to protect. These are included in the Coast Guard Area Contingency Plan. (All)

3.1.h Provide formal education, training programs and technical assistance related to extreme events and climate change; including planning, mapping and decision support tools. (T, E)

3.1.i Facilitate coordination, communication and training programs relating to climate change research. (T)

3.1.j Provide training and technical assistance on techniques, funding sources and benefits of habitat- friendly shoreline stabilization (S, T)

3.1.k Utilize vulnerability assessments to guide management planning to identify strategies for mitigation, migration or retreat. (T)

Local coastal (human) communities are resilient in response to climate change and extreme events.

CTP will inform community decision makers about benefits of resilience practices, funding opportunities, and tools to increase resilience. Continue to build and maintain relationships with city and county decision makers, planners and citizens by facilitating and serving on committees such as the Local Mitigation Strategy and Community Rating System committees, and by collaborating across agencies. Provide training opportunities to stakeholders on vulnerability assessments, adaptation and implementation strategies utilizing community resilience research products, planning mapping and decision support tools in training programs and public outreach relating to coastal hazards. Provide them with the best data and tools available to prepare for and recover from extreme events and share post-disaster evaluations.

Work with Reserve Manager to update the Reserve's Disaster Response and Recovery plans and build /maintain relationships with the local Emergency Operations Center, Coast Guard and federal partners to assist with post-disaster efforts. Conduct post-disaster evaluations, share information with stakeholders, and revise disaster plan accordingly.

Strategies:

3.2.a Provide stakeholders with the best available data and tools to prepare for and recover from extreme events. (T)

3.2.b Provide local training opportunities for stakeholders on vulnerability, adaptation and implementation strategies. (T)

3.2.c Work with decision-makers and partners to inform property owners about measures they can take to improve resilience. (T)
3.2.d Provide training and data on the effectiveness of nature-based solutions and methods to implement nature-based solutions. (T)
3.2.e Build relationships with city and county decision makers and planners by serving on committees, attending meetings and collaborating across agencies. (T)
3.2.f Work with local governments to conduct Vulnerability Assessments to develop Adaptation Action Plans to be included in their Comprehensive Plans. (All)
3.2.h Utilize community resilience research products, planning, mapping, and decision support tools in training programs and public outreach related to coastal hazards. (T)
3.2.i Inform community decision makers about benefits of resilience practices and funding opportunities. (T)
3.2.j Build and maintain relationships with local Emergency Operations Center by serving on the Local Mitigation Strategy committee and sharing information with stakeholders. (T)
3.2.l Conduct post-disaster evaluations share information with stakeholders, and revise disaster plan accordingly. (All)
3.2.m Consider resilience to future flooding a/o storm surge when planning new Reserve facility and infrastructure construction.

Cultural and historical resources are conserved.
By offering regular trainings on monitoring and managing cultural resources and archaeological sites (Archaeological Resource Management training) in conjunction with DHR, Florida Public Archaeology Network, and other experts, staff and area land managers will increase their knowledge on conserving cultural and historical resources. Information and trainings will also be offered to decision makers, eco-tour guides, the tourism industry, residents and visitors on area cultural resources and the importance of the conservation and protection of these resources. Trainings will expand knowledge and result in increased stewardship and preservation of cultural resources.

Strategies:
3.3.b Work with partners (BHR, FPAN, other experts) to develop outreach to local community members (especially students) about the importance of conserving and protecting cultural resources. (T, E)
3.3.c Offer training programs that include information on and the importance of conservation and protection of cultural resources, local history and cultural practices. (T)
3.3.h Maintain institutional knowledge of staff and provide regular training on monitoring and managing cultural resources (Historical and Archaeological Resource Training, Archaeological Resource Management training). (S, T)
3.3.i Implement appropriate management actions based on monitoring. (All)

14.3 Needs and Opportunities

The CTP does have the capacity to meet its strategic objectives. Staff consists of a CTP Coordinator and a CTP Specialist. We have access to meeting space at the Reserve and around the community. We also have the knowledge and resources to host virtual meetings. An impediment to training is attendance. The area is very rural and decision makers and their staff are few and are torn in many directions. Stakeholders can easily be overwhelmed with meetings since they serve in many capacities in the community. Decision makers and their staff cannot attend day-long or multi-day trainings. To overcome this challenge, staff regularly attend meetings with priority audiences to glean gaps in knowledge and offer resources and tools.

Water quantity is the Reserve's most pressing issue. Upstream water diversions have had a profound impact on the estuary and the society. The Reserve is looking forward to sharing data and analysis through trainings and research symposiums over the next several years. The CTP plans to continue to offer vulnerability and adaptation planning trainings to improve coastal resilience of our estuary and the communities that surround it. Emerging partnerships include collaboration with FSU, state agencies and local stakeholders on bay management issues and the future of shellfish aquaculture. We plan to work more closely with NWFWMD and U. S. Soil and Water Conservation District on land use and hydrology issues within the watershed.

The Reserve's CTP Coordinator also seeks to create a closer partnership with the Franklin County Tourist Development Council to help educate visitors, second homeowners and businesses about the unique attributes of Apalachicola Bay as a National Estuarine Research Reserve, an UNESCO Man and the Biosphere Reserve and as a Florida Aquatic Preserve. Initial projects include helping vacationers understand and lessen their impact on endangered nesting sea turtles.

Staff work in partnership with the USFWS and the FWC on advancing living shorelines use in Florida, listed species issues and water quantity issues. Locally, staff partner with the Franklin County Planning and Zoning office, City of Apalachicola Planning office, Planning and Zoning volunteer boards, city and county code enforcement. Staff also work with the Franklin County Floodplain Administrator and the Franklin County Emergency Management staff on the Local Mitigation Strategy, increasing resilience and improving floodplain management.

Photo 17 / Research Symposium

Chapter 15: Communications Plan

Since the previous management plan, the Reserve has actively worked on increasing communications with its target audiences. The Reserve has worked to make stakeholders aware of the Reserve's mission and increase appreciation and stewardship of our natural resources. The Reserve implemented several strategies (outlined below) to reach these goals. To achieve these efforts, it was acknowledged that a dedicated position was needed. Funding was used from the Reserve's operations to hire a Communications Specialist to build out the Reserve's social media, print media and outreach programs. This position also serves as a liaison with the central office, OCM staff, and NERR Association staff. This position was initially under the Coastal Training Program and is now housed in the Education Program.

15.1 Target Audiences, Objectives, and Approach

The Reserve Communication Plan focuses on three distinct audiences: coastal decision makers, professionals, industry groups, local community residents and tourists. While some of the communication strategies are similar across audience types, messaging and desired outcomes are slightly different for each.

Coastal decision makers include appointed leaders, county and city staff, land use planners, law enforcement, regulatory staff, and state and federal partners. The Reserve's communication objective with this group is to provide needed data to develop and implement sound policies that protect Apalachicola Bay and River resources. One challenge in reaching this target

audience is individuals typically volunteer in these roles in addition to their full-time job responsibilities. Additionally, these individuals many constituents and groups, and are responsible for considering many, often conflicting, viewpoints. One strategy the Reserve will employ includes building and establishing trust by having consistent one-on-one discussions to share data on water quality, coastal community resilience resources, nature-based infrastructure, habitat change and resultant impacts to species from decrease water flows, invasive species and protection of archaeological, historical and natural resources. Staff at the Reserve will work to serve as a trusted resource and the go-to place for information supported by sound science. The Reserve's communications team will produce informational handouts and infographics to share key content with decision makers on specific issues like water quantity, storm water, and coastal resilience. This is a simple, concise way to convey important information.

The Reserve staff also reach out to professionals and industry groups such as the seafood industry dealers and harvesters, realtors, builders, marine contractors, boaters, landscape professionals, emergency management personnel, floodplain administrators, and those employed by tourist industry such as ecotour/fishing guides, vacation rental and hotel staff, and the tourist development council. This target audience has the opportunity to make positive decisions in their day-to-day lives that benefit the local environment and natural resources. They can also act as advocates for protecting our resources when interacting with their customers. The communication objective for this group is to raise awareness about of preserving the Apalachicola Bay and River resources and to inspire increased stewardship for the resources. The Reserve will accomplish this objective by producing publications and information that highlight the Reserve's natural features, low impact use of Reserve lands and waters, behavior modification their target audience can take as it relates to preservation of species and habitat, and ways to increase the resilience of our local coastal community. Reserve staff also attend industry-specific meetings and events to strengthen partnerships, share information and resources, and provide written articles for use in industry publications.

Residents, second homeowners and visitors comprise the largest audience. The Reserve communications objective for this audience is to increase their knowledge of the importance of preserving the estuary's connected ecosystem, inspiring and motivating them to help preserve Apalachicola Bay's resources, and to take steps to become more resilient to climate change and extreme weather events. This aligns with Goal 3: Resilient natural communities enhance local communities' capacity to respond to climate change; Objective 3.2 Local coastal human communities are resilient in response to climate change and extreme events. Like many coastal areas, Franklin County has experienced a large influx of new residents who have never lived on the coast and are not familiar with coastal threats (US Census Bureau, 2022b). This influx has increased the need for training opportunities and information on understanding coastal systems, community vulnerabilities, and steps that can be taken to increase resilience. These objectives will be accomplished by hosting workshops, regular radio shows, articles in print media, and regular Facebook posts on priority topics that focus behavior change.

15.2 Key Messages, Tactics and Costs

The Reserve's Communication Specialist develops an annual communications plan and editorial calendar. Objectives from this management plan will be incorporated into the annual communication plans and used to craft and hone the Reserve's messages. The Reserve will evolve its editorial calendar to include the key messages from the new management plan to communicate with audiences.

Decision Makers

One-on-one interactions: As mentioned above, one-on-one interactions are often the most meaningful way to communicate with decision-makers. This may work both ways with the official requesting a meeting and vice versa with the Reserve scheduling a meeting on a key topic.

Informational Handouts: Short documents are an easy way to share vital information in a concise format. Often these documents are only highlighting a few high-level concepts and are easily digestible. This condensed version is usually distilled from pertinent scientific publications or technical reports.

Professionals and Industry Groups

Workshops: Workshops bring together professionals to share perspectives and learn about best management practices. They learn as much from each other as they do from the instructors. The best possible outcome is the development of a community of practice where professionals adhere to the highest standards of environmental protection and conservation.

Websites: The Reserve has two websites – the Florida Department of Environmental Protection's webpage and one updated and maintained by the non-profit group, Friends of the Reserve (FOR). Special events, calendars of training, and public programs are listed on both sites.

Listservs: The Reserve also shares programs, news and calendars with the Friends of the Reserve database, the CTP database, the Tourist Development Council, rental agencies, chamber of commerce calendars, civic club and non-profit organizations, and partner organizations.

Public

Radio Shows: For the past five years, the Reserve has produced a radio segment, the Estuary Minute, that has been very well received in the community. The monthly 60-90 second show includes topics such as Bay-Friendly Landscaping techniques, tips on increasing resilience, nature-based infrastructure and seasonal bird migration. This segment has been an ideal communication tool. Feedback from the community has been overwhelmingly positive. The segments also introduce Reserve staff to the community. The show airs once daily at a cost of around $2,500 per year for 365 segments. The Reserve plans to continue this program.

Newsletter: The Reserve produces an eight-pager newsletter, The Oystercatcher, three times per year. Each Reserve sector writes an article for the newsletter on topics ranging from floodplain protection, to using prescribed burns to manage lands. Over 1,200 printed editions of the newsletter and 1,200 digital copies are distributed annually. The production and postage of the newsletter is approximately $2,000 per year. This effort will also be continued.

Newspaper: Each Reserve sector also writes a short article each month for the local paper, the Apalachicola Times. The article topics include ecology, research conducted at the Reserve, and new educational programs. The newspaper has a strong online presence, so we plan to align our messages to accommodate this format and focus our articles on priority topics in the new management plan. There is no charge for this column.

Lectures: Each week in the summer, the Reserve hosts a very popular Turtle Talk to help raise awareness about endangered sea turtles who nest on our beaches from May-October. The talks help the audience understand the species and what they can do to change their behavior to help the turtles. The talks attract 80-100 attendees and are held from June through October.

Sci Cafes: CTP offers Sci-Cafes every other month. These off-site informal talks are held around the community in restaurants, breweries, and galleries. Topics presented at these events include oysters, living shorelines, plankton/diatoms as art and more.

Social Media: The Friends of the Reserve group has two Facebook pages, one for Bay-Friendly Landscaping and a general page. The Friends of the Reserve shares content on events, workshops, techniques, contests, and resources on their pages.

Measuring Success/Outcomes

Success will be based on criteria set in the annual communications plan, including the number of each communication type. Measures of success will be based on positive interactions with decision makers and interactions with industry groups, increase in participation in programs, increase in volunteers and participation in citizen science projects, and increase in social media engagement.

15.3 Objectives and Actions

Decision Makers

Decision makers continue to uphold ordinances and adopt policies that protect natural resources and benefit the bay and its communities including:

- Ensure land use development continues to adhere to the Franklin County Comprehensive plan goals, objectives, and policies protecting water quality in Apalachicola Bay and minimize the threat to the natural environment, public health, safety, and welfare, and maximize the protection of the Apalachicola Bay, while respecting individual property rights.
- Ecological functions of wetlands are maintained including water conservation and flood control, ground water recharge and discharge, water quality improvement, shoreline and soil stabilization, fish, wildlife and plant habitat.
- Natural infrastructure and shorelines are preserved and expanded. Structural development complies with the county's Flood Hazard Ordinance which regulates construction within flood prone areas.
- Stormwater treatment exceeds state minimum criteria.
- The Apalachicola Bay System Initiative develops an Oyster Management Plan to aid in the oyster recovery and creates a broad-based community group to oversee the plan.

Professional and Industry Groups

Professional and industry groups such as vacation rental agencies, contractors, eco-tour guides, realtors, builders and the seafood industry value the natural resources and have a sense of stewardship for resources.

Examples of success include:

- The tourism industry understands and values the history of conservation of area lands and reflects these values to their tourist industry partners at the local, state, and national level in their marketing and promotion materials. They also use these materials to inspire and instill a sense of stewardship for resources.
- Tourist Development Council and realtors build their branding and marketing on Apalachicola Bay’s natural resources and the value of preserving the resources.
- Apalachicola Bay supports a thriving, sustainable natural resources-based economy and the seafood industry.
- Share educational materials in vacation rental houses that reduce negative interactions between visitors and endangered nesting sea turtles.
- Partner with businesses in using recyclable materials that replace Styrofoam or plastic to-go items that reduce marine debris and microplastics.
- Work with partners to design and implement an oyster shell recycling program that helps restore oyster beds and brings awareness to Apalachicola estuary.

- Create marketing and promotional partnerships with area businesses that highlight the Reserve mission and preservation of natural resources.
- Eco-tour and fishing guides educate and share accurate information with visitors on the unique attributes of the Reserve lands and the importance of conservation.
- Construction, land services, landscaping, environmental services value water quality and understand the benefits of natural infrastructure.

Residents and Visitors

Residents and visitors aware of the unique qualities of the Bay and River and its natural communities. They understand the value of protecting these resources, water quality and how to access Reserve lands. They also have a sense of stewardship for these resources and advocate for the bay and river at local, state and national levels. Residents understand that healthy natural communities support healthy human communities. Local communities are more aware of threats such as increasing temperatures increasing sea level rise, and more extreme weather events and have an increased capacity to adapt to changing conditions and become more resilient.

- Examples of success include:
- Residents understand what a resilient community is and steps they can implement to adapt their property to withstand future threats.
- The number of Bay-Friendly Landscaping graduates each year and the level of submissions to the Bay-Friendly Yard program.
- Increase in use of green infrastructure for residential properties.

Photo 18 / Apalachicola River slough

PART VIII – Administration of the Reserve

Chapter 16 - Administrative Plan

16.1 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 Reserves Division works with state agencies in developing a national network of estuarine research reserves. NOAA provides, through both competitive and non-competitive grants, funding to eligible state agencies for the establishment and continued operation of NERRs, 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 NERRs. The Office of Resilience and Coastal Protection (ORCP), under DEP's Deputy Secretary for Ecosystem Restoration, administers on-site operations, hires Apalachicola NERR staff and reviews program content for each NERR in the state. The ORCP also manages the state's 42 aquatic preserves, partners with NOAA in the management of the Coral Reef Conservation Program, the Florida Coastal Management Program, and the Florida Keys National Marine Sanctuary. The Office also oversees the Clean Boating, Florida Resilient Coastlines, Outer Continental Shelf, and Beaches and Inlets Management programs.

16.2 Current Staff

As with most NERRs in the system, the Apalachicola National Estuarine Research Reserve (ANERR or The Reserve) has four constituent programs: research and monitoring (ecosystem science), education, coastal training, and resource management (or stewardship). While the employees that form teams within each of these program areas have certain responsibilities to their program, there is a good degree of integration among programs. This is essential in supporting the tenets of resource management and protection set forth by both NOAA and DEP. In addition, there is an administration team that supports the efforts of all program areas. DEP will continue to pursue state, federal, and other funding for staff support as needed to fulfill the goals, objectives, and strategies of this management plan. See Figure XX for the staff organization chart for ANERR.
As of January 1, 2023 ANERR has fourteen State of Florida Full Time Equivalent (FTE, salaried with benefits) positions (12 state-funded and two federally-funded), and two Other Personal Services (OPS, non-Career Service) positions, and seven positions are funded through a contract to the Florida State University (interchange of personnel agreement) for a total of twenty-five staff at ANERR. The following details the organization and responsibilities of each of the teams at ANERR:

Reserve Manager (Program Administrator; state funded) Provides oversight and guidance to each of ANERR's program areas so that the entire reserve operates in an organized, integrated and meaningful manner; often serves as the face of ANERR at local, regional and national public meetings and workshops; serves as the liaison between state and federal partners; is active in the Apalachicola/Franklin County community to communicate the direction and purpose of ANERR. The manager works as the lead partner with state and federal agencies as well as public and private entities; supervises all program leads and additional administrative staff; and ensures that operational, resource management, and conservation goals of NOAA and DEP are met.

Assistant Manager (Environmental Administrator; state-funded): One major change since the last management plan is the establishment of an Assistant Manager position. The Assistant Manager position assists with overseeing budgets, supervising the Buffer Preserve/Aquatic Preserve staff in the region, writing grants, and overseeing restoration projects at the Reserve. The position supervises twelve aquatic preserves, one buffer preserve, and the managers associated with them. These preserves encompass more than 1.2 million acres of coastal and freshwater resources between Pensacola and Ocala. In this capacity the position must ensure that the management of the preserves is consistent with Florida statutes and rules and effective communications are maintained between the preserves and all stakeholders. The manager must also oversee and guide resource management and administrative activities; and directly engage with agency, public, and private interests in the aquatic and buffer preserve programs.

Administrative/Operations Team: Government Operations Consultant II (state-funded), Administrative Assistant II (state-funded), Facilities Services Consultant (state-funded), three Park Services Specialists (one state-funded, one federally-funded and one state-funded OPS) Primary Responsibilities: This team operates under the manager and includes two staff that have administrative duties, two staff that have building maintenance duties, and support the needs of the other programs in the form of repair and maintenance of equipment and in-house construction projects. The administrative staff work largely with budget, purchasing, grant tracking and reporting, timesheets, vehicle logs, and personnel paperwork. The building maintenance staff are almost completely dedicated to the upkeep and enhancement of the Reserve Headquarters and old shop facility. They also assist as needed with land management needs, public access, minor construction, and vehicle and vessel maintenance.

Research and Monitoring Program Team: One coordinator (Environmental Manager; state-funded), two Environmental Specialist IIs (state-funded), one Environmental Specialist I (contractor), and two Environmental Specialist Is (federally-funded OPS) Primary Responsibilities: This team is responsible for executing and directing ANERR's research and monitoring efforts. This includes maintaining databases; facilitating the work of visiting researchers; carrying out the System-Wide Monitoring Program, making sure all protocols are followed and data are submitted on time; attending to monthly, seasonal and annual monitoring and research programs; making data available to other DEP and ANERR programs; providing technical support to the Franklin County community and regional aquatic preserves; and participating in local and regional outreach.

Education Team: One coordinator (Environmental Specialist ES III; state-funded), two Environmental Specialist IIs (one state-funded and one contractor) and two Environmental Specialist Is (one state-funded and one contractor)
Primary Responsibilities: This team develops and executes all K – 12 education programs. This includes both programs that have school groups come to the nature center and those that are done at multiple locations in the field. The education team also conducts numerous public outreach activities during the year and hosts several non-formal educational group programs. The lead role in the preparation, printing and distribution of ANERR's newsletter, monthly report, brochure, and other outreach documents is performed by this team. This team is also responsible for all the operations, upkeep and enhancements to the Nature Center, including maintaining a number of aquaria and specimens. The Reserve recognizes the great value in building a volunteer program and the reality of making it a successful program requires the constant recruitment and cultivation of volunteers. This process requires a full-time employee to send out recruitment notices (through various media), review applications, interview new volunteers, keep an up-to-date opportunity list, schedule activities, and reward/acknowledge volunteer service. The Reserve has created a volunteer coordinator position which is responsible for managing the needs of the Reserve.

Coastal Training Program Team: One coordinator (ES III; federally-funded) and one Coastal Training Specialist (contractor)
Primary Responsibilities: The CTP provides professional training opportunities to coastal decision-makers, state and federal agency personnel, city and county officials, elected representatives, stakeholders and citizens. A typical CTP event includes subject matter experts, classroom lecture and discussion, and in the field training. Workshops cover a variety of topics that include best management practices for storm water management and watershed planning, leave-no-trace outdoor recreation, ecosystem restoration, coastal hazards and sustainable practices. The CTP team works with communities in the Panhandle and Big Bend to help them with their low-impact coastal planning efforts. The CTP Coordinator also oversees the Communications program at the Reserve and supervises the Communications Specialist. In addition to coordinating public relations and outreach, the Communication Specialist also assists with education programming and exhibit development.

Stewardship (Resource Management) Team: One coordinator (ES III), two support staff (one ES II and one ESI) All three positions are contractors)
Primary Responsibilities: This team is primarily responsible for the uplands resource management planning and activities for ANERR. This includes applying prescribed fire where appropriate, removal of exotic plants and animals, hydrologic restoration projects and maintaining and designing public access opportunities for the public, such as trails, kiosks, brochures, the Roadmap to Recreation, and more. This team serves as the host program for ANERR's Geographic Information System (GIS) program and oversees habitat mapping and monitoring projects, especially concerning emergent vegetation. This team oversees listed species management and monitoring activities within the Reserve, and/or coordinating these activities with other agencies. The Stewardship team oversees the reserve's cultural resource sites, including annual site checks and coordinating with other research that may be occurring. The Stewardship team also coordinates many of the reserve's marine

debris removal and shoreline clean-up efforts. A significant part of this team's role is maintaining and facilitating strong partnerships with regional agencies, non-profit groups, volunteers, and more, and participating in local education and outreach.

Many of the strategies identified in this plan will be implemented using existing staff and funding. However, several objectives and the strategies necessary to accomplish them cannot be completed during the life of this plan without additional resources. The plan's recommended actions, time frames, and cost estimates will guide the ORCP planning and budgeting activities over the period of this plan. These recommendations are based on the information that exists at the time the plan was prepared. A high degree of adaptability and flexibility must be built into this process to ensure that the ORCP can adjust to changes in the availability of funds, unexpected events such as hurricanes, and changes in statewide issues, priorities and policies.

Statewide priorities for management and restoration of submerged and coastal resources are evaluated each year as part of the process for planning the ORCP's annual budget. When preparing the ORCP's budget, it considers the needs and priorities of the entire aquatic preserve program, other programs within the ORCP, and the projected availability of funding from all sources during the upcoming fiscal year. The ORCP pursues supplemental sources of funds and staff resources whenever possible, including grants, volunteers, and partnerships with other entities. The ORCP's ability to accomplish the specific actions identified in the plan will be determined largely by the availability of resources, which may vary from year to year. Consequently, the target schedules and estimated costs identified in Appendix D may need to be adjusted during the ten-year management planning cycle.

16.3 Reserve Advisory Committee

The Reserve Advisory Committee (RAC) is not a formal board and thus does not have elected Directors or Officers. The RAC membership is primarily comprised of natural resource managers for managed lands located within and adjacent to the NERR, local government officials, state agencies, non-governmental organizations, business owners and the public. Formal MOAs with managed areas within the NERR can be found in appendix XX.

The RAC typically meets twice a year (Spring and Fall) to hear updates on the Reserve's programs and to make recommendations to the Reserve staff on the operations of the Reserve. Additional ad hoc meetings may be called for special circumstances such as a review of the management plan. All meetings are open to the public and widely advertised.

16.4 Key Organizational Partnerships

Numerous partnerships have been described throughout the body of the management plan, primarily within the program area descriptions, however there are some partnerships that span all the Reserve programs, furthering the mission of the Reserve. Those partnerships are described below:

Program for Local Adaptation to Climate Effects: Sea Level Rise (PLACE:SLR): Over the last ten years, the Reserve has participated in two Ecological Effects of Sea Level Rise (EESLR) projects funded through NCCOS: *Predicting Impacts of Sea Level Rise in the Northern Gulf of Mexico* (2010) and *Dynamic Sea Level Rise Assessments of the Ability of Natural and Nature-based Features to Mitigate Surge and Nuisance Flooding* (2016). The investment of Reserve staff time and resources has been considerable for these projects, however the return in data, models, tools and outreach materials has been

substantial. The strengthening of partnerships and collaboration has also been considerable. In the end, the EESLR-NGOM project produced over 50 publications, but perhaps the most useful and accessible tools were the Story Maps created by NOAA staff:
Coastal Dynamics of Sea Level Rise: Simulated Storm Surge:
https://noaa.maps.arcgis.com/apps/MapJournal/index.html?appid=964181e11b4d4736ac85d7ecd33104ab
Coastal Dynamics of Sea Level Rise: Hydro-MEM:
https://noaa.maps.arcgis.com/apps/MapJournal/index.html?appid=85242c8a228945f3b943f3ec7f01e035

The momentum of the EESLR project led to the Northern Gulf of Mexico being selected as one of the geographic regions of the NOAA-led Sentinel Site Cooperatives, now the Program for Local Adaptation for Climate Effects: Sea Level Rise (or PLACE:SLR). The manager has served on the management team of the SSC since 2015 and both the RC and the CTPC have participated in workgroups and special projects over the years. The SSC has been instrumental in bringing sea level rise science to local decisionmakers through a variety of means.

The Reserve partnered with the City of Apalachicola on a hazard mitigation planning grant in 2019, which was a part of the Resilience to Future Flooding project, funded by a NOAA Regional Coastal Resilience Grant and through the SSC. It served as a pilot project to address communication and financial barriers to increasing sea-level rise in the northern Gulf of Mexico. The project, *Achieving Resilience through Hazard Mitigation: Applying Mitigation Measures to Apalachicola's Vulnerable Historic and Economically Significant Resources is enabling* Apalachicola to become more resilient to future sea level rise, seasonal flooding and to reduce flood insurance rates on historic buildings in the flood zone. The project assessed and prepared site-specific analyses and recommendations for ten flood-vulnerable and economically-important historic structures in the City's commercial downtown district. The City was successful in implementing mitigation plans for two of its most historic buildings and obtaining funds to harden the structures. These buildings will serve as examples for other historic building owners in the downtown. A video diary was created to document the process: https://placeslr.org/our-products/resilience-to-future-flooding-short-films/

Apalachicola Bay System Initiative (ABSI): In 2019, the Florida State University Coastal and Marine Lab (FSUCML) was awarded approximately $8,000,000 from Triumph Gulf Coast Inc. to conduct priority research addressing the collapse of the oyster fishery in Apalachicola Bay. Triumph is a non-profit corporation created to disperse funding associated with economic losses that occurred during Deepwater Horizon. In addition to priority research, the Initiative brings together scientists, natural resource managers, local decisionmakers, local professionals in the seafood business, and other stakeholders to develop an ecosystem-based recovery and management plan for Apalachicola Bay. The ABSI team are working very closely with the Florida Fish and Wildlife Conservation Commission (agency responsible for oyster fishery management) to inform their most recent restoration effort; a $20 million dollar grant from the National Fish and Wildlife Foundation to rebuild approximately 1000 acres of oyster reef in the bay. Both the manager and CTPC serve on the Stakeholder Advisory Board and host the meetings at the Reserve.

Partially due to ABSI, the Reserve has been working more closely with researchers from the FSUCML to further research in Apalachicola Bay. In late 2020, a new director started at the CML. With new leadership and a closer working relationship, the Reserve staff took the opportunity to explore an interchange of personnel agreement with the University. Through this agreement, seven positions at the Reserve were moved to a contract with the University. The University positions offer more

benefits than the state other personnel service (OPS) positions, thus retention should be higher. The Reserve entered into this agreement on July 1st, 2021.

Center for Coastal and Marine Ecosystems (CCME): The Reserve has continued its partnership with the Florida Agricultural and Mechanical University (FAMU) to support the Center for Coastal and Marine Ecosystems under the NOAA Environmental Partnership Program with Minority Serving Institutions. The role of the Reserve shifted somewhat over the last six years. Until 2017, FAMU provided a position, a boat and field sampling supplies at the Reserve. The coordinator position assisted with student research, conducted educational outreach events, and assisted with the yearly center-wide core competencies (CWCC) field program. Since 2017, the Reserve participation has scaled back considerably. The manager is a member of the Community Stakeholder Advisory Board and participates on an average of two calls per month with the management team and the focal area leads. The Research Coordinator continues to work with researchers and students from FAMU to conduct priority research within the bay.

16.5 Citizen Support Organizations

The Friends of the Reserve (FOR), www.apalachicolareserve.com, is ANERR's primary citizen support organization. Through the years FOR has provided excellent support to ANERR by assistance with hosting meetings, providing food for myriad outreach and training events, and acting as the fiscal agent for sector meetings that ANERR has hosted. In May of 1988, FOR was formally incorporated "…*for the advancement of the ANERR and to promote the purposes of ANERR and to provide citizen support for resource protection, education and research*…" (Articles of Incorporation, FOR). FOR continues to be active. FOR's board of directors is particularly active in supporting ANERR. It has seven seats including a president, vice-president, treasurer, secretary and three at-large positions.

The Friends supported the construction of boardwalks that surround the headquarters. They also supported the construction of the outdoor classroom, which is located under the building. This is particularly useful as the students can conduct field work in front of the building and then bring their samples and gear back to the outdoor classroom.

The Friends have also been supporting two interns each summer to assist the staff in completing sea turtle nesting surveys. The sea turtle program is largely supported by volunteers and the Friends support volunteerism by purchasing T-shirts (identifying volunteers as sea turtle volunteers) and recognition through an annual appreciation event. Over the last year, the Reserve has developed an "Adopt-a Nest Program", which has generated significant funding to support the Turtle Program.

The Friends are very supportive of our local students. They reimburse the school the cost of bus transportation, bus drivers, and substitutes to cover field trips to the Reserve. Our staff have developed programs for Pre-K, 1st grade, 3rd grade, 5th grade, 7th grade and 10th grade. In 2020, the Friends are funding a scholarship program, that will allow a local high school senior to work directly with the Reserve on a special project. At the end of the project, the student will be awarded a scholarship to use towards post-secondary education.

The Friends support ANERR's annual National Estuaries Day event. Estuaries Day is one of the most popular and best attended events ANERR does all year, and FOR is an important factor in its success.

The St. George Island Lighthouse Association (SGLA), (www.stgeorgelight.org/), serves as a Citizen Support Organization for ANERR, in managing the operation of the Cape St. George Lighthouse. SGLA was established in 2004 following the acquisition of the Lighthouse by the state. The Lighthouse collapsed in 2005 mostly due to erosion caused by numerous tropical events. SGLA, an entirely volunteer organization, provided labor and administrative support recovering artifacts and obtaining grants for historic preservation of the Lighthouse. The Lighthouse, now open for public visitation, has been completely restored. Detailed information regarding the SGLA and the Cape St. George Lighthouse may be found at the SGLA website listed above.

Photo 19 / Volunteers in action – building the Sawyer St. living shoreline.

Chapter 17: Volunteer Plan

The Reserve volunteers include students, interns, spring breakers, conservation corps groups, service groups, docents, and citizen/community scientists. Volunteers benefit organizations as personnel, time, and money are often limiting constraints. By developing and growing our volunteer base, we hope to support and sustain new initiatives at the Apalachicola Research Reserve.

17.1 Background of Volunteers at the Reserve

The Reserve has used volunteers over the years to accomplish a multitude of activities. Some of these activities include special events such as Estuaries Day, sea turtle nesting surveys on St. George Island and greeters at the Nature Center. Estuaries Day is our largest education-hosted event with an average of 600-800 individuals attending. The success of this event depends on between 40 and 50 volunteers. Volunteer recruitment is typically the responsibility of the event coordinator (from the education sector). These events are usually a one-day commitment of the volunteers.

For the past 25 years, sea turtle nesting surveys have been managed by volunteers on St. George Island. During most seasons the Reserve has a range of 25 to 30 volunteers assisting the Reserve's Volunteer Coordinator, who coordinates nesting activities on St. George. Volunteers commit to surveys every morning from mid-May to mid-September. Volunteer recruitment, training and support for this program is the responsibility of the Volunteer Coordinator.

The Reserve's Nature Center front desk is covered by volunteers during the week (Tuesday through Friday). Volunteers greet visitors, answer questions and sell merchandise from the Friends of the Reserve store. These volunteers are recruited through word of mouth and coordinated by the Volunteer Coordinator and Education Specialist I who oversees Nature Center operations. The volunteers typically work a three-and-a-half-hour shift one day a week. In addition, the Reserve was able to add an RV parking site to the back of the staff parking lot. RV campground hosts are an immensely valuable tool utilized by the Florida State Parks and the St. Joseph Bay Buffer Preserve. In exchange for a water and power hook-up, the host(s) perform a multitude of tasks for the Reserve including Nature Center docent, maintenance and upkeep of the Center and the grounds, special tasks related to upkeep of the Center's aquaria and education programs, assistance with special events and security for the Reserve. The Reserve requests that the occupants volunteer about 20 hours a week to the Reserve.

The Reserve's Stewardship sector has recently launched a new Site Stewards Volunteer program. A site steward is a trained volunteer who observes and records information about our managed areas and reports those findings to the Reserve. Information collected may include observations about general site conditions, litter or debris concerns, trail conditions, visitor issues, infrastructure damage, wildlife or habitat issues. Though the program is still new, it has engaged new volunteers from the community, and we hope to continue to build this program moving forward.

The use of volunteers for other Reserve programs has been rather opportunistic. Often people will come to the Reserve or contact us about specific volunteer opportunities. We have not strategically recruited volunteers for specific programs other than what was mentioned above. Over the past couple of years, we have retained a few highly motivated individuals that regularly assist with research and education activities. Volunteers help with monitoring and research projects including sampling and data collection. Often volunteers assist with education programs for all ages. Volunteers have assisted with shell bagging events to build living shorelines and several coastal clean-up events.

Over the past decade the Reserve has increasingly engaged with students and early career individuals to provide high school, undergraduate, and recently graduate internships. The Volunteer Coordinator (SGI Sea Turtle Nesting Coordinator) recruits one intern per summer to assist with nesting surveys on St. George Island. The Stewardship sector recruits an intern each summer to assist with sea turtle nesting on Little St. George Island and other resource management projects. The Research section also regularly utilizes one to two interns each summer. These interns are supported by a variety of financial means. Friends of the Reserve provides a small stipend for one St. George Island turtle intern and the Little St. George Island turtle intern. Outside scholarship opportunities, such as NOAA's Hollings Undergraduate Scholarship Program, NOAA National Center for Coast Ocean Science (NCCOS) Interns, AmeriCorps Education awards, and other outside grants have been used to support these interns. The Reserve provides free housing in our dormitory facilities for interns. The Reserve has hosted other internships that vary in duration from one month to seven months. These are typically driven by the interests and needs of the student, often to fulfill requirements of their degrees. The Reserve does its best to match Reserve priorities to the interests of the student.

Large groups of volunteers are often utilized for debris and other larger-scale clean-up projects at the Reserve. Alternative spring break groups have been utilized heavily at the St. Joseph Bay Buffer Preserve. The Research Reserve has been able to utilize groups staying at the Buffer Preserve to conduct shoreline and other debris clean-ups. The inability to house large groups in our limited dormitory facilities does not allow the Reserve to host groups of this type ourselves. The difficulty in transporting large numbers of people and large amounts of debris to and from some of the remote areas of the Reserve, such as Little St. George Island, somewhat limits the Reserve's ability to expand this type of debris clean-up event.

Lastly, citizen scientists are a largely un-tapped resource for the Reserve. The only project that is run consistently with citizen scientists is the Christmas bird count. Currently the Reserve receives approximately 15,000 volunteer hours per year; equivalent to seven full time staff members. Citizen scientists also collect and process samples for local microplastics monitoring program multiple times per year, in conjunction with the Mississippi State University Extension Microplastic Monitoring Project.

17.2 Recruitment

Regular advertising is key to maintaining a volunteer program. Our local population fluctuates considerably during the year, so consistent messaging will be needed to cover regular shifts and regularly scheduled programs. Advertisements are run on the Friends of the Reserve Website, ANERR Facebook page, the local newspaper and local radio station. Potential volunteers could also be reached through the Friends of the Reserve contact list, Oystercatcher newsletter mailing list, and the Coastal Training Program mailing list.

Recruitment efforts should include what opportunities are available. Examples would include:
Administration: Front Desk greeter, website content, Facebook content
Research: Water Quality monitoring, trawling, oyster project; database maintenance
Stewardship: Site Stewards program, trail/boardwalk maintenance, invasives removal, marine debris monitor
Education: On-site programs, educational video editing, preparing materials/demonstration
Outreach/Special Events: Estuaries Day, Seafood Festival, Coastal Clean Up
Public Relations: Creating press releases/stories, photography, Distributing brochures
As we develop a list of potential volunteer opportunities, we will likewise create a list of desired knowledge, skills and abilities required to perform those duties. We will have specific criteria to guide the placement of volunteers within the Reserve programs.

17.3 Retention

Constant communication with volunteers is necessary to keep them engaged in the Reserve's programs. Ideally we would have regular communication through our website or Facebook. We could set up notifications or alerts when a new opportunity is available. It is important to acknowledge volunteer efforts through the website or newsletter. It is also important for the volunteer coordinator to frequently check in with volunteers to gauge their satisfaction with the experience. Regular feedback is helpful in growing the program and to continue developing new opportunities and it is important to make sure that they are engaged and satisfied by the experience.

Recognition for their contributions is key to retaining volunteers. The Friends of the Reserve has already supported our efforts by donating Friends T-shirts to those who work in the Nature Center. Members of our Turtle Patrol have also received T-shirts to wear during their morning surveys. Having everyone wear the same shirt creates an identity for the group and makes the participant feel included and appreciated. Certificates are another way to acknowledge service to the Reserve. The Reserve has been holding a banquet to celebrate volunteerism on an annual basis for the last few years.

Strategies:

2.3.a Implement volunteer program at the reserve supported by a full-time volunteer coordinator. (E)

2.3.b Identify and offer specific activities and opportunities for interns, spring break volunteers, students, and community members. Manage and track volunteers online. (All)

2.3.c Promote ANERR programs to build public support and stewardship. Promote more community involvement in ANERR programs by targeting community organizations. (T)

2.3.i Provide field experiences (summer or volunteer projects) for volunteers, student interns, and conservation corps members. (R, S, E)

2.3.j Identify and support citizen science that furthers the management of the Apalachicola system. (R, S, E)

2.3.k Work with programs that encourage or support volunteers or interns (such as the Conservation Corps of the Forgotten Coast, AmeriCorps, etc.) (S, R)

Photo 20 / Apalachicola National Estuarine Research Reserve Facilities in Eastpoint, Florida

Chapter 18: Facility Development and Improvement Plan

Background

The original Reserve building in Apalachicola was constructed in 1984, but as the Reserve staff and capacity grew over the next decade, the need for additional space was necessary. In the late '90s, an extension was completed on the front of the building, which increased the ability of the Reserve to host meetings and provided improved educational opportunities, however it did not provide more office space or expand the lab space. One way to alleviate the need for offices was to add a doublewide trailer across the street from the main building to accommodate several staff. In addition, a new facility was planned and constructed in 1998; located on Carroll St. in Eastpoint (across the bay from the Apalachicola building). This facility became the base of operations for the administration, Research, and Stewardship Programs, as well as the shop facility for maintenance of vehicles and vessels. The Education Program, and what would become the Coastal Training Program, remained at the building in Apalachicola. Within a few years the Reserve was again at capacity and following the successful construction of two Environmental Learning Centers at the two other Research Reserves, the Reserve embarked on an effort to design a facility that would bring the programs back together under one roof.

The Apalachicola National Estuarine Research Reserve (ANERR) staff moved into the facility at 108 Island Drive in Eastpoint in early 2011. Most of the staff from the two original offices are now consolidated into the new headquarters; however, staff still utilize both of the old facilities as bases for field work, maintenance and storage. Two of the practices employed at each of the facilities are the reduction of waste, and efficiency in energy usage. All existing facilities used to recycle multiple materials including paper, aluminum, glass, and plastic, unfortunately cuts to the county's recycling program has reduced ANERR's ability to recycle materials. Currently the county only recycles cardboard, materials including oil, appliances, tires, and industrial batteries. Staff transport household batteries to facilities that will accept them for recycling in neighboring counties.

The Marshall House runs on solar power and the new headquarters facility is extremely ecologically friendly - LEED (Leadership in Energy and Environmental Design) certified at the silver level. The chapter will also identify future facility needs.

18.1 Current status of Reserve Facilities

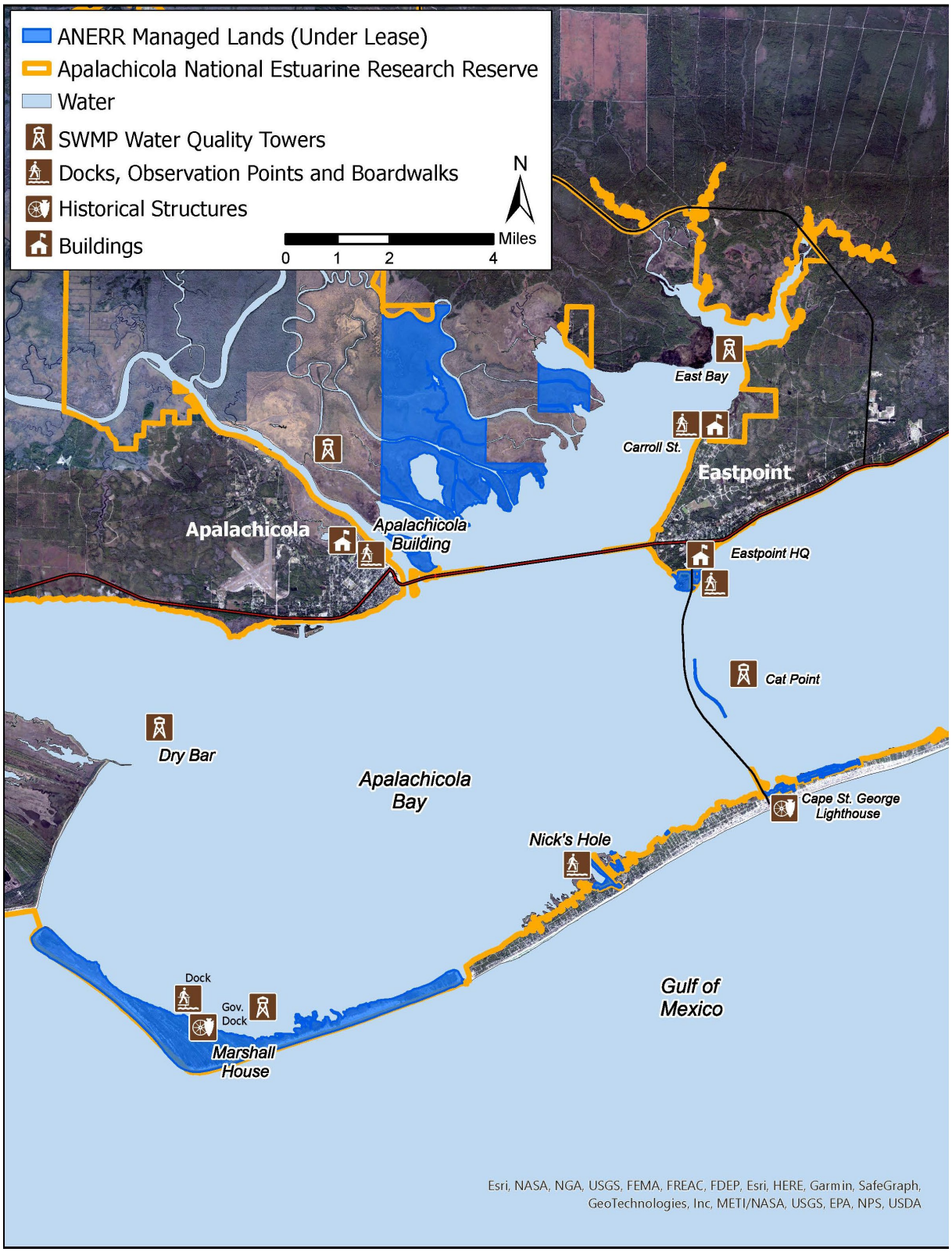
Headquarters Facility

The ANERR facility is sited on 26 acres of mixed oak/pine forest and salt marsh along the shore of Apalachicola Bay near the northern terminus of the St. George Island Bridge. The new ANERR Nature Center opened to the public in February 2011. The facility is approximately 18,000 square feet and was funded by both NOAA acquisition and construction grant funds and money appropriated by the Florida Legislature. The site where the facility is located was purchased by the State of Florida and assigned by the Board of Trustees of the Internal Improvement Trust Fund to DEP to manage as part of ANERR.

The facility was constructed so that various meetings/classes could happen simultaneously with normal walk-in visitation, and while both may happen in nearly the same space, neither would impinge on the other. For example, the Nature Center has a room within a room. This space is called the Bay Discovery room, which houses many hands-on exhibits. It has platform seating for roughly twenty-five. If a planned tour is watching a video or getting a presentation, the Bay Discovery room doors may be closed so the larger part of the Nature Center remains available for casual visitors. In the same vein, the multipurpose room can comfortably seat one hundred and is equipped to show video, but the larger room is divisible in two through the use of sliding partitions. When divided, the smaller portion will seat thirty and the larger room is available as meeting space. The arrival deck is connected to an amphitheater that lends itself to outdoor presentations, and doubles as a space where visitors may sit and relax. The building is on pilings allowing for the area under the building to be used as a covered area for outdoor programs. The exhibits and design of the facility are meant to give visitors an orientation as to where they are in Florida and within the Apalachicola-Chattahoochee-Flint watershed. Much of the interpretation demonstrates the connectivity among habitats (river, bay and gulf), to teach about the continuum of habitats.

The facility has an open area in the research and stewardship wing that houses the library, GIS area, and map room, along with a dive locker and shower area. There are two labs - a dry lab and a wet lab. A small kitchen was also included for use by staff and the CTP program to provide refreshments for their programs. Staff are currently designing signage to better enumerate planned trails and to enhance additional education components of the facility.

LEED Attributes: The building is LEED certified at the silver level. As such, new disturbance to the site was minimal. The building itself was planned to be constructed in an area previously disturbed therefore only a dozen or so small trees had to be removed. The building was built around larger trees. There is very little space between the forested habitat on site and the facility, so it appears to be a natural component of the site. Because most disturbances were concentrated within the footprint of the building and the parking areas, the remaining vegetation on site is native, and the small amount of landscaping needed was done with native plants that are found on the parcel.



Map 29 / Facilities and Infrastructure of the Reserve

Other LEED attributes include the use of pervious materials for all parking spaces with the exception of three handicap parking spaces. Additionally, the roof of the facility drains into cisterns that have 40,000 liters of water storage capacity located underneath the facility. Together, these two features make a very significant reduction in storm water run-off from the site so that no retention ponds were required to be constructed, which further reduced impacts to the site. This was the aim of ANERR since the important Cat Point oyster reef stretches south from the new facility site. Also, the cisterns serve to provide water to flush the toilets in the facility and are available to irrigate landscaping. Many of the light sources used are compact fluorescent bulbs and most are on motion sensors so are only on when a room is occupied. Also, there are many generously apportioned windows that allow for ample natural light inside the facility. All carpet in the building is made from recycled materials and put down in squares so that any damage to the carpet will only require the replacement of a square or two. The air handling system, and a heating, ventilating, and air conditioning (HVAC) unit, is programmed to respond to the heating or cooling needs of individual spaces or sections so that vacant areas are not over heated or over cooled. This system is also designed to moderate humidity levels so that conditioned air is not being overly absorbed by moist air in the building. Additionally, the HVAC system draws fresh air into the building which prevents stale air from continuing to be recycled. Also, many of the LEED design features of the building are interpreted through signage both in the building and on the grounds.

Facilities located in Apalachicola

Th Reserve maintains two facilities in Apalachicola. Both are situated in the city limits at the northern end of 7th Street. The first is ANERR's former headquarters and located across the street from it is a portable office building. The property that the buildings sit on was conditionally given to the State of Florida by the city of Apalachicola so that ANERR would have area parcel to build its first facility. The old headquarters is approximately 3,500 square feet and has been expanded twice since it was built in 1984. It has multiple exhibit spaces and an auditorium that can accommodate 40 people. Since the publication of the last management plan, there have been many changes to the Apalachicola building. The county, working with the University of Florida, supported the idea of utilizing the building to house the Institute of Food and Agricultural Sciences (UF/IFAS) Franklin County Extension and Sea Grant Office. Although the programs are run through the University of Florida, Franklin County is obligated to provide office space. A one-year lease agreement was executed to test the waters, during which Franklin County secured funding to complete minor repairs to the building and pave the access road and parking lot. Over the course of the year, the expected cost of the renovations skyrocketed, and the University decided to withdraw their plans to move into the building.

After other options were explored, Franklin County decided to move forward with their original plans to renovate the building and house the UF/IFAS office there. In 2018, the NERR executed a sublease with the County for a period of 20 years to house the UF/IFAS/Sea Grant Office. In lieu of the lease fee, Franklin County invested approximately $180,000 into the renovation of the building. The renovation included repairing an unlevel foundation at the front entrance, replacing damaged windows, and replacing part of the HVAC system. The bathrooms were renovated to be ADA compliant. All carpet was replaced, and concrete floors were covered with vinyl flooring. All lighting was repaired and retrofitted with energy-efficient LED fixtures. All of the interior was painted. The kitchen was gutted, and all new cabinets were installed. The work was completed in early 2020 and the extension staff have moved into the building. Two ANERR staff members have a small office still at the building and the Reserve an open invitation to use the upgraded meeting room when needed. Staff are also able to use the building as a base for field trips and research activities, since the Reserve boats are in slips nearby. Over the next five years, it is anticipated that new shingles will have to be put on the roof. Although still water-tight, some of the shingles are missing following Hurricane Michael in 2018. Also, a large greenhouse that used to house the Reserve's aquaria, will need to be either rebuilt or renovated to fit the new needs of the facility. Both the Extension and the Reserve focus outreach on restoration, so

there are many ideas for the future use of the space including spat on shell aquaculture and growing plants for living shorelines. The portable office building has been converted into dormitory space for visiting researchers. There are four bedrooms, one bathroom, a kitchen and a common space. This building, as well as the other portable located in Eastpoint will eventually have to be replaced. This idea is explored further down below.

Old Eastpoint Facility (Carroll St.)

The two older facilities in Eastpoint, the former research/shop building and the visiting scientist dormitory, are located at the northern end of Carroll Street on a tract known as Magnolia Bluff. The old Eastpoint facilities are on state-owned lands leased to the Florida Fish and Wildlife Conservation Commission (FWC) and subleased to Florida Department of Environmental Protection (DEP) under Sublease Agreement 3584-01, executed January 2001 (Appendix A.6), and for a term of 50 years. The purpose of the sublease is “only for the establishment and operation of administrative office, land base and maintenance shop, along with other related uses necessary for the accomplishment of this purpose.” Although the area used to meet the purpose of the sublease is approximately four acres, the acreage total of the sublease is 203.6 acres. The sublease states that a management plan for the area is required. To meet the requirement of the sublease, an abbreviated management plan for the ANERR use site is included in this document (Appendix E.9).

The former research building, built in 1997, is 8,000 square feet, and provides office and laboratory space to the FWC Fisheries Independent Monitoring group. Since the last management Plan was written, the use of this building has expanded to include the FWC Oyster Group and FWC Scallop group. In total, there are about 20 FWC staff that utilize this building. Before Hurricane Michael in 2018, FWC Bear Management staff also used the building. Since the storm, they have relocated to Carrabelle. The laboratory is outfitted with a hood, and is used to calibrate field equipment, species identification work, sample and gear storage. The shop area makes up 3,000 square feet of the building space. Many of ANERR’s tools are stored here, and it is a space where the maintenance staff can do repairs to vehicles, vessels, and other equipment. The grounds around this building are mostly pine flatwoods that are surrounded by salt marsh along the northeastern shore of the bay. The new Headquarters lacks space for storage, so most of the reserve’s large equipment, boats, trailers, and storage sheds are located on the grounds here. Behind the building is a dock that provides access to East Bay and has two lifts that hold ANERR boats for roughly three quarters of the year. The dock is wide enough to accommodate an All-Terrain Vehicle (ATV) which the research team uses to haul equipment between the boats and the parking lot. The visiting scientist dormitory is a portable building across the parking area from the research building. It has three bedrooms, two bathrooms, a kitchen, and a common space. A number of researchers and interns use this building each year.

Little St. George Island Facilities

When Little St. George Island was purchased by the state, there existed a primitive house (Marshall House), a derelict barn, and the Cape St. George lighthouse. The education, research, and stewardship programs occasionally use the Marshall House when they have overnight programs on the island, and it is used by staff to get out of inclement weather when they are working on the island. The derelict barn is not used, but a shed adjacent to the shed and serves to store ATVs and other equipment that is used on the island. There are also two docks on Little St. George Island, a staff dock and a public access dock, also known as the Government Dock. Finally, the lighthouse succumbed to coastal erosion and fell into the Gulf in October of 2005. Many of the bricks were recovered and used to rebuild the structure at a new location on St. George Island. The lighthouse belongs to the state through ANERR, but is managed by the St. George Lighthouse Association, a not-for-profit organization, under a lease agreement.

Other Reserve Infrastructure

Other than buildings, the Reserve maintains several other structures vital to the operation of the Reserve. This includes three docks, one at the Carroll St. office and two on Little St. George Island. The dock at Carroll St. is critical for access for researchers and staff to reach the East Bay monitoring infrastructure including a SWMP weather station, water quality station and surface elevation tables. The two docks on Little St. George Island provide access to the island for both staff and the public. The dock at Carroll St. and the staff dock on LSGI are nearing the end of their lifespan. Repairs are made continually to ensure that they are safe to staff and visitors. Repairs to the Carroll St. dock are planned for 2023 using state funding. No funding has been identified to replace the staff dock on the island. The other dock on the island; the government dock, was finished in 2020 after many years of repairs.

In addition to the boardwalks at the nature center, there is a boardwalk at the old headquarters in Apalachicola. This boardwalk has been maintained over time by replacing stringers, decking and handrails as needed, largely through a collaboration with the Conservation Corps of the Forgotten Coast. There is a small pier that serves as a wildlife viewing platform at Nicks Hole, which the staff maintain.

The Reserve maintains a handful of storm shelters at Millender Park and on LSGI. Usually, staff make repairs to these structures as needed. No new storm shelters are proposed over the next five years. The Reserve has several small kiosks at public access points around the Reserve. These kiosks are vital to communicating with the public as they utilize our managed lands. Periodic sign updates at these locations are needed to keep information up to date.

As outdoor recreation use increases in popularity on ANERR lands, the need for minimal sanitary and convenience facilities increases. DEP's Division of Recreation and Parks has developed a basic amenities package or start-up kit for DEP-managed lands. These packages were developed to provide ready amenities to properties having public access, but no facilities. The package provides for a prefabricated unisex restroom, a prefabricated weather shelter, an interpretive kiosk and stabilized parking as necessary. The use of this type of package or similar application will meet the need of providing sanitary facilities on ANERR-managed lands. They are more easily built than conventionally planned facilities and are cost effective. Also, the construction techniques facilitate placement of these improvements in remote locations. An assessment will be made to determine which areas may benefit from such amenities.

Resilience Improvements

In 2005, Hurricane Dennis made landfall more than 200 miles west of ANERR, but due to its path across the Gulf of Mexico, the storm generated an eight to ten-foot storm surge in Franklin County. Commercial and residential infrastructure was severely impacted along the coast as well as many of the natural resources. The very active 2004 and 2005 hurricane seasons prompted dramatic changes to the building codes in Florida, especially within the Coastal Construction Control Line (CCCL). Many of those changes were implemented during the construction of the new Reserve Headquarters, such as increased piling height and impact-resistant windows.

Hurricane Michael made landfall on Wednesday, October 10, 2018, as a weak Category 5 storm near Mexico Beach, Florida. The storm moved relatively fast over land and remained strong as it bisected the Panhandle and made its way through southern Georgia. Impacts were catastrophic in the wake of the storm. The storm surge, well over 15 feet in some areas, washed buildings off their foundations and anything at ground level inland. The damaging winds destroyed houses and infrastructure. Vast swathes of timber were laid flat. The worst impacts were centered in Gulf and eastern Bay counties. In

Franklin County, a storm surge was between eight and nine feet and the windspeed was between 90 and 100 mph. Many homes were damaged on St. George Island, Dog Island, Carrabelle and Lanark Village. As in neighboring counties, there was significant wind damage to trees, with an estimated 15 percent of the federal and state timberlands in Franklin County impacted (NWS Tallahassee Hurricane Michael Report, 2018).

The Reserve implemented its hurricane plan and was able to move the majority of mobile equipment to high ground (vehicles, vessels, UTVs, mowers). Some of the equipment was moved to a trailer, which was closed in the shop facility. The shop facility had about four to five feet of water inside of it during the storm, so even though the equipment was elevated, it was still underwater during the storm. Everything inside the building was also a complete loss. The water came up under the dorm facility, so all of the utilities had to be replaced, but the building itself was still sound. Remediation and repairs were started on the building very quickly, due to the availability of funding from a state trust fund. The repairs were started within two months of the storm and substantially complete approximately eight months after.

The Reserve headquarters also suffered damage due to the storm surge. The life support for the aquaria was inundated by seawater and some components were washed off the platform and pipes were dislodged from the ceiling. The system was re-engineered to be resilient to future flooding. This was done by replacing the wood platform with concrete, raising the platform and the electrical boxes, and securing the tanks to the platform. The final repairs were completed in the spring of 2020, approximately one and half years after the storm. There was a small amount of structural damage underneath the building, including stairwells and breakaway walls. The boardwalk system was damaged as well. About half of the boardwalk was completely raised out of the ground. These repairs were also completed by the spring of 2020.

Lastly, there was damage to the Reserve's monitoring equipment. Two of the Reserve's long-term water quality monitoring stations were destroyed – Dry Bar and East Bay. These towers had been built in 2011 as an upgrade to the previous structures. The towers, with weather stations and telemetry equipment on top, were completely upended. The equipment from the East Bay tower was recovered, but the Dry Bar equipment was never recovered. Staff believe that these two towers were lifted by the surge more than the other two towers because they had additional lower platforms just above the water line. During rebuilding, the lower platforms were built with decking which allows water to pass through easily. Construction on the new towers was completed in June 2021. The Reserve's sentinel stations were impacted as well, with the loss of the depth/conductivity sensors. Staff were unable to go out these sites to retrieve the sensors before the conditions were hazardous due to the rapid strengthening of the storm.

18.2 Planned Facilities, Facility Upgrades and Exhibits

Planning, Engineering and Permitting
Currently, the Reserve funds these activities through the state Fixed Capital Outlay funding and will most likely continue to do so as the funding can be used later a match for federal funding.

Staff dock at Little St. George Island or Carroll St., Eastpoint (Estimated Cost: $1,500,000 each): Currently, the Reserve maintains the two docks piecemeal by replacing pilings, decking and railings as needed. All of the repairs are funded through state Fixed Capital Outlay. However, in the future, if a complete rebuild is needed, then each dock would cost approximately $500,000 to complete.

New Dormitory Facility ($2,000,000): As the portable in Eastpoint nears its usable life and the portable in Apalachicola is almost 15 years old, the Reserve would like to move towards constructing a new dormitory facility that would cover the needs of the Reserve into the future. Most likely this building would have to be sited in Eastpoint at the Carroll St. Office as there is little space available at the other locations. Ideally, the dorm would have 10 single rooms, five bathrooms, a kitchen, and a common area. The building would have to be raised to comply with floodplain building codes (and the historical conditions of the site). The dorms have been incredibly valuable to the Reserve, not only to house visiting researchers, but also students, volunteers, invited speakers, summer interns, visiting agency staff, and new hires. It is often challenging for people new to the area to find housing. The dorms are a very important tool for recruiting staff to the area.

Exhibits ($200,000)

It has been twelve years since exhibits were created to demonstrate the connections between our natural communities and our human communities. While some exhibits remain timeless (and very popular with our visitors), others need to be updated at some point to reflect content changes, boundary changes, changes in management, or simply the method of delivery. Technology has advanced while at the same time the way that people interact with exhibits has changed. Over the last few years, the Reserve has made upgrades and repairs to the exhibits utilizing both state and federal funding, however these projects have been relatively small in scope. One large project funded by the state, was the creation of a 12-minute-long movie for the nature center. This movie has been pivotal in communicating the uniqueness of Apalachicola and the value in preserving this region. While no specific project is identified here, there may be needs related to updating video media, updating artwork/signage, updating casework/aquarium structures, and generally improving accessibility for all audiences.

Resiliency Projects

While the headquarters facility demonstrates several resilient features, there are always new technologies and improvements that can be made. As discussed above, some of those improvements have been made recently as part of the recovery from Hurricane Michael. Smaller scale projects have been identified, such as retrofitting the parking lot lights to solar power so that power lines are not run underground where they are likely to be inundated with saltwater. Solar power will also reduce electricity costs. Larger scale projects have been proposed such as fortifying the Carroll St. office from future flooding. Ideas have included a berm surrounding the building and/or installing temporary gates at each of the entrances to prevent flooding during storm surges. At this time, no scopes of work or cost estimates have been developed.

Strategy:

3.2.m Consider resilience to future flooding a/o storm surge when planning new Reserve facility and infrastructure construction.

Photo 21 / Lower River Marshes

Chapter 19: Land Acquisition Plan

19.1 Background of Land Acquisition

Land consolidation and acquisition activities within ANERR include acquisition goals focused on assuring for the establishment of adequate long-term state control over areas sufficient to provide protection for ANERR resources and acquiring current in-holdings within the boundary. This protection in turn will ensure a stable environment for research activities within ANERR. Of the total 234,715 acres within the ANERR boundary, 6,794 state-owned upland acres are managed by the Florida Department of Environmental Protection's (DEP) Office of Resilience and Coastal Protection (ORCP) under Lease #3862 from the Board of Trustees of the Internal Improvement Trust Fund. Many of the parcels are fragmented and disjointed but serve their acquisition purpose well by protecting the watershed from runoff-producing activities and providing public access. Other state and federally owned parcels within ANERR's boundary include areas managed by Florida Fish and Wildlife Conservation Commission, DEP's Florida Park Service, U.S. Fish and Wildlife Service and North Florida Water Management District. ANERR management staff enjoy advantages and face challenges not typical of the NERR System, due to ANERR's large boundary, physical location, and array of managing entities (see Chapter 2). The ANERR boundary currently encompasses 234,715 acres of submerged lands and leased uplands in Franklin, Liberty and Gulf counties, Florida (Map 28). Inclusion of the potential acquisitions listed below would increase the size of ANERR by 50,122 acres, to 284,837 acres.

19.2 Prospective Land Acquisitions

Florida's conservation land acquisition programs (Preservation 2000 (1990 – 1999); and Florida Forever (1999 – present)) have supported the acquisition of hundreds of thousands of acres of lands within the Apalachicola River Watershed, including lands managed by the Reserve. Florida Forever continues to serve as the blueprint for land acquisition in Florida. The Florida Forever Act, passed in 2000, highlights the "importance of conserving the state's natural and cultural heritage; providing urban open space; increasing public recreation opportunities; and supporting quality stewardship of the lands acquired (2023 Florida Forever Plan | Florida Department of Environmental Protection)." In the past decade, the program has invested approximately $3 billion dollars to conserve more than 1 million acres in Florida. Florida Forever is directed by the Acquisition and Restoration Council, which is comprised of state agency representation and members of the public that have backgrounds in environmental sciences, forestry, wildlife management and recreation. Each year, a prioritization occurs and an annual workplan is developed. The workplan is executed through the Department of Environmental Protection's Division of State Lands. Potential acquisitions are approved by the state's Board of Trustees.

One tool in the prioritization process is the Florida Ecological Greenways Network, which is a "database that identifies and prioritizes a functionally connected, statewide ecological network of public and private conservation lands (Florida Forever, 2023)." Florida Forever leverages several partnerships with state and federal agencies, local governments, conservation organizations and land trusts for cost-sharing and lowering of acquisition costs. Restitution from Deepwater Horizon has enabled the State to purchase key properties over the last several years including the Dickerson Bay addition to Tate's Hell State Forest. Currently, the State is working on the Apalachicola River Ecosystem Land Acquisition and Management project, which would include 32,000 acres of floodplain and 38 miles of river frontage along the Apalachicola River. This parcel would be contiguous with the northern boundary of the Reserve. Coastal resilience and climate change lands are also a priority for Florida Forever. Protecting vital coastal habitats and providing corridors for migration of species will ensure resilience to future climate change impacts. Protecting critical historical resources is another priority for the plan. On the 2023 Florida Forever Priority list, the Apalachicola River project is ranked #1 under the Critical Natural Lands category. The St. Joe Timberland project is ranked #2 under the Climate Change Lands category and the Pierce Mounds Complex is ranked #2 under the Critical Historical Resources category.

Land acquisition is contingent on working with a willing seller, negotiating around the fair market value of the property, and securing funding either through the State or other means. Sometimes acquisition is opportunistic. If there is a small parcel being offered at a reasonable price and it is within a current or historic acquisition project, the State may make an offer. This is how the Reserve acquired the 2.5-acre property adjacent to the Pelican Point property in 2020.

There are two existing Florida Forever projects (see Maps 30 and 31) that are considered priorities by ANERR due to their proximity to Apalachicola Bay, unique ecological attributes and cultural resources. First, the **St. Joe Timberland** project, which includes, among others, the St. Vincent Sound-to-Lake Wimico Ecosystem project. If acquired, this project would connect St. Joseph Bay State Buffer Preserve, the Box R Wildlife Management Area and ANERR. It includes a large portion of the Depot Creek drainage, and a large portion of the southern parcel flows directly into St. Vincent Sound, part of Apalachicola Bay. Since the last management plan was completed, two large acquisitions have been made adjacent to the Box R Ranch and within the St. Joe Timberland project. The first was a 1000-acre addition to Box R in early 2018, filling in a section of the property that was an inholding that fronts Lake Wimico. In early 2020, the Nature Conservancy purchased 20,146 acres surrounding Lake Wimico through the Gulf Environmental Benefit Fund Lake Wimico Acquisition: TNC and Partner Agencies

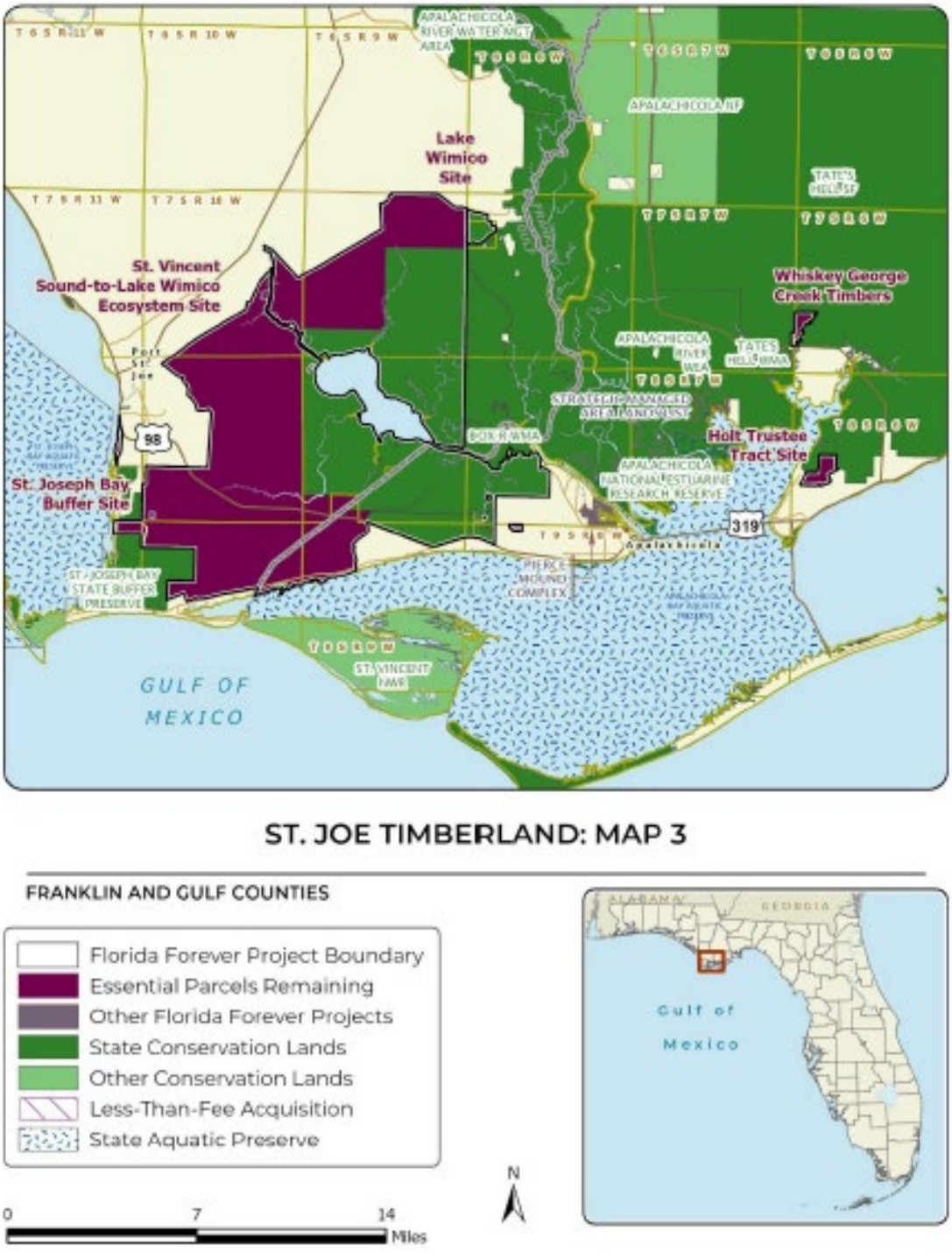
Protect 20,000 Acres of Vital Land in Northwest Florida. (Perchick, 2020). Once the purchase was complete, the Nature Conservancy transferred ownership to the state of Florida and now the land will be managed by the FWC, with 6,194 acres added to Box R WMA and 13,945 acres added to Apalachicola River Wildlife and Environmental Area. Second, the **Pierce Mounds Complex** Florida Forever project would place in public ownership one of the state's important archaeological sites and would also add a mosaic of upland natural communities.

While not part of the Reserve Boundary, **The St. Joseph Bay State Buffer Preserve** is managed by staff working through the Reserve. The Reserve staff primarily provide administrative support and budget oversight to the Buffer Preserve and the Aquatic Preserves in the northwest region of the ORCP. The BP and the APs have their own standalone funding for staff and operations, but report to leadership located at the ANERR. The Reserve has twelve full time, state-funded staff. Only eight of the twelve positions are used as match for the operations award. Of those eight, only 50% of the person's time is used as match for the award. The regional structure also benefits the Reserve in many ways. For example, the Buffer Preserve manager serves as the Burn Boss for any prescribed fire at the Reserve. ANERR's Assistant Manager oversees the manager of the buffer preserve. ANERR provides additional equipment and staffing needs for special projects and resource management. The buffer preserve works closely with a variety of researchers and students on projects ranging from the effects of climate change to fire ecology to listed species protection. ANERR Coastal Training Program and the Buffer Preserve staff routinely cooperate in on-site training and public outreach activities.

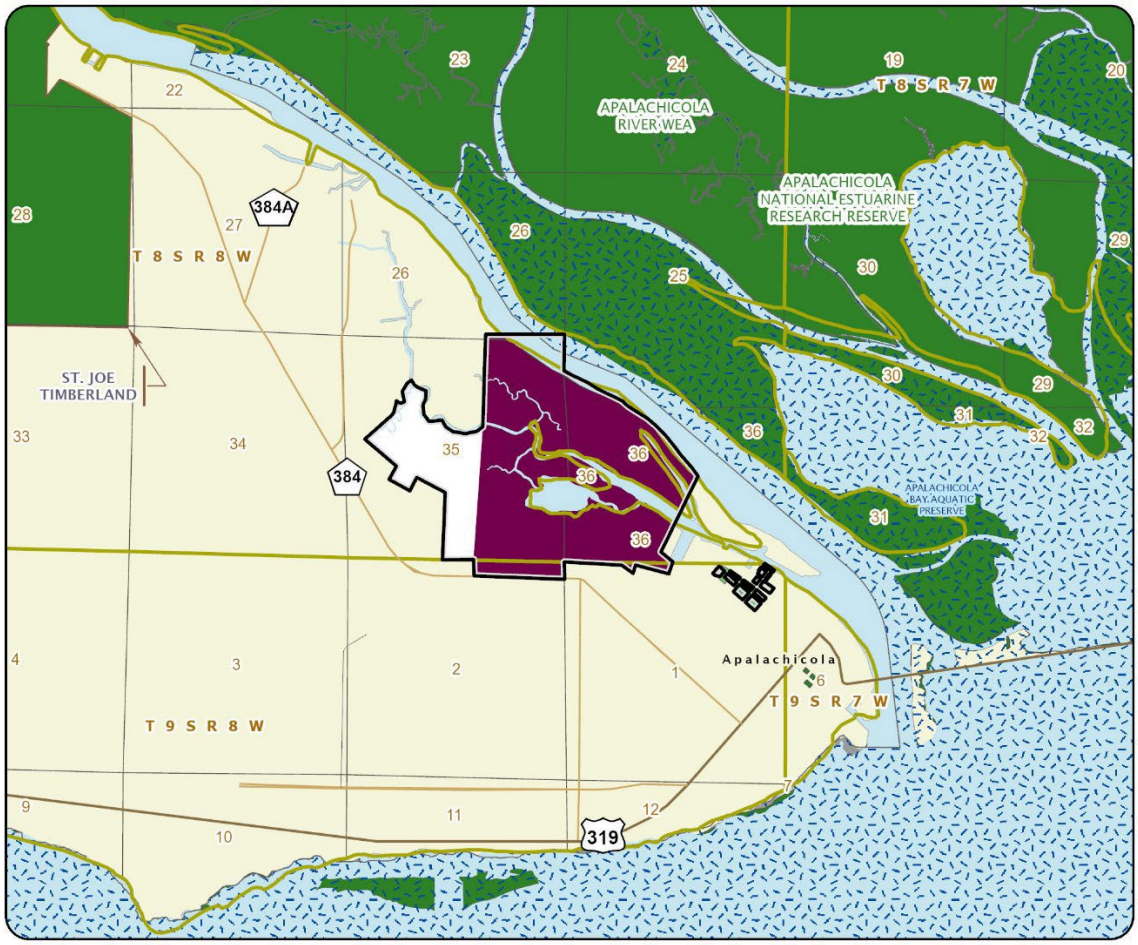
The property lies along the east and southwest coasts of St. Joseph Bay and consists of three major tracts.
State Road 30 bisects the southeastern tract. West of State Road 30 the land is mostly slash pine flatwoods and black needlerush marsh, while east of the highway the land rises onto old dunes with sandhill and scrub, lower areas are occupied by cypress swamps and bogs. Many rare plants are found on the preserve including Chapman's rhododendron, telephus spurge, panhandle spiderlily, thick-leaved water-willow, and bog tupelo. The Buffer Preserve provides protection for the Apalachicola River and Bay watershed, St. Joseph Bay and the Gulf of Mexico. Additionally, ANERR is pursuing the acquisition of uplands property along western St. Vincent Sound which would make the boundaries of ANERR and Buffer Preserve contiguous.

Indian Lagoon is the westernmost area of Apalachicola Bay and is bounded by the Indian Pass peninsula to the south, the St. Vincent Sound mainland to the north, and the Bay itself to the east. The lagoon is very shallow and consists of finer, organic sediments which are largely derived from the surrounding salt marsh and creek systems, as well as mesic pine-dominated forests. Expanding ANERR boundary to include Indian Lagoon would include a small, but productive part of Apalachicola Bay, and help make the connection to the other area of expansion (St. Joseph Bay State Buffer Preserve).

Other Adjacent Parcels: Priority parcels are identified in the State's acquisition plan, Florida Forever, as projects. Smaller parcels adjacent to the Reserve, may be considered for acquisition if they are part of previously identified projects. For instance, lots located on St. George Island near the Nicks Hole property are high priority for acquisition due to the value of the location as a nursery for commercially and recreationally important species.



Map 30 / St. Joe Timberland - St. Vincent Sound to Lake Wimico Ecosystem Site (From Florida Forever Plan 2023)



PIERCE MOUND COMPLEX

FRANKLIN COUNTY

- Florida Forever Project Boundary
- Essential Parcels Remaining
- Other Florida Forever Projects
- State Conservation Lands
- Other Conservation Lands
- Less-Than-Fee Acquisition
- State Aquatic Preserve

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Map 31 / Pierce Mound Complex (From Florida Forever Plan 2023)

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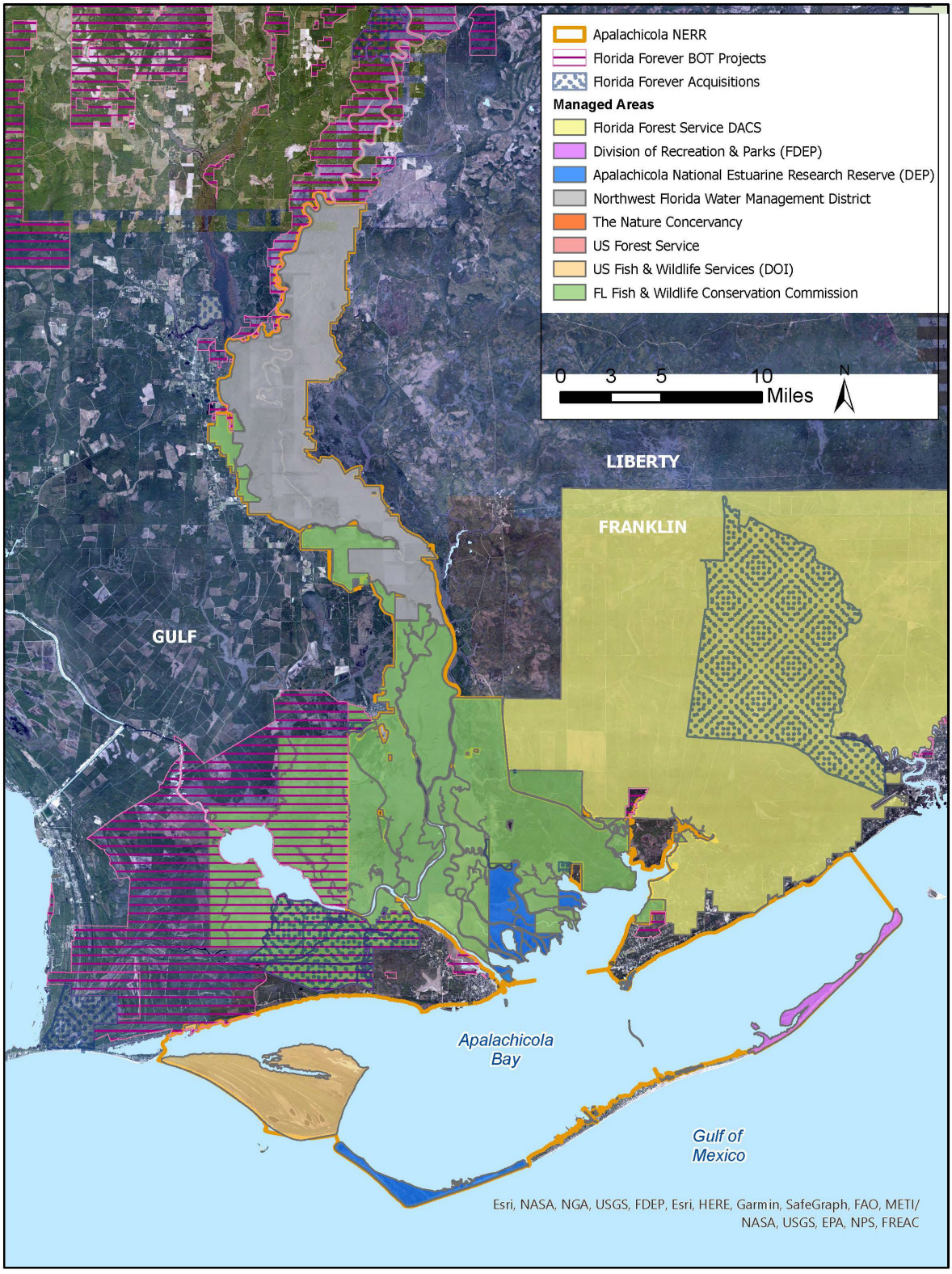

Map 31 / Prospective Land Acquisitions (Florida Forever Projects)

Strategies:

2.1.a Ensure public input into potential boundary expansion and acquisition of priority land parcels. (All)

3.1.m Identify land acquisition funding sources to purchase lands (identified by Florida Forever and ARSA plan) which would allow for the migration of important estuarine habitats. (R, S)

19.3 Planned Expansion of the Apalachicola Research Reserve Boundary

ANERR does not wish to pursue a boundary expansion during development of the management plan. However, over the last few years, with the large expansion of two of the areas managed by other entities within our boundaries (described above), we are considering a future boundary expansion. In addition to the expanded protection of the Apalachicola River watershed further to the west encompassing Lake Wimico, there are also current negotiations to acquire land further to the north, which would expand the ARWEA several miles upriver. The Reserve would like to wait until the new ARWEA boundary is finalized before pursuing an expansion of our boundary. An expansion would allow us to revisit our MOUs with our partners with the anticipated outcomes of strengthening our collaborations, facilitating more research, exploring new funding opportunities, and supporting our shared conservation goals.

LIST OF APPENDICES

Appendix A - Legal Documents

A.1 - Aquatic Preserve Resolution

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

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

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

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

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

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

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

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

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

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

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

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

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

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

designated managing agency for the preserve in question.

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

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

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

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

A.2 - Florida Statutes

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

- Florida Statutes, Chapter 253: State Lands
- Florida Statutes, Chapter 258: State Parks and Preserves
  Part II (Aquatic Preserves)
- Florida Statutes, Chapter 267: Historical Resources
- Florida Statutes, Chapter 370: Saltwater Fisheries
- Florida Statutes, Chapter 372: Wildlife
- Florida Statutes, Chapter 403: Environmental Control
- (Statute authorizing the Florida Department of Environmental Protection (DEP) to create Outstanding Florida Waters is at 403.061(27))
- Florida Statutes, Chapter 597: Aquaculture

A.3 - Florida Administrative Code

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

- **Florida Administrative Code, Chapter 18-20: Florida Aquatic Preserves**
  https://www.flrules.org/gateway/ChapterHome.asp?Chapter=18-20
- **Florida Administrative Code, Chapter 18-21: Sovereignty Submerged Lands Management**
  https://www.flrules.org/gateway/ChapterHome.asp?Chapter=18-21
- Florida Administrative Code, Chapter 62-302: Surface Water Quality Standards *(Rule designating Outstanding Florida Waters is at 62-302.700)*
  https://www.flrules.org/gateway/ChapterHome.asp?Chapter=62-302

A.4 - Management Agreements

MOA Friends of the Reserve

CITIZEN SUPPORT ORGANIZATION AGREEMENT

THIS AGREEMENT is made the 15 day of November 2019 by the State of Florida Department of Environmental Protection, hereinafter called "DEP," the Office of Resilience and Coastal Protection, hereinafter called the "RCP," and Friends of the Reserve (FOR), hereinafter called the" CSO," as an approved Citizen Support Organization for the Apalachicola National Estuarine Research Reserve hereinafter called "ANERR"{acronym for preserve/reserve/program}, an organizational entity within RCP.

PARTIES

1. DEP is an agency of the state created under Section *20:255,* Florida Statutes.

2. The CSO is a not for profit Florida corporation incorporated under the provisions of Chapter 617, F.S., and approved by the Florida Department of State.

PURPOSE

3. ANERR is vested with restoring and enhancing the ANERR for research, resource management, restoration, education, public enjoyment, and recreation.

4. The CSO desires to act as an approved Citizen Support Organization for the ANERR with all the requirements, rights, and privileges provided in Section 20.2551, Florida Statutes.

5. By this Agreement, the RCP on behalf of the DEP, has determined that the CSO's organization and purpose, as provided in the CSO's Articles of Incorporation, incorporated and made part of this Agreement as Exhibit "A", are consistent with the goals of DEP, RCP and the ANERR and are in the best interests of the State.

6. The RCP desires to permit the CSO to provide authorized services to the ANERR provided the CSO's activities are consistent with all statutes, rules, the goals of the RPC, and are in the best interests of the state, all as more particularly set forth in this Agreement.

NOW THEREFORE, it is agreed:

7. This Agreement and the documents or instruments incorporated herein by reference constitute the entire agreement between the parties and supersede all previous agreements or understandings between the parties, whether oral or written, of any kind or nature.

8. The RCP hereby grants to the CSO, and the CSO hereby accepts from RCP, an exclusive Agreement to serve as the Citizen Support Organization for the ANERR; and the CSO agrees to operate in conformance with all applicable Florida laws, including but not limited to, the standards and reporting requirements of Chapter 119, Florida Statutes and Sections 215.981, 112.3251, 20.2551, and 20.058, Florida Statutes, for the period stated herein, subject to all terms and conditions set forth in this Agreement, and the purposes as set forth in the Articles of Incorporation of the CSO.

9. Term of Agreement. This Agreement shall take effect upon execution and shall continue indefinitely or until terminated pursuant to legislative action or paragraph 10 of this Agreement and may be modified pursuant to paragraph 12 of this Agreement.

10. Termination of Agreement.

a. Any violation of, or failure to comply with, the terms of this Agreement shall, at the option of the RCP, constitute cause to terminate this Agreement after 30 days or either party to term for convenience in 90 days from receipt of written notice to the CSO. The CSO shall further ensure that it meets all not for profit corporate management and tax regulations and, in the event that the CSO ever fails to maintain its nonprofit status, it shall immediately notify DEP.

b. In the event that this Agreement is terminated with or without cause, the CSO will utilize all donated funds and resources in a manner consistent with the donor's intent and consistent with the CSO's Articles of Incorporation.

c. In the event that this Agreement is terminated, or the CSO otherwise ceases to exist, any remaining assets of the CSO shall be transferred to another approved Citizen Support Organization, earmarked for that specific preserve/reserve/program.

11.Activities of the CSO. The CSO is hereby authorized to conduct the following kinds of activities, projects, and events, and to provide the following kinds of services that include but are not limited to: fund raising events; official meetings of the CSO membership; volunteer activities and projects; a dminister grants and donations; public educational and interpretative activities; collect entrance and parking fees; ecotourism including boat and kayak tours; or conduct any other events and activities outlined in the Articles of Incorporation for the CSO.

12.Modification of Agreement. This Agreement may be modified in writing by the parties hereto.

13. Notice. All notices and orders given to the CSO may be served by mail at the following address: FOR, PO Box 931, Apalachicola, Florida 32329. All notices given to the RCP may be served by mail at the following address: 3900 Commonwealth Blvd., Mail Station 235, Tallahassee, Florida 32399, with a copy to the AN ERR Manager at 108 Island Drive, Eastpoint, Florida 32328

14. Fiscal Year. The CSO's Fiscal Year shall be January 1 to December 31.

15. CSO Responsibilities.

a. The CSO agrees to keep records in compliance with Section 20.2551, Florida Statutes and agrees to comply with Chapter 119, Florida Statutes, and allow public access to all documents, papers, letters, or other material subject to provisions of Chapter 119, Florida Statutes. This Agreement may be unilaterally canceled by the RCP for refusal by the CSO to allow public access to all documents, papers, letters, or other material subject to provisions of Chapter 119, Florida Statutes, and made or received by the CSO in conjunction with this Agreement.

b. Pursuant to Section 112.3251, Florida Statutes, the CSO's code of ethics must be posted conspicuously on the CSO's website.

c. In accordance with 20.2551, 20.058, and 215.981 Florida Statutes, the CSO agrees to provide a complete and accurate Annual Report, including the appropriate Internal Revenue Service forms.

d. In accordance with Section 215.981 (2), Florida Statutes, should the CSO's annual expenditures exceed $300,000, the CSO shall provide an annual financial audit of its accounts and records to be conducted by an independent certified public accountant in accordance with Rules of the Auditor General pursuant to 11.45(8). The audit report shall be submitted within 9 months after the end of the fiscal year to the Auditor General and to DEP.

e. The CSO is required to collect any sales or other tax required by law and properly remit collected taxes as required by law.

f. The CSO agrees and consents to allow DEP to conduct operational and financial reviews of the CSO's finances and other records with 14 business days prior notice, in order to assess compliance with the terms and conditions of this Agreement.

g. The CSO President, elected under the terms and conditions set forth in the CSO's Articles of Incorporation attached as Exhibit "A", shall be responsible for the CSO's compliance with the terms and conditions set forth in this Agreement. Details of the CSO President's responsibilities referenced in this Agreement are included in Exhibit "B", which is attached and incorporated by reference.

h. The CSO agrees that all funds generated by the CSO through the use of ANERR facilities, collection of entrance and parking fees, or funds generated by other events and activities, or use of the RCP's name or identity will be used as agreed upon by the Preserve/Reserve/Program Manager for the direct benefit of the RCP or in support of the CSO's stated purposes.

16. CSO Use of RCP Property. AN ERR may permit, without charge, appropriate use of RCP property, vehicles, vessels, equipment, staff and facilities by the CSO subject to the conditions of this paragraph. Such use must be directly in keeping with the approved purposes of the CSO and may not be made at times or places that would unreasonably interfere with opportunities for the general public to use the property and facilities, or normal reserve operations. In order to use property or facilities of ANERR, the CSO must:

a. Comply with all DEP, RCP, and ANERR policies, rules, and regulations as they may be amended periodically;

b. Develop and submit to the ANERR Manager, for review and prior written approval, on an annual basis, a program or schedule of all projects, activities and events it plans to carry out on ANERR property, including the designation of a specific location and time for such use;

c. Be responsible for maintaining the property, vehicles, vessels, facilities, or equipment assigned in a clean and orderly state. For vessels, ANERR will be responsible for routine maintenance, including fueling. The CSO shall, at its expense, complete pre-departure safety checks, flush engine following each use with fresh water, rinse canopy, hull, and engine with fresh water following each use, log in each use with captain's name, engine hours, destination, and gas consumption.

17.RCP Responsibilities. The ANERR Manager shall be primarily responsible for insuring performance of the terms and conditions of this Agreement. Details of the Manager's responsibilities referenced in this Agreement are included in Exhibit "B", which is attached and incorporated by reference. The _____ {preserve/reserve/program} Assistant Manager is hereby designated as liaison to the CSO. Details of the Assistant Manager responsibilities are included in Exhibit "B", which is attached and incorporated by reference.

a. At no time shall less than 85% of all revenue collected by the CSO not be used for the direct benefit of ANERR. For the purposes of this agreement, revenue shall be defined as fees collected by the CSO on behalf of AN ERR to include entrance and parking fees, AN ERR staff coordinated programs and facilities rentals. At no time are the CSO's administrative costs expected to exceed 15% of annual expenditures. Any administrative cost which would exceed 15% of total annual expenditures must be approved in advance, in writing, by the preserve/reserve/program manager.

b. The CSO is authorized to accept donations that benefit of ANERR Grant awards must be reviewed and coordinated by the Manager, to ensure that the grant application and work to be funded by such grant is consistent with the RCP's goals and objectives, maintenance or replacement needs of the ANERR, and the ANERR Management Plan. Funds collected by the CSO as mitigation or public interest shall be used for the direct benefit of AN ERR and as required by any applicable permit condition(s).

c. CSO Trusts or Investment Funds. If the CSO intends to participate in financial services, a trust or an investment fund, including an endowment fund or non-endowment fund, the proposed agreement must be reviewed and preapproved in writing by the Director of the RCP. The financial services agreement, trust and or investment fund must not contradict this Agreement. The CSO is not authorized to enter into a financial services agreement, trust or other investment fund that requires forfeiture of the principal.

d. Volunteer Liability. It is acknowledged that the CSO is operating as a Citizen Support Organization and volunteer nonprofit organization for the benefit of the DEP. As such, the activities of the CSO, which have been approved by its Board of Directors and officers, and by the RCP pursuant to this Agreement, are volunteers and are immune from tort liability pursuant to Section 617.0834, Florida Statutes. Each CSO officer and member of its Board of Directors must annually sign the RCPs Volunteer Agreement. This provision does not waive the State of Florida's or its agencies sovereign immunity under Section 768.28, Florida Statutes.

e. Worker's Compensation. DEP shall have no legal responsibility for workers' compensation coverage for CSO employees. The CSO is responsible for providing workers' compensation for CSO employees.

f. Conflicts of Interest. The CSO agrees that it presently has no interest and shall not acquire any interest that would conflict in any manner or degree with the stated goals of this Agreement or the mission of the CSO or the RCP. The CSO agrees not to conduct any program or activity that would be injurious or cause disrepute to the DEP, the RCP, or ANERR Additional guidance in state law regarding CSO's employees can be found in Section 112.3251, Florida Statutes, which addresses CSO code of conduct and prevents conflicts of interest. Notably, this law and Fla. Stat. § 112.313(10) prohibits a CSO employee from holding office as a member of the CSO's governing board while at the same time continuing to be an employee of the CSO.

g. Forum Selection and Choice of Law. The Agreement has been delivered in the State of Florida and shall be construed in accordance with the laws of Florida. Wherever possible, each provision of this Agreement shall be interpreted in such manner as to be effective and valid under applicable Florida law, but if any provision of this Agreement shall be prohibited or invalid under applicable Florida law, such provision shall be ineffective only to the extent of such prohibition or invalidity, without invalidating the remainder of such provision or the remaining provisions of this Agreement. Any action hereon or in connection herewith shall be brought in Leon County, Florida, unless prohibited by applicable law.

h. Third Party Beneficiaries. This Agreement is not intended nor shall it be construed as granting any rights, privileges or interest to any third party without mutual written agreement of the parties hereto.

i. Integration. This Agreement contains all the terms and conditions agreed upon by the parties, which terms and conditions shall govern all transactions between DEP/RCP and the CSO. Any alterations, variations, changes, modifications or waivers of provisions of this Agreement shall only be valid when they have been reduced to writing, duly signed by each of the parties hereto, and attached to the original of this Agreement. No oral agreements or representations shall be valid or binding upon the DEP/RCP or the CSO.

j. Authority. Each of the signatories to this Agreement confirms that he/she is duly authorized to execute and deliver this Agreement.

IN WITNESS WHEREOF, based on the foregoing, the State of Florida Department of Environmental Protection, Office of Resilience and Coastal Protection herein approves Friends of the Reserve as a Citizen Support Organization.
State of Florida signed by Alex Reed Friends of the Reserve signed by Catherin S. Franklin

Appendix B - Resource Data

B.1 - Glossary of Terms

References to these definitions can be found at the end of this list and in Appendix B.2 (References).

aboriginal - the original biota of a geographical region (Lincoln, Boxshall & Clark, 2003).
anaerobic - growing or occurring in the absence of molecular oxygen (Lincoln et al., 2003).
aquaculture - the cultivation of aquatic organisms (Lincoln et al., 2003).
aquifer – a body of porous rock or soil through which water passes and in which water gathers (Collin, 2004).
biodiversity – the range of species, subspecies or communities in a specific habitat such as a rainforest or a meadow (Collin, 2004).
biotic community – a community of organisms in a specific area (Collin, 2004).
codify - to arrange laws and rules systematically (Neufeldt & Sparks, 1990).
dendrochronology – the science of dating by means of tree rings; all aspects of the study of annual growth rings in wood (Allaby, 2005)
diversity - a measure of the number of species and their relative abundance in a community (Lincoln et al., 2003).
drainage basin (catchment) - the area from which a surface watercourse or a groundwater system derives its water; watershed (Allaby, 2005).
easement - a right that one may have in another's land (Neufeldt & Sparks, 1990).
ecosystem - a community of organisms and their physical environment interacting as an ecological unit (Lincoln et al., 2003).
emergent - an aquatic plant having most of the vegetative parts above water; a tree which reaches above the level of the surrounding canopy (Lincoln et al., 2003).
endangered species - an animal or plant species in danger of extinction throughout all or a significant portion of its range (U.S. Fish and Wildlife Service [FWS], 2015).
endemic - native to, and restricted to, a particular geographical region (Lincoln et al., 2003).
epifauna – the total animal life inhabiting a sediment surface or water surface; epibenthos (Lincoln et al., 2003).
estuary – a part of a river where it meets the sea and is partly composed of salt water (Collin, 2004).
extinction - the disappearance of a species from a given habitat (Lincoln et al., 2003).
fauna - the animal life of a given region, habitat or geological stratum (Lincoln et al., 2003).
flora - the plant life of a given region, habitat or geological stratum. (Lincoln et al., 2003).
geographic information system (GIS) - computer system supporting the collection, storage, manipulation and query of spatially referred data, typically including an interface for displaying geographical maps (Lincoln et al., 2003).
habitat – the type of environment in which a specific organism lives (Collin, 2004).
hydric - pertaining to water; wet (Lincoln et al., 2003).
infauna - the animal life within a sediment (Lincoln et al., 2003).
intertidal zone - the shore zone between the highest and lowest tides; littoral (Lincoln et al., 2003).
listed species - a species, subspecies, or distinct population segment that has been added to the Federal list of endangered and threatened wildlife and plants (FWS, 2015).
mandate - an order or command; the will of constituents expressed to their representative, legislature, etc. (Neufeldt & Sparks, 1990).

mesic - pertaining to conditions of moderate moisture or water supply; used of organisms occupying moist habitats (Lincoln et al., 2003).

midden - a refuse heap; used especially in archaeology (Lincoln et al., 2003).

monitoring – a process of regular checking on the progress of something (Collin, 2004).

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

pollution – the presence of unusually high concentrations of harmful substances in the environment, as a result of human activity or a natural process (Collin, 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).

runoff - part of precipitation that is not held in the soil but drains freely away (Lincoln et al., 2003).

salinity - a measure of the total concentration of dissolved salts in seawater (Lincoln et al., 2003).

sessile - non-motile; permanently attached at the base (Lincoln et al., 2003).

species - a group of organisms, minerals or other entities formally recognized as distinct from other groups; the basic unit of biological classification (Lincoln et al., 2003).

species of concern - an informal term referring to a species that might be in need of conservation action. This may range from a need for periodic monitoring of populations and threats to the species and its habitat, to the necessity for listing as threatened or endangered. Such species receive no legal protection and use of the term does not necessarily imply that a species will eventually be proposed for listing. A similar term is "species at risk," which is a general term for listed species as well as unlisted ones that are declining in population. Canada uses the term in its new "Species at Risk Act." “Imperiled species” is another general term for listed as well as unlisted species that are declining (FWS, 2015).

stakeholder - any person or organization who has an interest in the actions discussed or is affected by the resulting outcomes of a project or action (FWS, 2015).

subtidal - environment which lies below the mean low water level (Allaby, 2005).

supratidal - the zone on the shore above mean high tide level (Lincoln et al., 2003).

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

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

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

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

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.3 - Species Lists

A complete inventory of species found within ANERR can be found in ANERR's site profile, which is located at the following website: https://www.apalachicolareserve.com/wp-content/uploads/pdf/A_River_Meets_the_Bay.pdf.

B.3.1 - Listed Species

Legend: FT = Federally-Designated Threatened • FE = Federally-Designated Endangered • ST = State-Designated Threatened • SE = State-Designated Endangered • (S/A) = listed due to similarity of appearance • BGEPA = Bald and Golden Eagle Protection Act

Scientific Name	Common Name	Status
Fish		
Acipenser oxyrynchus desotoi	Gulf sturgeon	FT, ST
Pteronotropis (Notropis) welaka	Bluenose shiner	ST
Amphibians		
Ambystoma bishopi	Reticulated flatwoods salamander	FE, SE
Ambystoma cingulatum	Frosted flatwoods salamander	FT, ST
Haideotriton wallacei	Georgia blind salamander	ST
Amphibians		
Alligator mississippiensis	American alligator	FT (s/a)
Caretta caretta	Loggerhead sea turtle	FT, ST
Chelonia mydas	Green turtle	FT, ST
Dermochelys coriacea	Leatherback turtle	FE, SE
Drymarchon couperi	Eastern indigo snake	FT, ST
Gopherus polyphemus	Gopher tortoise	ST
Graptemys barbouri	Barbour's map turtle	ST
Lepidochelys kempii	Kemp's ridley	FE, SE
Pituophis melanoleucus mugitus	Florida pine snake	ST
Birds		
Ammodramus maritimus junciolus	Wakulla seaside sparrow	ST
Antigone canadensis pratensis	Florida sandhill crane	ST
Charadrius alexandrinus	Snowy plover	ST
Charadrius alexandrinus tenuirostris	Southeastern snowy plover	ST
Charadrius melodus	Piping plover	FT, ST
Cistothorus palustris marianae	Marian's marsh wren	ST
Egretta caerulea	Little blue heron	ST
Egretta rufescens	Reddish egret	ST
Egretta tricolor	Tricolored heron	ST
Falco sparverius paulus	Southeastern kestrel	ST

Scientific Name	Common Name	Status
Haematopus palliatus	American oystercatcher	ST
Haliaeetus leucocephalus	Bald eagle	BGEPA
Mycteria americana	Wood stork	FT, ST
Picoides borealis	Red-cockaded woodpecker	FE, SE
Platalea ajaja	Roseate spoonbill	ST
Rynchops niger	Black skimmer	ST
Sternula antillarum	Least tern	ST
Mammals		
Myotis grisescens	Gray bat	FE, SE
Myotis sodalis	Indiana bat	FE, SE
Trichechus manatus latirostris	West Indian manatee	FT, ST
Invertebrates		
Amblema neislerii	Fat threeridge mussel	FE, SE
Elliptoideus sloatianus	Purple bankclimber mussel	FT, ST
Plants		
Actaea pachypoda	Baneberry	SE
Andropogon arctatus	Chapman pinewoods bluestem, pinewoods bluestem	ST
Aquilegia canadensis	Columbine	SE
Arabis canadensis	Sickelpod	SE
Aristolochia tomentosa	Pipevine, wooly dutchman's pipe	SE
Arnica acaulis	Leopard's-bane	SE
Arnoglossum diversifolium	Indian plantain, variable leaved indian plantain	ST
Asclepias viridiflora	Milkweed, green flowered milkweed, green milkweed	SE
Asclepias viridula	Southern milkweed, green milkweed	ST
Aster spinulosus	Pinewoods aster, Apalachicola aster	SE
Baptisia megacarpa	Apalachicola wild indigo	SE
Baptisia simplicifolia	Scare-weed	ST
Calamintha dentata	Florida calamint, toothed savory	ST
Callirhoe papaver	Poppy mallow , woodland poppy mallow	SE
Calopogon multiflorus	Many-flowered grass pink	ST
Calycanthus floridus	Sweet-shrub, Carolina-allspice, bubby-shrub	SE
Carex baltzellii	Baltzell's sedge	ST
Cleistes divaricata	Rosebud orchid, spreading pogonia, lady's ettercap, rose orchid	SE
Conradina glabra	Apalachicola rosemary, Apalachicola false rosemary	FE, SE
Cornus alterniflor	Pagoda dogwood , alternate-leaf dogwood, pagoda cornel, umbrella cornel	SE
Croomia pauciflora	Few-flowered croomia , croomia	SE
Cryptotaenia canadensis	Honewort , wild chervil, Canadian honewort	SE
Cuphea aspera	Florida waxweed, tropical waxweed, Chapman's waxweed	SE

Scientific Name	Common Name	Status
Cynoglossum virginianum	Wild comfrey	SE
Delphinium carolinianum	Larkspur, Carolina larkspur	SE
Drosera intermedia	Spoon-leaved sundew, water sundew, narrowleaf sundew	ST
Echinacea purpurea	Purple coneflower	SE
Epigaea repens	Trailing arbutus	SE
Erythronium umbilicatum	Dogtooth-violet, dimpled dogtooth-violet, trout lily, amberbell, dimpled troutlilly	SE
Euonymus atropurpureus	Burningbush, wahoo, spindle tree, strawberry bush, arrow wood, eastern wahoo	SE
Euphorbia telephioides	Telephus spurge	FT, SE
Gentiana pennelliana	Wiregrass gentian	SE
Goodyera pubescens	Downy rattlesnake plantain, downy rattlesnake orchid	SE
Harperocallis flava	Harper's beauty	FE, SE
Hepatica nobilis	Liverleaf, roundolobed liverleaf	SE
Hexastylis arifolia	Wild ginger, Heartleaf, heartleaf wild ginger, little-brown-jug	ST
Hybanthus concolor	Green violet	SE
Hydrangea arborescens	Smooth hydrangea, wild hydrangea, mountain hydrangea, seven-bark, American hydrangea	SE
Hymenocallis henryae	Panhandle spiderlily, Mrs. Henry's spiderlily, green pine lily, green spiderlily	SE
Hypericum lissophloeus	Smooth-barked St. John's-wort, water-cedar	SE
Isopyrum biternatum	False rue-anemone	SE
Justicia crassifolia	Thick-leaved water willow	SE
Kalmia latifolia	Mountain laurel, ivy, calico bush, spoon wood	ST
Leitneria floridana	Florida corkwood, corkwood	ST
Liatris provincialis	Godfrey's blazing star , Godfrey's gayfeather	SE
Lilium catesbaei	Pine lily, Catesby lily, leopard lily, southern red lily	ST
Lilium michauxii	Carolina lily, turk's cap lily	SE
Linum westii	Orange-flowered flax, West's flax	SE
Lobelia cardinalis	Cardinal flower	ST
Lupinus westianus	Sanddune lupine, Gulfcoast lupine	ST
Lythrum curtissii	Loosestrife, Curtiss' loosestrife, Curtiss' lythrum	SE
Macbridea alba	White birds-in-a-nest	FT, SE
Macranthera flammea	Hummingbird flower, flameflower	SE
Magnolia ashei	Ashe's magnolia	SE
Magnolia pyramidata	Pyramid magnolia, cucumber tree, wood-oread	SE
Malaxis unifolia	Green adder's-mouth, green addersmouth orchid	SE
Malus angustifolia	Crab apple,flowering crabapple, southern crabapple	ST
Matelea alabamensis	Alabama spiny-pod, Alabama milkvine	SE
Matelea baldwiniana	Baldwin's spiny-pod, Baldwin's milkvine	SE
Matelea flavidula	Yellow-flowered angelpod, yellow-flowered spiny-pod, yellow Carolina milkvine	SE
Matelea floridana	Florida milkweed, Florida spinypod, Florida milkvine	SE
Matelea gonocarpa	Angle-pod	ST

Scientific Name	Common Name	Status
Medeola virginiana	Indian cucumber-root, cushat lily	SE
Nolina atopocarpa	Florida beargrass	ST
Opuntia stricta	Prickly pear, shell mound prickly pear, erect prickly pear, common prickly pear	ST
Oxypolis greenmanii	Giant water-dropwort, giant water cowbane	SE
Parnassia caroliniana	Coastal or Carolina grass-of-parnassus, brook parnassia	SE
Parnassia grandifolia	Large -leaved grass-of-parnassus, undine	SE
Phoebanthus tenuifolia	Narrow leaved phoebanthus, pineland false sunflower	ST
Physostegia godfreyi	Obedient plant, Apalachicola dragon-head, Apalachicola obedience plant, Godfrey's dragonhead	ST
Pinckneya bracteata	Fever tree, maiden's blushes, Georgia bark	ST
Pinguicula ionantha	Godfrey's or Panhandle butterwort, violet butterwort	FT, SE
Pinguicula lutea	Yellow butterwort	ST
Pinguicula planifolia	Chapman's or swamp butterwort, flatleaf butterwort	ST
Pityopsis flexuosa	Panhandle golden aster, zigzag silkgrass, bent golden aster	ST
Platanthera blephariglottis	White fringed orchid , plume of Navarre, large white-fringed orchid	ST
Platanthera cristata	Crested fringed orchid	ST
Platanthera flava	Southern rein-orchid, Southern tubercled orchid, Gypsy-spikes, palegreen orchid	ST
Platanthera integra	Orange rein-orchid, Southern yellow fringeless orchid, frog arrow	SE
Platanthera nivea	Snowy orchid, bog orchid , frog spear, white rein orchid	ST
Pogonia ophioglossoides	Rose pogonia , ettercap, crested ettercap, rose crested orchid	ST
Polygonella macrophylla	Large-leaved jointweed	ST
Rhexia parviflora	Small-flowered or Apalachicola meadow beauty	SE
Rhexia salicifolia	Panhandle meadow beauty	ST
Rhododendron austrinum	Florida flame azalea, orange azalea	SE
Rhododendron chapmanii	Chapman's rhododendron, rose-bay	FE, SE
Ruellia noctiflora	Night-flowering ruellia, night-flowering petunia	SE
Sarracenia leucophylla	White-top pitcher-plant	SE
Sarracenia psittacina	Parrot pitcher-plant	ST
Schisandra coccinea	Bay star vine, wild sasparilla, schisandra	SE
Scutellaria floridana	Florida skullcap, helmet flowers	FT, SE
Sideroxylon thornei	Thorne's buckthorn, Georgia bully	SE
Silene polypetala	Fringed campion, fringed catchfly, fringed pink, eastern fringed catchfly	FE, SE
Spiranthes ovalis	Lesser ladies'-tresses, oval ladies' tresses, October ladies' tresses	SE
Stachydeoma graveolens	Mock pennyroyal	SE
Stachys crenata	Shade betony	SE
Staphylea trifolia	Bladdernut, American bladdernut	SE
Stewartia malachodendron	Silky camellia	SE
Taxus floridana	Florida yew	SE
Torreya taxifolia	Florida torreya, Stinking cedar, gopherwood	FE, SE

Scientific Name	Common Name	Status
Trillium lancifolium	Wakerobins, lance-leaved wakerobin, narrow leaf trillium	SE
Uvularia floridana	Bellwort, Florida bellwort, Florida merrybells	SE
Veratrum woodii	False hellebores, Wood's false hellebore	SE
Verbesina chapmanii	Chapman's crownbeard	ST
Xanthorhiza simplicissima	Yellow-root, brook feather	SE
Xyris isoetifolia	Yellow-eyed grass, quillwort yellow-eyed grass	SE
Xyris longisepala	Karst pond yellow-eyed grass, karst pond xyris, Kral's pond yellow-eyed grass	SE
Xyris scabrifolia	Harper's yellow-eyed grass	ST
Yucca gloriosa	Moundlily yucca, Spanish dagger, Roman candle, palm lily	SE
Zephyranthes treatiae	Rain-lily, Treat's zephyr lily, easter lily, Treat's rainlily	ST

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

This will be posted in the final draft of the plan.

B.4 - Arthropod Control Plan

May 29, 2013

Mr. Lee Edmiston, Director
ANERR
Eastpoint, FL 32328

Dear Lee:

Please lie advised that Franklin County has not and does not engage in aerial spraying for any arthropods, including mosquitoes, in any area of the county. The Board of County Commissioners recognizes the risk aerial spraying poses to the health and productivity of the Apalachicola Bay.

If the occasion ever arises where aerial spraying is a necessity for the protection of public health the Board will certainly contact the Reserve before any spraying is done. The county has traditionally not participated in aerial spraying after hurricanes, but from time to lime, depending on the storm event and the amount of rain, both the state and the FEMA have asked the county if it wants to participate in some jointly funded programs. If this situation arises the Reserve will be contacted regarding any spraying of land managed by the Reserve, and a plan mutually agreeable to both parties will be put in place before any spraying occurs.

If I can be of further assistance please let me know.

Sincerely,

Alan C. Pierce, Director
Administrative Services

Cc: Dewitt Polous, Mosquito Control

B.5 - Archaeological and Historical Sites Associated with Apalachicola National Estuarine Research Reserve

The list below was derived from shapefiles obtained from the Florida Department of State, Division of Historical Resources on August 2, 2023, and includes sites within 50 meters of Reserve boundaries.

*Sites denoted by an asterisk fall partially within ANERR boundaries and partially outside of ANERR boundaries.

Site ID	Site Name	Site Type	Site location
CA00069	Queen City*	No further information	Within ANERR Boundaries
FR00001	Porter's Bar*	Historic burial(s); Homestead	Within ANERR Boundaries
FR00007	Topsail Bluff*	Habitation (prehistoric); Prehistoric shell midden	Within ANERR Boundaries
FR00009	Nine Mile Point*	Prehistoric shell midden	Within ANERR Boundaries
FR00010	Eleven Mile Point*	Prehistoric, multi-use site.	Within ANERR Boundaries
FR00013	Five Mile Point*	Prehistoric shell midden	Within ANERR Boundaries
FR00017	NN*	Campsite (prehistoric); Prehistoric shell midden	Within ANERR Boundaries
FR00024	Saint George West	Prehistoric midden(s)	Directly Managed by ANERR
FR00027	New Pass Site/Oyster Bay Village*	Prehistoric, multi-use site.	Within ANERR Boundaries
FR00056	No Name Wreck Site	Historic shipwreck	Within ANERR Boundaries
FR00059	NN*	Building remains; Prehistoric shell midden	Within ANERR Boundaries
FR00060	Sportsman*	Prehistoric, multi-use site.	Within ANERR Boundaries
FR00064	Fort Gadsden Historic Memorial	Historic burial(s)	Within 50 meters of ANERR Boundaries
FR00069	Cape St. George Lighthouse	Lighthouse and outparcel.	Structure no longer located within ANERR boundaries
FR00071	Paradise Point	Habitation (prehistoric); Prehistoric shell midden	Within ANERR Boundaries
FR00079	St George Plantation - Leisure Properties*	Prehistoric midden(s)	Within ANERR Boundaries
FR00282	Power Generating Plant	Commercial	Within 50 meters of ANERR Boundaries
FR00286	Kimball Marine Ways	Private residence	Within 50 meters of ANERR Boundaries
FR00352	Saint Vincent Ferry	Prehistoric, multi-use site.	Within ANERR Boundaries
FR00354	Saint Vincent Point	Prehistoric, multi-use site.	Within ANERR Boundaries
FR00356	Big Bayou 1	Prehistoric, multi-use site.	Within ANERR Boundaries
FR00357	Big Bayou 2	Prehistoric, multi-use site.	Within ANERR Boundaries
FR00358	Headquarters Marsh	Prehistoric shell midden	Within ANERR Boundaries
FR00359	Fort Mallory	Historic earthworks	Within ANERR Boundaries
FR00360	Saint Vincent 1	Prehistoric, multi-use site.	Within ANERR Boundaries
FR00361	Saint Vincent 2	Prehistoric, multi-use site.	Within ANERR Boundaries
FR00362	Saint Vincent 3	Prehistoric, multi-use site.	Within ANERR Boundaries
FR00363	Saint Vincent 4	Prehistoric, multi-use site.	Within ANERR Boundaries
FR00364	Saint Vincent 5	Prehistoric, multi-use site.	Within ANERR Boundaries
FR00365	Saint Vincent 6	Prehistoric, multi-use site.	Within ANERR Boundaries

Site ID	Site Name	Site Type	Site location
FR00366	Saint Vincent 7	Prehistoric, multi-use site.	Within ANERR Boundaries
FR00367	Saint Vincent 8	Prehistoric, multi-use site.	Within ANERR Boundaries
FR00368	Saint Vincent 9	Prehistoric, multi-use site.	Within ANERR Boundaries
FR00369	Saint Vincent 10	Prehistoric, multi-use site.	Within ANERR Boundaries
FR00370	Saint Vincent 11	Prehistoric, multi-use site.	Within ANERR Boundaries
FR00739	Bloody Bluff South	Prehistoric midden(s)	Within ANERR Boundaries
FR00744	Van Horn Creek Shell Mound	Prehistoric shell midden	Directly Managed by ANERR
FR00745	Hendrix 2	Prehistoric shell midden	Directly Managed by ANERR
FR00746	Pilots Cove	Prehistoric shell midden	Directly Managed by ANERR
FR00747	Cape St George Lighthouse Keepers Quarters	Lighthouse	Directly Managed by ANERR
FR00748	Government Dock	Wharf / Dock / Pier	Directly Managed by ANERR
FR00749	Turpentine Camp	Turpentine camp	Directly Managed by ANERR
FR00752	Bleached Bones	No further information	Within ANERR Boundaries
FR00754	Sam's Creek Cutoff Shell Mound	Prehistoric burial(s); Prehistoric shell midden	Within ANERR Boundaries
FR00755	Thank You Ma'am Creek	Prehistoric, multi-use site.	Within ANERR Boundaries
FR00756	Doug Elam*	No further information	Within ANERR Boundaries
FR00757	Carmichael	Prehistoric shell midden	Within 50 meters of ANERR Boundaries
FR00759	Gardner Landing	No further information	Within ANERR Boundaries
FR00785	Dot's Landing*	Prehistoric midden(s)	Within ANERR Boundaries
FR00786	Marsh Point*	Lithic scatter/quarry (prehistoric: no ceramics)	Within ANERR Boundaries
FR00787	Royal Bluff*	No further information	Within ANERR Boundaries
FR00801	BHR-EP1	No further information	Within ANERR Boundaries
FR00804	Cape St George/Hendrix 1	Prehistoric shell midden	Directly Managed by ANERR
FR00805	Chert Scraper	Lithic scatter/quarry (prehistoric: no ceramics)	Directly Managed by ANERR
FR00806	Gardener's Landing Shell Mound*	Campsite (prehistoric); Prehistoric shell midden	Within ANERR Boundaries
FR00807	Nicks Hole	Prehistoric; Redeposited site (to this location)	Directly Managed by ANERR
FR00832	Nagel 1*	Prehistoric shell midden	Within ANERR Boundaries
FR00833	Nagel 2*	Prehistoric shell midden	Within ANERR Boundaries
FR00834	Nagel 3*	Prehistoric shell midden	Within ANERR Boundaries
FR00835	Nagel 4*	Prehistoric shell midden	Within ANERR Boundaries
FR00836	Nagel 5*	Prehistoric shell midden	Within ANERR Boundaries
FR00837	Nagel 6*	Prehistoric shell midden	Within ANERR Boundaries
FR00838	Nagel 7*	Prehistoric shell midden	Within ANERR Boundaries
FR00839	Nagel 8*	Prehistoric shell midden	Within ANERR Boundaries
FR00845	Late PM Midden	Prehistoric, multi-use site.	Within ANERR Boundaries
FR00854	Two Mile	Prehistoric, multi-use site.	Within 50 meters of ANERR Boundaries

Site ID	Site Name	Site Type	Site location
FR00855	Ten-and-a-Half-Mile*	Prehistoric shell midden	Within ANERR Boundaries
FR00856	Sneads Hammock Shell Mound	Prehistoric, multi-use site.	Within ANERR Boundaries
FR00857	Cape St. George Shipwreck	Historic shipwreck	Directly Managed by ANERR
FR00859	Breakaway Marina	Campsite (prehistoric); Prehistoric shell midden	Within 50 meters of ANERR Boundaries
FR00860	Bloody Bluff House	Private residence	Within ANERR Boundaries
FR00861	Bloody Bluff Cemetery*	No further information	Within ANERR Boundaries
FR00862	High Bluff Homestead*	Homestead; Historic well	Within ANERR Boundaries
FR00863	Creels*	Historic multi-use site.	Within ANERR Boundaries
FR00864	Sand Beach Hammock	Prehistoric, multi-use site.	Within ANERR Boundaries
FR00876	Bloody Bluff Landing	Turpentine camp; Wharf / Dock / Pier	Within ANERR Boundaries
FR00878	Creels Side Camp	Turpentine camp	Within ANERR Boundaries
FR00888	Cape Saint George East Site	Prehistoric, multi-use site.	Within ANERR Boundaries
FR00915	Millender Tract Site	Prehistoric, multi-use site.	Directly Managed by ANERR
FR00915	Millender Tract Site*	Prehistoric, multi-use site.	Within ANERR Boundaries
FR00916	Porter Lake Steamboat	Historic shipwreck	Within ANERR Boundaries
FR00917	Porter Lake Barge	Historic shipwreck	Within ANERR Boundaries
FR00919	SGI Anomaly #13	Saltwater submerged site	Within ANERR Boundaries
FR00951	Huckleberry Boat Landing	Wharf / Dock / Pier	Within 50 meters of ANERR Boundaries
FR00952	Bluff Road Landing*	Historic structure.	Within ANERR Boundaries
FR00960	Shiver-Thompson Boat	Historic shipwreck	Within ANERR Boundaries
FR00961	Apalachicola Trader's Canoe	Log Boat - Historic or Prehistoric	Within ANERR Boundaries
FR00968	Brothers River Apiary	No further information	Within ANERR Boundaries
FR00971	Hatch Cemetery*	Family cemetery	Within ANERR Boundaries
FR00973	Pierce Cabin	Park; Private residence	Within ANERR Boundaries
FR00974	Pierce Boathouse	No further information	Within ANERR Boundaries
FR01146	St. George Is. Bomb Range # 1*	WWII training area	Within ANERR Boundaries
FR01147	St. George Is. Bomb Range # 2*	WWII training area	Within ANERR Boundaries
FR01148	St. George Is. Strafing Range*	WWII training area	Within ANERR Boundaries
FR01149	St. George Is. Skip Bombing Range*	WWII training area	Within ANERR Boundaries
FR01150	St. George IS. Pursuit Curve Range*	WWII training area	Within ANERR Boundaries
FR01265	Big Bayou South	Campsite (prehistoric); Prehistoric shell midden	Within ANERR Boundaries
FR01277	Mallard Slough Site	Habitation (prehistoric); Prehistoric shell midden	Within ANERR Boundaries
FR01280	Little St. George Historic Scatter	Building remains	Directly Managed by ANERR
FR01300	Marshall House Field Station Main House	Historic structure	Directly Managed by ANERR

Site ID	Site Name	Site Type	Site location
FR01302	Apalachicola Waterfront	Habitation (prehistoric); Prehistoric midden(s)	Within 50 meters of ANERR Boundaries
FR01303	Poor Man's Creek Site*	Habitation (prehistoric); Prehistoric burial mound(s)	Within ANERR Boundaries
FR01367	Little Redfish Creek	Campsite (prehistoric)	Within ANERR Boundaries
FR01368	233 Patton Dr	Private residence	Within 50 meters of ANERR Boundaries
FR01375	Cat Point	Campsite (prehistoric); Prehistoric shell midden	Directly Managed by ANERR
FR01380	Lewis Leland Headstone	No further information	Directly Managed by ANERR
FR01390	Fort Gadsden Wreck	Historic shipwreck	Within ANERR Boundaries
FR01395	Short Cut Delta	Prehistoric midden(s)	Within 50 meters of ANERR Boundaries
FR01397	555 HWY 98	Private residence	Within 50 meters of ANERR Boundaries
FR01406	575 HWY 98	Private residence	Within 50 meters of ANERR Boundaries
FR01408	571 HWY 98	Private residence	Within 50 meters of ANERR Boundaries
FR02054	2636 HWY 98 W	Private residence	Within 50 meters of ANERR Boundaries
FR02055	2728 HWY 98 W	Private residence	Within 50 meters of ANERR Boundaries
FR02056	2730 HWY 98 W	Private residence	Within 50 meters of ANERR Boundaries
FR02057	2738 HWY 98 W	Private residence	Within 50 meters of ANERR Boundaries
FR02058	2746 HWY 98 W	Private residence	Within 50 meters of ANERR Boundaries
FR02063	555 HWY 98	No further information	Within ANERR Boundaries
FR02183	326 Patton Dr	Commercial	Within 50 meters of ANERR Boundaries
FR02185	263 Patton Dr	Private residence	Within 50 meters of ANERR Boundaries
FR02186	258 Patton Dr	Commercial and residence	Within 50 meters of ANERR Boundaries
FR02188	72 Patton Dr	Private residence	Within 50 meters of ANERR Boundaries
FR02248	147 North Bayshore Dr	Private residence	Within 50 meters of ANERR Boundaries
FR02253	431 McCloud St	Private residence	Within 50 meters of ANERR Boundaries
FR02258	327 Land St	Private residence	Within 50 meters of ANERR Boundaries
FR02268	523 W Sawyer St	Private residence	Within 50 meters of ANERR Boundaries
FR02274	625 W Bayshore Dr	Private residence	Within 50 meters of ANERR Boundaries
FR02305	481 E Gulf Beach Dr	Private residence	Within 50 meters of ANERR Boundaries
FR02434	239 Water Street	Other	Within 50 meters of ANERR Boundaries
FR02435	Buddy Ward & Sons Seafood	Commercial	Within 50 meters of ANERR Boundaries
FR02437	119 Water St	No further information	Within 50 meters of ANERR Boundaries

Site ID	Site Name	Site Type	Site location
FR02668	0 Highway 98	Commercial	Within 50 meters of ANERR Boundaries
FR02669	454 US Highway 98	Mobile Home/Trailer Home	Within 50 meters of ANERR Boundaries
FR02858	53 S Bayshore Dr	Private residence	Within 50 meters of ANERR Boundaries
FR02859	153 S Bayshore Dr	Private residence	Within 50 meters of ANERR Boundaries
FR02867	266 HWY 98	Private residence	Within 50 meters of ANERR Boundaries
FR03473	Old St. George Island Bridge South*	Bridge	Within ANERR Boundaries
FR03474	Old St. George Island Bridge North*	Bridge	Within ANERR Boundaries
GU00004	Isabel Landing	Prehistoric burial mound(s); Ceramic scatter	Within ANERR Boundaries
GU00005	Chipola Cut-Off*	Prehistoric, multi-use site.	Within ANERR Boundaries
GU00014	Confederate Battery Gilmer	Historic fort	Within ANERR Boundaries
GU00027	Douglas Landing	Ceramic scatter	Within 50 meters of ANERR Boundaries
GU00033	Saul's Creek Road East	Prehistoric lithics only, but not quarry	Within ANERR Boundaries
GU00035	Saul's Creek Road West	Ceramic scatter	Within ANERR Boundaries
GU00037	Dead Field House*	Historic refuse / dump; Ceramic scatter	Within ANERR Boundaries
GU00038	Overgrown Road	Ceramic scatter	Within ANERR Boundaries
GU00039	Willis Landing	Single artifact or isolated find	Within 50 meters of ANERR Boundaries
GU00040	Firebreak Circle	No further information	Within ANERR Boundaries
GU00042	Three Pine Clearing	Ceramic scatter	Within ANERR Boundaries
GU00046	Marge Martin	Ceramic scatter	Within ANERR Boundaries
GU00049	Douglas Creek Borrow Pit	Ceramic scatter	Within ANERR Boundaries
GU00050	Doug Birmingham*	Ceramic scatter	Within ANERR Boundaries
GU00052	Roy Whitfield	Historic refuse / dump; Ceramic scatter	Within 50 meters of ANERR Boundaries
GU00053	Former Shell Mound*	Prehistoric shell midden; Prehistoric shell scatter	Within ANERR Boundaries
GU00061	Rachel Griffin	Historic refuse / dump; Ceramic scatter	Within 50 meters of ANERR Boundaries
GU00063	Roberts Cemetery Landing	No further information	Within 50 meters of ANERR Boundaries
GU00066	Gartner	No further information	Within ANERR Boundaries
GU00090	Beanfield South	Habitation (prehistoric)	Within ANERR Boundaries
GU00091	Beanfield North	Habitation (prehistoric)	Within ANERR Boundaries
GU00092	New Roadcut	Habitation (prehistoric)	Within ANERR Boundaries
GU00094	Confederate Battery Cobb	Historic fort; Prehistoric mound(s)	Within ANERR Boundaries
GU00098	Isolate Canoe Site	Log Boat - Historic or Prehistoric	Within ANERR Boundaries
GU00100	J.B. Lovett Cabin Site	Building remains; Wharf / Dock / Pier	Within ANERR Boundaries
GU00104	Lower Chipola Apiary	Agriculture/Farm structure; Building remains	Within ANERR Boundaries

Site ID	Site Name	Site Type	Site location
GU00115	Apalachicola 8.5 Wreck	Historic shipwreck	Within ANERR Boundaries
GU00121	Tank Boat	Historic shipwreck	Within ANERR Boundaries
GU00122	Gibby's Boat	Historic shipwreck	Within ANERR Boundaries
GU00123	Ingram Creek Steamboat	Historic shipwreck	Within ANERR Boundaries
GU00138	Virginia Cut Pull Boat	Historic shipwreck	Within ANERR Boundaries
GU00179	Iola	Historic town	Within 50 meters of ANERR Boundaries
GU00183	Apalachee Wreck	Historic shipwreck	Within ANERR Boundaries
GU00271	Roberts Cemetery	Community African American cemetery	Within 50 meters of ANERR Boundaries
GU00274	Confederate River Obstructions	Historic fort; Water control structure or dam	Within ANERR Boundaries
GU00614	Douglas Landing	Private residence	Within 50 meters of ANERR Boundaries
GU01352	324 Red Bull Island Dr	Private residence	Within 50 meters of ANERR Boundaries
GU01354	175 Palm St	Private residence	Within 50 meters of ANERR Boundaries
GU01383	355 Bozeman Cir	Private residence	Within 50 meters of ANERR Boundaries
GU01384	102 Riverview Dr	Private residence	Within 50 meters of ANERR Boundaries
GU01385	108 Riverview Dr	Private residence	Within 50 meters of ANERR Boundaries
GU01386	118 Riverview Dr	Private residence	Within 50 meters of ANERR Boundaries
GU01387	204 Riverview Dr	Private residence	Within 50 meters of ANERR Boundaries
GU01722	190 Neal Dr	Private residence	Within 50 meters of ANERR Boundaries
GU01731	273 Byrd Parker Dr	Private residence	Within 50 meters of ANERR Boundaries
GU01732	341 Byrd Parker Dr	Private residence	Within 50 meters of ANERR Boundaries
GU01733	351 Byrd Parker Dr	Private residence	Within 50 meters of ANERR Boundaries
GU01735	411 Byrd Parker Dr	Private residence	Within 50 meters of ANERR Boundaries
GU01738	502-504 Byrd Parker Dr	Private residence	Within 50 meters of ANERR Boundaries
GU01739	506 Byrd Parker Dr	Private residence	Within 50 meters of ANERR Boundaries
GU01740	574 Byrd Parker Dr	Private residence	Within 50 meters of ANERR Boundaries
GU01741	594 Byrd Parker Dr	Private residence	Within 50 meters of ANERR Boundaries
GU01746	3136 Lake Grove Rd	Private residence	Within 50 meters of ANERR Boundaries
GU01747	3180 Lake Grove Rd	Private residence	Within 50 meters of ANERR Boundaries
GU01748	3290 Lake Grove Rd	Private residence	Within 50 meters of ANERR Boundaries
GU01749	3336 Lake Grove Rd	Private residence	Within 50 meters of ANERR Boundaries
GU01750	3354 Lake Grove Rd	Private residence	Within 50 meters of ANERR Boundaries

Site ID	Site Name	Site Type	Site location
GU01751	125 Cutoff Dr	Private residence	Within 50 meters of ANERR Boundaries
GU01752	168 Cutoff Dr	Private residence	Within 50 meters of ANERR Boundaries
GU01909	2056 Lake Grove Rd	Private residence	Within 50 meters of ANERR Boundaries
GU01910	2112 Lake Grove Rd	Private residence	Within 50 meters of ANERR Boundaries
GU01911	2154 Lake Grove Rd	Private residence	Within 50 meters of ANERR Boundaries
GU01912	2172 Lake Grove Rd	Private residence	Within 50 meters of ANERR Boundaries
GU02104	257 Elm St	Private residence	Within 50 meters of ANERR Boundaries
GU02226	191 Birch St	Private residence	Within 50 meters of ANERR Boundaries
GU02231	7389 Blossom Hill Rd	Agricultural	Within 50 meters of ANERR Boundaries
GU02238	383 S Turkey Ave	Private residence	Within 50 meters of ANERR Boundaries
GU02264	370 S Duck Ave	Private residence	Within 50 meters of ANERR Boundaries
LI00043	Brushy Creek Sidewheeler	Historic shipwreck	Within ANERR Boundaries
LI00118	USFS 82-13*	Campsite (prehistoric); Habitation (prehabitation)	Within ANERR Boundaries
LI00132	USFS 83-9 Apalch*	Campsite (prehistoric); Prehistoric midden(s)	Within ANERR Boundaries
LI00198	Pig Island Pit	Prehistoric lithics only, but not quarry	Within ANERR Boundaries
LI00220	Florida River	No further information	Within ANERR Boundaries
LI00426	Isolate Canoe Site	Log Boat - Historic or Prehistoric	Within ANERR Boundaries
LI00511	Dancing Woodcock	Campsite (prehistoric)	Within ANERR Boundaries
LI00981	3992 Easy St SW	Abandoned or vacant	Within 50 meters of ANERR Boundaries
LI00984	4008 Easy St SW	Private residence	Within 50 meters of ANERR Boundaries
LI00985	31752 Fox St SW	Private residence	Within 50 meters of ANERR Boundaries
LI00986	31724 Fox St	Private residence	Within 50 meters of ANERR Boundaries
LI01282	31823 Fox St	Private residence	Within 50 meters of ANERR Boundaries

Appendix C - Public Involvement

C.1 - Advisory Committee

The following Appendices contain information about the advisory committee meeting which was held in order to obtain input from the Apalachicola National Estuarine Research Reserve Management Plan Advisory Committee regarding the draft management plan.

C.1.1 - List of members invited and their affiliations

Member	Organization	Role
Barbara Sanders	SGI neighbor	Landowner/stakeholder
Caroline Stahala	Audubon	Conservation group
Carrie Jones	FDACS	Aquaculture
Cathy Davis	Soil and Water Conservation District	
Chad Hanson	Pew Trusts	Conservation group
Clint Davis	Tate's Hell State Forest	Co-managing agency
Erik Lovestrand	UF-IFAS Seagrant	Partner
Evan Blythe	Apalachee Regional Planning Council	Partner
Georgia Ackerman	Apalachicola Riverkeeper	Conservation group
Janelle Johnson	FWC	FWRI - Eastpoint
Jenna Harper	Florida DEP	Lead managing agency
Jerry Pitts	Box-R WMA	Co-managing agency
Joel Trexler	FSU	Academia
Joshua Hodson	St. George Island State Park	Co-managing agency
Kimberly Crossen	SGI/Unit 4 neighbor	Landowner/stakeholder/ volunteer
Mark Curenton	Franklin County	County Planner
Matthew Chasse	NOAA	Co-managing agency
Michael Moron	Franklin County	County Administrator
Michelle Rice	FWC	Regional Biologist
Nia Wellendorf	Florida DEP	DEAR
Paul Thurman	NWFWMD	Soil & Water Conservation District
Ricky Jones	Franklin County	County Commissioner
Steven Cook	FWC	FWC - Law Enforcement
Terry Peacock	St. Vincent NWR	Co-managing agency
Thomas & Rebecca Dolan	Friends of the Reserve	Board Member; academia
Thomas Kuhn	FWC	Regional Biologist, Aquatic Issues

C.1.2 - Florida Administrative Register Posting

This will be added in the final draft of the plan.

C.1.3 - Meeting Summaries

This will be added in the final draft of the plan.

C.2 - Formal Public Meeting

The following Appendices contain information about the Formal Public Meeting which was held in order to obtain input from the public about the Apalachicola National Estuarine Research Reserve Draft Management Plan.

C.2.1 - Florida Administrative Register Posting(s)

This will be added in the final draft of the plan.

C.2.2 - Advertisement Flyer

This will be added in the final draft of the plan.

C.2.3 - Newspaper Advertisement

This will be added in the final draft of the plan.

C.2.4 - Summary of the Formal Public Meeting

This will be added in the final draft of the plan.

Appendix D / Goals, Objectives, and Strategies

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

The following table provides a cost estimate for conducting the management activities identified in this plan. The data is organized by year and Management Program with subtotals. The following represents the actual budgetary needs for managing the resources of the Research Reserve. This budget was developed using data from the Office of Resilience and Coastal Protection (ORCP) and other cooperating entities, and is based on actual costs for management activities, supplies and equipment purchases. This budget table does not include costs related to facilities upkeep; vessel and vehicle maintenance; utilities; fuel; or execution of fixed capital projects. This budget assumes optimal staffing levels to accomplish these strategies, and includes the costs associated with staffing such as salary or benefits.

Goals, Objectives & Integrated Strategies	Management Program	Implementation Date (Planned)	23-24	24-25	25-26	26-27	27-28	28-29	29-30	30-31	31-32	32-33
Goal 1: Natural resources within the Reserve are conserved through research, monitoring, and adaptive management.												
Objective 1.1: Diversity, abundance and productivity of natural communities and species within ANERR are maintained.												
Strategy 1.1.a Maintain the Reserve Habitat Mapping and Change Plan and complete change analysis at regular intervals.	R, S	2023	$40,084				$19,528					$19,528
Strategy 1.1.b Maintain a comprehensive mapping and monitoring program that enables ANERR to establish conditions and determine changes in the lower Apalachicola River and Bay system. Identify important submerged and emergent habitats within ANERR through remote sensing and physical ground truthing.	R, S	2023	$39,350	$39,350	$39,350	$39,350	$39,350	$39,350	$39,350	$39,350	$39,350	$39,350
Strategy 1.1.c Maintain a Spatial Database and provide GIS-based products in support of decision-making.	R, S	2023	$4,304	$4,304	$4,304	$4,304	$4,304	$4,304	$4,304	$4,304	$4,304	$4,304

Goals, Objectives & Integrated Strategies	Management Program	Implementation Date (Planned)	23-24	24-25	25-26	26-27	27-28	28-29	29-30	30-31	31-32	32-33
Strategy 1.1.d Facilitate the natural fire regime on ANERR-managed properties and conduct prescribed burning or mechanical treatment where appropriate.	S	2023	$21,717	$21,717	$21,717	$21,717	$21,717	$21,717	$21,717	$21,717	$21,717	$21,717
Strategy 1.1.e Identify, monitor, and reduce the presence and abundance of invasive/exotic species.	S	2023	$7,811	$7,811	$7,811	$7,811	$7,811	$7,811	$7,811	$7,811	$7,811	$7,811
Strategy 1.1.f Identify and monitor the presence and abundance of state and federally protected species. Contribute to statewide databases	S, R	2023	$82,669	$82,669	$82,669	$82,669	$82,669	$82,669	$82,669	$82,669	$82,669	$82,669
Strategy 1.1.g Incorporate the conservation of listed species theme into education and outreach programs.	E, T	2023	$36,498	$36,498	$36,498	$36,498	$36,498	$36,498	$36,498	$36,498	$36,498	$36,498
Strategy 1.1.h Reserve provides data, analyses, and training for state, local, and federal partners on the health of the system and future implications of proposed use.	R, T	2023	$3,654	$3,654	$3,654	$3,654	$3,654	$3,654	$3,654	$3,654	$3,654	$3,654
Strategy 1.1.i Promote research and monitoring efforts within ANERR through the development of agreements with other entities within DEP, other research organizations and universities, and other state and federal agencies.	R, S	2023	$27,226	$27,226	$27,226	$27,226	$27,226	$27,226	$27,226	$27,226	$27,226	$27,226
Strategy 1.1.j Provide scientific information and recommendations on methods to reduce or eliminate threats to protected	R, S	2023	$3,624	$3,624	$3,624	$3,624	$3,624	$3,624	$3,624	$3,624	$3,624	$3,624

Goals, Objectives & Integrated Strategies	Management Program	Implementation Date (Planned)	23-24	24-25	25-26	26-27	27-28	28-29	29-30	30-31	31-32	32-33
species and pursue the removal of nuisance species.												
Strategy 1.1.k Hold a periodic symposium that highlights research and monitoring within the Reserve as it relates to natural resource management (similar to ARSA, but to include species management, climate change impacts, etc.).	All	2023	$4,962	$4,962	$4,962	$4,962	$4,962	$4,962	$4,962	$4,962	$4,962	$4,962
Strategy 1.1.l Provide training and technical assistance on techniques, funding sources, and benefits of restoration.	T	2023	$15,998	$15,998	$15,998	$15,998	$15,998	$15,998	$15,998	$15,998	$15,998	$15,998
Strategy 1.1.m Work with stakeholders to identify, promote and support restoration efforts for aquatic and upland habitats; seeking funding for projects not covered under normal funding allowances.	S, T	2023	$13,681	$13,681	$13,681	$13,681	$13,681	$13,681	$13,681	$13,681	$13,681	$13,681
Strategy 1.1.n Engage local (Franklin and Gulf County) schools in restoration projects.	E	2023	$31,198	$31,198	$31,198	$31,198	$31,198	$31,198	$31,198	$31,198	$31,198	$31,198
Strategy 1.1.o Continue to offer education and training programs, that highlight the importance of conservation and management of submerged and upland habitats and provide additional information via signage and various media.	E, T	2023	$27,498	$27,498	$27,498	$27,498	$27,498	$27,498	$27,498	$27,498	$27,498	$27,498

Goals, Objectives & Integrated Strategies	Management Program	Implementation Date (Planned)	23-24	24-25	25-26	26-27	27-28	28-29	29-30	30-31	31-32	32-33
Objective 1.2: Impacts to Apalachicola Bay, resulting from modified hydrology in the Apalachicola-Chattahoochee-Flint watershed, are reduced.												
Strategy 1.2.a Characterize and monitor the physical, chemical, and biological characteristics of waters within the bay as it relates to the flow regime of the Apalachicola River.	R	2023	$187,329	$187,329	$187,329	$187,329	$187,329	$187,329	######	$187,329	$187,329	$187,329
Strategy 1.2.b Support research that investigates the impacts, whether detrimental or beneficial, of dredging activities along the Apalachicola River and Gulf Intercoastal Water Way.	R	2023	$3,964	$3,964	$3,964	$3,964	$3,964	$3,964	$3,964	$3,964	$3,964	$3,964
Strategy 1.2.c Facilitate research and monitoring programs that help identify natural variability (highs and lows) in flows and levels necessary to protect the natural resources of ANERR.	R	2023	$19,821	$19,821	$19,821	$19,821	$19,821	$19,821	$19,821	$19,821	$19,821	$19,821
Strategy 1.2.d Maintain partnerships with state and federal agencies, especially Northwest Florida Water Management District, FWC, US Fish and Wildlife Service, and the US Army Corps of Engineers, to help determine water flow needs of habitats and species within the NERR.	R, T, Admin	2023	$25,921	$25,921	$25,921	$25,921	$25,921	$25,921	$25,921	$25,921	$25,921	$25,921
Strategy 1.2.e Provide scientific information from Reserve research and monitoring programs to local, regional, and state decision-makers that will assist in effective water management.	R	2023	$6,169	$6,169	$6,169	$6,169	$6,169	$6,169	$6,169	$6,169	$6,169	$6,169

Goals, Objectives & Integrated Strategies	Management Program	Implementation Date (Planned)	23-24	24-25	25-26	26-27	27-28	28-29	29-30	30-31	31-32	32-33
Strategy 1.2.f Develop outreach and educational programs about the importance of maintaining water quality and the detrimental effects of reduced water flows on local resources utilizing Reserve data products.	E, T	2023	$40,031	$40,031	$40,031	$40,031	$40,031	$40,031	$40,031	$40,031	$40,031	$40,031
Strategy 1.2.g ANERR works with the Northwest Florida Water Management District (NWFWMD) to recommend priority restoration projects.	R, T	2023	$2,577	$2,577	$2,577	$2,577	$2,577	$2,577	$2,577	$2,577	$2,577	$2,577
Objective 1.3: Water quality and sediment conditions are maintained at current or optimal levels.												
Strategy 1.3.a Coordinate with the multiple agencies/entities monitoring for contaminants to ensure that monitoring is of sufficient frequency and proximity for detection.	R	2023	$7,929	$7,929	$7,929	$19,821	$19,821	$19,821	$19,821	$19,821	$19,821	$19,821
Strategy 1.3.b Work with federal and state regulators on the Total Maximum Daily Load determinations and Impaired Waters status.	R	2023	$1,027	$1,027	$1,027	$1,027	$1,027	$1,027	$1,027	$1,027	$1,027	$1,027
Strategy 1.3.c Continue long-term monitoring programs within and adjacent to the NERR to determine the status of water quality parameters, potential threats to water quality, and impacts of water quality changes on resources.	R	2023	$39,643	$39,643	$39,643	$39,643	$39,643	$39,643	$39,643	$39,643	$39,643	$39,643

Goals, Objectives & Integrated Strategies	Management Program	Implementation Date (Planned)	23-24	24-25	25-26	26-27	27-28	28-29	29-30	30-31	31-32	32-33
Strategy 1.3.d Facilitate research and engage with partners to address water quality changes due to surface water contamination and the resultant effects on the biota of the estuary.	R	2023	$7,929	$7,929	$7,929	$7,929	$7,929	$7,929	$7,929	$7,929	$7,929	$7,929
Strategy 1.3.e Monitor nutrient availability in Apalachicola Bay by the collection of monthly discrete water samples identifying concentrations of total nitrogen, nitrate, nitrite, orthophosphate, and chlorophyll a.	R	2023	$31,714	$31,714	$31,714	$31,714	$31,714	$31,714	$31,714	$31,714	$31,714	$31,714
Strategy 1.3.f Continue long-term monitoring programs within and adjacent to the NERR to determine the status of submergent and emergent habitats, potential threats to submergent and emergent habitats, and impacts of water quality changes on submergent and emergent habitats.	R, S	2023	$65,822	$65,822	$65,822	$65,822	$65,822	$65,822	$65,822	$65,822	$65,822	$65,822
Strategy 1.3.g Attract and support researchers addressing early detection of harmful algal blooms in Apalachicola Bay.	R	2023	$3,082	$3,082	$3,082	$3,082	$3,082	$3,082	$3,082	$3,082	$3,082	$3,082
Strategy 1.3.h Use monitoring and research to inform decision-makers of point and nonpoint source impacts within the watershed.	R, T	2023	$2,060	$2,060	$2,060	$2,060	$2,060	$2,060	$2,060	$2,060	$2,060	$2,060
Strategy 1.3.i Point and nonpoint sources of contaminants are mitigated	T	2023	$3,098	$3,098	$3,098	$3,098	$3,098	$3,098	$3,098	$3,098	$3,098	$3,098

Goals, Objectives & Integrated Strategies	Management Program	Implementation Date (Planned)	23-24	24-25	25-26	26-27	27-28	28-29	29-30	30-31	31-32	32-33
through priority construction and remediation projects.												
Strategy 1.3.j Communicate information to the public, managers, and decision-makers (especially local governments) about the importance of maintaining water quality, the detrimental effects of reduced water quality, and methods that can be used to minimize impacts to water quality.	E, T	2023	$19,698	$19,698	$19,698	$19,698	$19,698	$19,698	$19,698	$19,698	$19,698	$19,698
Strategy 1.3.k Develop outreach and educational programs for teachers about the importance of water quality and the detrimental effects of reduced water quality.	E	2023	$11,699	$11,699	$11,699	$11,699	$11,699	$11,699	$11,699	$11,699	$11,699	$11,699
Goal 2: Thriving natural communities support healthy human communities												
	Objective 2.1: Land use practices are sustainable and compatible with the long-term preservation of the Apalachicola Bay and River System.											
Strategy 2.1.a Ensure public input into potential boundary expansion and acquisition of priority land parcels.	Admin	2023	$8,905	$8,905	$8,905	$8,905	$8,905	$8,905	$8,905	$8,905	$8,905	$8,905
Strategy 2.1.b Partner with other agencies such as the Water Management District and the USDA Soil and Water District to better understand how land use/agricultural use may impact the river and bay.	R	2023	$1,027	$1,027	$1,027	$1,027	$1,027	$1,027	$1,027	$1,027	$1,027	$1,027

Goals, Objectives & Integrated Strategies	Management Program	Implementation Date (Planned)	23-24	24-25	25-26	26-27	27-28	28-29	29-30	30-31	31-32	32-33
Strategy 2.1.c Assist local governments with appropriate input on comprehensive plan development, point and nonpoint source controls, setbacks, development issues, etc.	T	2023	$5,164	$5,164	$5,164	$5,164	$5,164	$5,164	$5,164	$5,164	$5,164	$5,164
Strategy 2.1.d Incorporate education themes into K-12 programs that address use of BMPs at home and school where teachers and students can be involved in protecting water quality.	E	2023	$11,699	$11,699	$11,699	$11,699	$11,699	$11,699	$11,699	$11,699	$11,699	$11,699
Strategy 2.1.e Contribute to land management by participating in land management reviews, Florida Forever surveys and ARSA projects.	S	2023	$11,717				$11,717					$11,717
Strategy 2.1.f Provide current science, tools, and maps to local and state entities to consider infrastructure impacts on ANERR ecosystems.	R, T, S	2023	$5,685	$5,685	$5,685	$5,685	$5,685	$5,685	$5,685	$5,685	$5,685	$5,685
Strategy 2.1.g Provide training and technical assistance relating to stormwater systems and support research to address effects of stormwater.	T	2023	$7,999	$7,999	$7,999	$7,999	$7,999	$7,999	$7,999	$7,999	$7,999	$7,999
Strategy 2.1.h Promote and support research of innovative, environmentally sensitive development and land use practices through training programs, technical assistance, demonstration sites, and public outreach.	R, T	2023	$4,125	$4,125	$4,125	$4,125	$4,125	$4,125	$4,125	$4,125	$4,125	$4,125

Goals, Objectives & Integrated Strategies	Management Program	Implementation Date (Planned)	23-24	24-25	25-26	26-27	27-28	28-29	29-30	30-31	31-32	32-33
Strategy 2.1.i Coordinate with clean marina/clean boating program.	T	2023	$1,033	$1,033	$1,033	$1,033	$1,033	$1,033	$1,033	$1,033	$1,033	$1,033
Strategy 2.1.j Provide education materials for the public at the Nature Center related to BMPs for homeowners to protect water quality.	E	2023	$7,800	$7,800	$7,800	$7,800	$7,800	$7,800	$7,800	$7,800	$7,800	$7,800
Strategy 2.1.k Work with regional groups to provide planning and technical assistance on restoration projects such as nature-based infrastructure for improved resilience to extreme storms and other impacts.	T	2023	$7,999	$7,999	$7,999	$7,999	$7,999	$7,999	$7,999	$7,999	$7,999	$7,999
Objective 2.2: Public use of Reserve lands is sustainable.												
Strategy 2.2.a Designate areas for, and types of, public use that are compatible with the resource management goals of ANERR.	S	2023	$25,622	$25,622	$25,622	$25,622	$25,622	$25,622	$25,622	$25,622	$25,622	$25,622
Strategy 2.2.b Install and maintain signage (kiosks; brochures) within areas that present opportunities for instruction and education about the resources and objectives of ANERR.	S	2023	$17,717	$17,717	$17,717	$17,717	$17,717	$17,717	$17,717	$17,717	$17,717	$17,717
Strategy 2.2.c Maintain effective relationships with local law enforcement, FWC, LE, Florida Forest Service, and other agencies to ensure environmentally sensitive lands are protected as well as the health and safety of visitors.	S	2023	$7,335	$7,335	$7,335	$7,335	$7,335	$7,335	$7,335	$7,335	$7,335	$7,335

Goals, Objectives & Integrated Strategies	Management Program	Implementation Date (Planned)	23-24	24-25	25-26	26-27	27-28	28-29	29-30	30-31	31-32	32-33
Strategy 2.2.d Identify and resolve urban/conservation land interface conflicts	S	2023	$21,717	$21,717	$21,717	$21,717	$21,717	$21,717	$21,717	$21,717	$21,717	$21,717
Strategy 2.2.e Allow dove hunting on Little St. George Island consistent with FWC regulations and seasons. Notify the public of hunting regulations on LSGI through appropriate signage.	E,S	2023	$1,441	$1,441	$1,441	$1,441	$1,441	$1,441	$1,441	$1,441	$1,441	$1,441
Strategy 2.2.f Allow game hunting on the Lower River Marshes consistent with FWC regulations and seasons for the Apalachicola River Wildlife and Environmental Area (ARWEA).	S	2023	$3,906	$3,906	$3,906	$3,906	$3,906	$3,906	$3,906	$3,906	$3,906	$3,906
Strategy 2.2.g Offer Coastal Training Program classes that highlight ANERR habitats and their management. Promote Best Management Practices (BMPs) that minimize impacts.	T	2023	$15,998	$15,998	$15,998	$15,998	$15,998	$15,998	$15,998	$15,998	$15,998	$15,998
Strategy 2.2.h Publicize resource-related recreational opportunities on ANERR-managed resources (land and waters) at the ANERR Visitor Center, in the ANERR newsletter, ANERR websites, and other social media.	E, T	2023	$11,500	$11,500	$11,500	$11,500	$11,500	$11,500	$11,500	$11,500	$11,500	$11,500
Objective 2.3: The local community is knowledgeable about and vested in their local natural resources.												
Strategy 2.3.a Implement volunteer program at the reserve supported by a full-time volunteer coordinator.	E	2023	$36,127	$36,127	$36,127	$36,127	$36,127	$36,127	$36,127	$36,127	$36,127	$36,127

Goals, Objectives & Integrated Strategies	Management Program	Implementation Date (Planned)	23-24	24-25	25-26	26-27	27-28	28-29	29-30	30-31	31-32	32-33
Strategy 2.3.b Identify and offer specific activities and opportunities for interns, spring break volunteers, students, and community members. Manage and track volunteers online.	E	2023	$31,713	$31,713	$31,713	$31,713	$31,713	$31,713	$31,713	$31,713	$31,713	$31,713
Strategy 2.3.c Promote ANERR programs to build public support and stewardship. Promote more community involvement in ANERR programs by targeting community organizations.	T	2023	$1,600	$1,600	$1,600	$1,600	$1,600	$1,600	$1,600	$1,600	$1,600	$1,600
Strategy 2.3.d Identify community needs and develop strategies to engage under-represented community members in targeted programs or activities.	T	2025	$0	$0	$4,800	$4,800	$4,800	$4,800	$4,800	$4,800	$4,800	$4,800
Strategy 2.3.e Use a variety of media to provide accurate and current technical information about the importance of the Apalachicola River and Bay system and the threats it faces.	T	2023	$7,999	$7,999	$7,999	$7,999	$7,999	$7,999	$7,999	$7,999	$7,999	$7,999
Strategy 2.3.f Highlight positive stewardship actions by local community members.	T	2023	$3,200	$3,200	$3,200	$7,999	$7,999	$7,999	$7,999	$7,999	$7,999	$7,999
Strategy 2.3.g Support priority conservation actions by non-governmental groups with applicable science and expertise.	R, S	2023	$11,717	$11,717	$11,717	$11,717	$11,717	$11,717	$11,717	$11,717	$11,717	$11,717

Goals, Objectives & Integrated Strategies	Management Program	Implementation Date (Planned)	23-24	24-25	25-26	26-27	27-28	28-29	29-30	30-31	31-32	32-33
Strategy 2.3.h Continue participating in community (both formal and informal) meetings to stay current on environmental issues of public concern.	T	2023	$7,999	$7,999	$7,999	$7,999	$7,999	$7,999	$7,999	$7,999	$7,999	$7,999
Strategy 2.3.i Provide field experiences (summer or volunteer projects) for volunteers, student interns, and Conservation Corps members.	E, R, S, T	2023	$29,392	$29,392	$29,392	$29,392	$29,392	$29,392	$29,392	$29,392	$29,392	$29,392
Strategy 2.3.j Identify and support citizen science that furthers the management of the Apalachicola system.	E, R, S	2023	$2,823	$2,823	$2,823	$2,823	$2,823	$2,823	$2,823	$2,823	$2,823	$2,823
Strategy 2.3.k Work with programs that encourage or support volunteers or interns (such as the Conservation Corps of the Forgotten Coast, AmeriCorps, etc.)	R, S	2023	$18,498	$18,498	$18,498	$18,498	$18,498	$18,498	$18,498	$18,498	$18,498	$18,498
Objective 2.4: Apalachicola Bay supports a thriving, sustainable, natural resource-based economy.												
Strategy 2.4.a Reserve shares data with partners, decision makers, industry, residents and visitors on resource issues.	R, T	2023	$29,472	$29,472	$29,472	$29,472	$29,472	$29,472	$29,472	$29,472	$29,472	$29,472
Strategy 2.4.b Reserve works with partners (stakeholders, state and federal agencies, academia and NGOs) to monitor, restore, and increase the productivity of fisheries in the Bay.	R	2023	$10,272	$10,272	$10,272	$10,272	$10,272	$10,272	$10,272	$10,272	$10,272	$10,272
Strategy 2.4.c Facilitate research and education that supports the increase of historical fisheries knowledge	E, R, T	2023	$4,800	$4,800	$4,800	$4,800	$4,800	$4,800	$4,800	$4,800	$4,800	$4,800

Goals, Objectives & Integrated Strategies	Management Program	Implementation Date (Planned)	23-24	24-25	25-26	26-27	27-28	28-29	29-30	30-31	31-32	32-33
and support innovative practices.												
Strategy 2.4.d Oyster harvesters are knowledgeable about innovative fishery practices.	E, T	2023	$5,222	$5,222	$5,222	$5,222	$5,222	$5,222	$5,222	$5,222	$5,222	$5,222
Strategy 2.4.e Opportunities to diversify the fishing industry (i.e. aquaculture) are explored to reduce pressure on the wild fisheries.	T	2023	$4,800	$4,800	$4,800	$4,800	$4,800	$4,800	$4,800	$4,800	$4,800	$4,800
Strategy 2.4.f Develop programs for K-12 and adults on aquaculture, in collaboration with DACS, other schools, FAMU, WEI, private businesses, and SeaGrant.	E, T	2023	$7,833	$7,833	$7,833	$7,833	$7,833	$7,833	$7,833	$7,833	$7,833	$7,833
Strategy 2.4.g Facilitate research related to restoration science and provide assistance in engaging stakeholders in the process and data dissemination.	E, R, T	2023	$17,606	$17,606	$17,606	$17,606	$17,606	$17,606	$17,606	$17,606	$17,606	$17,606
Strategy 2.4.h Support the development of an oyster shell recycling program (working collaboratively with DACS and Conservation Corps).	T, S	2023	$5,473	$5,473	$5,473	$5,473	$5,473	$5,473	$5,473	$5,473	$5,473	$5,473
Strategy 2.4.i Reserve provides information about the value, history and preservation efforts over time of the Apalachicola ecosystem to the tourism industry and residents.	E, T	2023	$16,499	$16,499	$16,499	$16,499	$16,499	$16,499	$16,499	$16,499	$16,499	$16,499

Goals, Objectives & Integrated Strategies	Management Program	Implementation Date (Planned)	23-24	24-25	25-26	26-27	27-28	28-29	29-30	30-31	31-32	32-33
Strategy 2.4.j Communicate with professionals and explore new opportunities to work with service providers who will connect with stakeholders.	T	2023	$5,164	$5,164	$5,164	$5,164	$5,164	$5,164	$5,164	$5,164	$5,164	$5,164
Strategy 2.4.k Continue to participate in the UNESCO Man and the Biosphere Program which links healthy ecosystems and sustainable local economies.	All	2023	$2,583	$2,583	$2,583	$2,583	$2,583	$2,583	$2,583	$2,583	$2,583	$2,583
Strategy 2.4.l Continue to recruit new members to the Reserve Advisory Board that represent the broad business community in the county.	All	2023	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000
Strategy 2.4.m Continue to support efforts to understand socioeconomic linkages to our natural resources.	R, T	2023	$3,092	$3,092	$3,092	$3,092	$3,092	$3,092	$3,092	$3,092	$3,092	$3,092
Goal 3: Resilient natural communities enhance local communities' capacity to respond to changing climate												
Objective 3.1: The Apalachicola River and Bay ecosystem is resilient in response to climate change and extreme events.												
Strategy 3.1.a Continue long-term monitoring programs within and adjacent to ANERR to determine the status of water quality parameters, potential threats to water quality, and impacts of water quality changes on resources.	R	Insert fiscal year	*Duplicates 1.3.c									
Strategy 3.1.b Identify the potential implications of climate change on estuarine species and habitats through research, monitoring and modeling.	R, S	2023	$132,048	$132,048	$132,048	$132,048	$132,048	$132,048	######	$132,048	$132,048	$132,048

Goals, Objectives & Integrated Strategies	Management Program	Implementation Date (Planned)	23-24	24-25	25-26	26-27	27-28	28-29	29-30	30-31	31-32	32-33
Strategy 3.1.c Maintain Sentinel Stations (WQ, Water level, WX, sediment elevation tables (SETs), porewater and vegetation monitoring) at two locations. Monitor additional surface elevation tables.	R, S	2023	$51,360	$51,360	$51,360	$51,360	$51,360	$51,360	$51,360	$51,360	$51,360	$51,360
Strategy 3.1.d Identify changes in species composition of natural communities (HMCP) – migration, expansion and reduction.	R, S	2023	$11,491	$11,491	$11,491	$11,491	$11,491	$11,491	$11,491	$11,491	$11,491	$11,491
Strategy 3.1.e Improve understanding of impacts on ANERR resources related to extreme events.	R, S	2023	$18,424	$18,424	$18,424	$18,424	$18,424	$18,424	$18,424	$18,424	$18,424	$18,424
Strategy 3.1.f Build partnerships with local emergency management and city/county government to increase coordination during extreme events and exercise the reserve disaster plan regularly.	All	2023	$2,583	$2,583	$2,583	$2,583	$2,583	$2,583	$2,583	$2,583	$2,583	$2,583
Strategy 3.1.g Consider demonstration sites, including surface elevation table to show types of monitoring.	E	2023	$7,800	$7,800	$7,800	$7,800	$7,800	$7,800	$7,800	$7,800	$7,800	$7,800
Strategy 3.1.h Provide formal education, training programs and technical assistance related to extreme events and climate change; including planning, mapping and decision support tools.	E, T	2023	$27,498	$27,498	$27,498	$27,498	$27,498	$27,498	$27,498	$27,498	$27,498	$27,498
Strategy 3.1.i Facilitate coordination, communication and training programs relating to climate change research.	T	2023	$5,200	$5,200	$5,200	$5,200	$5,200	$5,200	$5,200	$5,200	$5,200	$5,200

Goals, Objectives & Integrated Strategies	Management Program	Implementation Date (Planned)	23-24	24-25	25-26	26-27	27-28	28-29	29-30	30-31	31-32	32-33
Strategy 3.1.j Provide training and technical assistance on techniques, funding sources and benefits of habitat- friendly shoreline stabilization	S, T	2023	$3,409	$3,409	$3,409	$3,409	$3,409	$3,409	$3,409	$3,409	$3,409	$3,409
Strategy 3.1.k Utilize vulnerability assessments to guide management planning to identify strategies for mitigation, migration or retreat.	T	2023	$3,200	$3,200	$3,200	$3,200	$3,200	$3,200	$3,200	$3,200	$3,200	$3,200
Strategy 3.1.l Engage teachers in K-12 programs at local schools to incorporate habitat restoration projects into their curriculum.	E	2023	$10,057	$10,057	$10,057	$10,057	$10,057	$10,057	$10,057	$10,057	$10,057	$10,057
Strategy 3.1.m Identify land acquisition funding sources to purchase lands (identified by Florida Forever and ARSA plan) which would allow for the migration of important estuarine habitats.	R, S	2023	$1,811	$1,811	$1,811	$1,811	$1,811	$1,811	$1,811	$1,811	$1,811	$1,811
Objective 3.2: Local coastal (human) communities are resilient in response to climate change and extreme events.												
Strategy 3.2.a Provide stakeholders with the best available data and tools to prepare for and recover from extreme events.	T	2023	$4,800	$4,800	$4,800	$4,800	$4,800	$4,800	$4,800	$4,800	$4,800	$4,800
Strategy 3.2.b Provide local training opportunities for stakeholders on vulnerability, adaptation and implementation strategies.	T	2023	$3,200	$3,200	$3,200	$3,200	$3,200	$3,200	$3,200	$3,200	$3,200	$3,200
Strategy 3.2.c Work with decision-makers and partners to inform property owners about measures they can take to improve resilience.	T	2023	$4,800	$4,800	$4,800	$4,800	$4,800	$4,800	$4,800	$4,800	$4,800	$4,800

Goals, Objectives & Integrated Strategies	Management Program	Implementation Date (Planned)	23-24	24-25	25-26	26-27	27-28	28-29	29-30	30-31	31-32	32-33
Strategy 3.2.dProvide training and data on the effectiveness of nature-based solutions and methods to implement nature-based solutions.	T	2023	$3,200	$3,200	$3,200	$3,200	$3,200	$3,200	$3,200	$3,200	$3,200	$3,200
Strategy 3.2.e Build relationships with city and county decision makers and planners by serving on committees, attending meetings and collaborating across agencies.	T	2023	$3,200	$3,200	$3,200	$3,200	$3,200	$3,200	$3,200	$3,200	$3,200	$3,200
Strategy 3.2.f Work with local governments to conduct Vulnerability Assessments to develop Adaptation Action Plans to be included in their Comprehensive Plans.	All	2023	$2,583	$2,583	$2,583	$2,583	$2,583	$2,583	$2,583	$2,583	$2,583	$2,583
Strategy 3.2.g Attract, support, and encourage scientists conducting community resilience research (or applied research) that emphasizes science to management applications.	R, S	2023	$20,606	$20,606	$20,606	$20,606	$20,606	$20,606	$20,606	$20,606	$20,606	$20,606
Strategy 3.2.h Utilize community resilience research products, planning, mapping, and decision support tools in training programs and public outreach related to coastal hazards.	T	2023	$3,200	$3,200	$3,200	$3,200	$3,200	$3,200	$3,200	$3,200	$3,200	$3,200
Strategy 3.2.i Inform community decision makers about benefits of resilience practices and funding opportunities.	T	2023	$2,065	$2,065	$2,065	$2,065	$2,065	$2,065	$2,065	$2,065	$2,065	$2,065

Goals, Objectives & Integrated Strategies	Management Program	Implementation Date (Planned)	23-24	24-25	25-26	26-27	27-28	28-29	29-30	30-31	31-32	32-33
Strategy 3.2.j Build and maintain relationships with local Emergency Operations Center by serving on the LMS committee and sharing information with stakeholders.	T	2023	$3,200	$3,200	$3,200	$3,200	$3,200	$3,200	$3,200	$3,200	$3,200	$3,200
Strategy 3.2.k Staff update the Reserve's Disaster Response and Recovery plans and maintain relationships with local EOC, Coast Guard and federal partners to assist with post-disaster efforts.	T,R, Admin	2023	$7,114	$7,114	$7,114	$7,114	$7,114	$7,114	$7,114	$7,114	$7,114	$7,114
Strategy 3.2.l Conduct post-disaster evaluations share information with stakeholders, and revise disaster plan accordingly.	All	2023	$7,114	$7,114	$7,114	$7,114	$7,114	$7,114	$7,114	$7,114	$7,114	$7,114
Strategy 3.2.m Reserve to consider resilience to future flooding a/o storm surge when planning new Reserve facility and infrastructure construction.	Admin	2023	$7,692	$7,692	$7,692	$7,692	$7,692	$7,692	$7,692	$7,692	$7,692	$7,692
Objective 3.3: Cultural and historical resources are conserved.												
Strategy 3.3.a Upgrade existing exhibits at the Center to provide increased awareness of historical and archaeological resources.	E	2023	$28,499	$28,499	$28,499	$28,499	$28,499	$28,499	$28,499	$28,499	$28,499	$28,499

Goals, Objectives & Integrated Strategies	Management Program	Implementation Date (Planned)	23-24	24-25	25-26	26-27	27-28	28-29	29-30	30-31	31-32	32-33
Strategy 3.3.b Work with partners (Florida Department of State – Division of Historical Resources, FPAN, other experts) to develop outreach to local community members (especially students) about the importance of conserving and protecting cultural resources.	E, T, S	2023	$8,700	$8,700	$8,700	$8,700	$8,700	$8,700	$8,700	$8,700	$8,700	$8,700
Strategy 3.3.c Offer training programs that include information on and the importance of conservation and protection of cultural resources, local history and cultural practices.	T	2023	$4,800	$4,800	$4,800	$4,800	$4,800	$4,800	$4,800	$4,800	$4,800	$4,800
Strategy 3.3.d Look for opportunities to weave historical concepts into existing science-based curricula to educate the local youth about the local history and culture.	E	2023	$19,499	$19,499	$19,499	$19,499	$19,499	$19,499	$19,499	$19,499	$19,499	$19,499
Strategy 3.3.e Provide educational information (kiosks, signs, brochures) at public access points describing archaeological resources and their protections.	S	2023	$8,906	$8,906	$8,906	$8,906	$8,906	$8,906	$8,906	$8,906	$8,906	$8,906
Strategy 3.3.f Boundary signs include “protection” language.	S, Admin	2023	$5,456	$5,456	$5,456	$5,456	$5,456	$5,456	$5,456	$5,456	$5,456	$5,456
Strategy 3.3.g Monitor status of archaeological sites on ANERR-managed lands annually.	S	2023	$11,717	$11,717	$11,717	$11,717	$11,717	$11,717	$11,717	$11,717	$11,717	$11,717

Goals, Objectives & Integrated Strategies	Management Program	Implementation Date (Planned)	23-24	24-25	25-26	26-27	27-28	28-29	29-30	30-31	31-32	32-33
Strategy 3.3.h Maintain institutional knowledge of staff and provide regular training on monitoring and managing cultural resources (Historical and Archaeological Resource Training).	S, T	2023	$11,011	$11,011	$11,011	$11,011	$11,011	$11,011	$11,011	$11,011	$11,011	$11,011
Strategy 3.3.i Implement appropriate management actions based on monitoring.	All	2023	$12,561	$12,561	$12,561	$12,561	$12,561	$12,561	$12,561	$12,561	$12,561	$12,561
Strategy 3.3.j Maintain appropriate buffer around Marshall House to discourage fires and maintain pump/water systems near Marshall House to facilitate fire suppression.	S	2023	$15,925	$15,925	$15,925	$15,925	$15,925	$15,925	$15,925	$15,925	$15,925	$15,925
Strategy 3.3.k Continue to stabilize the shoreline in front of the Marshall House.	S	2023	$1,136	$1,136	$1,136	$1,136	$1,136	$1,136	$1,136	$1,136	$1,136	$1,136
Strategy 3.3.l Sustain Memorandum of Agreement with the St. George Island Lighthouse Association to provide access to, and maintenance of, the lighthouse.	Admin	2023	$13,434	$13,434	$13,434	$13,434	$13,434	$13,434	$13,434	$13,434	$13,434	$13,434

D.2 - Major Accomplishments since the Approval of the Previous Plan

Administration of the Reserve:

- **Assistant Manager Position** - The Reserve was able to create an assistant manager position that supports all programs at the Reserve as well as the Aquatic Preserves within the region. The position also supports restoration programs, coordination with the local Conservation Corps, and special projects for the manager.
- **Contract with FSU** – The Reserve has entered into a contract with Florida State University Coastal and Marine Lab to support seven positions at the Reserve through an interchange of personnel agreement. The contractual positions provide benefits to the employees beyond what was available to them as state OPS employees. This contract and agreement has also strengthened the relationship between the NERR and the FSUCML through collaborative research projects and oyster restoration planning development through the Apalachicola Bay System Initiative.
- **Old Apalachicola Headquarters** – since the last plan was completed, the Reserve has entered into a sublease with Franklin County to house the County Extension Office at the old NERR headquarters. As part of this agreement, the County secured funding through the legislature to make several repairs to the building including completely renovating the interior of the building, improving the accessibility, and function of the facility. The Reserve has made repairs as needed to ensure that the building will be a solid structure for many years to come.

Planning and Evaluation:

- **Biosphere Redesignation** – The Reserve staff completed the redesignation process for the Apalachicola Biosphere in 2020 which included renaming the Biosphere, updating all pertinent information related to its purpose and function, and reconnecting with national leadership of the program through the National Park Service.
- Since the last plan was published, the Reserve has completed two **NOAA 312 evaluations** (in 2014 and in 2021). The 2021 evaluation was extremely valuable in providing a focus and direction for this plan. It was a very successful evaluation in that it was conducted entirely virtually, with several local participants (stakeholders) coming to the Reserve to provide testimonials about successful partnerships with the Reserve.

Disaster Preparedness and Response:

- **Hurricane Michael** - On October 10th, 2018, the Reserve was hit by Hurricane Michael, which came in as a weak Category 5 storm about 30 miles west of the Reserve. The Reserve facilities were heavily impacted; however, the main offices were reopened within two weeks. Key losses were the life support system for the aquariums, the flooding of the old research/stewardship offices (now occupied by another agency), and the loss of the boardwalk at the Nature Center. Two SWMP water quality towers were also lost during the storm. Upgrades were made to all construction projects to improve performance and resilience to future storm events.
- Many impacts were mitigated due to the implementation of the Reserve's Hurricane Plan, which is part of the Reserve's **Disaster Response Plan (2017).**

Research and Monitoring

- The Reserve supported the **Supreme Court lawsuit between Georgia and Florida over water allocation** in the Apalachicola-Chattahoochee-Flint Watershed. Decades of the Reserve's water quality, nutrient and biological monitoring data were used in support of the argument that severe drought and reduced river flows

harmed Apalachicola Bay. Research generated by two former Graduate Research Fellows was utilized for the lawsuit. The Reserve continues to support research focused on the effects of upstream water diversion.

- Likewise, the Reserve and its partners have made great strides to understand **climate change impacts**, including tropicalization on the Reserve's landscape. Black and red mangroves have become established within the boundary of the Reserve. Although mangroves have been found within the Reserve for decades, it has only been the last several years that they have expanded and grown larger than ever before. Regular surveys of the mangroves and coordination on multiple research projects, has yielded a better understanding of the process.
- Over the last decade, the Reserve served as a partner on the **Ecological Effects of Sea Level Rise project** (funded through NOAA's National Center for Coastal Ocean Science), which produced high accuracy SLR and storm surge models for the Reserve and the Northern Gulf of Mexico. The project also explored the impacts to marsh systems and barrier island systems. The project produced an incredible amount of information which is continuing to evolve to this day. Around the same time,
- **Research Symposium –** The Reserve has been able to host two Research Symposiums highlighting research conducted by the Reserve staff, our partners and others working with the Apalachicola Bay System. This has been incredibly meaningful to connect researchers and share information.

Land Management and Restoration:

- **Upland Restoration and Prescribed Fire -** The Reserve has worked towards the application of better upland restoration management practices, including conducting ANERR's first Timber Assessment, creating new fire lines and increased mechanical fuel reduction, increasing the application of prescribed fire to Reserve-managed upland areas, and invasives removal. Of particular note is the establishment of a prescribed fire regime at Nick's Hole, which prior to 2013 did not have prescribed fire history. The parcel has been burned on a 3-year rotation three times since the last management plan. Following the most recent wildfire in Unit 4, larger and more fire lines have been added to this area; mechanical fuel reduction is also completed more often. Invasive plant surveys and treatment efforts have increased at all properties. For example, eight years of Chinese tallow treatments at the Cat Point area have turned a serious, dense infestation into a property nearly free of this non-native weed.
- **Increased Recreational Opportunities –** The Reserve has focused on developing recreational infrastructure and promoting these opportunities. ANERR has added seven new trails and currently totals twenty miles of low-impact hiking trails within its directly managed areas. The Reserve has added 13 informational kiosks at access points to these managed areas, and in addition to informational signage at these kiosks has created a series of brochures about managed areas and a "Roadmap to Recreation" brochure detailing nature-based recreational opportunities throughout the Reserve.
- The Reserve has coordinated on several restoration projects funded by civil and criminal damages from the Deepwater Horizon Oil Spill and the National Coastal Resilience Fund. The Reserve has participated in primarily oyster reef restoration and living shoreline creation; however, this has expanded to hydrologic restoration of sloughs in the floodplain. This has included anything from the planning stages, implementation, and monitoring post-construction.
- **Conservation Corps of the Forgotten Coast** – The Reserve has built a strong relationship with our local GulfCorps chapter. This organization has continued to evolve and grow over the last several years to include

many opportunities to coordinate on restoration, training, education and outreach. The Reserve has benefited from 1000's of hours donated by these youth.

Education, Training and Outreach:

- **Increased awareness and appreciation for the Reserve -** During this time period, the Reserve was able to hire a communications specialist to oversee communications between the Reserve and the Department, and support public-facing media. Many efforts were continued and broadened to showcase the Reserve's work. One new effort was the use of 1-minute shows on the local radio station (Oyster Radio) highlighting the work of the Reserve, conservation efforts around the Reserve, and timely information on species of concern protections.
- **Estuaries Day**, held once a year, is an incredibly important event to bring primarily local individuals to the Reserve to learn about estuaries and why it is important to protect them. Typically, more than 800 attendees come to the Reserve on that one afternoon.
- **Public Education Programs -** Habitat-focused public lectures transitioned into occurring every month of the year on the third Wednesday and are advertised as, Reserve Wednesday's. Previously turtle lectures replaced the habitat-focused lectures during the summer months. Turtle talks are now held on Tuesdays from the beginning of June through the second Tuesday in August. The talks have been branded as Turtle Tuesdays. While the classes are still focused on teaching about the area and resources found here, the goal is to educate our local community members and encourage them to become advocates for our natural resources.
- **Professional Development through the Education Program –** A Needs Assessment and Market Analysis (MA/NA) was completed in 2017. A MA/NA was required as a perquisite for facilitating Teachers on the Estuary (TOTE) professional development programs. At least one TOTE has been facilitated every year since 2017. Connecting more closely with teachers has allowed the Reserve to implement more meaningful and impactful student programs.
- **K-12 Continuity Across the District –** Student programs are facilitated for every student in the district and occur every other year (grades pre-k, 1, 3, 5, 7, and once in high school). This series of programs has firmly established ANERR's role as a member of the academic community. All programs prioritize school needs, particularly the alignment of activities to state standards. Stewardship and field-based sessions are a priority of all programs.
- **Volunteer Development** - Hosting the front desk in our Nature Center by volunteers now occurs on a nearly full-time basis. This has been a valuable accomplishment since the last management plan as it has allowed for a re-classification of the previous position into a full-time education specialist.

Appendix E – Other Requirements

E.1 – Acquisition and Restoration Council Management Plan Compliance Checklist

This will be added in the final draft of the plan.

E.2 – Management Procedures for Archaeological and Historical Sites and Properties on State-Owned or Controlled Lands

(revised June 2021)

These procedures apply to state agencies, local governments, and non-profits that manage state-owned properties.

A. Historic Property Definition

Historic properties include archaeological sites and historic structures as well as other types of resources. Chapter 267, Florida Statutes states: " '*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 Chapter 267, *F.S.* and state policy related to historic properties, state agencies of the executive branch must provide the Division of Historical Resources (Division) the opportunity to comment on any undertakings with the potential to affect historic properties that are listed, or eligible for listing, in the National Register of Historic Places, 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 undertaking. (267.061(2)(a))

State agencies must consult with the Division when, as a result of state action or assistance, a historic property will be demolished or substantially altered in a way that will adversely affect the property. State agencies must take timely steps to consider feasible and prudent alternatives to the adverse effect. If no feasible or prudent alternatives exist, the state agency must take timely steps to avoid or mitigate the adverse effect. (267.061(2)(b))

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. (267.061(2)(c))

State agencies are responsible for preserving historic properties under their control. State agencies are directed to use historic properties available to the agency when that use is consistent with the historic property and the agency's mission. State agencies are also directed to pursue preservation of historic properties to support their continued use. (267.061(2)(d))

C. Statutory Authority

The full text of Chapter 267, F.S. and additional information related to the treatment of historic properties is available at:

https://dos.myflorida.com/historical/preservation/compliance-and-review/regulations-guidelines/

D. Management Implementation

Although the Division sits on the Acquisition and Restoration Council and approves land management plans, these plans are conceptual and do not include detailed project information. Specific information for individual projects must be submitted to the Division for review and comment.

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. The Division's recommendations may include, but are not limited to:

approval of the project as submitted, recommendation for a cultural resource assessment survey by a qualified professional archaeologist, and modifications to the proposed project to avoid or mitigate potential adverse effects. Projects such as additions or alterations to historic structures as well as new construction must also be submitted to the Division for review. Projects involving structures fifty years of age or older must be submitted to the Division for a significance determination**.** In rare cases, structures under fifty years of age may be deemed historically significant. Adverse effects to historic properties must be avoided when possible, and if avoidance is not possible, additional consultation with the Division is necessary to develop a mitigation plan. Furthermore, managers of state property should make preparations for locating and evaluating historic properties, both archaeological sites and historic structures.

E. Archaeological Resource Management (ARM) Training

The ARM Training Course introduces state land managers to the nature of archaeological resources, Florida archaeology, and the role of the Division in managing state-owned archaeological resources. Participants gain a better understanding of the requirements of state and federal laws with regard to protecting and managing archaeological sites on state managed lands. Participants also receive a certificate recognizing their ability to conduct limited monitoring activities in accordance with the Division's Review Procedure, thereby reducing the time and money spent to comply with state regulations. Additional information regarding the ARM Training Course is available at:

https://dos.myflorida.com/historical/archaeology/education/arm-training-courses/

F. Matrix for Ground Disturbance on State Lands

The matrix is a tool designed to help streamline the Division's Review Procedure. The matrix allows state land managers to make decisions about balancing ground disturbance and stewardship of historic resources. The matrix establishes types of undertakings that are either minor or major disturbances and then guides the land manager to consult the Division, conduct ARM-trained project monitoring, or proceed with the project.

Additional information regarding the matrix is available at:

https://dos.myflorida.com/historical/archaeology/education/dhr-matrix-for-ground-disturbance-on-state-lands/

G. Human Remains Treatment

Chapter 872, *Florida Statutes* makes it illegal to willfully and knowingly disturb human remains. In the event human remains are discovered, cease all activity in the area that may disturb the remains. Leave the bones and nearby items in place. Immediately notify law enforcement or the local district medical examiner of the discovery and follow the provisions of Chapter 872, FS. Additional information regarding the treatment of human remains and cemeteries is available at:

https://dos.myflorida.com/historical/archaeology/human-remains/

https://dos.myflorida.com/historical/archaeology/human-remains/abandoned-cemeteries/what-are-the- applicable-laws-and-regulations/

H. Division of Historical Resources Review Procedure

Projects on state owned or controlled properties may submit projects to the Division for review using the streamlined State Lands Consultation Form. The form provides instructions to submit projects for review and outlines the necessary information for the Division to complete the review process. The State Lands Consultation Form and additional information about the Division's review process is available at:

https://dos.myflorida.com/historical/preservation/compliance-and-review/state-lands-review/

* * *

Questions relating to the treatment of archaeological and historic resources on state lands should be directed to:

Compliance and Review Section
Bureau of Historic Preservation Division of Historical Resources
R. A. Gray Building
500 South Bronough Street
Tallahassee, FL 32399-0250
StateLandsCompliance@dos.myflorida.com
Phone: (850) 245-6333
Toll Free: (800) 847-7278
Fax: (850) 245-6435

E.3 – Letter of Compliance with County Comprehensive Plan

This will be added in the final draft of the plan.

E.4 – Division of State Lands Management Plan Approval Letter

This will be added in the final draft of the plan.

E.5 – Surplus Lands Determination

FLORIDA DEPARTMENT OF Environmental Protection

Apalachicola National Estuarine Research Reserve
108 Island Drive
Eastpoint, FL 32328

Ron DeSantis
Governor

Jeanette Nuñez
Lt. Governor

Shawn Hamilton
Secretary

Memorandum

TO:
FROM: Jennifer Harper
SUBJECT: Surplus lands determination – State Lands Lease #3862
DATE: July 31, 2023

Staff from the Apalachicola NERR and planning personnel from the Office of Resilience and Coastal Protection have analyzed the potential for any lands currently held under lease #3862 to be considered "surplus." The Reserve has determined that as of publication of the 2023 Management Plan, there are no properties identified as "surplus." Specific criteria were applied to make this determination including:

- Does the property continue to serve the purpose for which it was acquired? Ecological or Cultural purposes?
- Does the property provide ecological benefits to targeted species or natural communities that support species diversity and richness?
- Does the property provide a critical buffer to protect essential habitats for fish and wildlife?
- Does the property provide a likely migration pathway for essential habitats to move under climate change and sea level rise?
- Does the property provide a key access point for public use?

Each of the Reserve's properties continues to serve at least one of these functions and is valuable to maintain for the benefits that it provides to the estuarine system and the local coastal communities.

E.5 – Public Comments and Responses

2017 Land Management Review Team Report for Apalachicola NERR

1. Introduction

Section 259.036, F.S. requires a periodic on-site review of conservation and recreation lands titled in the name of the Board of Trustees to determine (1) whether the lands are being managed for the purposes for which they were acquired and (2) whether they are being managed in accordance with their land management plan adopted pursuant to s. 259.032, F.S. In case where the managed areas exceed 1,000 acres in size, such a review must be scheduled at least every five years. In conducting this review, a statutorily constructed review team "shall evaluate the extent to which the existing management plan provides sufficient protection to threatened or endangered species, unique or important natural or physical features, geological or hydrological functions or archaeological features. The review shall also evaluate the extent to which the land is being managed for the purposes for which it was acquired and the degree to which actual management practices, including public access, are in compliance with the adopted management plan."

The land management review teams are coordinated by the Division of State Lands and consist of representatives from the Division of Recreation and Parks (DEP), the Florida Forest Service (DACS), the Fish and Wildlife Conservation Commission, the local government in which the property is located, the DEP District in which the parcel is located, the local soil and water conservation district or jurisdictional water management district, a conservation organization member, and a local private land manager.

Each Land Management Review Report is divided into three sections. Section 1 provides the details of the property being reviewed as well as the overall results of the report. Section 2 provides details of the Field Review, in which the Review Team inspects the results of management actions on the site. Section 3 provides details of the Land Management Plan Review, in which the team determines the extent to which the Management Plan provides for and documents adequate natural and recreational resource protection.

Finally, each report may also contain an Appendix that lists individual team member comments. This is a compilation of feedback, concerns or other thoughts raised by individual team members, but not necessarily indicative of the final consensus reached by the Land Management Review Team.

1.1. Property Reviewed in this Report

Name of Site: Apalachicola NERR
Managed by: Florida Department of Environmental Protection – Florida Coastal Office
Acres: 234,715 **County:** Franklin
Purpose(s) for Acquisition: to protect and restore the natural and cultural values of the property and provide the greatest benefit to the citizens of the state.
Acquisition Program(s): CARL/P2000/Florida Forever **Original Acquisition Date:**
Area Reviewed: Entire Property **Last Management Plan Approval Date:** 8/15/13
Review Date: 11/17/17

Agency Manager and Key Staff Present:

- Jenna Harper, Reserve Manager
- Caitlin Snyder

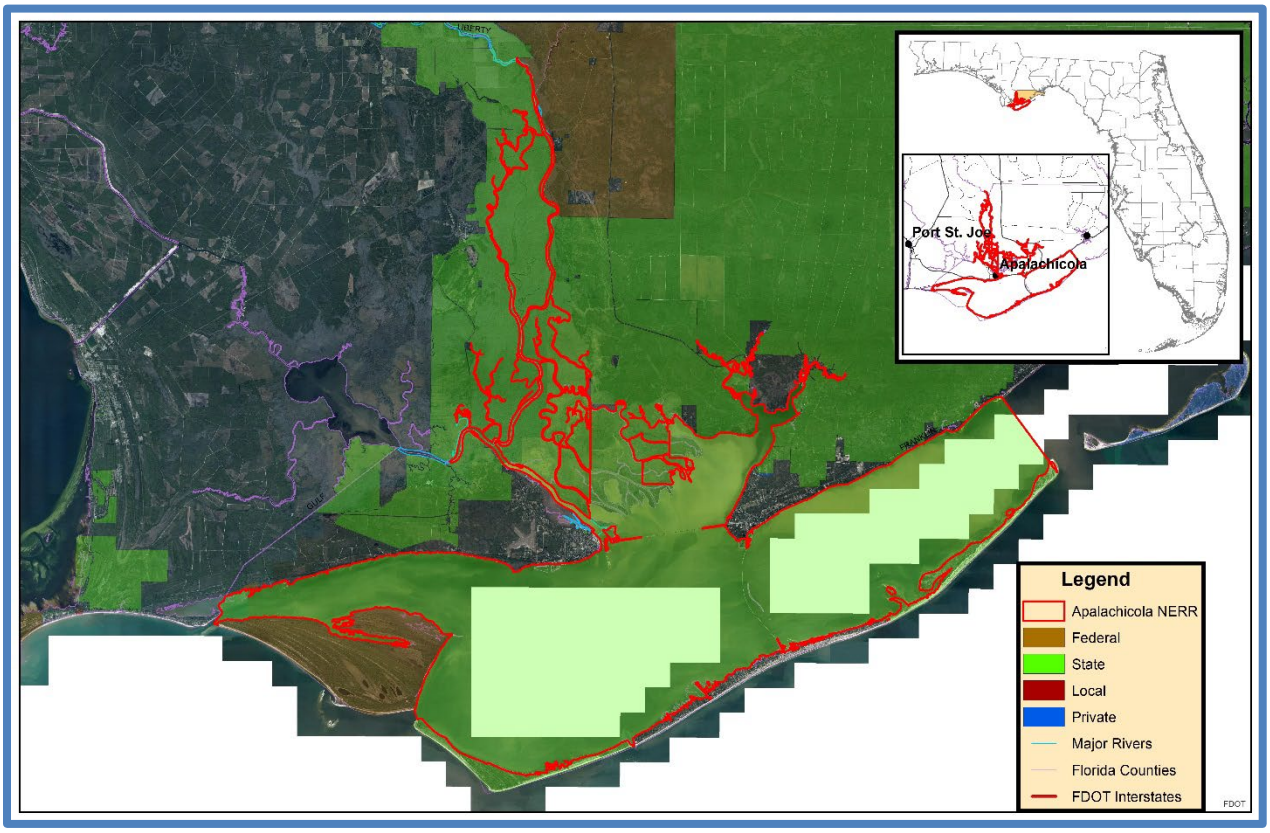
Review Team Members Present (voting)

- Phil Manor, FWC
- Lesley Cox, Conservation Org.
- Mark C. Curenton, Local Government
- Mark Gillman, DEP District
- Raya Pruner, DRP District
- Linda Chaisson, NWFWMD
- Jason Love, FFS
- Private Land Manager, None

Other Non-Team Members Present (attending)

- James Parker, DEP/DSL
- Keith Singleton, DEP/DSL

1.2 Property Map



1.3. Overview of Land Management Review Results

Is the property managed for purposes that are compatible with conservation, preservation, or recreation?

Yes = 7, No = 0

Are the management practices, including public access, in compliance with the management plan?

Yes = 7, No = 0

Table 1 shows the average scores received for each applicable category of review. *Field Review* scores refer to the adequacy of management actions in the field, while *Management Plan Review* scores refer to adequacy of discussion of these topics in the management plan. Scores range from 1 to 5 with 5 signifying excellence. For a more detailed key to the scores, please see *Appendix A*.

Table 17: Results at a glance

Major Land Management Categories	Field Review	Management Plan Review
Natural Communities / Forest Management	3.07	3.06
Prescribed Fire / Habitat Restoration	4.29	4.21
Hydrology	4.29	4.09
Imperiled Species	4.82	4.07
Exotic / Invasive Species	4.74	4.26
Cultural Resources	4.64	4.43
Public Access / Education / Law Enforcement	4.77	4.63
Infrastructure / Equipment / Staffing	4.26	N/A
Color Code (See Appendix A for detail)		

1.3.1 Consensus Commendations for the Managing Agency

The following commendations resulted from discussion and vote of the review team members:

1. The team commends the Florida Coastal Office (FCO) for the excellent education, outreach and training programs that promote public awareness and stewardship of cultural and nstural resources. (7+, 0-)
2. The team commends the FCO for its comprehensive long-term scientific monitoring of the estuarine ecosystem and other research programs. (7+, 0-)
3. The team commends the FCO for working with partners to improve management for shorebirds. (7+, 0-)
4. The team commends the FCO for improvement of interpretive materials and kiosks at sensitive coastal areas. (7+, 0-)

1.3.2. Consensus Recommendations to the Managing Agency

The following recommendations resulted from a discussion and vote of review team members. The next management plan update should include information about how these recommendations have been addressed:

1. The team recommends that the FCO look into adding emergent sand bars/oyster bars to the lease to improve management for American oystercatcher and other State threatened shorebird species. (7+, 0-)
   Managing Agency Response: *Reserve staff continue to identify these sovereign submerged lands within the boundary that support listed shorebird species. Stewardship staff continued collaboration efforts with Audubon in 2017 and identified a new site for the Florida shorebird database adjacent to Nick's Hole on St. George Island. Stewardship staff put up precautionary signs at the emergent sand bar/oyster bar and assisted Audubon with banding 2 fledgling American oystercatchers at the site. The staff also installed precautionary signs on the emergent sand bar just north of the Reserve's Church of God property (east of where the St. George Island bridge connects to St. George Island). The Reserve will continue to coordinate with Audubon to monitor these areas for improved management and will look into adding to leases if that is an option.*

   The team recommends that the FCO add and/or improve objectives for management of imperiled coastal wildlife (e.g., shorebirds). (7+, 0-)

   Managing Agency Response: *Objective 2.1.5 in the management plan is to conserve and manage listed species through focused habiat management, education and training. The Reserve will continue to accomplish this objective through the following strategies listed in the management plan; post clear signage and limit access to important habitats for listed species suring nesting activities; limit predation of listed species on ANERR lands through nuisance species removal; provide scientific information and recommendations on methods to reduce or eliminate threats to listed species; provide information and training on alternatives for local governments and developers to minimize impacts to habitats of listed species; incorporate education themes into existing K-12 program venues that address conservation of listed species; and continuing to offer*

training programs that include the importance of the conservation of listed species. In an effort to assist with the management of imperiled species, Reserve staff have put up additional signage on managed lands including 300 foot buffer signs on the SGI Causeway for the recently extended Critial Wildlife Area (CWA) time period during nesting season, assisted with the SGI Causeway Restoration project, continue to burn the SGI Causeway annually to enhance shorebird nesting habitat, continue to participate in the Florida Panhandle Shorebird Working Group as well as the annual Audubon Christmas Bird Count. Reserve staff will continue to collaborate with partners on imperiled species management and will update and enhance these objectives in the next management plan.

2. The team recommends that the FCO develop a working five-year fire management plan to assist with prescribed fire. (7+, 0-)
   Managing Agency Response: *ANERR's Management Plan contains a Fire Management Plan in Appendix E.5 on page 406. This plan was developed in 2012 and is currently being updated to include additional fire history, updated maps, burn zone intervals and resource needs. The Management Plan is updated every 10 years but the Reserve will keep a working fire management plan updated annually in-house to assist with prescribed fire.*

3. The team recommends that the FCO have a timber assessment completed, per Florida Statute. (7+, 0-)
   Managing Agency Response: *As per ANERR's Management Plan page 47, a Timber Management Assessment has not been conducted for this site. Chapter 253, Florida Statutes, requires that plans for 1,000+ acre parcels contain an analysis of multiple-use potential, to include a professional forester's assessment of the resource conservation and revenue-producing potentials of the tract's forests. ANERR has two larger parcels meeting this requirement. The Lower River Marshes, consisting of marshes and alluvial forest, contain no known quantities of harvestable timber. Litte St. George Island contains slash pine of harvestable quantity and size, however, most of these harvestable sized trees show "catface" scars from turpentine operations during the early to mid 20th century. These trees are considered cultural artifacts and remain protected from commercial harvest. Reserve staff will contact a professional forester to survey managed lands for potential options and will include this timber inventory/assessment results in the future management plan. Multiple-use potential is discussed in the plan.*

2. Field Review Details

2.1 Field Review Checklist Findings

The following items received high scores on the review team checklist, which indicates that management actions exceeded expectations.

1. Natural communities, specifically scrub,beach dune, coastal grassland, coastal interlude swale, shell mound, mesic hammock/hydric hammock, floodswamp, depression marsh, floodplain marsh, alluvial stream, unconsolidated subrate, marine/estuarine tidal marsh.
2. Listed species: Protection & Preservation, specifically animals, sea turtles, shorebirds, plants
3. Natural resources survey/monitoring specifically listed species or their habitat monitoring, other non-game species or their habitat monitoring, fire effects montitoring, other habitat management effects monitoring invasive species survey/monitoring.

4. **Cultural resources, specifically cultural resource survey, and protection and preservation**
5. **Resource management (prescribed fire), specifically quality.**
6. **Restoration, specifically living shoreline restoration**
7. **Non-native, invasive, and problem species, specifically prevention and control of plants, animals and pest/pathogens.**
8. **Hydro-alteration, specifically roads and culverts, ditches, and hydro-period alteration**
9. **Ground Water Monitoring specifically, quality and quantity**
10. **Resource protection, specifically, boundary survey, gates and fencing, signage and law enforcement presence.**
11. **Adjacent property concerns, specifically expanding development and inholdings/additions**
12. **Public access, specifically roads, parking, boat access**
13. **Environmental education and outreach, specifically wildlife, invasive species, habitat management activies, interpretive facilities and signs, recreational opportunities, management of visitor impacts.**
14. **Management resources, specifically waste disposal, sanitary facilities, buildings, staff**

2.2. Items Requiring Improvement Actions in the Field

The following items received low scores on the review team checklist, which indicates that management actions noted during the Field Review were not considered sufficient (less than 3.0 score on average). Please note that overall good scores do not preclude specific recommendations by the review team requiring remediation. **The management plan update should include information on how these items have been addressed**:

1. ***Forest Management, specifically timber inventory, received a below average score. The review team is asked to evaluate, based on information provided by the managing agency, whether forest management is sufficient.***

   Managing Agency Response: *Please see response above in regards to the timber inventory/assessment. Reserve staff will contact a professional forester to survey managed parcels for potential options and will include the timber inventory/assessment results in the future management plan.*

2.3. Field Review Checklist and Scores

Field Review Item	Reference #	Anonymous Team Members								Average
		1	2	3	4	5	6	7	8	
Natural Communities (I.A)										
Scrub	I.A.1	5	4	5	5	5	5	5		4.86
Beach Dune	I.A.2	5	5	5	5	5	5	5		5.00
Coastal Grassland	I.A.3	5	4	5	5	4	5	5		4.71

Coastal Interdunal Swale	I.A.4	5	4	5	5	4	5	5		4.71
Shell Mound	I.A.5	4	4	4	x	5	5	4		4.33
Scrubby Flatwoods	I.A.6	4	1	4	4	3	4	4		3.43
Mesic Flatwoods	I.A.7	5	1	4	5	3	4	5		3.86
Mesic Hammock/ Hydric Hammock	I.A.8	5	4	4	5	4	4	5		4.43
Floodplain Swamp	I.A.9	5	5	5	5	5	5	5		5.00
Depression Marsh	I.A.11	5	5	4	5	4	5	5		4.71
Floodplain Marsh	I.A.12	5	5	5	5	5	5	5		5.00
Alluvial Stream	I.A.13	5	5	5	5	5	5	5		5.00
Unconsolidated Substrate	I.A.14	5	5	5	4	5	5	5		4.86
Marine/Estuarine Tidal Marsh	I.A.15	5	5	5	5	5	5	5		5.00
								Natural Communities Average Score		4.64
Listed species:Protection & Preservation (I.B)										
Animals	I.B.1	5	5	4	5	5	5	5		4.86
Sea Turtles	I.B.1.a	5	5	5	5	5	5	5		5.00
Shorebirds	I.B.1.b	5	5	4	5	5		5		4.83
Plants	I.B.2	5	4	3	5	5	5	5		4.57
								Listed Species Average Score		4.82
Natural Resources Survey/Management Resources (I.C)										
Listed species or their habitat monitoring	I.C.2	5	5	5	5	5	5	5		5.00
Other non-game species or their habitat monitoring	I.C.3	5	5		5	5	4	4		4.67
Fire effects monitoring	I.C.4	5	5	4	5	4	5	5		4.71
Other habitat management effects monitoring		5	4	4	5	5	5	5		4.71
Invasive species survey / monitoring	I.C.6	5	5	5	5	5	5	5		5.00
Cultural Resources (Archeological & Historic sites) (II.A, II.B)										
Cultural Res. Survey	II.A	5	4	4	5	5	5	5		4.71
Protection and preservation	II.B	5	4	4	5	5	5	4		4.57
								Cultural Resources Average Score		4.64
Resource Management, Prescribed Fire (III.A)										
Area Being Burned (no. acres)	III.A1	4	2	3	x	x	5	3		3.40
Frequency	III.A.2	4	2	3	x	x	4	3		3.20
Quality	III.A.3	5	3	4	5	x	4	4		4.17
								Resource Management, Prescribed Fire Average Score		3.59
Restoration (III.B)										
Living Shoreline Restoration	III.B.2	5	5	5	5	5	5	5		5.00
								Restoration Average Score		5.00
Forest Management (III.C)										
Timber Inventory / Assessment	III.C.1	1	1	2	x	1	1	3		1.50
								Forest Management Average Score		1.50
Non-Native, Invasive & Problem Species (III.D)										

Prevention										
prevention - plants	III.D.1.a	5	5	5	5	5	5	5		5.00
prevention - animals	III.D.1.b	5	4	4	5	5	5			4.67
prevention - pests/pathogens	III.D.1.c	x	3	x	5	5	5			4.50
Control										
control - plants	III.D.2.a	5	5	5	5	5	5	5		5.00
control - animals	III.D.2.b	5	4	5	5	5	5	5		4.86
control - pest/pathogens	III.D.2.c	x	3	x	5	5	4	5		4.40
								Non-Native, Invasive & Problem Species Average Score		4.74
Hydrologic/Geologic function Hydro-Alteration (III.E.1)										
Roads/culverts	III.E.1.a	5	3	3	5	x	4	4		4.00
Ditches	III.E.1.b	5	3	3	5	x	4	4		4.00
Hydro-period Alteration	III.E.1.c	5	3	3	5	x	4	4		4.00
								Hydrologic/Geologic function, Hydro-Alteration Average Score		4.00
Ground Water Monitoring (III.E.2)										
Ground water quality	III.E.2.a	5	3	5	5	5	4	5		4.57
Ground water quantity	III.E.2.b	5	3	5	5	5	4	5		4.57
								Ground Water Monitoring Average Score		4.57
Resource Protection (III.F)										
Boundary survey	III.F.1	5	3	5	5	5	5	5		4.71
Gates & fencing	III.F.2	5	3	5	5	5	5	5		4.71
Signage	III.F.3	5	3	5	5	5	5	5		4.71
Law enforcement presence	III.F.4	5	3	4	5	5	5	5		4.57
								Resource Protection Average Score		4.68
Adjacent Property Concerns (III.G)										
Land Use										
Expanding development	III.G.1.a	5	4	5	5	5	5	5		4.86
Inholdings/additions	III.G.2	5	3	5	5	5	5	5		4.71
Public Access & Education (IV.1, IV.2, IV.3, IV.4, IV.5)										
Public Access										
Roads	IV.1.a	5	4	5	5	5	5	5		4.86
Parking	IV.1.b	5	4	5	5	5	5	5		4.86
Boat Access	IV.1.c	5	4	5	5	5	5	5		4.86
Environmental Education & Outreach										
Wildlife	IV.2.a	5	5	5	5	5	5	5		5.00
Invasive Species	IV.2.b	5	5	5	5	5	5	5		5.00
Habitat Management Activities	IV.2.c	5	4	5	5	5	5	5		4.86
Interpretive facilities and signs	IV.3	5	4	5	5	5	5	5		4.86
Recreational Opportunities	IV.4	5	4	5	5	5	5	5		4.86
Management of Visitor Impacts	IV.5	5	4	3	5	5	5	5		4.57
								Public Access & Education Average Score		4.86
Management Resources (V.1, V.2, V.3. V.4)										
Maintenance										
Waste disposal	V.1.a	5	4	5	5	5	5	5		4.86

Sanitary facilities	V.1.b	5	4	5	5	x	5	5		4.83
Infrastructure										
Buildings	V.2.a	5	4	5	5	5	5	5		4.86
Equipment	V.2.b	3	3	4	2	3	2	4		3.00
Staff	V.3	5	4	5	4	4	4	5		4.43
Funding	V.4	3	4	4	3	5	3	3		3.57
								Management Resources Average Score		4.26

Color Code:	Excellent	Above Average	Below Average	Poor	See Appendix A for detail
		Missing Vote	Insufficient Information		

3. Land Management Plan Review Details

3.1 Items Requiring Improvements in the Management Plan

The following items received low scores on the review team checklist, which indicates that the text noted in the Management Plan Review does not sufficiently address this issue (less than 3.0 score on average.). Please note that overall good scores do not preclude specific recommendations by the review team requiring remediation. The next management plan update should address the checklist items identified below:

1. ***Forest Management, specifically timber inventory, received a below average score. This is an indication that the management plan does not sufficiently address a timber inventory.***

   Managing Agency Response: *As per ANERR's Management Plan page 47, a Timber Management Assessment has not been conducted for this site. An assessment was done on three smaller tracts and is valuable in identifying what we have on our lands in light of wildfires/hurrricanes, etc. Chapter 253, Florida Statutes, requires that plans for 1,000+ acre parcels contain an analysis of multiple-use potential, to include a professional forester's assessment of the resource conservation and revenue-producing potentials of the tract's forests. ANERR has two larger parcels meeting this requirement. The Lower River Marshes, consisting of marshes and alluvial forest, contain no known quantities of harvestable timber. Litte St. George Island contains slash pine of harvestable quantity and size, however, most of these harvestable sized trees show "catface" scars from turpentine operations during the early to mid 20th century. These trees are considered cultural artifacts and remain protected from commercial harvest. Reserve staff will contact a professional forester to survey managed lands for potential options and will include this timber inventory/assessment results in the future management plan. Multiple-use potential is discussed in the plan.*

2. ***Adjacent Property Concerns, specifically discussion of potential surplus land determination received a below average score. This is an indication that the management plan does not sufficiently address surplus lands.***

   Managing Agency Response: *The current management plan includes a Land Acquisition Plan. This was not listed as a concern during the LMR in 2012, therefore it wasn't on the radar. Staff*

will coordinate with the Division of State Lands (DSL) to provide a discussion of potential surplus land determination in the future management plan.

3.2 Management Plan Review Checklist and Scores

Plan Review Item	Reference #	Anonymous Team Members								Average
		1	2	3	4	5	6	7	8	
Natural Communities (I.A)										
Scrub	I.A.1	5	3	3	5	5	5	5		4.43
Beach Dune	I.A.2	5	3	3	5	5	5	5		4.43
Coastal Grassland	I.A.3	5	3	3	4	5	5	5		4.29
Coastal Interdunal Swale	I.A.4	5	3	3	4	5	5	5		4.29
Shell Mound	I.A.5	5	3	4	3	5	5	5		4.29
Scrubby Flatwoods	I.A.6	5	3	3	4	5	5	5		4.29
Mesic Flatwoods	I.A.7	5	3	3	4	5	5	5		4.29
Mesic Hammock/Hydric Hammock	I.A.8	5	3	3	3	5	5	5		4.14
Floodplain Swamp	I.A.9	5	3	3	5	5	5	5		4.43
Depression Marsh	I.A.11	5	3	3	5	5	5	5		4.43
Floodplain Marsh	I.A.12	5	3	5	4	5	5	5		4.57
Alluvial Stream	I.A.13	5	3	5	5	5	5	5		4.71
Unconsolidated Substrate	I.A.14	5	3	3	5	5	5	5		4.43
Marine/Estuarine Tidal Marsh	I.A.15	5	3	5	5	5	5	5		4.71
								Natural Communities Average Score		4.41
Listed species: Protection & Preservation (I.B)										
Animals	I.B.1	5	4	4	4	4	5	3		4.14
Sea Turtles	I.B.1.a	5	5	3	4	4	5	3		4.14
Shorebirds	I.B.1.b	5	5	3	4	4		3		4.00
Plants	I.B.2	5	4	3	4	4		4		4.00
								Listed Species Average Score		4.07
Natural Resources Survey/Management Resources (I.C)										
Listed species or their habitat monitoring	I.C.2	5	3	3	5	5	5	5		4.43
Other non-game species or their habitat monitoring	I.C.3	5	3	3	3	5	5	4		4.00
Fire effects monitoring	I.C.4	5	3	3	4	5	5	5		4.29
Other habitat management effects monitoring	I.C.5	5	3	4	4	5	5	5		4.43
Invasive species survey / monitoring	I.C.6	5	3	5	5	5	5	5		4.71
Cultural Resources (Archeological & Historic sites) (II.A,II.B)										
Cultural Res. Survey	II.A	5	3	3	5	5	5	5		4.43
Protection and preservation	II.B	5	3	3	5	5	5	5		4.43

								Cultural Resources Average Score		4.43
Resource Management, Prescribed Fire (III.A)										
Area Being Burned (no. acres)	III.A.1	5	3	3	4	2	5	5		3.86
Frequency	III.A.2	5	3	4	4	3	4	4		3.86
Quality	III.A.3	5	3	3	4	3	4	5		3.86
								Resource Management, Prescribed Fire Average Score		3.86
Restoration (III.B)										
Living Shoreline Restoration	III.B.2	5	3	5	4	5	5	5		4.57
								Restoration Average Score		4.57
Forest Management (III.C)										
Timber Inventory / Assessment	III.C.1	1	1	2	3	3	1	1		1.71
								Forest Management Average Score		1.71
Non-Native, Invasive & Problem Species (III.D)										
Prevention										
prevention - plants	III.D.1.a	5	3	3	5	5	5	5		4.43
prevention - animals	III.D.1.b	1	3	3	5	5	5	5		3.86
prevention - pests/pathogens	III.D.1.c	5	3	3	5	5	5	5		4.43
Control										
control - plants	III.D.2.a	5	3	4	5	5	5	5		4.57
control - animals	III.D.2.b	1	3	4	5	5	5	5		4.00
control - pest/pathogens	III.D.2.c	5	3	3	5	5	4	5		4.29
								Non-Native, Invasive & Problem Species Average Score		4.26
Hydrologic/Geologic function, Hydro-Alteration (III.E.1)										
Roads/culverts	III.E.1.a	5	3	3	3	x	5	4		3.83
Ditches	III.E.1.b	5	3	3	3	x	5	4		3.83
Hydro-period Alteration	III.E.1.c	5	3	3	3	x	5	5		4.00
								Hydrologic/Geologic function, Hydro-Alteration Average Score		3.89
Ground Water Monitoring (III.E.2)										
Ground water quality	III.E.2.a	5	3	3	4	5	5	5		4.29
Ground water quantity	III.E.2.b	5	3	3	4	5	5	5		4.29
								Ground Water Monitoring Average Score		4.29
Resource Protection (III.F)										
Boundary survey	III.F.1	5	3	4	5	5	5	5		4.57
Gates & fencing	III.F.2	5	3	4	5	5	5	5		4.57
Signage	III.F.3	5	3	4	5	5	5	5		4.57
Law enforcement presence	III.F.4	5	3	4	5	5	5	5		4.57
								Resource Protection Average Score		4.57
Adjacent Property Concerns (III.G)										
Land Use										
Expanding development	III.G.1.a	5	3	4	4	5	5	5		4.43
Inholdings/additions	III.G.2	5	4	5	3	5	5	5		4.57

Discussion of Potential Surplus Land Determination	III.G.3	1	2	1	3	5	1	2		2.14
Surplus Lands Identified?	III.G.4	5	5	5	5	5	5	5		5.00
Public Access & Education (IV.1, IV.2, IV.3, IV.4, IV.5)										
Public Access										
Roads	IV.1.a	5	3	5	5	5	5	5		4.71
Parking	IV.1.b	5	3	5	5	5	5	5		4.71
Boat Access	IV.1.c	5	3	5	5	5	5	5		4.71
Environmental Education & Outreach										
Wildlife	IV.2.a	5	3	5	5	5	5	5		4.71
Invasive Species	IV.2.b	5	3	5	5	5	5	5		4.71
Habitat Management Activities	IV.2.c	5	3	5	5	5	5	5		4.71
Interpretive facilities and signs	IV.3	5	3	5	5	5	5	5		4.71
Recreational Opportunities	IV.4	5	3	5	5	5	5	5		4.71
Management of Visitor Impacts	IV.5	5	3	3	5	5	5	5		4.43
								Public Access & Education Average Score		4.68
Managed Area Uses (VI.A, VI.B)										
Existing Uses										
Hiking	VI.A.1	5	5	5	5	5	5	5		5.00
Environmental Ed.	VI.A.2	5	5	5	5	5	5	5		5.00
Boating	VI.A.3	5	5	4	5	5	5	5		4.86
Beach Access	VI.A.4	5	5	4	5	5	5	5		4.86
Fishing	VI.A.5	5	5	4	5	5	5	5		4.86
Wildlife viewing	VI.A.6	5	5	3	5	5	5	5		4.71
Hunting	VI.A.7	5	5		5	5	5	5		5.00
Primitive Camping	VI.A.8	5	5	3	5	5	5	5		4.71
	Color Code:	Excellent		Above Average		Below Average		Poor		See Appendix A for detail
				Missing Vote		Insufficient Information				

Appendix A: Scoring System Detail

Explanation of Consensus Commendations:

Often, the exceptional condition of some of the property's attributes impress review team members. In those instances, team members are encouraged to offer positive feedback to the managing agency in the form of a commendation. The teams develop commendations generally by standard consensus processes or by majority vote if they cannot obtain a true consensus.

Explanation of Consensus Recommendations:

Subsection 259.036(2), F.S., specifically states that the managing entity shall consider the findings and recommendations of the land management review. We ask team members to provide general recommendations for improving the management or public access and use of the property. The teams discuss these recommendations and develop consensus recommendations as described above. We provide these recommendations to the managing agency to consider when finalizing the required ten-year

management plan update. We encourage the manager to respond directly to these recommendations and include their responses in the final report when received in a timely manner.

Explanation of Field Review Checklist and Scores, and Management Plan Review Checklist and Scores:

We provide team members with a checklist to fill out during the evaluation workshop phase of the Land Management Review. The checklist is the uniform tool used to evaluate both the management actions and condition of the managed area, and the sufficiency of the management plan elements. During the evaluation workshop, team members individually provide scores on each issue on the checklist, from their individual perspective. Team members also base their evaluations on information provided by the managing agency staff as well as other team member discussions. Staff averages these scores to evaluate the overall conditions on the ground, and how the management plan addresses the issues. Team members must score each management issue 1 to 5: 1 being the management practices are clearly insufficient, and 5 being that the management practices are excellent. Members may choose to abstain if they have inadequate expertise or information to make a cardinal numeric choice, as indicated by an "X" on the checklist scores, or they may not provide a vote for other unknown reasons, as indicated by a blank. If a majority of members failed to vote on any issue, that issue is determined to be irrelevant to management of that property or it was inadequately reviewed by the team to make an intelligent choice. In either case staff eliminated the issue from the report to the manager.

Average scores are interpreted as follows:

Scores 4.0 to 5.0 are *Excellent*
Scores 3.0 to 3.99 are *Above Average*
Scores 2.0 to 2.99 are *Below Average*
Scores 1.0 to 1.99 are considered *Poor*

2022 Land Management Review Team Report for Apalachicola National Estuarine Research Reserve

Introduction

Section 259.036, F.S. requires a periodic on-site review of conservation and recreation lands titled in the name of the Board of Trustees to determine (1) whether the lands are being managed for the purposes for which they were acquired and (2) whether they are being managed in accordance with their land management plan adopted pursuant to s. 259.032, F.S. In cases where the managed areas exceed 1,000 acres in size, such a review must be scheduled at least every five years. In conducting this review, a statutorily constructed review team "shall evaluate the extent to which the existing management plan provides sufficient protection to threatened or endangered species, unique or important natural or physical features, geological or hydrological functions or archaeological features. The review shall also evaluate the extent to which the land is being managed for the purposes for which it was acquired and the degree to which actual management practices, including public access, are in compliance with the adopted management plan."

The land management review teams are coordinated by the Division of State Lands and consist of representatives from the Division of Recreation and Parks (DEP), the Florida Forest Service (DACS), the Fish and Wildlife Conservation Commission, the local

government in which the property is located, the DEP District in which the parcel is located, the local soil and water conservation district or jurisdictional water management district, a conservation organization member, and a local private land manager.

Each Land Management Review Report is divided into three sections. Section 1 provides the details of the property being reviewed as well as the overall results of the report. Section 2 provides details of the Field Review, in which the Review Team inspects the results of management actions on the site. Section 3 provides details of the Land Management Plan Review, in which the team determines the extent to which the Management Plan provides for and documents adequate natural and recreational resource protection.

Finally, each report may also contain an Appendix that lists individual team member comments. This is a compilation of feedback, concerns or other thoughts raised by individual team members, but not necessarily indicative of the final consensus reached by the Land Management Review Team.

Property Reviewed in this Report

Name of Site: Apalachicola National Estuarine Research Reserve

Managed by: Department of Environmental Protection, Resilience and Coastal Protection

Acres: 234,715 **County:** Franklin

Purpose(s) for Acquisition: to protect and restore the natural and cultural values of the property and provide the greatest benefit to the citizens of the state.

Acquisition Program(s): P2000/CARL/Florida Forever **Original Acquisition Date:**

Area Reviewed: Entire Property **Last Management Plan Approval Date:** 8/15/13

Review Date: 10/6/22

Agency Manager and Key Staff:

- Jenna Harper, Manager
- Megan Lamb, Resource Coordinator
- Kim Miller, Assistant Manager

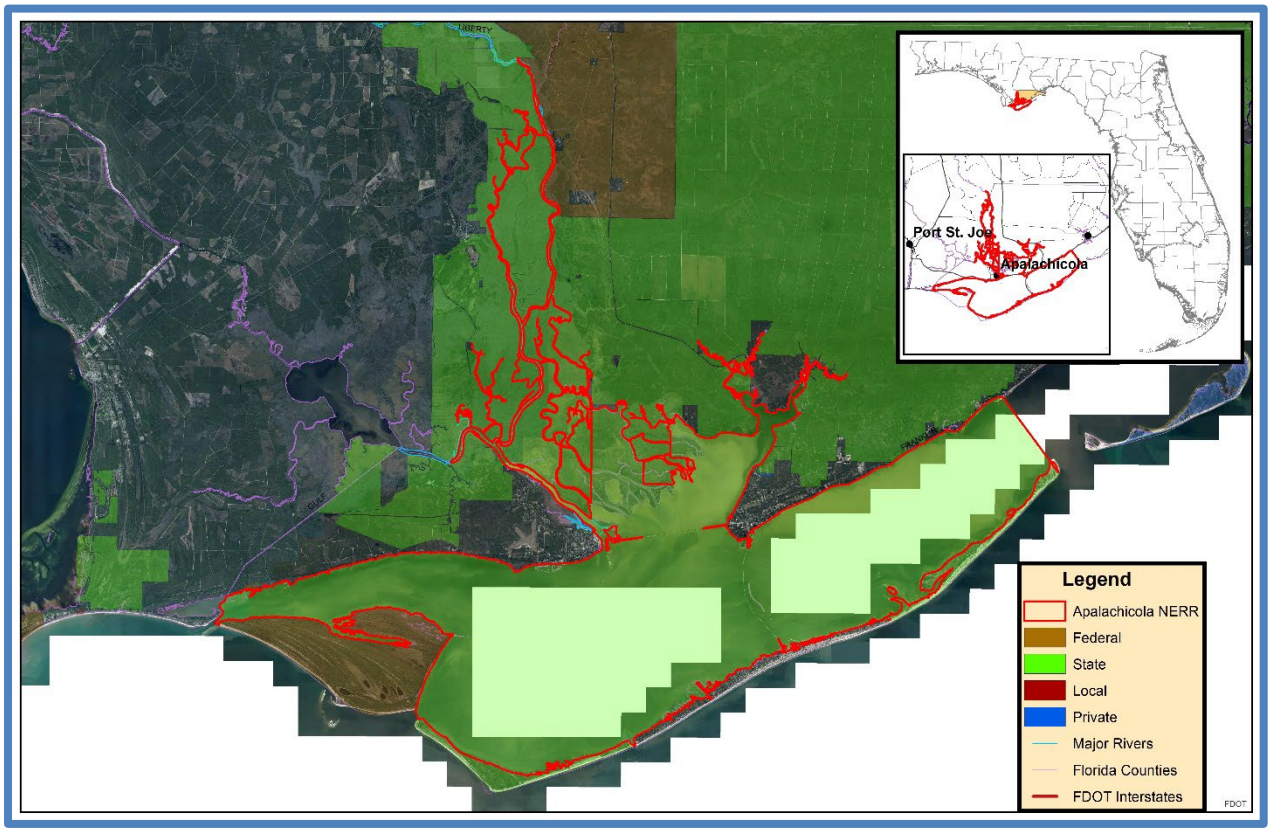
Review Team Members (voting)

- DRP District, None
- Mark Curenton, Local Gov't.
- Catherine Ricketts, FWC
- Monica Hardin, DEP District
- Shelly Wayte, FFS
- Coakley Taylor, NWFWMD
- Conservation Org., None
- Private Land Manager, None

Non-Team Members (attending)

- Keith Singleton, DEP/DSL
- Dylan Shoemaker, DEP/RCP
- Earl Pearson, DEP/RCP

Property Map



Overview of Land Management Review Results

Is the property managed for purposes that are compatible with conservation, preservation, or recreation?

Yes = 5, No = 0

Are the management practices, including public access, in compliance with the management plan?

Yes = 5, No = 0

Table 1 shows the average scores received for each applicable category of review. *Field Review* scores refer to the adequacy of management actions in the field, while *Management Plan Review* scores refer to adequacy of discussion of these topics in the management plan. Scores range from 1 to 5 with 5 signifying excellence. For a more detailed key to the scores, please see *Appendix A*.

Table 18: Results at a glance.

Major Land Management Categories	Field Review	Management Plan Review
Natural Communities / Forest Management	4.45	3.87
Prescribed Fire / Habitat Restoration	4.32	3.97
Hydrology	4.20	3.49
Imperiled Species	4.71	4.65
Exotic / Invasive Species	4.50	3.87
Cultural Resources	4.60	4.40
Public Access / Education / Law Enforcement	4.69	4.28
Infrastructure / Equipment / Staffing	4.30	N/A

Color Code (See Appendix A for detail)

Excellent	Above Average	Below Average	Poor

Consensus Commendations for the Managing Agency

The following commendations resulted from discussion and vote of the review team members:

5. The team commends the staff for management/monitoring of imperiled species and habitats; particularly for continuously seeking innovative ways to restore/maintain shorebird habitat. (5+, 0-)
6. The team commends the staff for efforts to mitigate urban encroachment issues and those impacts on prescription burning by facilitating good relationships with neighbors. (5+, 0-)
7. The team commends staff for educational and outreach effort, from Estuaries Day, work with school children, to community classes, workshops for Land Managers, etc. Outstanding work in this area. (5+, 0-)

Consensus Recommendations to the Managing Agency

The following recommendations resulted from a discussion and vote of review team members. The next management plan update should include information about how these recommendations have been addressed:

4. The team recommends the need for a more quantitative approach to assessing status of fire-maintained upland communities. (5+, 0-)

   Managing Agency Response:

   Thank you for your comments. We are currently reviewing and rewriting our Management Plan, and are also using our recently completed Timber Assessment as a springboard to further update management recommendations and measurable goals for our managed areas. We want to ensure that our management activities are appropriate for our unique resources and restoration goals as we move forward in this process.

Field Review Details

Field Review Checklist Findings

The following items received high scores on the review team checklist, which indicates that management actions exceeded expectations.

15. **Natural communities, specifically scrub, beach dune, coastal grassland, coastal interlude swale, shell mound, scrubby flatwoods, mesic flatwoods, mesic hammock/hydric hammock, floodplain swamp, depression marsh, floodplain marsh, alluvial stream, unconsolidated subrate, marine/estuarine tidal marsh.**
16. **Listed species, listed animal and plant species in general, and specifically sea turtles, and shorebirds.**
17. **Natural resources survey/monitoring resources, specifically listed species or their habitat monitoring, other non-game species or their habitat monitoring, fire effects monitoring, other habitat management effects monitoring, and invasive species survey and monitoring.**
18. **Cultural resources, specifically cultural resource survey, and protection and preservation.**
19. **Resource management (prescribed fire), specifically quality.**
20. **Restoration, specifically living shoreline restoration.**
21. **Forest Management, specifically timber inventory.**
22. **Non-native, invasive, and problem species, specifically prevention and control of plants, animals, and pest/pathogens.**
23. **Hydro-alteration, specifically roads and culverts, ditches, and hydro-period alteration.**
24. **Surface water monitoring, specifically quality and quantity.**
25. **Resource protection, specifically boundary survey, and gates and fencing, signage, and law enforcement presence.**
26. **Adjacent property concerns, land use, specifically expanding development, and inholdings and additions.**
27. **Public access, specifically roads, and parking.**
28. **Environmental education and outreach, specifically wildlife, invasive species, habitat management activities, interpretive facilities and signs, recreational opportunities, and management of visitor impacts.**
29. **Management resources, specifically waste disposal, sanitary facilities, buildings, equipment, and staff.**

Items Requiring Improvement Actions in the Field

The following items received low scores on the review team checklist, which indicates that management actions noted during the Field Review were not considered sufficient (less than 3.0 score on average). Please note that overall good scores do not preclude specific recommendations by the review team requiring remediation. The management plan update should include information on how these items have been addressed:

The review team scores did not identify items requiring improvement actions in the field.

Field Review Checklist and Scores

Field Review Item	Reference #	Anonymous Team Members								Average
		1	2	3	4	5	6	7	8	
Natural Communities (I.A)										
Scrub	I.A.1	5	x	5	4	5				4.75
Beach Dune	I.A.2	5	x	5	5	5				5.00
Coastal Grassland	I.A.3	5	x	5	4	5				4.75
Coastal Interdunal Swale	I.A.4	5	x	5	4	5				4.75
Shell Mound	I.A.5	4	x	5	3	4				4.00
Scrubby Flatwoods	I.A.6	5	3	4	4	5				4.20
Mesic Flatwoods	I.A.7	5	3	4	3	5				4.00
Mesic Hammock/Hydric Hammock	I.A.8	5	4	5	X	5				4.75
Floodplain Swamp	I.A.9	4	4	5	4	5				4.40
Depression Marsh	I.A.10	4	4	4	4	4				4.00
Floodplain Marsh	I.A.11	4	4	5	4	4				4.20
Alluvial Stream	I.A.12	5	4	5	4	5				4.60
Unconsolidated Substrate	I.A.13	5	4	5	5	4				4.60
Marine/Estuarine Tidal Marsh	I.A.14	5	5	5	5	5				5.00

									Natural Communities Average Score	4.50
Listed species: Protection & Preservation (I.B)										
Animals	I.B.1	5	5	5		5				5.00
Sea Turtles	I.B.1.a	5	5	5	4	5				4.80
Shorebirds	I.B.1.b	5	5	5	4	5				4.80
Plants	I.B.2	5	4	4	X	4				4.25
									Listed Species Average Score	4.71
Natural Resources Survey/Management Resources (I.C)										
Listed species or their habitat monitoring	I.C.2	5	5	5	4	5				4.80
Other non-game species or their habitat monitoring	I.C.3	5	4	5	4	5				4.60
Fire effects monitoring	I.C.4	5	4	5	2	5				4.20
Other habitat management effects monitoring	I.C.5	5	4	5	4	5				4.60
Invasive species survey / monitoring	I.C.6	5	5	5	5	5				5.00
Cultural Resources (Archeological & Historic sites) (II.A, II.B)										
Cultural Res. Survey	II.A	5	5	5	3	5				4.60
Protection and preservation	II.B	5	5	5	3	5				4.60
									Cultural Resources Average Score	4.60
Resource Management, Prescribed Fire (III.A)										
Area Being Burned (no. acres)	III.A.1	3	3	3	3	3				3.00
Frequency	III.A.2	4	3	4	2	4				3.40
Quality	III.A.3	5	4	5	X	4				4.50
									Resource Management, Prescribed Fire Average Score	3.63
Restoration (III.B)										
Living Shoreline Restoration	III.B.1	5	5	5	5	5				5.00
									Restoration Average Score	5.00
Forest Management (III.C)										
Timber Inventory	III.C.1	5	5	5	3	4				4.40
									Forest Management Average Score	4.40
Non-Native, Invasive & Problem Species (III.D)										
Prevention										
prevention - plants	III.D.1.a	5	4	5	3	5				4.40
prevention - animals	III.D.1.b	5	5	5	4	5				4.80
prevention - pests/pathogens	III.D.1.c	5	5	4	3	4				4.20
Control										
control - plants	III.D.2.a	5	5	5	3	4				4.40
control - animals	III.D.2.b	5	5	5	4	5				4.80
control - pests/pathogens	III.D.2.c	5	5	5	3	4				4.40
									Non-Native, Invasive & Problem Species Average Score	4.50
Hydrologic/Geologic function Hydro-Alteration (III.E.1)										
Roads/culverts	III.E.1.a	5	4	5	3	4				4.20
Ditches	III.E.1.b	5	4	5	3	4				4.20
Hydro-period Alteration	III.E.1.c	5	4	5	3	4				4.20
									Hydrologic/Geologic function, Hydro-Alteration Average Score	4.20

Ground Water Monitoring (III.E.2)										
Ground water quality	III.E.2.a	5	4	5	2	3				3.80
Ground water quantity	III.E.2.b	5	4	5	2	3				3.80
									Ground Water Monitoring Average Score	3.80
Surface Water Monitoring (III.E.3)										
Surface water quality	III.E.3.a	5	5	5	4	4				4.60
Surface water quantity	III.F.3.b	5	5	5	4	4				4.60
									Surface Water Monitoring Average Score	4.60
Resource Protection (III.F)										
Boundary survey	III.F.1	5	5	5	3	5				4.60
Gates & fencing	III.F.2	5	5	5	4	4				4.60
Signage	III.F.3	5	5	5	4	5				4.80
Law enforcement presence	III.F.4		5	5	3	4				4.25
									Resource Protection Average Score	4.56
Adjacent Property Concerns (III.G)										
Land Use										
Expanding development	III.G.1.a	5	5	5	4	4				4.60
Inholdings/additions	III.G.2	5	5		4	4				4.50
Public Access & Education (IV.1, IV.2, IV.3, IV.4, IV.5)										
Public Access										
Roads	IV.1.a	5	4	5	4	4				4.40
Parking	IV.1.b	5	5	5	3	4				4.40
Environmental Education & Outreach										
Wildlife	IV.2.a	5	5	5	5	5				5.00
Invasive Species	IV.2.b	5	5	5	5	5				5.00
Habitat Management Activities	IV.2.c	5	5	5	5	5				5.00
Interpretive facilities and signs	IV.3	5	5	5	5	5				5.00
Recreational Opportunities	IV.4	5	5	5	5	5				5.00
Management of Visitor Impacts	IV.5	5	4	5	5	5				4.80
									Public Access & Education Average Score	4.83
Management Resources (V.1, V.2, V.3. V.4)										
Maintenance										
Waste disposal	V.1.a	5	4	5	4	4				4.40
Sanitary facilities	V.1.b	5	5	5	4	4				4.60
Infrastructure										
Buildings	V.2.a	5	5	5	4	5				4.80
Equipment	V.2.b	4	5	5	3	3				4.00
Staff	V.3	5	5	5	3	3				4.20
Funding	V.4	4	5	4	3	3				3.80
									Management Resources Average Score	4.30

Color Code:	Excellent	Above Average	Below Average	Poor	See Appendix A for detail
		Missing Vote	Insufficient Information		

Land Management Plan Review Details

Items Requiring Improvements in the Management Plan

The following items received low scores on the review team checklist, which indicates that the text noted in the Management Plan Review does not sufficiently address this issue (less than 3.0 score on average.). Please note that overall good scores do not preclude specific recommendations by the review team requiring remediation. The next management plan update should address the checklist items identified below:

2. ***Ground Water Monitoring, specifically quality, and quantity, received below average scores. This is an indication that the management plan does not sufficiently address ground water monitoring.***

   Managing Agency Response:

   Thank you for your comments. The Northwest Florida Water Management District maintains a groundwater well within the Rodrigue tract in ANERR's Cat Point managed area as part of its statewide program to monitor ground water resources. The Reserve's porewater wells, which monitor water quality closer to the surface in sensitive marsh areas, were established in 2016 after the 2013 Management Plan was completed. We are currently undergoing edits for an updated Management Plan; we will make sure that the groundwater monitoring and discussion of the porewater monitoring is included in the plan update.

Management Plan Review Checklist and Scores

Plan Review Item	Reference #	Anonymous Team Members								Average
		1	2	3	4	5	6	7	8	
Natural Communities (I.A)										
Scrub	I.A.1	5	5	3	2	5				4.00
Beach Dune	I.A.2	5	5	3	2	5				4.00
Coastal Grassland	I.A.3	5	5	3	2	5				4.00
Coastal Interdunal Swale	I.A.4	5	5	3	2	5				4.00
Shell Mound	I.A.5	5	5	3	2	5				4.00
Scrubby Flatwoods	I.A.6	5	5	3	2	5				4.00
Mesic Flatwoods	I.A.7	5	5	3	2	5				4.00
Mesic Hammock/Hydric Hammock	I.A.8	5	5	3	1	5				3.80
Floodplain Swamp	I.A.9	5	5	3	2	5				4.00
Depression Marsh	I.A.10	5	5	3	2	5				4.00
Floodplain Marsh	I.A.11	5	5	3	2	5				4.00
Alluvial Stream	I.A.12	5	5	3	2	5				4.00
Unconsolidated Substrate	I.A.13	5	5	3	2	5				4.00
Marine/Estuarine Tidal Marsh	I.A.14	5	5	3	2	5				4.00
									Natural Communities Average Score	3.99
Listed species: Protection & Preservation (I.B)										

Animals	I.B.1	5	5	5		5				5.00
Sea Turtles	I.B.1.a	5	5	5	4	5				4.80
Shorebirds	I.B.1.b	5	5	5	4	5				4.80
Plants	I.B.2	5	5	5	1	4				4.00
									Listed Species Average Score	4.65
Natural Resources Survey/Management Resources (I.C)										
Listed species or their habitat monitoring	I.C.2	5	5	3	4	4				4.20
Other non-game species or their habitat monitoring	I.C.3	5	5	5	4	4				4.60
Fire effects monitoring	I.C.4	5	5	3	2	4				3.80
Other habitat management effects monitoring	I.C.5	5	5	4	4	4				4.40
Invasive species survey / monitoring	I.C.6	5	5	5	4	4				4.60
Cultural Resources (Archeological & Historic sites) (II.A, II.B)										
Cultural Res. Survey	II.A	5	5	5	3	4				4.40
Protection and preservation	II.B	5	5	5	3	4				4.40
									Cultural Resources Average Score	4.40
Resource Management, Prescribed Fire (III.A)										
Area Being Burned (no. acres)	III.A.1	5	5	1	3	4				3.60
Frequency	III.A.2	5	5	3	3	4				4.00
Quality	III.A.3	5	5	4	3	4				4.20
									Resource Management, Prescribed Fire Average Score	3.93
Restoration (III.B)										
Living Shoreline Restoration	III.B.1	5	5	5	2	3				4.00
									Restoration Average Score	4.00
Forest Management (III.C)										
Timber Inventory	III.C.1	5	5	1	X	4				3.75
									Forest Management Average Score	3.75
Non-Native, Invasive & Problem Species (III.D)										
Prevention										
prevention - plants	III.D.1.a	5	5	5	2	3				4.00
prevention - animals	III.D.1.b	5	5	5	2	3				4.00
prevention - pests/pathogens	III.D.1.c	5	5	4	2	3				3.80
Control										
control - plants	III.D.2.a	5	5	4	2	3				3.80
control - animals	III.D.2.b	5	5	4	2	3				3.80
control - pests/pathogens	III.D.2.c	5	5	4	2	3				3.80
									Non-Native, Invasive & Problem Species Average Score	3.87
Hydrologic/Geologic function, Hydro-Alteration (III.E.1)										
Roads/culverts	III.E.1.a	5	5	4	2	3				3.80
Ditches	III.E.1.b	5	5	4	1	3				3.60
Hydro-period Alteration	III.E.1.c	5	5	3	2	3				3.60
									Hydrologic/Geologic function, Hydro-Alteration Average Score	3.67
Ground Water Monitoring (III.E.2)										
Ground water quality	III.E.2.a	5	5	1	1	2				2.80

Ground water quantity	III.E.2.b	5	5	1	1	2				2.80
									Ground Water Monitoring Average Score	2.80
Surface Water Monitoring (III.E.3)										
Surface water quality	III.E.3.a	5	5	5	1	4				4.00
Surface water quantity	III.E.3.b	5	5	5	1	4				4.00
									Surface Water Monitoring Average Score	4.00
Resource Protection (III.F)										
Boundary survey	III.F.1	5	5	5	1	4				4.00
Gates & fencing	III.F.2	5	5	5	1	4				4.00
Signage	III.F.3	5	5	5	3	4				4.40
Law enforcement presence	III.F.4	5	5	5	2	4				4.20
									Resource Protection Average Score	4.15
Adjacent Property Concerns (III.G)										
Land Use										
Expanding development	III.G.1.a	5	5	4	2	4				4.00
Inholdings/additions	III.G.2	5	5		2	4				4.00
Discussion of Potential Surplus Land Determination	III.G.3	4	5	2	2	4				3.40
Surplus Lands Identified?	III.G.4	5	5	5	2	3				4.00
Public Access & Education (IV.1, IV.2, IV.3, IV.4, IV.5)										
Public Access										
Roads	IV.1.a	5	5	5	2	5				4.40
Parking	IV.1.b	5	5	5	2	5				4.40
Environmental Education & Outreach										
Wildlife	IV.2.a	5	5	5	2	5				4.40
Invasive Species	IV.2.b	5	5	5	2	5				4.40
Habitat Management Activities	IV.2.c	5	5	5	2	5				4.40
Interpretive facilities and signs	IV.3	5	5	5	2	5				4.40
Recreational Opportunities	IV.4	5	5	5	2	5				4.40
Management of Visitor Impacts	IV.5	5	5	5	2	5				4.40
									Public Access & Education Average Score	4.40
Managed Area Uses (VI.A, VI.B)										
Existing Uses										
Hiking	VI.A.1	5	5	5	4	5				4.80
Environmental Ed.	VI.A.2	5	5	5	4	5				4.80
Boating	VI.A.3	5	5	5	4	5				4.80
Beach Access	VI.A.4	5	4	5	4	5				4.60
Fishing	VI.A.5	5	5	5	4	5				4.80
Wildlife viewing	VI.A.6	5	5	5	4	5				4.80
Hunting	VI.A.7	5	3	5	4	5				4.40
Primitive Camping	VI.A.8	5	5	5	4	5				4.80

Color Code:	Excellent	Above Average	Below Average	Poor	See Appendix A for detail
		Missing Vote	Insufficient Information		

Appendix A: Scoring System Detail

Explanation of Consensus Commendations:

Often, the exceptional condition of some of the property's attributes impress review team members. In those instances, team members are encouraged to offer positive feedback to the managing agency in the form of a commendation. The teams develop commendations generally by standard consensus processes or by majority vote if they cannot obtain a true consensus.

Explanation of Consensus Recommendations:

Subsection 259.036(2), F.S., specifically states that the managing entity shall consider the findings and recommendations of the land management review. We ask team members to provide general recommendations for improving the management or public access and use of the property. The teams discuss these recommendations and develop consensus recommendations as described above. We provide these recommendations to the managing agency to consider when finalizing the required ten-year management plan update. We encourage the manager to respond directly to these recommendations and include their responses in the final report when received in a timely manner.

Explanation of Field Review Checklist and Scores, and Management Plan Review Checklist and Scores:

We provide team members with a checklist to fill out during the evaluation workshop phase of the Land Management Review. The checklist is the uniform tool used to evaluate both the management actions and condition of the managed area, and the sufficiency of the management plan elements. During the evaluation workshop, team members individually provide scores on each issue on the checklist, from their individual perspective. Team members also base their evaluations on information provided by the managing agency staff as well as other team member discussions. Staff averages these scores to evaluate the overall conditions on the ground, and how the management plan addresses the issues. Team members must score each management issue 1 to 5: 1 being the management practices are clearly insufficient, and 5 being that the management practices are excellent. Members may choose to abstain if they have inadequate expertise or information to make a cardinal numeric choice, as indicated by an "X" on the checklist scores, or they may not provide a vote for other unknown reasons, as indicated by a blank. If a majority of members failed to vote on any issue, that issue is determined to be irrelevant to management of that property or it was inadequately reviewed by the team to make an intelligent choice. In either case staff eliminated the issue from the report to the manager.

Average scores are interpreted as follows:

Scores 4.0 to 5.0 are *Excellent*
Scores 3.0 to 3.99 are *Above Average*
Scores 2.0 to 2.99 are *Below Average*
Scores 1.0 to 1.99 are considered *Poor*

E.6 – Federal Consistency

This will be added in the final draft of the plan.

E.7 – Apalachicola National Estuarine Research Reserve Fire Management Plan

(Updated July 2023)

The legislature of the State of Florida has recognized the fact that prescribed burning is a valuable land management tool and has addressed this issue with legal requirements associated with prescribed burns. These requirements include laws, rules, and policies administered by the Florida Division of Forestry, Environmental Laws and Endangered Species Laws and Rules.

The primary laws are covered in Florida Statutes, Chapter 590 and Section 5I-2 of the Florida Administrative Code (Appendix B.5). A summary of the legal requirements that apply to prescribed fire activity of the Apalachicola National Estuarine Research Reserve are listed below.

Florida Statutes Chapter 590.125

(Complete statute available at https://www.flsenate.gov/laws/statutes/2018/590.125)

(1) DEFINITIONS.--As used in this section, the term:

(a) “Prescribed burning” means the application of fire by broadcast burning for vegetative fuels under specified environmental conditions, while following appropriate measures to guard against the spread of fire beyond the predetermined area to accomplish the planned fire or land management objectives.

(b) “Certified prescribed burn manager” means an individual who successfully completes the certified prescribed burning program of the Florida Forest Service and possesses a valid certification number.

(c) “Prescription” means a written plan establishing the conditions and methods for conducting a certified prescribed burn.

(f) “Completed” means that for:

1. Broadcast burning, no continued lateral movement of fire across the authorized area into entirely unburned fuels within the authorized area.

(3) CERTIFIED PRESCRIBED BURNING; LEGISLATIVE FINDINGS AND PURPOSE.—

(a) The application of prescribed burning is a land management tool that benefits the safety of the public, the environment, and the economy of the state. The Legislature finds that:

1. Prescribed burning reduces vegetative fuels within wild land areas. Reduction of the fuel load reduces the risk and severity of wildfire, thereby reducing the threat of loss of life and property, particularly in urban areas.

2. Most of Florida’s natural communities require periodic fire for maintenance of their ecological integrity. Prescribed burning is essential to the perpetuation, restoration, and management of many plant and animal communities. Significant loss of the state’s biological diversity will occur if fire is excluded from fire-dependent systems.

3. Forestland and rangeland constitute significant economic, biological, and aesthetic resources of statewide importance. Prescribed burning on forestland prepares sites for reforestation, removes undesirable competing vegetation, expedites nutrient cycling, and controls or eliminates certain forest pathogens. On rangeland, prescribed burning improves the quality and quantity of herbaceous vegetation necessary for livestock production.

4. The state purchased hundreds of thousands of acres of land for parks, preserves, wildlife management areas, forests, and other public purposes. The use of prescribed burning for management of public lands is essential to maintain the specific resource values for which these lands were acquired.

5. A public education program is necessary to make citizens and visitors aware of the public safety, resource, and economic benefits of prescribed burning.

6. Proper training in the use of prescribed burning is necessary to ensure maximum benefits and protection for the public.

7. As Florida's population continues to grow, pressures from liability issues and nuisance complaints inhibit the use of prescribed burning. Therefore, the Florida Forest Service is urged to maximize the opportunities for prescribed burning conducted during its daytime and nighttime authorization process.

Florida Administrative Code 5I-2.006 Open Burning Allowed

(Complete code available at https://www.flrules.org/Gateway/View_notice.asp?id=15144045)

(1) Open Burning in General. Authorization must be obtained from the Florida Forest Service (FFS) for burns relating to agriculture, silviculture and pile burning. Daytime authorizations for these types of burning are issued on the day of the burn or after 4:00 p.m. of the previous day and ignition of the burn will start at 8:00 a.m. (Central Time) or 9:00 a.m. (Eastern Time) on the day stated in the FFS authorization unless approval is given by the FFS District or Center Manager or their designee to begin the burn earlier. The FFS will set special requirements for all types of authorizations, (certified or non-certified), in order to protect public health and safety, including; on site inspections, restricting wind direction, limiting the burning period, within each day or to a specific number of days for those types of authorizations that allow for multiple burning days, halt or limit burning when fire danger is too high in all, or specific parts of the state, and requiring specific personnel e.g., Certified Burners and containment equipment on site. Any authorized burn that goes out of compliance, but has not escaped the authorized area will be allowed a maximum of two hours to be brought into compliance by the person responsible. In the event that the FFS determines that there is a threat to life, public safety or property, immediate suppression action will be taken by the FFS.

(2) Open Burning for Certified Prescribed Burn Managers. All burning conducted under this section is related to broadcast burning for the purposes of: Silviculture, Wildlife Management, Ecological Maintenance and Restoration, and Agriculture. Open burning authorizations under this section require the Certified Prescribed Burn Manager's certification number be presented at the time of the request, and that a Certified Prescribed Burn Manager be on site and directly supervises the certified prescribed burn until the burn is completed, after which the Certified Prescribed Burn Manager is not required to be present.

(a) Prescription. A prescription for the burn must be completed prior to any ignition and a paper copy must be on site and available for inspection by a Department representative. The prescription will contain, as a minimum, the following:

1. Stand or Site Description;
2. Map of the area to be burned;
3. Fire Breaks (External and Internal) to be Constructed or Re-Worked (Map);
4. Minimum number of personnel and equipment types to be used on the prescribed burn;
5. Desired weather factors, including but not limited to surface wind speed and direction, transport wind speed and direction, minimum mixing height, minimum relative humidity, maximum temperature, and the minimum fine fuel moisture;
6. Desired fire behavior factors, such as type of burn technique, flame length, and rate of spread;
7. The time and date the prescription was prepared;
8. The authorization date and the time period of the authorization;
9. An evaluation and approval of the anticipated impact of the proposed burn on related smoke sensitive areas;
10. The signature and number of the Certified Prescribed Burn Manager.

(b) Open Burning Hours.

1. Daytime Certified Prescribed Burn Manager Authorizations will be issued for the burning to be completed two hours after sunset.
2. Nighttime Certified Prescribed Burn Manager Authorizations will be issued with a Dispersion Index of 6 or above, for the burning to be conducted between one hour before sunset and must be completed by 8:00 a.m. (CT) or 9:00 a.m. (ET) the following day. Ignition of these fires is authorized up to midnight, however the fire can continue to spread into unburned fuels until 8:00 a.m. (CT) or 9:00 a.m. (ET) the following day. If additional time is required a new authorization (daytime) must be

obtained from the FFS. The FFS will issue authorizations at other times, in designated areas, when the FFS has determined that atmospheric conditions in the vicinity of the burn will allow good dispersement of emissions, and the resulting smoke from the burn will not adversely impact smoke sensitive areas, e.g., highways, hospitals and airports.

(c) A new prescription or authorization is not required for smoldering that occurs within the authorized burn area unless new ignitions are conducted by the Certified Prescribed Burn Manager.

(d) Monitoring the smoldering activity of a certified prescribed burn does not require a prescription or an additional authorization even if flames begin to spread within the authorized burn area due to ongoing smoldering.

(e) Burn Manager Certification Process. To become a Certified Prescribed Burn Manager an individual must complete the required training and conduct a successful certification burn.

1. The Florida Certified Prescribed Burn Manager Training Course is approved by the FFS to meet the required training. It is offered in two formats:

a. The distance learning format is intended for experienced burners and students must meet the following criteria prior to taking the course; have obtained authorizations, as provided in subsection (1), from the FFS and conducted a minimum of three broadcast burns in Florida or participation in five broadcast burns in Florida with recommendation from a current Certified Prescribed Burn Manager, or hold a current prescribed burner certification in another State or hold a current Prescribed Fire Burn Boss Type 2 Certification.

b. The classroom format is open to individuals of all experience levels. After taking this course trainees must obtain direct experience in three broadcast burns prior to conducting a certification burn. If the student meets the criteria for the distance learning format, then the three burns after the course are not necessary.

2. Certification burn process. Within three years of completing the course (either format), applicants must submit a completed prescription for the proposed certifying burn to their local FFS office prior to the burn for review and approval. After the prescription has been approved the burn described in that prescription must be reviewed by the FFS during the burn operation. The local FFS Center/District Manager (or their designee) will recommend FFS Prescribed Burn Manager Certification to the Forest Protection Bureau upon satisfactory completion of both the prescription and the review of the actual burn.

3. In order to continue to hold the FFS Prescribed Burn Manager Certification the burner must comply with paragraph 5I-2.006(2)(f), F.A.C., or Florida Forest Service Certification will terminate five years from the date of issue.

(f) Certification Renewal. A Certified Prescribed Burn Manager must satisfy the following requirements in order to retain certification.

1. Participation in a minimum of eight hours of FFS approved training every five years relating to the subject of prescribed fire, or participation in a FFS recognized Fire Council Meeting; and

2. The Certified Prescribed Burn Manager has submitted their certification number for two completed prescribed burns in the preceding five (5) years; or

3. Participation in five (5) burns and have this documented and verified in writing to the Forest Protection Bureau’s Prescribed Fire Manager of the FFS by a current Certified Prescribed Burn Manager; or

4. Retaking the Florida Certified Prescribed Burn Manager Training Course in either format.

(g) Decertification. A Certified Prescribed Burn Manager’s certification shall be revoked if the Burn Manager’s actions constitute violations of Florida law and agency rules which equal or exceed 15 points within any two year period using the Certified Prescribed Burn Manager Violations – Point Assessment Table, Version 3.0, July 31, 2014, which is hereby adopted and incorporated by reference and is available at: http://www.flrules.org/Gateway/reference.asp?No=Ref-04586. A decertified Burn Manager must complete the Burn Manager Certification process outlined in paragraph 5I-2.006(2)(c), F.A.C., in order to be recertified.

Apalachicola National Estuarine Research Reserve Site Fire History:

Florida's natural communities have evolved over the millennia by direct influence of fire burning throughout the landscape. The majority of natural communities recognized in Florida today have existed for approximately 20,000 years. The biodiversity of many communities requires the influence of fire. Some communities have more frequent fire intervals than others and are more susceptible to carry fire. Fire frequency is dependent on the community pyrogenicity, or ease of ignition and ability to carry fire. Systems comprised mainly of herbaceous, fine fuels are usually the most pyrogenic. Systems comprised of this vegetation are responsible for the ignition of other less pyrogenic areas adjacent to or within them, such as coastal strand, oak scrub, or scrubby Flatwoods.

Florida's natural fire season can occur year round but peaks with the seasonal weather patterns that produce cloud to ground lightning, mainly thunderstorms. This time corresponds with Florida's growing season. The peak season of lightning-caused fire activity in Northwest Florida is May through August. Lightning fires are most common in May and June, despite the fact that more thunderstorms occur in July and August. May is the peak of the spring-time drought and the period of low moisture content in the vegetation which contributes to this natural timing of fires.

Much of the eastern US forests had been clear-cut in the late 19th century leaving logging slash across the landscape creating dangerous fuel conditions. Devastating fires followed this unsustainable harvesting practice, which lead to the organization of efforts to control wildfires. Throughout the twentieth century, forest agencies developed extensive programs to prevent or extinguish wildfires.

As early as the 1970's public agencies and scientific professionals began to reexamine the role of natural fire across North America. Due to an increased understanding of the natural community ecology and the role of fire to maintain ecological integrity, fire has been reintroduced by land managers as an ecological management tool.

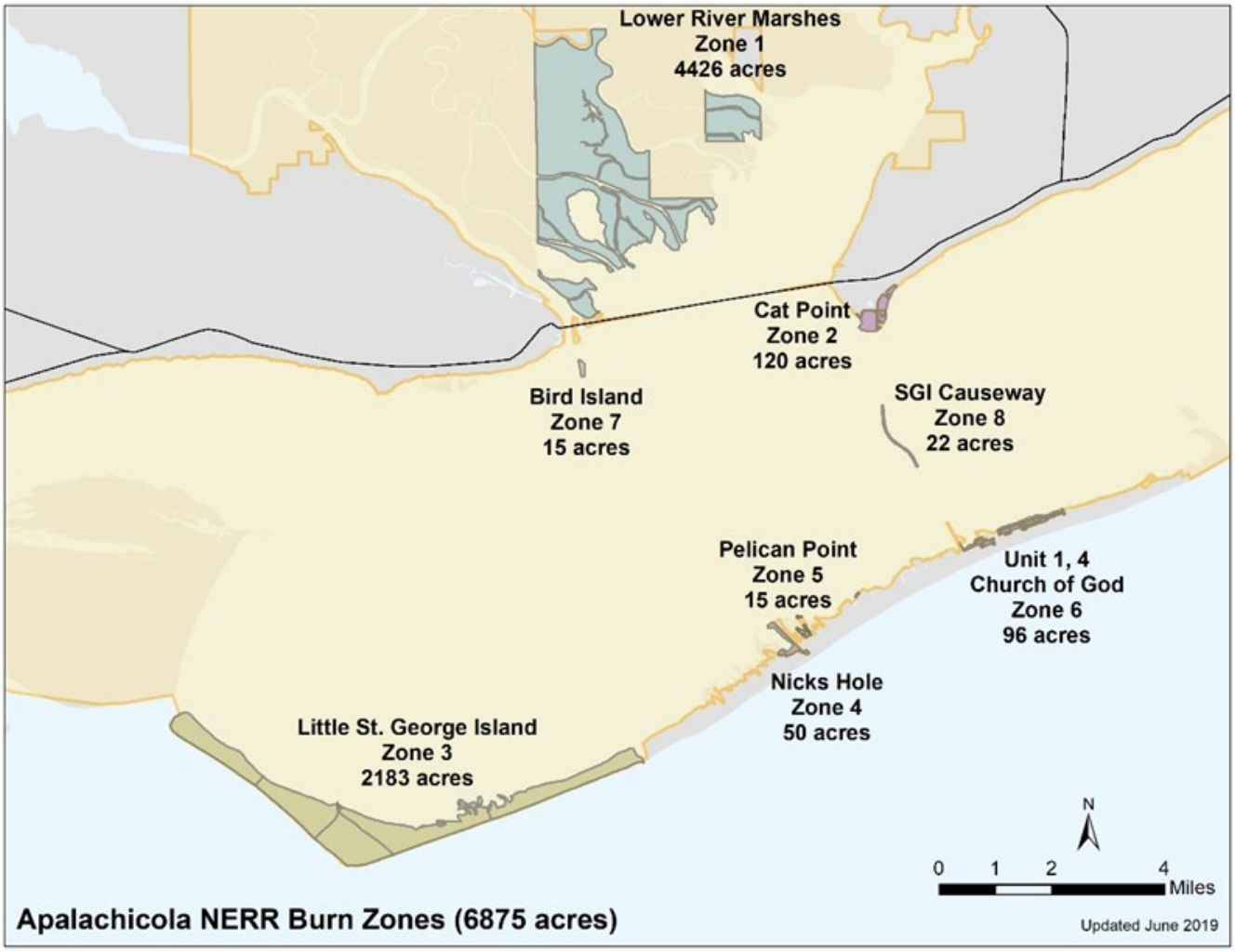
Apalachicola NERR lands have been mostly fire suppressed until recently. The Lower River Marshes and Little St. George Island, which comprise the majority of ANERR managed land, are both accessible by boat only. The remaining ANERR managed lands are smaller parcels often with close urban interface. The small size and placement of these parcels has resulted in little or no natural fire (lightning) occurrence and quick suppression if they were to ignite for any cause. Up until 1998, staff routinely suppressed fire on Little St. George Island as well. The resultant condition of the natural communities located on the smaller parcels is one of long-term fire exclusion resulting in large fuel loads and reduced biodiversity. Staff have been working to slowly introduce prescribed fire into managed areas over the past decade as permitted by site conditions and staff ability. Mechanical fuel reduction and pine thinning remain viable options or enhancements to any planned burning on the smaller ANERR tracts.

Burn Administration:

Burning on ANERR lands will be conducted by ANERR and FCO Staff, FFS, private contractors or others who meet the current requirements for conducting prescribed burns on DEP uplands. Currently the manager of the St. Joseph State Buffer Preserve holds prescribed burn manager certification and serves as Burn Manager for ANERR's managed lands, and several ANERR staff are as members of a joint St. Joseph Buffer Preserve – ANERR fire team to serve as crew. This fire team is able to assist in sharing resources with other locales (e.g. State Parks, TNC), especially members of ARSA, across the region for prescribed and wildfire purposes. Where applicable and practical FFS land managers follow guidelines set by the Florida Park Service Fire Management Standards, for purposes of training and equipment standards for prescribed burning.

Apalachicola NERR Burn Zones:

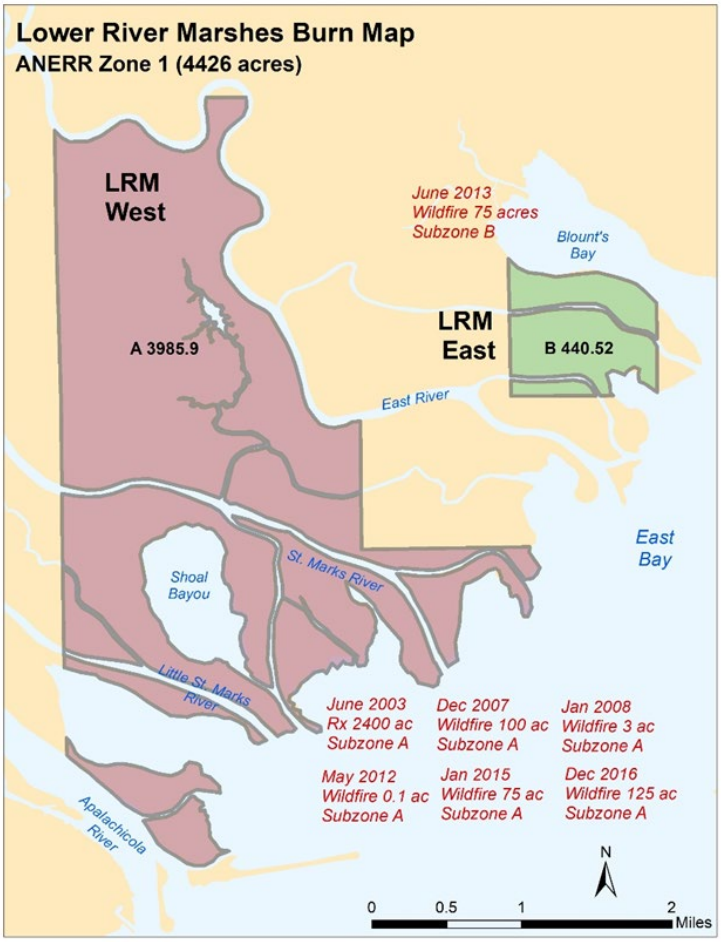
- Lower River Marshes
- Little St. George Island
- Unit 4
- Nick's Hole
- Pelican Point
- Cat Point
- St. George Island Causeway



Lower River Marsh (LRM):

The Lower River Marsh tract is located along the Apalachicola River channel and between the distributary channels of the Apalachicola, East, St. Marks and Little St Marks Rivers. These land areas are literally "islands" and have escaped much anthropogenic alteration. The burnable portion of LRM, approximately 4426 acres, is comprised of emergent marsh vegetation including: saw-grass, bulrush, cattails, phragmites, spartina, juncus and other marsh associated vegetation. Wildfires have occurred in 2007 (100 acres), 2008 (3 acres), 2012 (0.1 acre), 2013 (75 acres), 2015 (75 acres), 2016 (125 acres). Anecdotal fire history includes deliberate ignition of the marshes by local hunters to allow for easy access. Prescribed fire has occurred in 2003 (2,400 acres) and 2022 (3,100 acres). Because of the nature of the vegetative community, mechanical fuel reduction is not applied to the LRM area.

This zone will be burned in conjunction and cooperatively with FFWCC burning the ARWEA EEL Tract. Preferred burn conditions there include a southeasterly wind component to push smoke away from Highway 98 and the towns of Apalachicola and Eastpoint. Previous cooperative burns here have been accomplished with aerial ignition from a FFWCC helicopter, with boat and staff support from ANERR. FFWCC administers the burn permit administration for this zone.



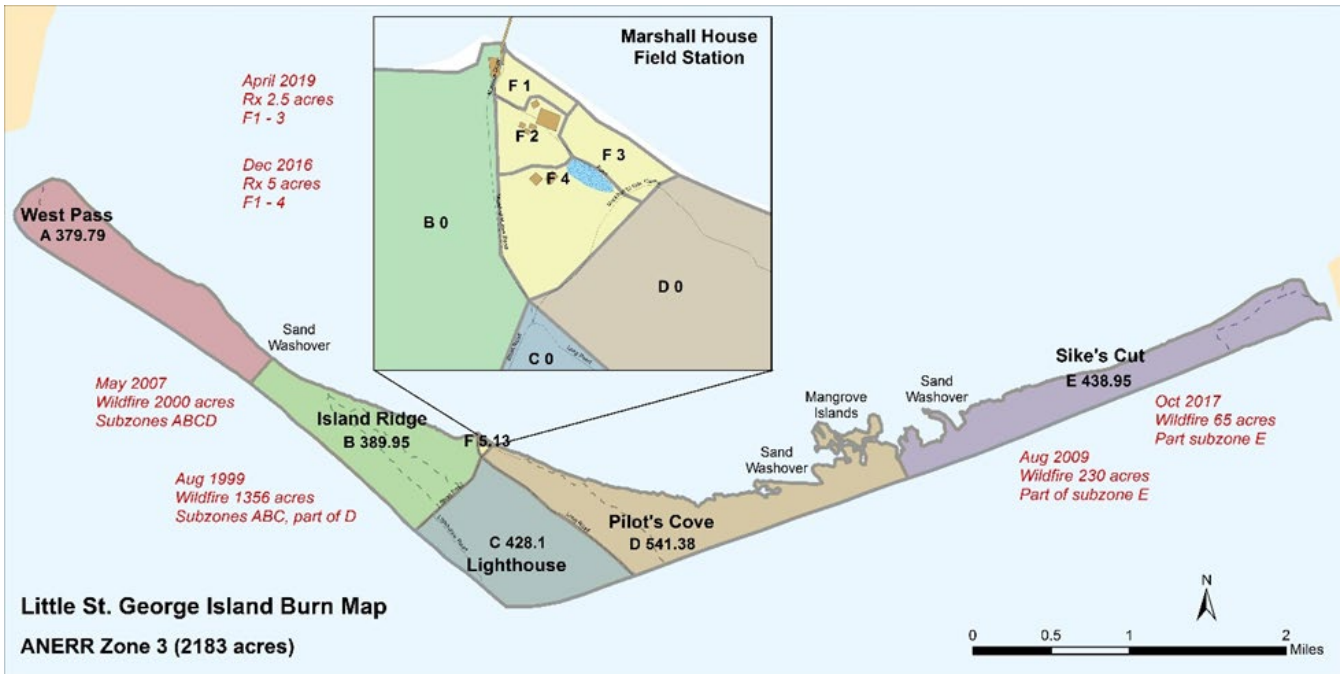
Little St. George Island:

Little St. George Island (LSGI) lies directly west of (Big) St. George Island, the two being separated by Sikes Cut, a man-made pass or opening from Apalachicola Bay to the Gulf of Mexico. The islands topography is mostly one of ancient dune-ridges with swales between. The high sandy dune ridges support scrub and scrubby flatwoods type natural communities of mostly slash pine and saw palmetto. These natural communities burn poorly unless fuel has been allowed to accumulate over longer time periods. The swales between, comprised of finer fuels, mostly saw-grass, burn more frequently and carry fire well, as do the transitional vegetative area between the two communities.

Burns are not planned per se for most of the island; rather, the practice of allowing a natural fire regime is practiced. This means that when a lightning fire occurs, the island's vegetation is allowed to burn without manipulation, the only exception being to protect the Marshall House field station complex on the bay side of the island, and a weather shelter on the gulf side. Allowing fire to burn under the varying environmental conditions of temperature, wind direction and speed, relative humidity and fuel moisture, results in varying fire effects throughout the islands natural communities. A fire on the island may last for days.

Upon discovering an ignition, the St. Joseph State Buffer Preserve manager is notified and staff is dispatched to the island equipped with portable pumps and hand tools. If conditions require, backfiring is conducted in areas adjacent to the Marshall House complex, to protect the structures. Staff monitors and patrols the active burn for any visitor interaction needed for their safety. Local fire departments, law enforcement agencies, FFS and local media are notified when burning occurs on the island. Large wildfires occured in 1999 (1,356 acres), 2007 (2,000 acres), and a smaller wildfire in 2009 (230 acres). In 2017 a vandal lit a fire with a flare, resulting in 65 acres being burned on the eastern side of the island.

The five acre area surrounding the Marshall House, barn, and other outbuildings and sheds (Zone 3F) is burned every 3-5 years with the purpose of reduce fuel to protect these important historical resources. Prescribed fire was applied to this area in 2016 and 2019.



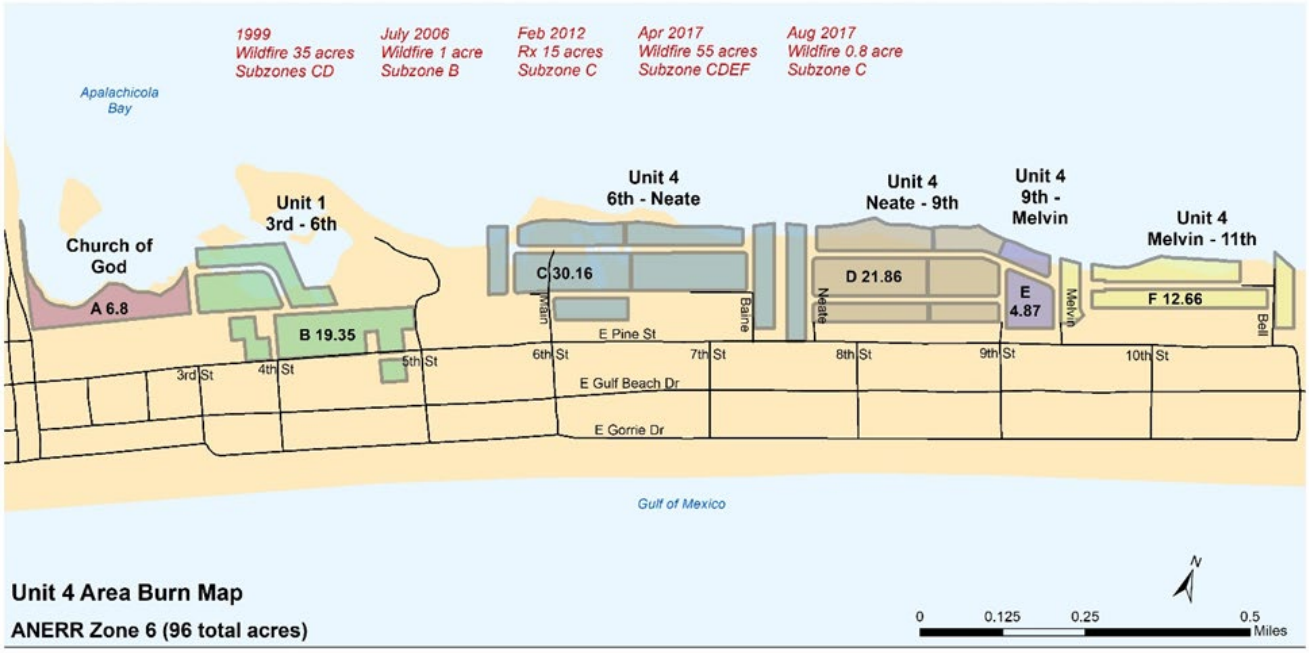
Unit 4:

Unit 4, located along the bay side shore of St. George Island is actually comprised of many residential building lots separated by county roads, alleys, canals and rights-of-way. The zone is mostly wet flatwoods with fragmented salt marsh. Dominant species include pine, palmetto, juncus and spartina. There is a high degree of urban interface with houses “embedded” in high fuel load lots adjacent to state owned lands. The zone is easily fragmented for burning due to the established road system. There is currently a high number of dead snags throughout the property and close to fire lines. The site is considered in need of preparation, in particular snag removal, before prescribed fire can be safely applied.

Wildfires occurred in Unit 4 in 1999 (35 acres, subzones CD), 2006 (1 acre, subzone B), 2017 (55 acres, subzone CDEF), 2017 (0.8 acres, subzone C). Prescribed fire has been applied in 1999 (35 acres) and 2012 (15 acres, subzone C). Following the wildfire in 2017, larger and more fire lines were added to this area; county roads and right of ways are utilized as fire lines and addition firelines were added where there was not an existing right of way between state-owned parcels and privately owned parcels. Firelines are mowed twice a year. Additional mechanical vegetation removal to reduce fuels and increase the buffer between forested and urban areas has occurred in 2017, 2018, 2020, 2022, and 2023.

Ideal burn conditions include a southerly component wind to push smoke away from St. George Island and the adjacent residential areas. The area should be burned with recent rainfall to avoid pine kill from smoldering duff layers. The

most recent burning was conducted by DOF who administered the permit and resident notification process. ANERR staff assisted with day-of-burn participation, including firing the zone. Mechanical fuel reduction and pine thinning remain viable options or enhancements to any planned burning on this zone.



Nick's Hole:

Nick's Hole is located on the bay side of St. George Island, within the gated and private "St. George Island Plantation" community. The site is directly adjacent to a small airport located to the east of Nick's Hole. The zone is comprised mostly of mesic and scrubby flatwoods and salt marsh. There is a small remnant dune with scrub vegetation on the south border, adjacent to the threshold of the airport's runway 32. Pine, palmetto, sand live oak, juncus and spartina are the dominant species. Numerous expansive homes are nearby the Nick's Hole area.

There is no prescribed fire history prior to 2013 for Nick's Hole. In 2013, ANERR coordinated with the FFS to establish firelines, coordinate public awareness with the neighboring community. A prescribed fire was applied in March 2015 and since then this area has been burned on a three year rotation with additional prescribed fires in 2018 and 2021. No wildfire area recorded for this area, and ANERR has not utilized mechanical methods for fuel reduction. Burning conducted is for both fuel reduction and natural community maintenance. Ideal burn conditions include a south or southeast wind component adequate to push smoke away from the airport runway. Some portion of the zone could benefit from pine thinning.

Pelican Point:

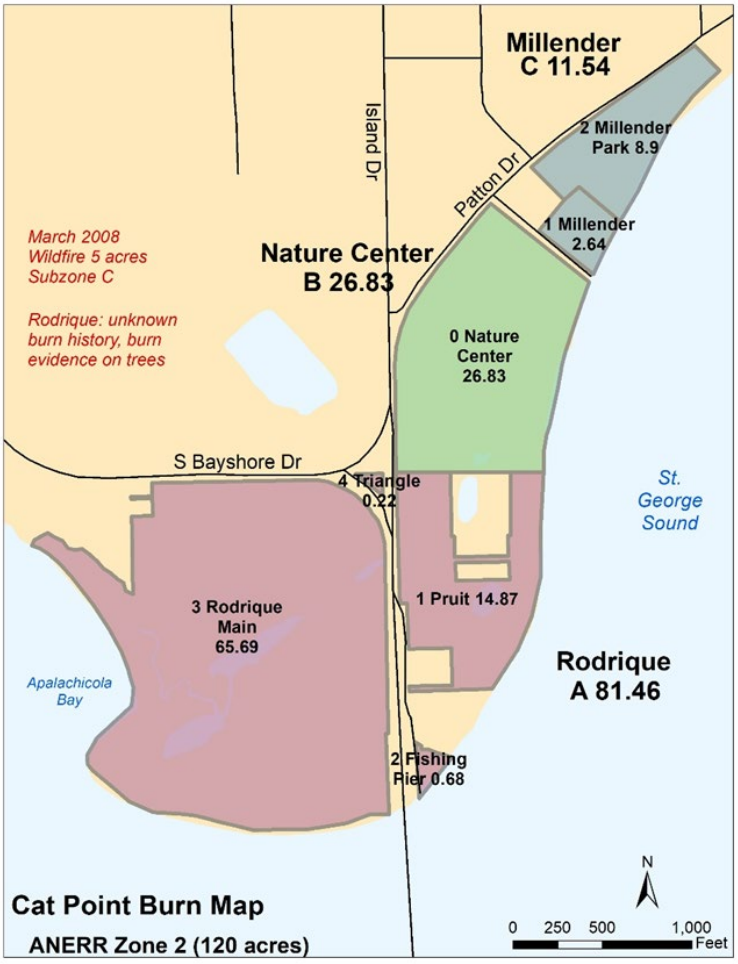
Similar to Unit Four, the Pelican Point Burn Zone is comprised of multiple residential building lots on two roads within the "Pelican Point" community of the 'Plantation". This is a close urban-interface zone within multiple residences adjacent to the state-owned lots. The zone contains flatwoods and salt marsh species. Mowing is a viable option to burning these lots as an interim management strategy for fuel reduction. This area does not have prescribed or wildfire history. Ideal burn conditions include southerly or even southwesterly wind to avoid impacting the airport runway.

Cat Point:

The Cat Point Zone is located near the mainland (North) end of the new St. George Island bridge. The zone is a collage of four sub-zones (A-D) totaling 93 acres. The zone includes long-term fire-excluded flatwoods, salt marshes and mixed forest, with high fuel loads and reduced natural community diversity. The near urban interface and ready accessibility for local fire departments has resulted in historic fire suppression.

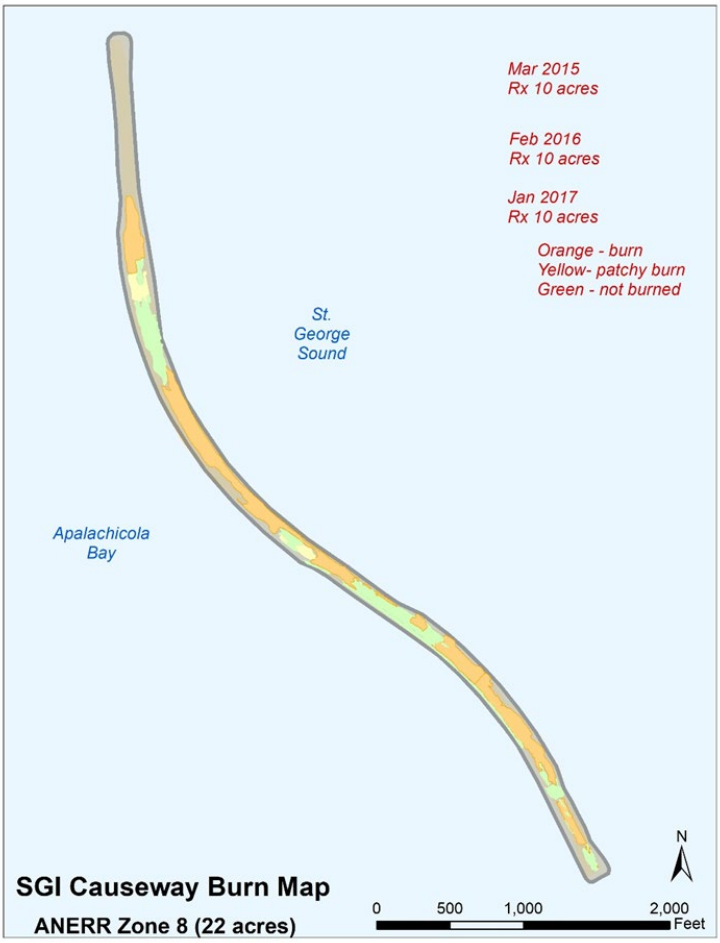
Burn goals for this zone will be mostly fuel reduction/wildfire prevention. Zone C has undergone mechanical fuel reduction in 2021 and 2023. A 2022 Timber Assessment showed the Rodrigue area (Zones A and D) are overstocked, and pine thinning is an appropriate pre-burn treatment for these parcels before prescribed fire application should be considered.

Burns conducted on Cat Point will by necessity be conducted by DOF personnel as urban-interface mitigation burning for fuel reduction, or contracted to others for completion. Ideal burn conditions, especially wind, vary for each portion. Generally speaking care has to be taken to avoid smoke impacts on US Hwy 98, Island Drive and the St. George Island Bridge. Mowing is a viable option to burning these lots as an interim management strategy for fuel reduction.



St. George Island Causeway:

The St. George Island Causeway is a man-made island in the St. George Sound between Eastpoint and St. George Island. It served as the Causeway for the old St. George Island bridge which was decommissioned in 2004. At that time the bridge structure was demolished, the roadbed removed, and the island was left in place to serve as a shorebird nesting habitat. The causeway is designated as a Critical Wildlife Area (CWA) by Florida Fish and Wildlife (FWC) and closed to public access from March 1 – September 31. When the roadway was vacated in 2004, much of the area was open sandy substrate, but vegetation now covers the 22-acre island. This vegetative cover is preferable for some bird nesting species, but undesirable for other imperiled nesting shorebirds that prefer more open nesting habitat. The vegetation on the Causeway is almost entirely herbaceous groundcover dominated by Bermudagrass. Much of the remainder were typical cool-season weedy/ruderal flora, while ca. 5-10% were native, salt-tolerant (salt marsh and beach dune) flora. Mechanical vegetation removal was employed for many years over a smaller area (~5 acres) to create more nesting habitat for certain species, but it is prohibitively resource and labor intensive to move machinery to the island and conduct these activities. Prescribed fire was experimentally applied to the Causeway in 2015, 2016, and 2017 with the goal of vegetation reduction to promote nesting habitat. This was not very successful at reducing vegetation, so at this time ANERR does not have further plans to apply fire.



Apalachicola National Estuarine Research Reserve				
Burn Zone	*Description*	Acres	Intended Fire Frequency	Next Intended Burn
Lower River Marshes	Estuarine marsh community in good condition, with rushes, cattails, phragmites, saw grass, spartina, juncus and other miscellaneous species. Rattlebox has been found and is not currently treated due to difficulty of access.	4426	3-5 Years	To be burned in Conjunction with FFWCC EEL tract
Little St. George Island	Ancient dune ridge/swale topography with freshwater marsh within the swales and scrubby or scrub community on the ridges. All in fair to good condition.Expanses of coastal grassland occur on the island also. Estuarine salt marsh is found on the Apalachicola Bay side of the island. Torpedo grass	2183	The island allows for naturally (lightning) recurring burn regime. 10 years +/-	Upon natural ignition; 5 acres (Zone 3F) around the Marshall House is burned every 3-5 years to protect cultural resources with next intended burn 2024.

	and wisteria have been found and treated on the island.			
Unit 4	Wet flatwoods with interspersed freshwater and tidal salt marsh. The zone is mostly fire excluded but in fair condition. Brazilian Pepper, showy rattlebox, has been found and removed from the site.	75	10 Year fuel reduction	Extensive site preparation needed prior to applying prescribed fire .
Nick's Hole	Scrubby and wet flatwoods with interspersed tidal salt marsh. The zone is in fair to good condition. Chinese Tallow, showy rattlebox, smooth rattlebox, Tamarisk, occurs on the site and is removed as found.	50	10 Year Fuel reduction	2024
Cat Point	Zone is mostly flatwoods, mixed hammock and estuarine salt marsh, in poor condition due to fire exclusion. Chinese tallow, Cherokee rose, Purple sesban, mimosa, air potato, camphor tree, and wisteria has been found and treated/removed from the site; Japanese climbing fern and Peruvian primrose willow has been found but not treated due to ineffectiveness of treatment.	93	10 Year Fuel reduction	None planned.
Pelican Point	Mostly salt marsh and scrubby flatwoods in fair to good condition. No exotics noted.	12		None planned.
SGI Causeway	Herbaceous groundcover dominated by Bermudagrass, weedy/ruderal flora, native, salt-tolerant (salt marsh and beach dune) flora. No exotics noted.	22		None planned.

Wildfire:

Response to Wildfire on ANERR managed lands will be ultimately managed by FFS. Should fire occur on remote lands not easily accessed, or if environmental conditions allow, natural fires should be allowed to burn out. Public health and safety shall be the prime factor in any decision to allow an "unscheduled" fire to burn. If an FCO Burn Manager deems it necessary or is not available, ANERR will assist FFS as needed in any suppression or monitoring deemed necessary by FFS.

E.8 – Timber Management Analysis

Apalachicola National Estuarine Research Reserve
Timber Management Analysis
Prepared by: F4 Tech, Tallahassee, Florida, Contract RP897
May 19, 2022

Special Management Considerations

Timber Management Analysis

Chapters 253 and 259, Florida Statutes, require an assessment of the feasibility of managing timber in land management plans for parcels greater than 1,000 acres if the lead agency determines that timber management is not in conflict with the primary management objectives of the land. The feasibility of harvesting timber at the Apalachicola National Estuarine Research Reserve (ANERR) during the period covered by the subject Management Plan was considered in the context of statutory responsibilities and an analysis of the research reserve's resource needs and values.

ANERR is designated as a single-use property for conservation and preservation. As such, timber management is only permitted as a method of natural community restoration and maintenance rather than as an ongoing extractive activity. The long-term management goal for forest communities in the reserve system is to maintain or re-establish natural characteristics to the degree practicable, except in those natural communities specifically managed for a structure that differs from reference site descriptions established by the Florida Natural Areas Inventory (FNAI). Natural community-specific reference site characteristics developed by FNAI will serve as a benchmark. In the case of imperiled species, the management of certain natural communities may differ from standard treatments to provide optimum habitat conditions within the reserve.

Most natural communities evaluated at ANERR had pine overstory stocking levels within the range identified for corresponding FNAI Reference Sites. Conversely, non-pine (hardwood) overstory stocking levels were generally above the upper limits identified for corresponding FNAI Reference Sites. The Timber Management Analysis found in Addendum ___ provides additional details. Overstory thinning is a management tool that may be utilized in areas which have overstocked conditions. However, specific management goals and objectives for each natural community are detailed in the body of this Management Plan.

Addendum _____
Timber Management Analysis

1. Management Context and Best Management Practices

Timber management at the Apalachicola National Estuarine Research Reserve (ANERR) is based on the desired future condition (DFC) of a management zone or natural community (NatCom) as determined by the Management Plan, along with guidelines developed by the Florida Natural Areas Inventory (FNAI). In most cases, the DFC will be closely related to the historic NatCom. However, it is important to note, that in areas where the historic community has been severely altered by past land-use practices, the DFC may not always be the same as the historic NatCom. All timber management activities undertaken will adhere to or exceed the current Florida Silvicultural Best Management Practices (BMPs) and Florida Forestry Wildlife BMPs for State Imperiled Species. ANERR staff shall take all measures necessary to protect water quality and wildlife species of concern while conducting timber management activities. The Florida Department of Environmental Protection has contracted with a private sector, professional forest management firm to complete this timber assessment: F4 Tech.

2. Purpose of Timber Management Activities

Timber management activities may be conducted to help improve or maintain current conditions per the associated DFC. Timber management will primarily be conducted in upland NatCom types. Candidate upland NatCom types may include mesic flatwoods, wet flatwoods, sandhill, upland pine, and upland mixed woodland along with scrubby flatwoods, scrub, and altered landcover types such as successional hardwood forest and pine plantations. There will likely be no scheduled timber management activities in historically hardwood-dominated or wetland NatCom types, e.g., upland hardwood forest, hydric hammock, and slope forest. In some circumstances, timber management may include the harvesting and removal of overstory invasive/exotic trees. Descriptions of NatCom types are detailed in the body of the Management Plan.

3. Potential Silvicultural Treatments

Several silvicultural treatments may be considered and utilized over the next ten years. The various types of timber harvests may include pine thinning, targeted hardwood overstory removal, and clearcutting. Silvicultural treatments will be selectively implemented to minimize potential impacts to water and soil resources, non-target vegetation, and wildlife (see BMPs). Depending upon the condition and marketability of the timber being manipulated, it is possible to generate revenue from the harvest. It is also possible the timber removal could be a cost. In all decisions, the mission of preserving and restoring natural communities will be the guiding factor.

Thinning is conducted to reduce the basal area (BA) or density of trees/stems in a stand to improve forest health and growth conditions for residual trees. Allowing trees more room to grow has the potential to increase tree and forest vigor, which helps mitigate the potential for damaging insect and disease outbreaks. Most tree harvesting/removals also increase sunlight reaching the forest floor and fine fuels that facilitate consistent fire return intervals and responses, which can benefit groundcover vegetation abundance, species richness, and overall ecological diversity. The disruption of natural fire regimes and fire return intervals can often result in the need to remove undesirable or overstocked hardwood stems that currently occupy growing space in the canopy and sub-canopy. Clearcutting may be used to support restoration goals by removing off-site pine or hardwood species and is a precursor to establishing site-appropriate species. It can also be used to control insect infestations that are damaging or threatening forest resources and ecosystem conditions.

On occasion, salvage cuts may be needed to remove small volumes of wood damaged by fires, windstorms, insects, or other natural causes. The decision whether to harvest the affected timber will depend on the threat to the surrounding stands, risk of collateral ecological damage on- and/or off-site, and the volume/value of the trees involved. For example, small, isolated lightning-strikes and beetle kills are a natural part of a healthy ecosystem and affected trees are not typically cut/removed. However, if a drought caused the insect infestation to spread, the affected trees and a buffer zone might have to be removed to prevent significant damage.

4. Inventory Data and Potential Actions per Area of Interest

ANERR is primarily located in Franklin County and comprises 234,712 acres based on LULC GIS data provided by ANERR staff in Spring/Summer 2021. Per ANERR, this timber assessment is limited to four ANERR properties: ANERR-Eastpoint, St. George Island (SGI) - Nick's Hole, SGI Unit 4, and Little SGI (LSGI), which together encompass 2,738 acres. Approximately 988 acres are associated with two upland NatCom types (flatwoods and scrub) that are potential candidates for timber management (Table 1).

Table E.8.1. Subject ANERR properties and associated sample areas.

Property	Number of Flatwoods and Scrub NatCom Polygons	Acres	Candidate NatCom Polygons	Candidate NatCom Acres	Number of Plots	Notes
ANERR-Eastpoint	10	51	4	42	11	
SGI-Nick's Hole	4	42	2	39	7	
SGI-Unit 4	12	50	2	38	7	
LSGI	80	845	26	754	42	Subsampled NatCom polygons; corresponds with one field day for two field staff.
Total	106	988	34	873	67	

The information contained herein describes the methods F4 Tech used to collect on-site data and generate summaries and analyses to support the timber assessment. F4 Tech generated field maps and identified NatCom polygons to potentially sample. In May 2022, two NatCom types were inspected by field crews: flatwoods and scrub. All potential polygons were uniquely identified and numbered by ANERR. Islands, land-locked, and inaccessible polygons were excluded from field sampling. Likewise, isolated polygons <5 AC were excluded (some smaller polygons were combined with others on a case by case basis). As a result, 873 acres in 34 NatCom polygons were identified as being candidates for a field inspection (Tables 1 & 2) and 17 NatCom polygons were visited and inventoried via 67 plots. Field data collections focused on overstory, midstory, understory/tree regeneration, and groundcover layers. Invasive species present within the plots were also recorded. Stakeholders and research reserve staff are encouraged to view this timber assessment and inventory data as supplemental information for future consideration, i.e., it is not intended to be prescriptive. Given the dynamic nature of property ownership and land management activities at ANERR, together with the timeframe required to create or update a management plan, it is possible that some tabular data may be dated. Therefore, NatCom acreages and recent treatments that occurred after Spring/Summer 2021 may not be reflected in the following tables.

Table E.8.2. NatCom types and polygons to potentially sample and those inventoried.

NatCom Type	Property	NatCom Polygon	Acres	Inventoried Plots
Flatwoods	ANERR Eastpoint	APA_01711	14.3	3
Flatwoods	ANERR Eastpoint	APA_01712	5.4	2
Flatwoods	ANERR Eastpoint	APA_02257	15.1	3
Flatwoods	ANERR Eastpoint	APA_02272	7.2	3
Flatwoods	Little St. George Island	APA_00822	4.7	0
Flatwoods	Little St. George Island	APA_00842	44.7	3
Flatwoods	Little St. George Island	APA_00843	5.5	0

Flatwoods	Little St. George Island	APA_00844	9.9	0
Flatwoods	Little St. George Island	APA_00846	7.0	0
Flatwoods	Little St. George Island	APA_00847	6.8	0
Flatwoods	Little St. George Island	APA_00848	7.6	0
Flatwoods	Little St. George Island	APA_00849	7.6	0
Flatwoods	Little St. George Island	APA_00852	30.2	4
Flatwoods	Little St. George Island	APA_00873	23.8	0
Flatwoods	Little St. George Island	APA_00874	12.1	2
Flatwoods	Little St. George Island	APA_00875	17.5	0
Flatwoods	Little St. George Island	APA_00883	31.0	2
Flatwoods	Little St. George Island	APA_00895	17.6	0
Flatwoods	Little St. George Island	APA_00900	32.4	2
Flatwoods	Little St. George Island	APA_00902	20.9	0
Flatwoods	Little St. George Island	APA_02181	13.2	3
Flatwoods	Little St. George Island	APA_02187	58.8	9
Flatwoods	Little St. George Island	APA_02218	7.6	0
Flatwoods	Little St. George Island	APA_02224	5.7	0
Flatwoods	Little St. George Island	APA_02226	5.5	0
Flatwoods	Little St. George Island	APA_02246	24.8	0
Flatwoods	St. George Island - Unit 4	APA_02105	12.8	3
Flatwoods	St. George Island - Unit 4	APA_02123	25.2	4
Flatwoods	St. George Island - Nick's Hole	APA_02169	32.8	4
Subtotal		29	507.6	47
Scrub	Little St. George Island	APA_00880	272.7	15
Scrub	Little St. George Island	APA_00901	35.0	0
Scrub	Little St. George Island	APA_00931	22.8	0
Scrub	Little St. George Island	APA_02247	28.6	2
Scrub	St. George Island - Nick's Hole	APA_02159	6.0	3
Subtotal		5	365.1	20
Total		34	872.7	67

Flatwoods (594 acres)

Longleaf pine (*Pinus palustris*) and slash pine (*P. elliottii var. densa*) are the preferred overstory pine species in the region. The FNAI Reference Sites in this region for flatwoods contain longleaf and slash pine at a BA of 10 to 60 square feet per acre with non-pine at a density of 0 to 26 trees per acre (TPA). This range corresponds with FNAI targets for mesic, scrubby, and wet flatwoods. Table 3 summarizes the overstory conditions for this NatCom type at ANERR and target overstory condition for flatwoods in this region. Plot level pine BA ranged from 0 to 170 square feet per acre. On average, overstory pine trees were 60 years old (13-128 years old based on 29 age trees). Plot level none-pine overstory BA ranged from 0 to 140 square feet per acre. Midstory species included slash pine, wax myrtle (*Myrica cerifera*), saw palmetto (*Serenoa repens*), hollies (*Ilex* spp.),

scrub oaks, e.g., *Quercus geminata* and *Q. myrtifolia*, and gallberry/fetterbush (*Ilex glabra and I. coriacea*/*Lyonia lucida*). Pine regeneration was recorded in and around some of the plots. Wiregrass (*Aristida beyrichiana)* and bracken fern (*Pteridium aquilinum*) were recorded in some plots. Chinese tallow (*Triadica sebifera*) was present in one plot. Property level overstory summaries for flatwoods and target FNAI overstory conditions are found in Table 4.

Scrub (394 acres)

Sand pine (*Pinus clausa*) is the preferred overstory pine species in the region. The FNAI Reference Site in this region for scrub contains sand pine at a BA of 0 to 20 square feet per acre with non-pine at a density between 0 and 13 TPA. Table 3 summarizes the overstory condition for this NatCom type at ANERR and target overstory condition for scrub in this region. Plot level pine BA ranged from 0 to 30 square feet per acre and overstory pine trees were approximately 41 years-old (six age trees). Plot level non-pine overstory BA ranged from 0 to 30 square feet per acre. The midstory included species such as slash pine, hollies, scrub oaks, and wax myrtle. Pine regeneration was recorded only in one plot. Wiregrass was recorded in one scrub plot. Property level overstory summaries for scrub and target FNAI overstory conditions are found in Table 5.

Table E.8.3. Overstory summary for subject NatCom types at ANERR.

NatCom Type	Acres	Current Average Overstory Conditions*							Target Overstory Conditions	
		Pine BA (ft^2/ac)	Pine TPA	Pine Volume (tons/ac)	Non-Pine BA (ft^2/ac)	Non-Pine TPA	Non-Pine Volume (tons/ac)	Total Pine and Non-Pine Volume (tons/ac)	FNAI Reference Condition Pine BA Range (ft^2/ac)	FNAI Reference Condition Non-Pine TPA Range
Flatwoods	594.0	42.6	83.8	37.7	19.6	40.4	10.6	48.3	10 – 60**	0 – 26**
Scrub	394.0	6.0	14.3	2.7	2.5	25.5	0.0	2.7	0 - 20	0 - 13

*Summary statistics based on 47 flatwoods plots inventoried in 14 distinct NatCom polygons and 20 scrub plots inventoried in three distinct NatCom polygons.

**Target values for scrubby flatwoods, wet flatwoods and mesic flatwoods sourced from FNAI Reference Sites at T.H. Stone Memorial St. Joseph Peninsula State Park and Dr. Julian G. Bruce St. George Island State Park.

Table E.8.4. Flatwoods overstory summary at ANERR properties

Property	Flatwoods Acres	Current Average Overstory Conditions							Target Overstory Conditions	
		Pine BA (ft^2/ac)	Pine TPA	Pine Volume (tons/ac)	Non-Pine BA (ft^2/ac)	Non-Pine TPA	Non-Pine Volume (tons/ac)	Total Pine and Non-Pine Volume	FNAI Reference Conditio	FNAI Reference Conditio

								(tons/ac)	n Pine BA Range (ft^2/ac)	n Non-Pine TPA Range
ANERR Eastpoint	50.7	96.4	94.5	98.1	47.3	84.3	30.3	128.5	10 – 60*	0 – 26*
LSGI	460.1	16.8	58.3	10.9	13.2	33.6	6.3	17.2	10 – 60*	0 – 26*
SGI - Nick's Hole	32.8	72.5	113.7	65.8	2.5	3.8	0.0	65.8	10 – 60*	0 – 26*
SGI - Unit 4	50.4	32.9	140.8	21.8	8.6	16.4	0.7	22.5	10 – 60*	0 – 26*

*Target values for scrubby flatwoods, wet flatwoods and mesic flatwoods sourced from FNAI Reference Sites at T.H. Stone Memorial St. Joseph Peninsula State Park and Dr. Julian G. Bruce St. George Island State Park.

Table E.8.5. Scrub overstory summary at ANERR properties

Property	Scrub Acres	Current Average Overstory Conditions							Target Overstory Conditions	
		Pine BA (ft^2/ac)	Pine TPA	Pine Volume (tons/ac)	Non-Pine BA (ft^2/ac)	Non-Pine TPA	Non-Pine Volume (tons/ac)	Total Pine and Non-Pine Volume (tons/ac)	FNAI Reference Condition Pine BA Range (ft^2/ac)	FNAI Reference Condition Non-Pine TPA Range
LSGI	384.8	5.9	15.3	2.5	0.0	0.0	0.0	2.5	0 – 20	0 – 13
SGI - Nick's Hole	9.2	6.7	8.5	4.2	16.7	170.1	0.0	4.2	0 – 20	0 – 13

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